HONEYWELL INTERNATIONAL
BUFFALO RIVER AOC CAPPING AND HABITAT RESTORATION
BUFFALO, NEW YORK
RES PROJECT NUMBER 38514

REMEDIAL ACTION
LUMP SUM/UNIT RATE PROPOSAL

REQUEST FOR PROPOSAL No. 38514-01

Honeywell

Prepared By: Anchor QEA Engineering, PLLC
290 Elwood Davis Road
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Honeywell
Corporate HSE&R
Remediation and Evaluation Services
101 Columbia Road
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May 19, 2014

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Buffalo River AOC Capping and Habitat Restoration

Request For Proposal No. 38514-01

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REMEDIAL ACTION
LUMP SUM/UNIT RATE PROPOSAL

SECTION I
BIDDER INFORMATION

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LUMP SUM/UNIT RATE PROPOSAL
SECTION I
BIDDER INFORMATION

A. Invitation To Bid

The bidder is requested to submit a firm Lump Sum Proposal for the construction of an aquatic cap and installation of habitat restoration components for the Buffalo River Area of Concern (AOC) located in Buffalo, Erie County, New York in accordance with all the requirements stipulated in the attached Bid Specification and documents. This project is being undertaken by Honeywell to comply with regulatory obligations and requirements prescribed in the Great Lakes Legacy Act Project Agreement between the United States Environmental Protection Agency and Honeywell, as well as applicable permits from New York State Department of Environmental Conservation. The bidder shall furnish all the materials, equipment, except that identified as being furnished by Honeywell, all labor, supervision, construction tools, equipment and facilities and perform all work and render all services necessary for and incidental to the proper completion of the project contained in this Bid Specification.

Honeywell intends to award the entire requirement(s) as stated in this bid; however, Honeywell reserves the right to award all, a subset, or none of the requirements via the Request For Proposal (RFP) and an auction process, or to conduct another bid for the requirements at its sole discretion. Likewise, Honeywell reserves the right to award this project based on the bid results of the RFP prior to an auction being conducted. Therefore, suppliers should bid accordingly during the RFP phase of this process.

B. Contacts

The following personnel represent the contacts for all items of this RFP:

Proposal Technical Contact / Owner's Representative – all questions regarding the scope of work or technical content:

Anchor QEA Engineering, PLLC.
ATTN: Mark Reemts
10400 Little Patuxent Parkway, Suite 220
Columbia, MD 21044
Phone: 410-715-0824

Honeywell Purchasing Representative – all questions related to contract administration:

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Raj Ghaisas, CPIM
Honeywell Corporate Procurement
101 Columbia Road
Morristown, NJ 07962
Phone: 973-455-4465

C. Proposal Due Date

Complete Proposal submittal for this request is due on June 17, 2014 at 12:00 p.m. No bids may be withdrawn after the above date and time for a period of ninety (90) days.

Proposals shall be sent to the following Proposal Technical Contact:

Anchor QEA Engineering, PLLC
ATTN: Mark Reemts,
10400 Little Patuxent Parkway, Suite 220
Columbia, MD 21044
Phone: 410-715-0824

Pricing shall remain valid for 180 days after the bid opening. Honeywell reserved the right to accept or to reject any proposal and to waive irregularities in proposals. Should the Bidder observe or determine conditions at the site or in the bidding documents that would require a change in the project, this information shall be presented to Honeywell prior to the submission of bids.

D. Pre-Bid Meeting

A pre-bid meeting will be conducted at the Embassy Suites (200 Delaware Ave, Buffalo, NY) on June 4, 2014 at 12:30 PM. As part of this meeting, a visit of the site will occur to point out areas of work and evaluate existing conditions, including existing topography and bathymetry, available utilities and landside features, surface features including foundations and drainage, and surface water conditions. The site visit will be conducted via a boat tour; Bidders shall limit attendance to a maximum of two participants due to capacity limitations for the boat tour.

All follow-up visits shall be coordinated with the Proposal Technical Contact - Mark Reemts, Telephone No. (410) 715-0824 x223, email mreemts@anchorqea.com. If Bidder requires another site visit (beyond the one described above), they shall provide a minimum notification period of at least 2 working days to schedule the site visit. Unless otherwise specified, a Honeywell Representative must be present during all site visits.

E. Site Examination

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It is recommended that the Bidder examine the site prior to the submission of its bid to familiarize itself with the area, access, utilities and existing surface conditions.

F. Scope Of Work

The scope of the work to be performed is defined, summarized and otherwise set forth in Section III, and in various other documents and drawings that comprise this Request for Proposal. Further, the Bidder is held responsible for understanding the presentation of the included information contained in this Request for Proposal. It is the Bidder's responsibility to obtain resolution of any questions or potential misunderstandings from Honeywell's designated representative during the bid period.

G. General Instructions

1. Bidder's Proposal shall be entered on the attached Proposal Form Page Form-1 through Form-5 with the complete breakdown of costs as requested. The cost breakdown shall include applicable overhead, insurance, taxes (including Sales and/or Use Taxes), profit, etc. **SUBMISSION OF THE BIDDER'S PROPOSALS ON ANY OTHER FORM OTHER THAN THE FORM INCLUDED IN THIS SECTION AS WELL AS ANY PROPOSALS SUBMITTED WITHOUT THE REQUESTED BID ITEM BREAKDOWNS WILL NOT BE ACCEPTED.**

   Five (5) hard copies (one (1) original and four (4) copies) and five (5) electronic copies (provided on DVD) of all proposal materials, including the original Proposal Form and all supporting proposal documents, shall be sent to the attention of the following:

   Anchor QEA Engineering, PLLC
   ATTN: Mark Reemts
   10400 Little Patuxent Parkway, Suite 220
   Columbia, MD 21044
   Phone: 410-715-0824

2. Each Item of Work listed in this Proposal Form is described and explained in detail in Section III, Scope of Work, and further specified in Section IV, Technical Specifications, of this Request for Proposal.

3. **Prior to the pre-bid meeting, Bidders shall confirm concurrence with the Terms and Conditions included in Section II of this proposal. Written acceptance of the contract Terms and Conditions shall be sent to the Proposal Technical Contact Mark Reemts, email mreemts@anchorqea.com and Honeywell Purchasing Representative Raj Ghaisas, Honeywell, email raj.ghaisas@honeywell.com. Any**

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exceptions to these terms shall be clearly outlined and submitted to the Proposal Contacts in writing prior to the pre-bid meeting.

4. Bidder shall prepare and make part of its Proposal, **"AN ITEMIZED LIST OF ANY AND ALL EXCEPTIONS, ASSUMPTIONS, OR CORRECTIONS NECESSARY TO ALLOW SUBMISSION OF THIS PROPOSAL."** The omission of such a list will be the Bidder's acknowledgment that it fully understands all phases of the specified work and accepts the completeness of all documents transmitted with and made part of the Bid Specification. Where such a list is submitted, the Proposal shall be considered a qualified Proposal.

5. In any instance where the Drawings and other documents of the Bid Specification are not sufficiently complete to allow the Bidder to submit a complete Proposal without excessive contingencies being applied for indefinite items, or with major assumptions being made by the Bidder, Bidder shall contact Honeywell for clarification before submitting its proposal.

6. Bidder's Proposal shall be based on a six- (6) day sixty (60) hour work week. Alternate working schedules will be considered, and should be presented as an alternate proposal.

H. Additional Proposal Requirements

The following submittals will be required to complete the Proposal, and facilitate a full proposal evaluation. The Bidderôs Proposal will be REJECTED if any of the following items are NOT received with the Proposal Form.

1. Construction Planning Schedule

   Bidder shall include a Preliminary Construction Planning Schedule with the bid and shall submit its bid based on that schedule. The Planning schedule shall be formatted to include each work task contained as Bid Items in Table I-1. The planning schedule shall also include the estimated labor hours for each Bid Item.

2. Draft "Work Plan"

   Bidder shall submit with its proposal a draft "Work Plan" for all phases of construction work. Bidder's Plan shall be structured to correlate with the Lump Sum Proposal work item structure. The plan shall be written to provide clear and concise descriptive summaries of Bidder's plan to execute all work tasks contained in the Scope of Work. The Work Plan should not be longer than twenty (20) pages.

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3. Key On-Site Personnel

Bidder shall provide an organization chart and specify the name of its intended Project Manager, Field Superintendent, Site Health & Safety Officer and QA/QC Engineer with its Work Plan. Resumes for the Key On-Site personnel shall be included as an attachment to the Work Plan. The selected Contractor shall not change Project Manager and Superintendent for the duration of the job without Honeywell's review and written permission.

4. Billing Schedule

Bidder shall submit a proposed payment/billing schedule for the project that coincides with the Bidder's Planning Schedule and Bidder's Proposal. The Bidder shall develop the Billing Schedule from the example form included in this Section as **ATTACHMENT I-1.**

5. List of Subcontractors/Safety Evaluation Packages

A list of all the major subcontractors ($25,000 and above) that the Bidder anticipates will be working on the project, along with the craft or work that will be performed shall be provided in the space on the Bid Form. The subcontractors will be evaluated and approved by Honeywell during the Bid evaluation process. Honeywell reserves the right to reject any and all subcontractors listed by the Bidder.

All Prime Contractors contacted for the RFP have been prequalified through Honeywell's Contractor Safety Evaluation Package. Major subcontractors are required to submit a completed Honeywell Contractor Safety Evaluation Package, (**ATTACHMENT I-2**) and shall be submitted to Honeywell along with the proposal. During the course of the project any additional subcontractors (major or minor) must complete the Safety Evaluation Package and be approved by Honeywell prior to the subcontractors initiating site work.

6. Contractor Labor Rate Breakdown Schedule

Bidder shall furnish with its proposal a completed Labor Rate Breakdown (**ATTACHMENT I-3**) for all trades being utilized on this project. The Bidder is requested to complete a table for each craft that will be included on the project (i.e. laborer, operator, pipe fitter, etc.). Rates included in this table will be the basis for any possible Cost Plus Construction Change Order.

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7. Contractor Equipment Rates

Bidder shall furnish Honeywell with its proposal a list of applicable equipment daily, weekly, monthly rates. Bidder shall also provide a mobilization-demobilization cost for each piece of major equipment. Mobilization-demobilization shall include all decontamination work required to remove a piece of equipment from the site. Equipment rates shall not exceed current rates established by the Associated Equipment Distributors or Contractor's standard equipment rates for the work area; whichever is the lower rate. Rates included in this list will be the basis for any possible Cost Plus Construction Change Order.

I. Bidder Questions

The procedure for requesting supplemental information and responses to questions formulated during the bidding process shall be as follows:

1. All questions relating to commercial/contract items shall be submitted to the Honeywell Purchasing Representative identified above.
2. All questions relating to scope of work and technical items shall be submitted to the designated Proposal Technical Contact identified above.
3. All questions and requests for information shall be submitted to the designated representative in writing, through the means of letter or e-mail.
4. All Bidder's questions must be submitted before the close of business on June 6, 2014.
5. All questions will be answered directly to the Bidder that is requesting the clarification or information. A compilation of all Bidder's questions will be issued to all Bidders as an addendum by close of business on June 10, 2014.

J. Bidderôs Proposal Checklist

In order to ensure that the Bidder has completed all the forms and submittals that will be required for a full and complete Proposal Submittal, the Bidder shall review and complete the Check List included **(ATTACHMENT I-4)** of this Section. Proposal will be rejected if any the required forms and submittals identified in this Section are not submitted with the Proposal.

K. List of Potential Habitat Resources

Provided as **ATTACHMENT I-5** is a list of potential resources available to the Bidder. Listed resources are not required and are provided for information only and do not represent preferred vendors. Honeywell does not make any representations to the quality or reliability of these resources. At its own volition, and after careful deliberations, the Bidder may elect to use one, all, or none of the

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included resources, and shall make any and all arrangements with the resource directly.

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Honeywell

- PROPOSAL FORM -

FIRM LUMP SUM/UNIT RATE PROPOSAL

SUBMITTED BY: _____

_____

_____

FOR

Request For Proposal 38514-01

Buffalo River AOC Capping and
Habitat Restoration
Buffalo, NY

PROJECT NO. 38514

DATED: _____

IMPORTANT NOTE: PROPOSALS WHICH ARE NOT SUBMITTED ON THIS FORM WILL BE REJECTED AND WILL NOT BE CONSIDERED.

CONTRACTOR:_____

A. Proposal

The undersigned Bidder submits to Honeywell, 101 Columbia Road, Morristown, New Jersey 07962, its Proposal for furnishing all materials not furnished by Honeywell, all supervision, labor, construction tools, and necessary equipment to perform all work and services necessary for a reasonably incidental to the proper completion of all the items of work in accordance with the provisions, terms and conditions of/and as shown, described and contained in either the Lump Sum Contract or Purchase Order form and supporting documents as listed in the Specifications which accompanied and comprised Honeywell's inquiry number referenced on the cover page hereof.

Total Firm Lump Sum Bid _____

___ This is a complete bid - there are no exceptions to Bid Specifications or to Honeywell's Standard Form of Contract.

___ This is a qualified Bid (as per Paragraph. A3, Page 2 of this Proposal).

C. Breakdown

1. Proposal shall be provided with breakdown as shown in the attached Proposal Form, Table I-1

2. The following taxes as applicable, are included above on all materials and/or labor furnished by Bidder and will be paid by the Bidder:

	Check if Applicable	Rate (%)	Total Tax on Materials	Total Tax on Labor
State Sales Tax				
Local Sales Tax				
Use Tax				
Other				

(A proportionate share of the above taxes, in the event of an award, would be billed to Honeywell on each invoice submitted by Bidder and would be shown on the Detail of Billing as tax).

CONTRACTOR:_____

3. Names of proposed Subcontractors and work performed will be as follows:

Subcontractor(s) Name(s) & Location(s)	Craft Involved or Work to be Performed
_____	_____
_____	_____
_____	_____
_____	_____

4. Number of working days required to mobilize after award of order: _____

   Number of working days after mobilization to start actual work at jobsite: _____

   Number of working days estimated for completion: _____

5. Any work beyond that defined in the scope contained in the Bid Specification or any changes in the plans and specifications (or deletions with respect thereto) which are authorized by Honeywell in writing prior to the commencement thereof shall be performed by Bidder and paid for by Honeywell, (or shall be allowed by Bidder as a credit) on one of the following bases at Honeywell's option:

   a. LUMP SUM: To be agreed upon.

   b. UNIT PRICE: As may be agreed upon.

   c. COST PLUS: Including authorized sub-contracted work as follows:

      1. Direct cost of labor including fringes, taxes, and insurance, plus _____ percent (____%) for overhead, profit, small tools as shown in Exhibit ____, and expendable supplies as shown in Exhibit ____.

      2. Direct cost of materials including the minimum rental cost of construction equipment, plus ____ percent (____%) for overhead and profit. Equipment rentals shall not exceed current rates established by the Associated Equipment Distributors or standard rates for the area, whichever is the lower rate.

3. Direct cost of subcontracted work, plus ____ percent (____%) for overhead and profit.

4. Taxes, insurance and premium time shall be at Bidder's actual cost.

6. No home office expense shall be permitted unless authorized by Honeywell.

7. Bidder will operate with:

   a. Union Labor____ b. Non-Union Labor____ c. Both____

8. Alternate Proposal: Alternate proposals are solicited where Bidder could propose a reduced firm Lump Sum price based upon acceptance by Honeywell of alternate material(s) or construction techniques thereby reducing the cost of construction. Details of alternates are to be specified and attached to this proposal.

9. Honeywell reserves the right to reject any or all bids.

10. Bidder shall designate one of the following:

    a. If Bidder is operating as an <u>INDIVIDUAL</u>:

       1. Name of Firm: _____

       2. Address of Firm: _____

          _____

       3. Name of Owner: _____

    b. If Bidder is operating as a <u>PARTNERSHIP</u>:

       1. Name of Firm: _____

       2. Address of Firm: _____

          _____

       3. Names of all Partners: _____

          _____

          _____

CONTRACTOR:_____

c. If Bidder is operating as a CORPORATION:

1. Name of Firm: _____

2. Address of Firm: _____

_____

3. State in which INCORPORATED: _____

****

This Proposal is submitted by the undersigned consistent with the requirements of the Bid Specification and the instructions contained herein.

_____ _____

Date Bidder Name

_____

Signature of Authorized Representative

_____

Name Title

LUMP SUM/UNIT RATE PROPOSAL
SECTION I
BIDDER INFORMATION

- Table I-1 ï

Line Item Proposal Breakdown

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TABLE I-1
LINE ITEM COST PROPOSAL BREAKDOWN

Buffalo River AOC
Capping and Habitat Restoration:
BASE WORK
Buffalo, New York

Bid Item	Bid Item Description	Estimated Quantity	Unit Price Cost	Lump Sum Cost	Material Cost	Labor Cost
1.1	Work Plans, Submittals, Schedules and Permits	1	/LS			
2.1	Mobilization, Temporary Facilities and Controls	1	/LS			
2.2	Surveying	1	/LS			
6.1	Katherine Street Peninsula Habitat Subgrade	1	/LS			
6.2	Planting Substrate	196,000	/SF			
6.3	Gravel Spawning Area Gravel	1	/LS			
6.4	Riprap Rock Vanes	1	/LS			
6.5	Outfall Scour Protection	930	/SF			
7.1	ADM/Pillsbury Armored Cap	1	/LS			
7.2	City Ship Canal Cap: In-water Fill	1	/LS			
7.3	Debris Removal, Loading, Transport and Disposal	30	/CY			
13.1	Anchored Rootwad Log Installation	1	/LS			
13.2	Porcupine Crib Installation	1	/LS			
13.4	Emergent Vegetation Installation	1	/LS			
13.5	Emergent Vegetation Warranty	55	/EA			
13.6	Submerged Aquatic Vegetation Installation	1	/LS			
13.7	Submerged Aquatic Vegetation Warranty	190	/EA			
13.8	Herbivory Protection	44,200	/SF			
15.1	Demobilization	1	/LS			
16.1	Additive for Performance and Payment Bonds	1	/LS			
	TOTALS					

NOT TO EXCEED BID TOTAL [ ]

Notes:

1. Unit Rate Costs shall be extended by the Estimated Quantity to establish Lump Sum Cost
2. Unit Rates and Lump Sum Costs shall remained fixed for the life of the project. No provisions for escalation will be allowed.

TABLE I-1A
LINE ITEM COST PROPOSAL BREAKDOWN

Buffalo River AOC
Capping and Habitat Restoration:
OPTION 1 WORK - RIVERBEND
Buffalo, New York

Bid Item	Bid Item Description	Estimated Quantity	Unit Price Cost	Lump Sum Cost	Material Cost	Labor Cost
1.1	Work Plans, Submittals, Schedules and Permits	1	/LS			
2.1	Mobilization, Temporary Facilities and Controls	1	/LS			
2.2	Surveying	1	/LS			
6.2	Planting Substrate	59,200	/SF			
6.4	Riprap Rock Vanes	1	/LS			
6.5	Outfall Scour Protection	140	/SF			
7.3	Debris Removal, Loading, Transport and Disposal	5	/CY			
13.1	Anchored Rootwad Log Installation	1	/LS			
13.3	Coir Bank Buffer Installation	2,870	/LF			
13.4	Emergent Vegetation Installation	1	/LS			
13.5	Emergent Vegetation Warranty	48	/EA			
13.6	Submerged Aquatic Vegetation Installation	1	/LS			
13.7	Submerged Aquatic Vegetation Warranty	26	/EA			
13.8	Herbivory Protection	38,500	/SF			
15.1	Demobilization	1	/LS			
16.1	Additive for Performance and Payment Bonds	1	/LS			
	TOTALS					

NOT TO EXCEED BID TOTAL [ ]

Notes:

1. Unit Rate Costs shall be extended by the Estimated Quantity to establish Lump Sum Cost
2. Unit Rates and Lump Sum Costs shall remained fixed for the life of the project. No provisions for escalation will be allowed.

TABLE I-1B
LINE ITEM COST PROPOSAL BREAKDOWN

Buffalo River AOC
Capping and Habitat Restoration:
OPTION 2 WORK - BUFFALO COLOR PENINSULA
Buffalo, New York

Bid Item	Bid Item Description	Estimated Quantity	Unit Price Cost	Lump Sum Cost	Material Cost	Labor Cost
1.1	Work Plans, Submittals, Schedules and Permits	1	/LS			
2.1	Mobilization, Temporary Facilities and Controls	1	/LS			
2.2	Surveying	1	/LS			
6.2	Planting Substrate	69,400	/SF			
6.4	Riprap Rock Vanes	1	/LS			
6.5	Outfall Scour Protection	50	/SF			
7.3	Debris Removal, Loading, Transport and Disposal	5	/CY			
13.1	Anchored Rootwad Log Installation	1	/LS			
13.3	Coir Bank Buffer Installation	1,650	/LF			
13.4	Emergent Vegetation Installation	1	/LS			
13.5	Emergent Vegetation Warranty	64	/EA			
13.6	Submerged Aquatic Vegetation Installation	1	/LS			
13.7	Submerged Aquatic Vegetation Warranty	23	/EA			
13.8	Herbivory Protection	51,100	/SF			
15.1	Demobilization	1	/LS			
16.1	Additive for Performance and Payment Bonds	1	/LS			
	TOTALS					

NOT TO EXCEED BID TOTAL [ ]

Notes:

1. Unit Rate Costs shall be extended by the Estimated Quantity to establish Lump Sum Cost
2. Unit Rates and Lump Sum Costs shall remained fixed for the life of the project. No provisions for escalation will be allowed.

TABLE I-1C
LINE ITEM COST PROPOSAL BREAKDOWN

Buffalo River AOC
Capping and Habitat Restoration:
OPTION 3 WORK - OHIO STREET SHORELINE
Buffalo, New York

Bid Item	Bid Item Description	Estimated Quantity	Unit Price Cost	Lump Sum Cost	Material Cost	Labor Cost
1.1	Work Plans, Submittals, Schedules and Permits	1	/LS			
2.1	Mobilization, Temporary Facilities and Controls	1	/LS			
2.2	Surveying	1	/LS			
6.2	Planting Substrate	2,100	/SF			
7.3	Debris Removal, Loading, Transport and Disposal	5	/CY			
13.3	Coir Bank Buffer Installation	270	/LF			
13.4	Emergent Vegetation Installation	1	/LS			
13.5	Emergent Vegetation Warranty	3	/EA			
13.8	Herbivory Protection	1	/LS			
15.1	Demobilization	1	/LS			
16.1	Additive for Performance and Payment Bonds	1	/LS			
	TOTALS					

NOT TO EXCEED BID TOTAL [ ]

Notes:

1. Unit Rate Costs shall be extended by the Estimated Quantity to establish Lump Sum Cost
2. Unit Rates and Lump Sum Costs shall remained fixed for the life of the project. No provisions for escalation will be allowed.

LUMP SUM/UNIT RATE PROPOSAL
SECTION I
BIDDER INFORMATION

- ATTACHMENT I-1 ï

Billing Schedule

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BILLING SCHEDULE
Buffalo River AOC
Capping and Habitat Restoration
BASE WORK
Buffalo, NY

Bid Item	Cost Code	Bid Item Description	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	MONTH 6	MONTH 7	MONTH 8	MONTH 9	MONTH 10	MONTH 11	MONTH 12	TOTAL
1.1	5710	Work Plans, Submittals, Schedules and Permits													**$0.00**
2.1	5710	Mobilization, Temporary Facilities and Controls													**$0.00**
2.2	5710	Surveying													**$0.00**
6.1	5710	Katherine Street Peninsula Habitat Subgrade													**$0.00**
6.2	5710	Planting Substrate													**$0.00**
6.3	5710	Gravel Spawning Area Gravel													**$0.00**
6.4	5710	Riprap Rock Vanes													**$0.00**
6.5	5710	Outfall Scour Protection													**$0.00**
7.1	5710	ADM/Pillsbury Armored Cap													**$0.00**
7.2	5710	City Ship Canal Cap: In-water Fill													**$0.00**
7.3	5710	Debris Removal, Loading, Transport and Disposal													**$0.00**
13.1	5710	Anchored Rootwad Log Installation													**$0.00**
13.2	5710	Porcupine Crib Installation													**$0.00**
13.4	5710	Emergent Vegetation Installation													**$0.00**
13.5	5710	Emergent Vegetation Warranty													**$0.00**
13.6	5710	Submerged Aquatic Vegetation Installation													**$0.00**
13.7	5710	Submerged Aquatic Vegetation Warranty													**$0.00**
13.8	5710	Herbivory Protection													**$0.00**
15.1	5710	Demobilization													**$0.00**
16.1	5710	Additive for Performance and Payment Bonds													**$0.00**
		Retention													**$0.00**
		MONTHLY TOTAL - INVOICED	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**$0.00**
		CUMULATIVE TOTAL INVOICED	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**$0.00**
		MONTHLY PAYMENT	XXXX	XXXXX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**$0.00**
		PAYMENT- CUMULATIVE			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

NOTE: PAYMENT SCHEDULE BASED ON NET 60 DAY TERM

BILLING SCHEDULE
Buffalo River AOC
Capping and Habitat Restoration
OPTION 1 WORK - RIVERBEND
Buffalo, NY

Bid Item	Cost Code	Bid Item Description	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	MONTH 6	MONTH 7	MONTH 8	MONTH 9	MONTH 10	MONTH 11	MONTH 12	TOTAL
1.1	5710	Work Plans, Submittals, Schedules and Permits													**$0.00**
2.1	5710	Mobilization, Temporary Facilities and Controls													**$0.00**
2.2	5710	Surveying													**$0.00**
6.2	5710	Planting Substrate													**$0.00**
6.4	5710	Riprap Rock Vanes													**$0.00**
6.5	5710	Outfall Scour Protection													**$0.00**
7.3	5710	Debris Removal, Loading, Transport and Disposal													**$0.00**
13.1	5710	Anchored Rootwad Log Installation													**$0.00**
13.3	5710	Coir Bank Buffer Installation													**$0.00**
13.4	5710	Emergent Vegetation Installation													**$0.00**
13.5	5710	Emergent Vegetation Warranty													**$0.00**
13.6	5710	Submerged Aquatic Vegetation Installation													**$0.00**
13.7	5710	Submerged Aquatic Vegetation Warranty													**$0.00**
13.8	5710	Herbivory Protection													**$0.00**
15.1	5710	Demobilization													**$0.00**
16.1	5710	Additive for Performance and Payment Bonds													**$0.00**
		Retention													**$0.00**
		MONTHLY TOTAL - INVOICED	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**$0.00**
		CUMULATIVE TOTAL INVOICED	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**$0.00**
		MONTHLY PAYMENT	XXXX	XXXXX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**$0.00**
		PAYMENT- CUMULATIVE			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

NOTE: PAYMENT SCHEDULE BASED ON NET 60 DAY TERM

BILLING SCHEDULE
Buffalo River AOC
Capping and Habitat Restoration
OPTION 2 WORK - BUFFALO COLOR PENINSULA
Buffalo, NY

Bid Item	Cost Code	Bid Item Description	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	MONTH 6	MONTH 7	MONTH 8	MONTH 9	MONTH 10	MONTH 11	MONTH 12	TOTAL
1.1	5710	Work Plans, Submittals, Schedules and Permits													**$0.00**
2.1	5710	Mobilization, Temporary Facilities and Controls													**$0.00**
2.2	5710	Surveying													**$0.00**
6.2	5710	Planting Substrate													**$0.00**
6.4	5710	Riprap Rock Vanes													**$0.00**
6.5	5710	Outfall Scour Protection													**$0.00**
7.3	5710	Debris Removal, Loading, Transport and Disposal													**$0.00**
13.1	5710	Anchored Rootwad Log Installation													**$0.00**
13.3	5710	Coir Bank Buffer Installation													**$0.00**
13.4	5710	Emergent Vegetation Installation													**$0.00**
13.5	5710	Emergent Vegetation Warranty													**$0.00**
13.6	5710	Submerged Aquatic Vegetation Installation													**$0.00**
13.7	5710	Submerged Aquatic Vegetation Warranty													**$0.00**
13.8	5710	Herbivory Protection													**$0.00**
15.1	5710	Demobilization													**$0.00**
16.1	5710	Additive for Performance and Payment Bonds													**$0.00**
		Retention													**$0.00**
		MONTHLY TOTAL - INVOICED	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**$0.00**
		CUMULATIVE TOTAL INVOICED	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**$0.00**
		MONTHLY PAYMENT	XXXX	XXXXX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**$0.00**
		PAYMENT- CUMULATIVE			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

NOTE: PAYMENT SCHEDULE BASED ON NET 60 DAY TERM

BILLING SCHEDULE
Buffalo River AOC
Capping and Habitat Restoration
OPTION 3 WORK - OHIO STREET SHORELINE
Buffalo, NY

Bid Item	Cost Code	Bid Item Description	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	MONTH 6	MONTH 7	MONTH 8	MONTH 9	MONTH 10	MONTH 11	MONTH 12	TOTAL
1.1	5710	Work Plans, Submittals, Schedules and Permits													**$0.00**
2.1	5710	Mobilization, Temporary Facilities and Controls													**$0.00**
2.2	5710	Surveying													**$0.00**
6.2	5710	Planting Substrate													**$0.00**
7.3	5710	Debris Removal, Loading, Transport and Disposal													**$0.00**
13.3	5710	Coir Bank Buffer Installation													**$0.00**
13.4	5710	Emergent Vegetation Installation													**$0.00**
13.5	5710	Emergent Vegetation Warranty													**$0.00**
13.8	5710	Herbivory Protection													**$0.00**
15.1	5710	Demobilization													**$0.00**
16.1	5710	Additive for Performance and Payment Bonds													**$0.00**
		Retention													**$0.00**
		MONTHLY TOTAL - INVOICED	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**$0.00**
		CUMULATIVE TOTAL INVOICED	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**$0.00**
		MONTHLY PAYMENT	XXXX	XXXXX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**$0.00**
		PAYMENT- CUMULATIVE			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

NOTE: PAYMENT SCHEDULE BASED ON NET 60 DAY TERM

LUMP SUM/UNIT RATE PROPOSAL
SECTION I
BIDDER INFORMATION

- ATTACHMENT I-2 ï

Contractor Safety Evaluation Package

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Honeywell Corporate Health, Safety, Environmental and Remediation	Last Revised: February 22, 2013 Procedure Number: REM-1234 Document Owner: Bill Hague

CONTRACTOR SAFETY EVALUATION PACKAGE

	Contractor Home Office Information		Parent Company Info. (if applicable)
COMPANY NAME			
ADDRESS			
CITY, STATE, ZIP			
CONTACT PERSON			
CONTACT TITLE			
CONTACT TELEPHONE			
CONTACT FAX			
CONTACT E-MAIL			
PERSON RESPONSIBLE FOR SAFETY PROGRAM			
H&S TELEPHONE			
H&S E-MAIL			

Check the following that applies.				
• Original submittal	No	☐	Yes	☐
• Renewal submittal	No	☐	Yes	☐

HONEYWELL PROJECT SITE		**Point of Contact**	
		Telephone	
		E-mail	
CONSULTANT CO. NAME		**Point of Contact**	
		Telephone	
		E-mail	

Is your firm currently proposing on a Honeywell project? • If Yes, complete the RFP contact information below	No	☐	Yes	☐

HONEYWELL PROJECT SITE		**Point of Contact**	
		Telephone	
		E-mail	
CONSULTANT CO. NAME		**Point of Contact**	
		Telephone	
		E-mail	

1. Contractor Activity

Asbestos Abatement	☐	Concrete	☐	Consulting	☐	Demolition	☐	Diving	☐
Dredging	☐	Drilling	☐	Earthwork/ Excavation	☐	Electrical	☐	Engineering	☐
Environmental Remediation	☐	Fencing	☐	General Contractor	☐	Heavy Construction	☐	Laboratory Testing	☐
Landscaping	☐	Marine Services	☐	OM&M	☐	Plumbing/ HVAC	☐	Security Services: Equip. Installation	☐
Security Services: Guards	☐	Snow Plowing	☐	Surveying	☐	Trucking / Transporting	☐	Utility Locating	☐
Other:									

2. Work Activities

Are your employees involved with any of the activities described below? • If yes, check all that apply.	No	☐	Yes	☐

Aerial Lifts/ Scissor Lifts	☐	Asbestos Abatement	☐	Asphalt Paving	☐	Boating Operations	☐	Clearing & Grubbing	☐
Confined Space Entry	☐	Cranes	☐	Diving	☐	DOT Shipping/Handling Hazardous Materials	☐	Dredging	☐
Drilling	☐	Electrical	☐	Emergency Response	☐	Environmental Sampling	☐	Excavation/ Trenching	☐
Forklift Operations	☐	HazWaste clean-up operations	☐	Heavy Equipment Operation	☐	Hot Work	☐	Laboratory Safety	☐
Marine: Working Over / Near water	☐	Painting/Specialty Coatings	☐	Respirators	☐	Scaffolds	☐	Snow Plowing	☐
Surveying	☐	Trucking/ Transporters	☐	Utility Locating/ Underground Utilities	☐	Zero Energy – Lockout/Tagout	☐		
Other:									

Have employees engaged in activities that expose them to hazardous substances and health hazards received HAZWOPER training?	No	☐	Yes	☐	N/A	☐
Are employees that wear a respirator more than 30 days a year in a medical surveillance program?	No	☐	Yes	☐	N/A	☐
Are employees exposed to hazardous substances or health hazards at or above the established permissible exposure limit, without regard to the use of respirators, in a medical surveillance program?	No	☐	Yes	☐	N/A	☐

3. Substance Abuse Policy

Does your company have a written Alcohol and Substance Abuse Program?	No	☐	Yes	☐
Does your company certify that employees and other individuals (subcontracted labor, temps, etc.) hired by your company to work at a Honeywell project site will be drug and alcohol free?	No	☐	Yes	☐
Does your Program include 5-panel substance and alcohol testing?	No	☐	Yes	☐
Do BOTH your employees and other individuals as stated above participate in pre-employment/pre-job assignment drug testing for high-risk tasks 2 weeks prior to their initial assignment at each Honeywell work site?	No	☐	Yes	☐
Do BOTH your employees and other individuals as stated above participate in post-accident drug testing?	No	☐	Yes	☐
Do BOTH your employees and other individuals as stated above participate in just cause/reasonable suspicion drug testing?	No	☐	Yes	☐
Do BOTH your employees and other individuals as stated above participate in random drug testing (at least 10 percent per month)?	No	☐	Yes	☐
Does your company require certification to include lower tier subcontractors?	No	☐	Yes	☐

4. Safety Personnel

Number of Board Certified H&S Professionals on staff or on retainer:						CHMM		CIH	
Other:						CHCM		CSP	
If using an outside Safety Consultant is that person certified?						No	☐	Yes	☐
Who handles safety in your company?	Other	☐	Safety Consultant	☐	Part-Time Safety Person	☐	Full Time Safety Person		☐
Total years of safety experience for person handling safety (above)?	<5 years	☐	5-9 years	☐	10-14 years	☐	>15 years		☐
Years managing safety with Company for person handling safety (above)?	<5 years	☐	5-9 years	☐	10-14 years	☐	>15 years		☐

5. OSHA Inspections/Violations

Has OSHA inspected any of your job sites in the past five (5) years?						No	☐	Yes	☐
If "Yes" above, indicate the number of inspections (including zero) for each type listed below.									
Other		Accident		Complaint		Referral		Planned	
Indicate the total number of citations (including zero) issued for each type of violation listed below.									
Willful		Serious		Repeat		Other			

6. Safety Maturity

Does your company have a written Safety Manual and/or work procedures?	No	☐	Yes	☐

If "Yes," attach a copy of your Safety Manual's table of contents and/or list of work procedures.

Does your company conduct project site safety audits? If "Yes," indicate the frequency and whether the audits are documented or not.	No	☐	Yes	☐

Other – not documented	☐	Monthly – not documented	☐	Weekly – not documented	☐	As required – documented	☐	Monthly - documented	☐	Weekly - documented	☐

Does your company conduct field project safety meetings? If "Yes," indicate the frequency and type of meeting (documented or not documented).	No	☐	Yes	☐

Monthly – not documented	☐	Weekly – not documented	☐	Daily – not documented	☐	Monthly – documented	☐	Weekly - documented	☐	Daily - documented	☐

Does your company provide safety training to employees? If "Yes," indicate the type below.	No	☐	Yes	☐

- ☐ Aerial Lifts/Scissor Lifts
- ☐ Asbestos
- ☐ Blasting/Explosives
- ☐ Bloodborne Pathogens
- ☐ Boating Operations
- ☐ Confined Space Entry
- ☐ Construction (OSHA Certified 10 Hours)
- ☐ Construction (OSHA Certified 30 Hours)
- ☐ Cranes Operations
- ☐ Diving
- ☐ DOT Shipping/Handling
- ☐ Drilling
- ☐ Electrical Safety
- ☐ Emergency Response
- ☐ Excavation Competent Person
- ☐ Fall Protection
- ☐ Fire Extinguishers
- ☐ First Aid/CPR
- ☐ Other: _____
- ☐ Forklift Operations
- ☐ Hazard Communications
- ☐ Hazardous Waste (40-hour/8-hour refresher)
- ☐ Hearing Conservation
- ☐ Heavy Equipment Operation
- ☐ Laboratory Safety
- ☐ Lead
- ☐ Lockout/Tagout
- ☐ Personal Protective Equipment
- ☐ Power-actuated Tools
- ☐ Process Safety Management
- ☐ Radiation Protection
- ☐ Respiratory Protection
- ☐ Scaffolding/Ladders
- ☐ Site Security Operations
- ☐ Vehicle Safety / Defensive Driving
- ☐ Welding/Cutting

Who conducts training for your company (name, title)?

7. Safety Statistics

Does your company maintain an OSHA 300 Log? • **If yes, complete the following table and attach copies of OSHA 300 Logs and OSHA 300A Summaries for the last 3 complete years.** • **If no, complete the following table and provide a reason below for your exemption.**	No	☐	Yes	☐
Reason:				
What is the NAICS code reported on your OSHA Form 300A? (Required)				

STAFFING	2010	2011	2012	YTD
1. Man hours worked (Total hours worked by all employees)				

STATISTICS ï from OSHA 300 Logs	2010	2011	2012	YTD
1. Total number of deaths (Attach an explanation of each circumstance.)*				
2. Total number of cases with days away from work				
3. Total number of cases with job transfer or restriction				
4. Total number of cases with days away from work and/or transferred or restricted *(#2 + #3)* **(DART)**				
5. Total number of other recordable cases without lost work days				
6. Total recordable cases *(#4 + #5)* **(TRC)**				
7. Total number of days away from work				
8. Total number of days of job transfer or restriction				

* List the total number of fatalities that result from occupational injuries or illnesses. Deaths that occur in the workplace but are not the result of occupational injures should not be included.

8. Experience Modification Rate (EMR)

RATING ï from insurance carrier/broker	2010	2011	2012	Current year
Does your company have an Experience Modification Rate (EMR)? • **If yes, complete this table and provide written letter/documentation from EMR insurance carrier for the past 3 years.** • If no, provide a reason below and skip to Section 9.				
Reason:				

9. Areas of Service

Identify the region or state(s) that your company can provide service in.																
All States	☐															
Northeast	☐	CT ☐	DE ☐	IN ☐	MA ☐	MD ☐	ME ☐	MI ☐	NH ☐	NJ ☐	NY ☐	OH ☐	PA ☐	RI ☐	VT ☐	
Southeast	☐	AL☐	FL ☐	GA ☐	KY ☐	LA ☐	MS ☐	NC ☐	SC ☐	TN ☐	VA ☐	WV ☐				
Midwest	☐	AR ☐	IA ☐	IL ☐	KS ☐	MN ☐	MO ☐	ND ☐	OK ☐	SD ☐	TX ☐	WI ☐				
West Coast	☐	AZ ☐	CA ☐	CO ☐	ID ☐	MT ☐	NM ☐	NV ☐	OR ☐	UT ☐	WA ☐	WY ☐				
Canada	☐	Alberta ☐	Ontario ☐	Saskatchewan	Manitoba	Quebec	British Columbia									

10. Required Documentation

Please ensure that the following documentation (if applicable) is included with this submittal:	
☐	Copy of your firm's written Safety Manual Table of Contents and/or list of Work Procedures
☐	Copies of OSHA 300 Logs for the last 3 complete years (without employee's names)
☐	Copies of OSHA 300A Summaries for the last 3 complete years
☐	NAICS code reported on page 5
☐	Explanation of any reported fatalities and subsequent OSHA findings, if any
☐	EMR rating on insurance carrier letterhead for the past 3 years

11. Certification – by an Authorized Company Representative

I hereby certify that all information provided in this Contractor Safety Evaluation Package is accurate and correct.

Contractor/Company Name: _____

Representative Name: _____

Representative Title: _____

Date: _____

Questions and/or completed packages should be forwarded to:

Ms. Sandy McNally
CH2M HILL
One South Main Street
Suite 1100
Dayton, OH 45402
937.220.2921 (Direct)
937.234.6221 (Fax)
sandy.mcnally@ch2m.com

LUMP SUM/UNIT RATE PROPOSAL
SECTION I
BIDDER INFORMATION

- ATTACHMENT I-3 ï

Labor Rate Breakdown Schedule

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Honeywell

ATTACHMENT I-3
LABOR RATE BREAKDOWN SCHEDULE

Contractor Name: _____

Craft: _____ **Rates Effective From** _____ **To** _____

ITEM	REGULAR TIME 1	2	3	4	5	OVERTIME - PREMIUM TIME 1	2	3	4	5
1. Established base hr. rate	$	$	$	$	$	$	$	$	$	$
2. Vacation Fund _____%										
3. Travel Allowance										
4. Health & Welfare Fund										
5. Pension Fund										
6. Apprentice Training Fund										
7. Industrial Advancement Fund										
8. Other Fringes										
9. *Payroll Taxes ___% of Item 1										
10. **Insurance ____ % of Item 1										
11. Overhead & Profit ___% of Item 1						NA	NA	NA	NA	NA
Total Hourly Rate	$	$	$	$	$	$	$	$	$	$

NOTES: **(Apprentice shall be negotiated on an individual basis)**

- * STATE UNEMPLOYMENT RATE _____%
- * FEDERAL UNEMPLOYMENT RATE _____%
- * SOCIAL SECURITY RATE _____%
- ** GENERAL LIABILITY RATE _____%
- ** WORKMEN'S COMPENSATION RATE _____%

1. Complete all items listed and mark N/A if not applicable.
2. Please use maximum rate to complete labor schedule on crafts that have salaried ranges.
3. Overhead & Profit does not apply to premium portion of overtime, holiday pay, vacation pay or any other hours not worked.
4. Payroll taxes & insurance will be reimbursed at actual cost according to Federal, State and Local laws.

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LUMP SUM/UNIT RATE PROPOSAL
SECTION I
BIDDER INFORMATION

- ATTACHMENT I-4 ï

Bidder Proposal CheckList

In preparation for submitting the Proposal the Bidder has verified that the following information has been included:

_____ **Proposal Form**

_____ **Table I-1 Line Item Cost Proposal Breakdown**

_____ **Construction Planning Schedule**

_____ **Draft ñWork Planò**

_____ **Key On-Site Personnel**

  _____ **Resumes**

_____ **Billing Schedule (Attachment I-1)**

_____ **Completed Subcontractor Safety Evaluation Package for each Subcontractor (Attachment I-2)**

_____ **Contractor Labor Rate Breakdown Table (for each craft/trade) ï Attachment I-3**

_____ **Contractor Equipment Rate List**

_____ **List of Proposal Qualifications/Exceptions (As Required)**

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LUMP SUM/UNIT RATE PROPOSAL
SECTION I
BIDDER INFORMATION

- ATTACHMENT I-5 –

List of Potential Habitat Resources

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ATTACHMENT I-5

Buffalo River AOC Capping and Habitat Restoration RFP
List of Potential Habitat Resources

- Applied Ecological Services, Inc. (Waterloo, NY)
- Cardno JFNew (Walkerton, IN)
- Toadflax (South Glens Falls, NY)
- Meadville Land Services (Meadville, PA)
- Ecological Restoration Inc. (Apollo, PA)

Note: As identified in Section 1.K of the RFP, listed resources are provided for information only and do not represent preferred vendors. Honeywell does not make any representations regarding the quality or reliability of these resources. At its own volition, and after careful deliberations, the Bidder may elect to use one, all, or none of the included resources, and shall make any and all arrangements with the resource directly.

REMEDIAL ACTION
LUMP SUM/UNIT RATE PROPOSAL

SECTION II
CONTRACT

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SERVICES AGREEMENT

This Master Services Agreement ("**Agreement**") is entered into as of _____, 2014, ("**Effective Date**") between Honeywell International Inc., with offices at 101 Columbia Road, Morristown, NJ 07962 ("**Honeywell**") and _____, with offices at _____, ("**Supplier**"). Supplier is in the business of providing environmental remediation services. Honeywell desires to engage Supplier, from time to time, to provide services to it. This Agreement sets forth the general terms and conditions applicable to all Statements of Work and purchase orders issued under this Agreement. "**Parties**" means Honeywell and Supplier and "**Party**" means either of them individually.

1. Services

1.1 Services. All services performed or deliverables required under this Agreement **("Services"** and **"Deliverables"**, respectively) will be performed or delivered in accordance with Schedule 1 "Standard Fees and Discounts", or as supplemented in accordance with individual Statements of Work ("SOWs").

1.2 SOW Issuance. The Services to be provided shall be defined utilizing the SOW for Professional Services. Each SOW shall be accompanied by a proposal and will be governed by individual purchase order releases or amendments to this agreement. SOWs will become effective upon execution by an authorized representative of each Party. No SOW may change any of the terms of this Agreement as they apply to other SOWs, unless expressly intended by way of an amendment to this Agreement"

1.3 Affiliates. Affiliates of Honeywell are beneficiaries of this Agreement and may purchase Services under this Agreement and under any SOW issued there under from Supplier and/or Supplier's Affiliates by executing as applicable purchase orders or SOWs referencing this Agreement. In such event, (i) the Honeywell Affiliate executing the purchase order or the SOW shall, for the purposes of such purchase order, be considered "Honeywell" as that term is used in this Agreement, (ii) the Supplier Affiliate receiving such purchase order or executing such SOW, if applicable, shall, for the purposes of such purchase order, be considered "Supplier" as that term is used in this Agreement, and (iii) the purchase order or SOW shall incorporate all of the terms and conditions of this Agreement and be deemed to be a two party agreement between Supplier or Supplier Affiliate on the one hand and the applicable Honeywell Affiliate on the other hand. Each Party shall cause its Affiliates to comply with its obligations under this Agreement. "Affiliate(s)" means a Party's wholly-owned subsidiaries or a joint venture, partnership or corporation that directly or indirectly controls, is controlled by or is under common control of or with said Party or the Party's wholly-owned subsidiary. The word "control" as used in this definition will mean ownership of, or the right to acquire, not less than fifty percent (50%) of the stock of said corporation, the right to vote not less than fifty percent (50%) of the stock of said corporation, or not less than fifty percent (50%) ownership interest in a partnership or joint venture or corporation.

1.4 Local Enabling Agreements. In the event that Honeywell reasonably determines that it is necessary to execute a local enabling agreement to implement this Agreement and/or any SOW issued there under in certain country, the Parties and/or their Affiliates, as applicable, shall enter into such local enabling agreement, which shall incorporate all of the terms and conditions of this Agreement and/or any SOW issued there under subject only to the amendments required by applicable law.

2. Changes to SOW`s

2.1 The Honeywell Project Manager for a SOW may direct changes in the SOW using either the form attached to this Agreement as Exhibit B ("Change Order") or a change order issued through Honeywell's purchasing system. If any change causes an increase or decrease in the cost of, or the time required for, performing the SOW, an equitable adjustment will be made to the SOW price, delivery dates or both. Honeywell may deny any request for adjustment under this provision unless it is asserted in writing (including the amount of the request and supporting documentation substantiating the request) and delivered to Honeywell within 30 days from the date of Supplier's receipt of the Honeywell-directed change to the SOW. Any adjustment must be mutually agreed to by the Parties in writing. Notwithstanding any disagreement between the Parties regarding the impact of a change, Supplier will proceed diligently with its performance under the SOW as changed pending resolution of the disagreement.

3. Work Guidelines and Personnel

3.1 Project Managers. Each Party will designate a Project Manager for this Agreement or each SOW to serve as the primary contact between the Parties. Performance of the Services will be coordinated between the designated Project Managers.

3.2 Supplier Personnel. Supplier will assign qualified personnel to perform the Services under this Agreement and each SOW and will ensure that its personnel devote sufficient time and effort to performing the Services as necessary to complete all Services in accordance with this Agreement and each SOW. Supplier will bear all liability for the acts or omissions of the personnel assigned to perform the Services. Supplier will use its best efforts to ensure the continuity of Supplier's personnel performing the Services. There will be no charge to Honeywell for any replacement personnel assigned by Supplier until Honeywell and Supplier agree that the replacements have acquired orientation and background substantially equal to that of the personnel replaced. If Honeywell determines that any Supplier personnel performing Services are unacceptable, Honeywell will notify Supplier and Supplier will take prompt, appropriate corrective action, which may include, at Honeywell's request, replacing the personnel. Supplier will pay all costs associated with replacing the

personnel. If Supplier refuses to replace any of its personnel upon Honeywell's request, Honeywell may immediately terminate this Agreement or the SOW, or both.

3.3 Key Personnel. The Parties may designate certain Supplier personnel critical for the successful performance of the Services as **"Key Personnel."** Supplier will assign the Key Personnel to perform the Services and will not reassign or remove any Key Personnel without the prior written consent of Honeywell's Project Manager, which consent will not be unreasonably withheld.

3.4 Adherence to Delivery Schedule. **TIME IS OF THE ESSENCE** with respect to the delivery schedule ("**Delivery Schedule"**). If Supplier reasonably believes that it will be unable to meet the Delivery Schedule or any portion thereof Supplier will immediately notify Honeywell of the anticipated delay and take immediate corrective action to comply with the Delivery Schedule (including without limitation working overtime or providing additional personnel or equipment or other resources). All corrective actions will be at Supplier's sole cost and expense, unless the delay or anticipated delay is caused by Honeywell, in which case the Parties will mutually agree upon a corrective action plan and apportioning of the cost. If Supplier fails to promptly develop and implement a corrective action plan, Honeywell may implement its own corrective action plan at Supplier's expense.

3.5 Non-Solicitation. Neither Party may hire or solicit the services or employment of any personnel of the other Party directly involved in the Services or Deliverables during the Term. This restriction will not prohibit either Party from hiring personnel as a result of general recruiting strategies that are not directed specifically towards the other Party's employees, including but not limited to the placement of general advertisements or posting of positions on the World Wide Web.

3.6 Relationship of Parties/Independent Contractor. Nothing in this Agreement will be construed to place Supplier and Honeywell in an agency, employment, franchise, joint venture, or partnership relationship. Neither Party has the authority to obligate or bind the other in any manner. Nothing contained in this Agreement will give rise or is intended to give rise to rights of any kind to any third parties, except as otherwise set forth in this Agreement. Neither Party will make any representation to the contrary. The Parties agree that Supplier will perform its obligations under this Agreement as an independent contractor. Supplier retains the right to exercise full control of, supervision over and responsibility for Supplier's performance hereunder, including the employment, direction, compensation and discharge of Supplier's personnel, as well as compliance with workers' compensation, unemployment, disability insurance, social security, withholding and all other laws, rules, codes, regulations and ordinances governing such matters.

4. Term and Termination

4.1 Term of Agreement. This Agreement will commence on the Effective Date and remain in effect for a period of three (3) year(s), unless otherwise terminated as provided below ("Term"). This Agreement will continue to govern SOWs entered into before the end of the Term where completion of those SOWs extends beyond the Term.

4.2 Termination for Convenience. Notwithstanding anything to the contrary contained in this Agreement or an SOW, Honeywell may, at any time, terminate this Agreement or any SOW, in whole or in part, with or without cause, without liability or obligation, for undelivered Deliverables or unperformed Services, upon 30 days' prior written notice.

4.3 Termination for Cause. The non-breaching Party may terminate this Agreement or any SOW, in whole or in part, if the other Party commits a material breach and fails to remedy the breach within 30 days following receipt of written notice specifying the grounds for the breach. A material breach includes, but is not limited to, late delivery or delivery of nonconforming Deliverables or Services. The solvent Party may terminate this Agreement or any SOW upon written notice if the other Party becomes insolvent or if any petition is filed or proceedings commenced by or against that Party relating to bankruptcy, receivership, reorganization, or assignment for the benefit of creditors.

4.4 Effect of Termination. If Honeywell terminates this Agreement or any SOW, in whole or in part, for either convenience or cause, Honeywell's sole liability to Supplier, and Supplier's sole and exclusive remedy, is payment for Deliverables received and accepted and Services completed and accepted by Honeywell before the date of termination. The payment can be set off against any damages to Honeywell. Upon termination, Honeywell may require Supplier to transfer title and deliver to Honeywell any completed Deliverables and Honeywell will pay the Agreement or SOW price for those Deliverables subject to set off against any damages to Honeywell. Honeywell may also require Supplier to transfer title and deliver to Honeywell any or all property produced or procured by Supplier to perform this Agreement or any SOW. Honeywell will credit Supplier with the reasonable value of the property, but not more that Supplier's actual cost or the Agreement or SOW value, whichever is less.

4.5 Substitute Performance. If Honeywell terminates this Agreement or any SOW, in whole or in part, for cause, Honeywell may, without prejudice to any other rights or remedies it may have, provide or perform, or have a third party provide or perform, all or any part of the Services or Deliverables which have not been provided or performed at the time of termination, in accordance with the applicable SOW and this Agreement. All costs incurred by Honeywell in providing the Deliverables or performing the Services or having a third party do so, including reasonable overhead, incidental expenses and reasonable attorney and professional fees, will be charged to Supplier or deducted

from any sums due or to become due to Supplier.

4.6 Continued Performance. To the extent that any portion of this Agreement or any SOW is not terminated for convenience or cause, Supplier will continue performing that portion.

5. Pricing, Expenses, Invoicing and Payment Terms

5.1 Pricing. Supplier will perform the Services and deliver the Deliverables at or below the prices stated in Schedule 1 or the applicable SOW. Unless otherwise provided in Schedule 1 or the SOW, the prices include: (a) all packaging and freight to the specified delivery point; (b) all applicable taxes and other government charges including but not limited to all sales, use, or excise taxes; (c) all customs duties, fees, or charges; and (d) all items, intellectual property, and services necessary or incidental to provide the Deliverables and perform the Services in accordance with this Agreement and the applicable SOW. To the extent that value added tax (or any equivalent tax) is properly chargeable on the supply to Honeywell of any Deliverables or Services, Honeywell will pay the tax in addition to payments otherwise due Supplier under this Agreement, if Supplier provides to Honeywell a value-added tax (or equivalent tax) invoice.

5.2 Most Favorable Pricing: Service Provider will be selected based on competitive bidding process (eRFP/eAuction) to accomplish the services required under SOW.

5.3 Reimbursable Expenses. Each invoice will separately set forth expenses authorized in advance in writing by Honeywell for reimbursement ("Reimbursable Expenses"). Honeywell will reimburse Supplier for reasonable, necessary and pre-approved travel expenses incurred by Supplier in providing the Services or Deliverables that are in accordance with the Honeywell Service Provider Travel Policy attached as Exhibit C to this Agreement. Invoices must enumerate expenses actually incurred and be accompanied by documentation such as receipts, vouchers and invoices that are reasonably necessary to verify the amount, date and nature of each expense.

5.4 Invoicing. Supplier will submit invoices describing the Services, Deliverables and Reimbursable Expenses and the payments due. Unless otherwise agreed in a SOW, payment will be monthly in arrears. Invoices for Services not compensated on a fixed price basis will be itemized to reflect, as applicable, the number of hours or costs for which Supplier seeks reimbursement, and will be supported by time sheets, receipts and other documentation as Honeywell may reasonably require. The invoice must also include the following information: (a) name and address of Supplier and the Honeywell entity purchasing the Services and Deliverables; (b) name of shipper (if different from Supplier); and (c) Honeywell's purchase order number(s). Payment of an invoice does not constitute acceptance of the Services, Deliverables or Reimbursable Expenses and such payment is subject to appropriate adjustment should Supplier fail to meet the requirements of this Agreement. Payment terms are net 105 days from receipt of a correct invoice and conforming Services and Deliverables. Payment will be scheduled for the first payment cycle following expiration of the net terms period. If Honeywell disputes an invoice Honeywell will pay the undisputed portion of the invoice and withhold payment of the disputed portion until the dispute is resolved.

6. Records and Audit

6.1 Records. Supplier will retain and preserve all records and materials, including invoice records, pertaining to the Services and Deliverables provided under this Agreement for a period of 7 years after the expiration or termination of this Agreement or for the period prescribed by applicable law, whichever period is longer. Thereafter, Supplier will not destroy or dispose of or allow the destruction or disposition of such records and materials without first offering, in writing, to deliver such records and materials or copies thereof to Honeywell at Honeywell's expense. If Honeywell fails to request such records and materials within 90 days after receipt of the written offer, Supplier may destroy or dispose of such records and materials.

6.2 Audit. For a period of 7 years after termination or expiration of this Agreement or for the period prescribed by applicable law, whichever period is longer, Honeywell will have the right in connection with an examination of Honeywell or to insure compliance with the terms of this Agreement to conduct an audit If any invoice submitted by Supplier is found to be in error, an appropriate adjustment will be made to the invoice or the next succeeding invoice following the discovery of the error and the resulting payment or credit will be issued promptly. Supplier will promptly correct any deficiencies discovered as a result of the audit.

7. Acceptance

Supplier will notify Honeywell's Project Manager in writing when Deliverables have been delivered or the Services have been completed and are ready for final inspection and acceptance. If Honeywell determines that the Deliverables or Services are defective or otherwise not in conformity with this Agreement, then Honeywell will, by written notice to Supplier: (a) terminate this Agreement or any SOW, in whole or in part, for cause under the Termination for Cause clause; (b) accept the Deliverables or Services, in whole or in part, at an equitable reduction in price; or (c) reject the Deliverables or Services, in whole or in part. If Honeywell rejects the Deliverables or Services under subsection (c), then Supplier will, at Supplier's expense and in a timely manner, at Honeywell's option, re-perform, correct, repair or replace the defective or non-conforming Deliverables or Services so that they conform to the requirements of this

Agreement. If Supplier is unable or unwilling to fulfill this obligation within a reasonable time, then Honeywell may fulfill or have a third party fulfill Supplier's obligation at Supplier's expense.

8. Warranties and Remedies

8.1 General Warranties. Supplier warrants each of its personnel has the proper skill, training and background necessary to accomplish his or her assigned tasks; all Services will be performed in a competent and professional manner, by qualified personnel under the direction and control of Supplier, and in accordance with the highest standards in the industry provided by reputable service providers performing services of a similar nature; all software Deliverables provided to Honeywell will be free of code capable of disrupting, disabling, damaging, or shutting down a computer system or software or hardware component thereof or other items that may interfere with Honeywell's use of any software; and Honeywell has the right to use for any purpose any ideas, methods, techniques, materials and information provided to it or otherwise obtained by Honeywell as a result of this Agreement or any SOW without restriction, liability or obligations, except as may be specified in this Agreement or any SOW.

8.2 Service and Deliverable Warranties. Supplier warrants that for a period of one (1) year, or such longer period of time as is set forth in the applicable Statement of Work, from the date of acceptance by Honeywell ("**Warranty Period**"), the Services and Deliverables (including all replacement or corrected Services and Deliverables or components) will be free from defects in material, workmanship, and design, even if the design has been approved by Honeywell; conform to applicable drawings, designs, quality control plans, specifications and samples and other descriptions furnished or specified by Honeywell; be merchantable; be fit for the intended purpose and operate as intended; comply with all laws; be free and clear of any and all liens or other encumbrances; not infringe any patent, published patent application, or other intellectual property rights of any third party; and not utilize misappropriated third party trade secret information.

8.3 Remedies. Supplier will correct and repair any defect, malfunction, deficiency, error or non-conformance (collectively, **"Non-Conformance"**) in a Service or Deliverable which prevents the Service or Deliverable from conforming to the requirements of this Agreement or any SOW and performing as warranted, at no cost to Honeywell. If Supplier is unable or unwilling to correct or repair a Non-Conformance within the time specified by Honeywell, Honeywell may, in addition to any other rights or remedies it may have at law or in equity, by itself or through a third party correct or repair the Non-Conformance, re-perform the non-conforming Services at Supplier's expense, or require Supplier to provide Honeywell with a refund for all Services and Deliverables which do not conform and perform as warranted. Supplier is responsible for the costs of repairing, replacing or correcting nonconforming Services or Deliverables, and for all related costs, expenses and damages including, but not limited to, the costs of removal, disassembly, failure analysis, fault isolation, reinstallation, re-inspection, and retrofit of the nonconforming Services or Deliverables or of Honeywell's affected end-product; all freight charges; all customer charges; and all other corrective action costs (including costs of additional inspection or quality-control systems). Unless set off by Honeywell, Supplier will reimburse Honeywell for all such costs upon receipt of Honeywell's invoice.

8.4 Conditions Applicable to All Warranties. The warranties survive delivery, inspection, acceptance or payment by Honeywell for the entire Warranty Period. Claims for breach of warranty do not accrue until discovery of Non-Conformance, even if the Services or Deliverables were previously inspected. The warranties and rights provided are cumulative and in addition to any warranty and right provided at law or in equity. Any applicable statute of limitation runs from the date of discovery.

8.5 Authorization to Perform. Each Party represents that it is duly organized and authorized to enter into this Agreement and to perform all obligations; and that it is not a party to any Agreement with a third party which would restrict its ability to perform its obligations under this Agreement. Supplier will promptly notify Honeywell of any action taken by or against it that could result in a breach of Supplier's obligations or representations under this Agreement.

9. Intellectual Property Ownership

9.1 Disclosure. Supplier will promptly make a complete written disclosure to Honeywell of each invention, technique, device, discovery or procedure, whether patentable or not ("**Disclosed Subject**"), conceived or first actually reduced to practice solely by Supplier and its employees or agents, or jointly with Honeywell and its employees or agents, as a result of Services performed under this Agreement. As to each Disclosed Subject, Supplier will specifically point out the features or concepts that Supplier believes to be new or different.

9.2 Ownership of Work Product. The exclusive right, title and interest in and to all works performed under this Agreement, and all materials, source code, information, know-how and Deliverables prepared or developed as a result of Services performed, both as individual items or a combination of components and whether or not the Services are completed, including, without limitation, any Disclosed Subject ("Work Product") will vest in Honeywell. The Work Product will be deemed to be work made for hire and made in the course of Services rendered and will belong exclusively to Honeywell, with Honeywell having the sole right to obtain, hold and renew, in its own name or for its own benefit, patents, copyrights, registrations or other appropriate protection. To the extent that exclusive right, title or interest in the Work Product may not originally vest in Honeywell as contemplated in this Agreement (e.g., the Work Product does not constitute works made for hire), Supplier hereby irrevocably assigns, transfers and conveys to Honeywell all right, title and interest to the Work Product. Supplier and its personnel will give Honeywell or any Honeywell designee all reasonable assistance and execute all documents necessary to assist or enable Honeywell to perfect, preserve, register or record its rights in any Work Product. If for some reason the right, title and interest to Work Product is not assignable to Honeywell, then Supplier hereby grants to Honeywell an exclusive

(even as to Supplier), world-wide, assignable, paid-up, royalty-free, irrevocable, perpetual license to: (a) use, execute, reproduce, display, perform, maintain, distribute (internally and externally) copies of and prepare derivative works of the Work Product; (b) use, make, have made, sell, offer to sell, import and export the Work Product; and (c) authorize or sublicense others to do any, some or all of the foregoing without accounting to Supplier. Supplier will, immediately upon request of Honeywell, or upon termination, cancellation or expiration of the SOW or this Agreement, turn over to Honeywell all Work Product and any Honeywell documents or other materials held by or on behalf of Supplier, together with all copies thereof.

9.3 Supplier's Pre-Existing Works. Nothing contained in this Agreement will be construed to restrict, impair or deprive Supplier of any of its rights or proprietary interest in technology or products which existed prior to and independent of the performance of Services under this Agreement ("Supplier Pre-Existing Works"). No Work Product will include any Supplier Pre-Existing Works or works of authorship of a third party. To the extent that any Supplier Pre-Existing Works or other materials owned by any third party are contained in a Deliverable, those materials will be specifically identified in the applicable SOW. With respect to Supplier Pre-Existing Works or other material owned by Supplier or any third party incorporated into the Deliverables or Services, Supplier hereby grants to Honeywell an irrevocable, perpetual, non-exclusive, worldwide, royalty-free, paid-up, assignable license to: (a) use, execute, reproduce, display, perform, maintain, distribute (internally and externally) copies of and prepare derivative works thereof; (b) use, make, have made, sell, offer to sell, import and export the Supplier Pre-Existing Works or other material; and (c) authorize or sublicense others to do any, some, or all of the foregoing without accounting to Supplier.

9.4 Remedies. Supplier acknowledges and agrees that, in the event of a breach or threatened breach of this Intellectual Property Ownership Section, Honeywell will have no adequate remedy at law and, accordingly, will be entitled to an injunction against a breach or threatened breach.

10 Indemnification and Remedies

10.1 General Indemnification. Supplier will, at its expense, defend, hold harmless and indemnify Honeywell and its subsidiaries, affiliates, and agents, and their respective officers, directors, shareholders, and employees, and Honeywell's customers (collectively "**Indemnitees**") from and against any and all third party claims and related loss, cost, expense, damage, claim, demand, or liability, including reasonable attorney and professional fees and costs, and the cost of settlement, compromise, judgment, or verdict incurred by or demanded of an Indemnitee ("**Loss**") arising out of, resulting from or occurring in connection with negligent acts or omissions or willful misconduct of Supplier or its personnel, Supplier's breach of the terms of this Agreement, or any theft or other misappropriation of Honeywell's or its personnel's information, property or funds by Supplier or its personnel, except to the proportionate extent such Losses arise out of Honeywell's negligence, gross negligence or willful misconduct or breach of the Contract Documents .

10.2 Intellectual Property Indemnification Supplier will, at its expense, defend, hold harmless and indemnify the Indemnitees from and against any and all Loss arising out of, resulting from, or occurring in connection with any alleged: (a) patent, copyright or trademark infringement; (b) unlawful disclosure, use or misappropriation of trade secrets; or (c) any other violation of any third party intellectual property right. If any injunction or restraining order is issued, Supplier will, at its expense, obtain for Indemnitee either the right to continue to use and commercialize the Services and Deliverables and the allegedly misappropriated trade secrets, or replace or modify the Services and Deliverables to make them non-infringing.

10.3 Right to Defend. Supplier will have the right to conduct the defense and settlement of any claim or action described in this Indemnification and Remedies Section if it acknowledges in writing its responsibility for such claim, but in no event will Supplier enter into any settlement without Honeywell's prior written consent. Honeywell may participate in the defense or negotiations to protect its interests. If Supplier fails to defend or settle any Loss in a prompt and competent manner, then Honeywell, at its option, has the right to take over the defense and settlement of the Loss at Supplier's expense. Supplier will pay all costs, expenses (including reasonable attorney and professional fees and costs), awards, judgments and settlements promptly as they become due, and Supplier will give Honeywell all information, assistance and authority to enable Honeywell to defend and settle the claim or action.

10.4 Remedies. Unless expressly provided otherwise, all Honeywell remedies set forth in this Agreement are in addition to, and will in no way limit, any other rights and remedies that may be available to Honeywell at law or in equity.

11. Limitation of Liability

11.1 Limit on Types of Damages Recoverable. EXCEPT AS SPECIFICALLY SET FORTH IN THIS SECTION, IN NO EVENT WILL EITHER PARTY BE LIABLE TO THE OTHER PARTY FOR INDIRECT, INCIDENTAL, EXEMPLARY, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION DAMAGES FOR LOST PROFITS, REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT OR OTHERWISE AND EVEN IF SUCH PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

The limitation set forth in this Section will not apply with respect to: (a) claims for either Party's breach of its obligations with respect to the care and use of the other's Confidential Information, (b) claims for which Supplier is obligated to indemnify Honeywell under this Agreement, (c) claims for bodily injury or death or physical damage to tangible property resulting from either Party's negligence or willful misconduct, or (d) any claims resulting from either Party's fraudulent or willful misconduct.

12. Confidential Information

12.1 Definition. "**Confidential Information"** means all information exchanged between the Parties under this Agreement and in the performance of any SOW, subject to the exclusions below, including: (a) any Honeywell data made available to Supplier, (b) any Honeywell-owned or Honeywell-licensed software made available to Supplier, (c) any Personal Data of all Honeywell officers, directors, employees, agents and personnel, (d) any Supplier software licensed to or otherwise made available to Honeywell, (e) any business plans or records of the disclosing Party ("**Discloser**") made available to the receiving Party ("**Recipient**"), (f) the terms and conditions of this Agreement, and (g) any and all such other information that Discloser specifies as confidential and makes available to Recipient. Each Party's obligations of confidentiality with respect to the other Party's Confidential Information continue for 10 years after the expiration or termination of this Agreement, except for trade secrets specifically identified by Honeywell as such, which will be held in confidence perpetually, Personal Data, which will be held in confidence perpetually, and other Confidential Information which the Parties agree, in writing, will be held in confidence perpetually.

12.2 Personal Data. "**Personal Data**" means any information relating to an identified or identifiable natural person; an identifiable person is one who can be identified, directly or indirectly, in particular by reference to an identification number or to one or more factors specific to his physical, physiological, mental, economic, cultural or social identity.

12.3 Use of Confidential Information. Recipient will (a) disclose Confidential Information only to (i) its employees who are under a duty to protect the Confidential Information and (ii) those of its agents, personnel or third parties who are required to have the Confidential Information in connection with the performance or receipt of the Services or Deliverables or the performance of obligations under this Agreement or any SOW and who are bound to Recipient to protect and use the Confidential Information in accordance with the confidentiality obligations of this Agreement. The Recipient will be responsible for any breaches of the confidentiality obligations of this Agreement by such employees, agents, personnel or third parties; (b) use Confidential Information only in relation to the performance or receipt of the Services or Deliverables or the performance of obligations under this Agreement or any SOW or as provided in this Agreement; (c) protect the Confidential Information using the same degree of care of as it uses to protect its own proprietary information, but with no less than a reasonable degree of care; and (d) not decompile, disassemble, decode, reproduce, redesign, or reverse engineer Confidential Information or any part thereof. Recipient may make a limited number of copies of Confidential Information as necessary to complete the performance or receipt of the Services or Deliverables or the performance of obligations under this Agreement or any SOW. All copies made will reproduce the restrictive legends of the original. Each Party retains ownership of its Confidential Information including, without limitation, all rights in patents, copyrights, trademarks and trade secrets.

12.4 Personal Data Protection. Supplier will treat any Personal Data of all Honeywell officers, directors, employees, agents and personnel as Confidential Information. The Parties agree that the Supplier will be the Data Processor (as defined in the EU Data Protection Directive 95/46/EC) for the purposes of processing Personal Data pursuant to this Agreement. Supplier will (a) take appropriate technical and organizational security measures as are required by Honeywell to protect Personal Data; (b) use and permit employees and third parties to use Personal Data pursuant to Honeywell's instructions only for purposes directly related to the performance of the Services or Deliverables or the performance of obligations under this Agreement or any SOW; (c) refrain from transferring Personal Data out of the European Union unless Honeywell has given its prior written consent to the transfer and Supplier has satisfied any further requirements reasonably imposed by Honeywell; (d) indemnify Honeywell against all losses, costs, expenses, damages, liabilities, demands, claims, actions or proceedings which Honeywell may suffer or incur arising out of any breach of this Section; and (e) promptly notify Honeywell about: any legally binding request for disclosure of Personal Data by a law enforcement agency (unless otherwise prohibited); any accidental or unauthorized processing of Personal Data; and any requests received from individuals to whom Personal Data relates, without responding to that request unless it has been otherwise authorized to do so by Honeywell. If Supplier will process Personal Data that Honeywell transfers from any of its affiliates in the European Union to any of its affiliates in the US pursuant to the U.S. - EU Safe Harbor Framework ("**Safe Harbor Personal Data**"), Supplier warrants that either (a) Supplier self-certifies to the U.S. – EU Safe Harbor Framework with respect to the processing of the Safe Harbor Personal Data and will notify Honeywell immediately if its self-certification terminates for any reason, or (b) Supplier must provide at least the same level of privacy protection as required by the U.S. – EU Safe Harbor Framework.

12.5 Exclusions. With the exception of Personal Data, this Agreement imposes no obligation upon Recipient if Recipient can demonstrate that the Confidential Information: (a) was rightfully in Recipient's possession before receipt from Discloser and was not accompanied by a duty of confidentiality; (b) is or becomes a matter of public knowledge through no fault of Recipient; (c) is rightfully received by Recipient from a third party and is not accompanied by a duty of confidentiality; (d) is disclosed by Discloser to a third party without a duty of confidentiality on the third party; (e) is independently developed by Recipient without use of Discloser's Confidential Information; or (f) is disclosed under operation of law, provided Recipient notifies Discloser and upon Discloser's request and at Discloser's cost cooperates in all reasonable respects to contest the disclosure or obtain a protective order or other remedy.

12.6 Return. Recipient will return or destroy, at Discloser's discretion, Confidential Information and all copies upon the earlier of Discloser's written request or termination of this Agreement and will certify in writing to such return or destruction within 30 days. Notwithstanding the foregoing, Recipient may retain one copy of the Confidential Information for evidentiary purposes.

12.7 Security Terms and Conditions .Supplier will comply with Honeywell's Information and System Security Supplier Terms and Conditions attached as Exhibit D to this Agreement.

13. Insurance

Supplier will maintain and carry liability insurance which includes, but is not limited to, commercial general liability (including product liability and, for Services to be performed, completed operations liability) in a sum no less than $1 million, automobile liability in a sum no less than $1 million, workers' compensation in an amount no less than the applicable statutory minimum requirement, employer's liability in an amount of no less than $1 million, Contractor's Pollution Liability in a sum no less than $1 million. and professional liability in a sum no less than $1 million, during and for a period of at least 3 years after completion of Services, with insurance carriers with an AM Best rating of no less than A- or equivalent. Supplier will provide excess liability with limits of not less than $20 million per occurrence and in the aggregate for bodily injury and property damage. This insurance will be primary and non-contributory, and will be specifically endorsed or otherwise name Honeywell International Inc. and its subsidiaries as additional insureds, except for the workers' compensation and professional liability. Before delivery of any Deliverables or commencement of any Services under this Agreement, Supplier will provide to Honeywell evidence, in the form of one or more certificates of insurance, that Supplier maintains the described insurance, and that the coverage will not be changed without 30 days advance written notification to Honeywell from the carrier(s). Except where prohibited by law, Supplier will require its insurers to waive all rights of recovery or subrogation against Honeywell, its subsidiaries and affiliated companies, and its and their respective officers, directors, shareholders, employees, and agents. The amount of insurance carried in compliance with the above requirements is not to be construed as either a limitation on or satisfaction of the indemnification obligations in this Agreement.

14. Miscellaneous

14.1 Entire Agreement and Modifications. The exhibits, schedules and other attachments to this Agreement are incorporated by reference. This Agreement contains the entire Agreement between the Parties and supersedes and replaces any prior or inconsistent agreements, negotiations, representations or promises, written or oral, between the Parties respecting the subject matter hereof. Neither Party has relied on any promises, inducements or representations by the other, except those expressly stated in this Agreement. No modification of this Agreement will be binding on either Party unless set forth in a writing signed by an authorized representative of both Parties specifically stating it is amending this Agreement. No course of dealing, prior dealings, usage of trade or course of performance will be used to modify, supplement or explain any terms used in this Agreement.

14.2 Order of Precedence. If there is a conflict between or among the documents applicable to this Agreement, the order of precedence for resolving the conflict is (in descending order): (a) a fully signed SOW, but only for purposes of that particular SOW; (b) this Agreement; (c) the exhibits, schedules and other attachments to this Agreement; (d) Honeywell's applicable specifications, plans, drawings, designs, procedures, processes, descriptions and directions; and (e) any purchase orders issued hereunder. For purposes of clarity, a fully signed SOW can only modify the terms of this Agreement as such terms relate solely to the scope and fees of the Services and Deliverables to be provided under that particular SOW.

14.3 Waiver. The failure of either Party to enforce at any time any of the provisions of this Agreement will not be construed to be a continuing waiver of those provisions, nor will any failure prejudice the right of the Party to take any action in the future to enforce any provision.

14.4 Severability. If any provision of this Agreement is held to be illegal, invalid, or unenforceable by a court of competent jurisdiction, that provision will be severed from this Agreement; the remaining provisions will remain in full force and effect; and a similar legal, valid and enforceable provision will be substituted in lieu of the severed provision.

14.5 Headings and Captions. Headings and captions are for convenience of reference only and do not alter the meaning or interpretation of any provision of this Agreement.

14.6 Assignment and Subcontracting. This Agreement will inure to the benefit of and be binding on the Parties and their respective permitted successors and assigns. Supplier will not assign this Agreement or any rights or obligations under this Agreement or

subcontract all or any aspect of the work called for without the prior written approval of Honeywell. Any assignment or subcontract without Honeywell's written approval will be voidable at the option of Honeywell. Honeywell may assign this Agreement or any rights or obligations under this Agreement to any of its subsidiaries or affiliates or to any purchaser or successor to all or substantially all of the assets of Honeywell without Supplier's consent and upon written notice to Supplier.

14.7 Notices. All notices relating to this Agreement ("Notices") must be in writing. Notices to the Parties will be sent to their respective addresses appearing below. Any Notice will be deemed given on the date delivered if delivered personally; the next business day if sent by recognized overnight courier; 3 business days after being mailed certified first class mail, postage prepaid; or upon confirmation receipt that it was transmitted satisfactorily if transmitted by facsimile or email to addresses or numbers set forth below or as otherwise provided in writing by either Party.

If to Honeywell:

Honeywell International Inc.
101 Columbia Rd.
Morristown, NJ 07962
Attention: Mr. Raj Ghaisas
Telephone: (225) 290-0705
E-Mail: raj.ghaisas@Honeywell.com

With an additional copy to:

Honeywell International Inc.
Assistant General Counsel – Technology and Operations
Law Department
101 Columbia Road (AB-2B)
Morristown, NJ 07962

If to Supplier:

14.8 Non-Exclusivity. Nothing in this Agreement will restrict Honeywell's right to contract with any third party to provide or perform, or to provide or perform on its own behalf, Services, Deliverables and related products similar or identical to the Services, Deliverables and related products provided by Supplier pursuant to this Agreement or any SOW. Furthermore, unless otherwise specified in an SOW, there is no requirement that any minimum level of business or fees be provided to Supplier by Honeywell.

14.9 Advertising. Supplier will not use Honeywell's name or marks or refer to or identify Honeywell in any advertising or publicity releases or promotional or marketing materials without Honeywell's prior written approval. Furthermore, Supplier will not claim or suggest, implicitly or explicitly, that Honeywell's use of its services or deliverables constitutes Honeywell's endorsement of its services or deliverables.

14.10 Survival. All provisions of this Agreement which by their nature should apply beyond its Term will remain in force after any termination or expiration of this Agreement including, but not limited to, those addressing the following subjects: Pricing, Expenses, Invoicing and Payment Terms; Records and Audit; Warranties and Remedies; Intellectual Property Ownership; Indemnification and Remedies; Limitation of Liability, Confidential Information; Insurance; Severability; Notices; Advertising; Survival; Dispute Resolution - Executive Escalation; Governing Law and Forum; and Interpretation.

14.11 Dispute Resolution - Executive Escalation. The Parties will use their best efforts to settle any disputes, controversies or differences arising out of this Agreement ("**Disputes**"). Before the Parties initiate any legal action, other than injunctive relief, the Parties will consider using an executive conference. The conference will be attended by at least one executive from each Party. At the conference, each Party will present its view of the Dispute and the executives will enter into good faith negotiations in an attempt to resolve the Dispute. If the Dispute is not resolved, then either Party may pursue resolution of the Dispute consistent with the other terms of this Agreement.

14.12 Force Majeure. Neither Party will be in default for any delay or failure to perform due to causes beyond its control and without its fault or negligence ("**Force Majeure Event**"), but any delay or failure to perform caused by the default of a sub-tier supplier of Supplier will be excused only if (a) it is beyond the control of both Supplier and its sub-tier supplier(s) and without the fault or negligence of any of them, and (b) the Deliverables or Services to be furnished cannot be obtained from other sources in sufficient time to permit Supplier to meet the Delivery Schedule. Supplier's ability to sell Services or Deliverables at a more advantageous price or Supplier's economic hardship in buying materials or processing necessary for manufacture of the Services or Deliverables will not constitute a Force Majeure Event. The Party affected by a Force Majeure Event will promptly provide written notice to the other, explaining in detail the full particulars and expected duration of the Force Majeure Event, and will use its best efforts to remedy the delay if it can be remedied. If Supplier's delivery is delayed, Honeywell may, at Honeywell's sole option, cancel deliveries scheduled during the Force Majeure Event or elect to extend the period of performance to cover the period of delay caused by the Force Majeure Event. If a Force Majeure Event occurs that affects delivery of Deliverables or Services to Honeywell, Supplier will allocate its available supply of Deliverables and Services in a manner that assures Honeywell of at least the same proportion of Supplier's total output of Deliverables and Services as was allocated to Honeywell before the Force Majeure Event. If delivery of any Deliverables or Services is delayed for more than 30 days, Honeywell may, without liability, cancel all or any part of this Agreement or SOW.

14.13 Integrity and Compliance. When performing Services at Honeywell's facility, Supplier personnel will observe and comply with Honeywell's security procedures, rules, regulations, policies, working hours and holiday schedules. Supplier will comply with all laws, regulations and ordinances and Honeywell's Code of Business Conduct ("**Code**") in performing this Agreement. A copy of the Code may be obtained at http://www.honeywell.com/sites/honeywell/codeofconduct.htm. Supplier will maintain an integrity and compliance program acceptable to Honeywell and effective in preventing and correcting ethical violations and in maintaining compliance with laws.

14.14 Governing Law and Forum. The construction, interpretation and performance of this Agreement and all transactions under this Agreement will be governed by the laws of the State of New York, without regard to or application of its principles or laws regarding conflicts of laws and the federal and state courts in New York, New York will have exclusive jurisdiction of any Dispute.

14.15 No ISG/UCITA. The Parties hereby agree that their respective rights and obligations will be solely and exclusively as set forth in this Agreement and that the International Sale of Goods and UCITA, whether enacted in whole or in part by any state or applicable jurisdiction, regardless of how codified, will not apply to this Agreement and are hereby disclaimed.

14.16 Counterparts. This Agreement may be signed in one or more counterparts (including faxed or electronically scanned copies), each of which will be deemed one and the same original. Reproductions of this executed original (with reproduced signatures) will be deemed to be original counterparts of this Agreement**.**

14.17 Interpretation. This Agreement has been negotiated at arms-length between Parties who are experienced and knowledgeable in the matters contained in this Agreement, and the Parties hereby agree that any statute, law or common law principles or other authority that would require interpretation of any ambiguities in this Agreement against the Party who has drafted it are not applicable and are hereby waived.

14.18 Divested Businesses. In the event Honeywell divests a subsidiary, division or business unit, Supplier will extend services pursuant to this Agreement to such subsidiary, division or business unit for a period not to exceed 12 months from the date of divestiture under the terms of this Agreement.

14.19 Acquired Contracts. If Honeywell acquires a company that is a customer of Supplier, Supplier will permit the termination, at Honeywell's option, of the acquired entity's agreement with Supplier without liability so that the services provided to the acquired entity may be provided pursuant to the terms, condition, rates and charges contained in this Agreement between Honeywell and Supplier.

AGREED TO:
Honeywell International Inc.

By: _____

Name: _____

Title: _____

Date: _____

AGREED TO:
Supplier –

By: _____

Name:_____

Title: _____

Date: _____

PROFORMA TEMPLATE!

EXHIBIT A

FORM OF STATEMENT OF WORK

Statement of Work #[Please insert **SOW no.**]

dated [Please insert **Date**]

under the

Master Services Agreement

between

[Please insert **Honeywell legal entity of MSA**]

and

[Please insert **Supplier legal entity of MSA**]

STATEMENT OF WORK #[Please insert SOW no.]

This Statement of Work (SOW) #[Please insert **SOW no.**]dated [Please insert **Date**] between [Please insert **Honeywell legal entity and business address for SOW**] ("Honeywell") and [Please insert **Supplier legal entity and business address for SOW**] ("Supplier") is an attachment to the Master Services Agreement made entered as of [Please insert **MSA Date**] between [Please insert **Honeywell legal entity of MSA**] and [Please insert **Supplier legal entity of MSA**] (the "Agreement") and hereby fully incorporates the Agreement by reference. All capitalized terms not otherwise defined herein have the meaning ascribed to them in the Agreement. Supplier will provide Honeywell with the Services detailed in this SOW in accordance with the following requirements and schedules.

Scope:

The scope of Services performed under this SOW includes those described in this SOW and any additional or new services to which the Parties mutually agree in a written Change Order.

Administrative Information:

The Supplier Project Manager for this SOW is [Please insert **full name and title and contact info**]

The Honeywell Project Manager for this SOW is [Please insert **full name and title and contact info**]

The Honeywell Purchase Order Reference No. for this SOW is [Please insert **PO no.**].

Term:

The term of this SOW commences on [Please insert **Commencement Date**] and terminates on [Please insert **Termination Date**], unless earlier terminated or extended as set forth in the Agreement. Provisions for extension of this SOW, if any, are also as set forth in the Agreement.

Invoices:

Invoices (including the Honeywell Purchase Order number) will be sent to:

Honeywell
[Please insert **mailing address and contact**]

With a copy to:

Honeywell
[Please insert **internal Honeywell client name, title, mailing address, if any - otherwise enter "n/a"**]

SCHEDULES
1. Services and Milestones
2. Responsibilities
3. Key Personnel
4. Approved Subcontractors
5. Service Location(s)
6. Required Reports
7. Required Meetings
8. Required Software, Hardware, Equipment and Facilities
9. Fees and Expenses
10. Performance Guarantees and Credits
11. Termination/ Expiration Assistance
12. List of Change Orders

The Parties' authorized representatives have executed this Statement of Work by their signatures below:

Honeywell	**Supplier**
By: _____	**By:** _____
Name: _____	**Name:** _____
Title: _____	**Title:** _____
Date: _____	**Date:** _____

SCHEDULES

Schedule 1 – Services and Milestones

Services

#	Services / Deliverables	Deliverable Due Date	Acceptance Criteria	Review Completion Date
1	[Please **insert**]			
2				
3				
4				
5				
6				
7				
8				
9				
10				

Milestones

#	Milestone Date	Event	Completion Criteria
1	[Please **insert**]		
2			
3			
4			
5			
6			
7			
8			
9			
10			

Schedule 2 –Responsibilities

In addition to the responsibilities and deliverables outlined in the Agreement, Supplier's responsibilities for Services and deliverables include but are not limited to the following:

Supplier's Responsibilities

#	Responsibility	Due Date or Deadline
	[Please **insert**]	
1		
2		
3		
4		
5		
6		
7		

Honeywell Responsibilities

In addition to the responsibilities outlined in the Agreement, Honeywell's responsibilities include but are not limited to the following:

#	Responsibility	Due Date or Deadline
	[Please **insert - if none, insert "None"**]	
1		
2		
3		
4		
5		
6		
7		

Schedule 3 – Key Personnel

Supplier Personnel: List Key Supplier Personnel <u>only</u> if they are critical.

Note: Supplier is responsible for providing the deliverables and assigning adequate personnel to do so. The Supplier is responsible for the day-to-day management of their personnel.

Name	Title
[Please **insert**]	

Schedule 4 – Approved Subcontractors

Approved Subcontractors:

Approved Subcontractor Name	Describe Subcontracted Services	Limitations Regarding Subcontracted Services
[Please **insert - if none, insert "None"**]		

Schedule 5 –Service Location(s)

Supplier Service Location(s):
[Please **insert**]

Honeywell Service Location(s):
[Please **insert - if none, insert "None"**]

Schedule 6 – Required Reports

Required Reports:
[Please **insert**]

Schedule 7 – Required Meetings

Required Meetings:
[Please **insert**]

Schedule 8 – Required Software, Hardware, Equipment, and Facilities

List items required to be supplied by Honeywell and Supplier to complete the services:

Supplier Required Software, Hardware and Equipment
[Please **insert**]

Honeywell Required Software, Hardware and Equipment
None, unless stated otherwise

Schedule 9 – Fees and Expenses

I. For Fixed Fee Engagement:

Specify the Suppliers fee for the Services and Deliverables provided under this SOW

Deliverable or Milestone	**Amount**
[Please **insert**]	
Total Fees	

II. Professional Services Fees:

The following fee schedule sets forth the maximum fees to be used when calculating project fees for Services under this SOW that are billed on a time and materials basis.

[Note: If used, include under Supplier Responsibilities that Supplier will be responsible for providing a detailed report of actual hours and rates expended by each of their resources on the project.]

Task/Project	**Fee Amounts**
Total Fees	

III. Software License, Hardware and Equipment Fees:

Description:	**Fee Amount:**
[Please **insert - if none, insert "None"**]	
Total Fees	

IV. Miscellaneous.

[Please **insert e.g. volume discounts or other provisions specific to the SOW- if none, insert "None"**]

Schedule 10 – Performance Guarantees and Credits

#	SERVICES	MILESTONE	% REDUCTION FOR FAILURE TO MEET MILESTONE
1	[Please **insert**]		
2			
3			
4			
5			
6			
7			
8			
9			
10			

Schedule 11 – Termination/Expiration Assistance

Should either Party terminate this SOW prior to the normal expiration of the SOW, Supplier will provide the following Services to Honeywell no later than the effective date of the termination and perform any services required under the Term and Termination Section of the Agreement:

- Deliver to Honeywell in the format and on the media specified by Honeywell the most current version of all Work Product created under this SOW.
- Return to Honeywell all Honeywell data and Honeywell Confidential Information.
- [Please **insert any additional obligations, if any**]

Schedule 12 – List of Change Orders

Change Order Number	Change Order Date	Change Order Author	Change Order Description

PROFORMA TEMPLATE!

EXHIBIT B

CHANGE REQUEST FORM AND CHANGE ORDER FORM

PART A: CHANGE REQUEST FORM

To Be Completed by Honeywell

Honeywell Legal Entity Name ("Honeywell"): _____ Change #: _____

Project Name: _____ SOW # and Date: _____

Supplier Legal Entity Name ("Supplier"): _____ Supplier SOW Manager Name: _____

Requester's Name: _____ Phone #: _____ Date: _____

Description/Reason for Change:

Benefits of Change:

Costs of Not Doing Change: _____

Related Change Requests: _____

Priority: High ☐ Medium ☐ Low ☐

To Be Completed by Supplier

Items Impacted	Description of Impact (Scope, Cost, Schedule, other)
[Please **insert**]	
(add rows to Items list as needed)	

Risk Severity Impact: High ☐ Medium ☐ Low ☐

Time to complete this change: _____

Cost of this change:

ACCEPTANCE or REJECTION

Honeywell

Acceptance ( ) Rejection ( )

Approved By: _____ Date: _____

Title: _____ Rejection Reason: _____

Supplier Acceptance

Approved By: _____ Date: _____

Title:

EXHIBIT B (CONTINUED)

PART B: CHANGE ORDER FORM

CHANGE ORDER NO. [Please insert no.] ("CHANGE ORDER") TO THE STATEMENT OF WORK NO. [Please insert no.] DATED [Please insert Date] MADE BY AND BETWEEN HONEYWELL AND SUPPLIER (THE "PARTIES")

Whereas, the Parties desire to amend the scope of Services in Statement of Work specified in this Change Order.

Now, therefore, in consideration of the mutual promises and covenants contained in this Change Order Agreement, the Parties agree as follows:

1. Effective as of the date hereof, the following revisions shall be made to the Statement of Work specified in this Change Order:

Schedule 1: [Please insert **changes in detail**]

Schedule 2: [Please insert **changes in detail**]

Schedule 3: [Please insert **changes in detail**]

Schedule 4: [Please insert **changes in detail**]

Schedule 5: [Please insert **changes in detail**]

Schedule 6: [Please insert **changes in detail**]

Schedule 7: [Please insert **changes in detail**]

Schedule 8: [Please insert **changes in detail**]

Schedule 9: [Please insert **changes in detail**]

Schedule 10: [Please insert **changes in detail**]

Schedule 11: [Please insert **changes in detail**]

2. Except as hereinabove amended, all of the terms and conditions of the Statement of Work specified in this Change Order shall remain in full force and effect.

In Witness Whereof, the Parties have caused this Change Order to the Statement of Work specified in this Change Order to be executed by the signatures of their respective authorized representatives.

Honeywell	**Supplier**
By: _____	**By:** _____
Name: _____	**Name:** _____
Title: _____	**Title:** _____
Date: _____	**Date:** _____

EXHIBIT C

HONEYWELL TRAVEL GUIDELINES FOR SERVICE PROVIDERS

It is Honeywell's policy to conduct business travel in the least expensive manner following the guidelines defined within this document. No Service Provider should materially or monetarily benefit nor be penalized because of expenses incurred while traveling for Honeywell. Reimbursement shall be made for actual, reasonable and proper expenditures incurred in the conduct of approved Honeywell business. The purpose and amount of the expenditure should conform to the ethical and legal standards of conduct expected of all Honeywell Service Providers.

Any exceptions taken to these Travel Guidelines for Service Providers must be approved in writing by the CFO of the contracting entity.

AIR TRAVEL

A. All air travel must be booked economy / coach class.

B. All Service Providers must select the lowest logical airfare. For domestic travel, select the lowest logical airfare within a four-hour window of the desired departure time (2 hours before and 2 hours after), including connecting flights requiring not more than one connection per direction.

   For international travel, select the lowest logical airfare within an eight-hour window (4 hours before and 4 hours after) the requested time of travel for long-haul, out of country travel. For travel between USA and Mexico, between USA and Canada, between Asia and the Pacific (including India) and between Europe and the Middle East, the four-hour window will apply.

C. Where possible, travelers should make flight reservations at least 14 days in advance of the date of travel to take advantage of advance purchase discounts.

CAR RENTAL

A. Rental automobiles should be used only when economically justified over all other means of transportation (i.e. taxi, public transportation etc.)

A. Intermediate cars should be used unless equipment being carried or number of passengers requires a larger vehicle. If larger than intermediate car is rented, need to provide justification on the rationale for the larger vehicle

B. If there is a need to rent a car and Honeywell will reimburse for the expense, the car should be rented through Honeywell's preferred car rental providers. In the United States, Puerto Rico and Canada, the car rental providers are National and Enterprise. The contract number to use for both brands when renting is XZ24HSP. For Europe and Australia, the car rental provider is Europcar. The contract number to use is 50488454 EP.

C. Honeywell's rates include both Liability Insurance and Loss Damage Waiver. If the Service Provider purchases additional insurance, the cost of the insurance will *not* be reimbursed by Honeywell. If the Service Provider has a need to use the car insurance and the liability limits are in excess of those provided by the respective car rental agency, the Service Provider is responsible to pay the excess/deductible.

D. Please note that the contract numbers are strictly confidential and may not be used or disclosed to anyone other than to representatives of National, Enterprise, or Europcar when you are reserving a car.

SHUTTLE SERVICE - TAXI - LOCAL TRANSPORTATION

Commercial ground transportation such as shuttles, taxis, and public transportation should always be utilized in preference to renting a vehicle unless the use of the rental automobile is more cost effective.

At no time is a private car and driver (i.e., black car, limousine service, etc) acceptable; this mode of transportation is not reimbursable.

LODGING

Contact the Honeywell person providing work direction for assistance in arranging for lodging at the Honeywell location being visited. Where available, and to the extent possible, Service Providers should stay at Honeywell preferred hotel properties where Honeywell has a negotiated rate. In addition, Service Providers should request any special, published rates available upon check-in at the local property. Only standard room accommodations will be reimbursed; suites, concierge level, etc room types are not reimbursable unless they are provided at the same rate as the property's standard room rate or Honeywell's negotiated rate, whichever is lower.

PERSONAL EXPENSES

Expenses of a personal nature that are not considered necessary in the conduct of company business will not be reimbursed.

MEALS

Actual expense of meals, including gratuity, within reasonable limits (generally not to exceed a total of $70 per day) will be reimbursed. Alcohol will not be reimbursed

TELEPHONE CALLS

Reasonable business-related phone calls are reimbursable; personal telephone calls are not reimbursable.

ENTERTAINMENT

Entertainment expenses incurred by Service Providers in the course of Honeywell business are not reimbursable.

EXPENSE DOCUMENTATION

An itemized per day listing of reimbursable expenses shall be submitted. **Original** receipts are required for each travel-related expenditure of $25 or more. Proper receipts are as follows:

Airfare: Airline ticket (will be eligible for reimbursement only after the trip has taken place)

Hotel: Itemized hotel bill showing "Paid in Full"

Car rental: Rental agreement showing "Paid in Full"

Meals: Detailed receipts which denotes what was ordered. Tear tabs are insufficient documentation for meal spending and are not acceptable.

Phone calls: Person called/Business reason

Cash Out-of-Pocket Expenses: Original receipts are required for all cash out-of-pocket expenses regardless of dollar value.

PAYMENT

Service Provider should use their company's corporate credit card or their personal credit card for payment of their travel expenses. Service Provider's company will get reimbursed for Honeywell approved travel expenses through the normal invoice process.

EXHIBIT D

HONEYWELL'S SECURITY TERMS AND CONDITIONS FOR SUPPLIERS

The Honeywell Security Terms and Conditions for Suppliers set out below ("Security Terms and Conditions") were determined based on the anticipated scope of Services and Deliverables. If there is a subsequent change to scope of Services or Deliverables to be provided under this Agreement that impacts the previously agreed upon Security Terms and Conditions, then the Parties shall agree to amend this Security Terms and Conditions to reflect such change appropriately.

The Security Terms and Conditions are based upon Honeywell's Global Security Policies and Standards and may be modified from time to time. However, Honeywell will provide written notice to Supplier thirty (30) days in advance for any modification that impacts Supplier and no modification that has a material cost or other impact to Supplier will be effective until agreed to in writing by Supplier.

Instructions for the Honeywell Procurement Professional:

Detailed instructions for this process are available at http://go.honeywell.com/ProcurementSecurity

In summary, the process is as follows:

1. Procurement Professional downloads a copy of the Security Questionnaire/Checklist (Excel file) to send to the internal Procurement client.
2. The internal Procurement client completes the checklist (Questionnaire and Checklist tabs) to determine specific Security Terms and Conditions. Honeywell Global Security (HGS) can assist with this process.
3. The completed checklist is then sent to HGS (hgs-services@honeywell.com) so that HGS can review/reconcile the responses and generate the report of applicable Security Terms and Conditions (MS Word doc).
4. HGS sends the reviewed checklist and report of applicable Security Terms and Conditions to the Procurement Professional, who will provide it to Supplier for review and acceptance.
5. Once agreed upon, Procurement Professional shall attach the report constituting the Security Terms and Conditions as displayed text as Security Exhibit/Attachment to the MSA (not as embedded document).

Please note:

- **Any changes to the Security Terms and Conditions must be approved by HGS.**
- Sending the completed checklist to HGS also helps HGS track/manage Honeywell's supplier risk environment.

This textbox has to be deleted before executing the agreement.

LUMP SUM/UNIT RATE PROPOSAL
SECTION III
GENERAL REQUIREMENTS

Specification Section 01010
Summary of Work

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1.0 GENERAL

1.1 The material herein supplements that contained in Specification 01100-Remediation Construction Requirements (Section 3.0) as well as applicable articles in the Contract (Section 2.0).

1.2 Definitions: The following contract entities that are used in Section 2.0 and Specification Section 01100 are defined as follows:

- Client: Honeywell International Inc. (Honeywell)
- Alliance Partner, Engineer: Anchor QEA Engineering, PLLC.
- Contractor: Successful Bidder.

2.0 DRAWINGS

2.1 Contract Drawings transmitted with and made part of this Request for Proposal (RFP) in Section 5.0 are as listed on the Drawing Index in Paragraph 9 this Specification.

3.0 SPECIFICATIONS

3.1 General and Technical Specifications transmitted with and made part of this RFP in Sections 3.0 and 4.0 are as listed on the Specification Index in Paragraph 10 of this Specification.

4.0 INTENT

4.1 The intent of this Specification is to:

- summarize the Scope of Work;
- define work that is not included in the Contract but provided by Honeywell or Others; and
- provide measurement and payment terms for the Work required by the [Contractor][Subcontractor]

4.2 Bidder shall include cost(s) to furnish all labor, supervision, materials, construction tools, equipment, engineering, and services as required and reasonably incidental to the proper completion of all Work as called for on the Drawings and/or Bills of Material, and Specifications transmitted with and made part of this RFP except for work specifically furnished by Honeywell or Others.

4.3 Work called for or implied on one document but omitted on others shall not be considered a valid basis for claim of omission by the successful Bidder in bidding or in performing work. Any such conflict is the responsibility of the Bidder alone to call to the attention of Honeywell for resolution.

4.4 Schedule: Date for Substantial Completion is September 30, 2015. For Substantial Completion, all areas shall be excavated, sampled, backfilled, compacted, and have received final surface restoration (pavement, concrete, or topsoil and seed). Final Completion must be accomplished [no later than September 30, 2015 at which time all work including final site cleanup, removal of temporary erosion control measures, removal of the site temporary facilities and controls (decontamination pad, liquid waste storage facilities, etc.), and project documentation shall be completed. All invoices must be submitted to Honeywell within 30 calendar days from the accepted Final Completion date. Refer to the attached Project Schedule (Attachment 01010-1) of tentative dates for major milestones.

5.0 WORK NOT INCLUDED

5.1 Any other work not included in this contract is specifically stated under each item of work.

6.0 WORK SUMMARY

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The Buffalo River AOC is located in the City of Buffalo in western New York State. The AOC includes the entire 1.4-mile stretch of the City Ship Canal that adjoins the river just upstream of the river confluence with Lake Erie, and extends upstream in the main Buffalo River approximately 6.2 miles. The remedy for the Buffalo River AOC consists of sediment removal, capping of contaminated sediment, and aquatic habitat restoration upon completion of the dredging activities. Sediment removal activities have already begun under a separate contract.

Subaqueous capping work under this contract includes the placement of a cap within the head of the City Chip Canal and multi-layer armored cap adjacent to the ADM/Pillsbury property, also within the City Ship Canal but north of the main capping and restoration area. Following sediment remediation activities, habitat restoration will be conducted at five restoration sites to fulfill the remedial action objectives. The five restoration areas include Riverbend, Buffalo Color Peninsula, Ohio Street Shoreline, Katherine Street Peninsula, and the City Ship Canal.

The Contract work is subdivided into Base Work and Optional Work. The Optional work will be undertaken at the owner's discretion. The Base Work includes the following:

- ADM/Pillsbury armored cap
- City Ship Canal cap
- City Ship Canal habitat restoration
- Katherine Street Peninsula habitat restoration.

The Optional Work consists of the following:

- Option 1 - Riverbend habitat restoration
- Option 2 - Buffalo Color Peninsula habitat restoration
- Option 3 - Ohio Street Shoreline habitat restoration

Capping and habitat restoration construction activities will begin in 2014 and be completed in 2015. The Contractor will perform replanting and installation of herbivory protection controls from 2015 until 2016 under warranty.

The work under this Contract is for the capping and habitat restoration work. The scope of Base and Optional work under this contract includes but is not limited to the following:

- Provide coordination of work sequencing and scheduling under this Contract with Honeywell and other subcontractors conducting work under the minor contracts; i.e. surveyors, nurseries, quarries, and any other subcontractor that may be necessary to perform the work. Coordination will also be required with the ongoing dredging operations currently proceeding on the Buffalo River under separate contract.
- Develop and obtain approval for all work plans for habitat restoration and planting activities.
- Provide soil erosion and sedimentation controls (SESC).
- Install a subaqueous armored cap consisting of a filter and armor layer at the ADM/Pillsbury property.
- Install a subaqueous cap consisting of clean backfill materials at the City Ship Canal.

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- Place subgrade materials for Emergent Vegetation (EV) and Submerged Aquatic Vegetation (SAV) planting beds at the City Ship Canal and Katherine Street restoration areas
- Place planting substrate material at all five restoration areas.
- Install gravel spawning bed areas in the City Ship Canal.
- Install riprap rock vanes and stormwater outfall aprons.
- Install waterway habitat structures including anchored rootwad logs, porcupine cribs, and coir buffers.
- Install EV and SAV plants at proposed locations and densities.
- Install herbivory protection measures in EV planting areas.
- Provide all necessary environmental protection controls and monitoring during in-water work.
- Remove, coordinate, and transport debris that will affect the performance of the sediment cap and habitat restoration areas.
- Provide all necessary pre-construction, verification, progress, and as-built capping and habitat restoration material placement verification surveys
- Perform additional planting as necessary to provide required coverage in EV and SAV areas after one growing season.

In support of the remediation, temporary facilities and controls are required. These facilities and controls include; temporary office facilities, decontamination facilities, temporary utilities, and stockpile containment area controls.

Construction Sequencing

The project involves careful sequencing of the work to complete the project safely and in a timely manner. Prior to capping and habitat restoration activities, temporary facilities and controls will be installed. The staging area will be selected by the Contractor, a list of potential sites is provided in this request for proposal but the Contractor will be required to secure staging necessary to perform the work. SESC controls will also be established. The Contractor will conduct pre-capping and habitat restoration bathymetric surveys of each of the five restoration areas as well as the ADM/Pillsbury armored cap areas. Visible in-water debris that interferes with capping and habitat restoration activities will be removed and disposed of. Capping activities will be performed at the City Ship Canal beginning in the summer or fall of the first construction season. The ADM/Pillsbury Cap, consisting of a filter layer, and armor layer and a toe berm, may be constructed concurrently or during a later season. The sequence of installation will begin with the toe berm placement followed by the filter layer placement, and finally the armor layer placement. A bathymetric survey will be completed following placement of each layer to verify cap placement and thickness.

Following placement and bathymetric surveys of those material placement areas, the rock vanes, anchored rootwad logs, gravel spawning beds, and storm water outfall aprons will be installed. In the City Ship Canal, anchored rootwad logs will be placed above the gravel spawning bed areas. Planting substrate will then be installed at all five restoration areas. All habitat restoration materials, including loose fill, stone, and waterway habitat structures will be surveyed following placement.

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In the following year, after a season waiting period, the EV and SAV planting substrate placement areas will be surveyed to identify the limits of EV and SAV planting areas prior to planting. The coir buffer, porcupine cribs, and EV and SAV plants will be installed. The plants will be installed during the optimal planting seasons of the species selected by the Contractor. Herbivory Protection will be installed following EV planting. The EV and SAV monitoring, to be performed by the Owner's Representative, will begin immediately following the installation of plants. All waterway habitat structures and EV and SAV planting areas will be surveyed following installation. Herbivory Protection will be removed by the Contractor following the growing season, prior to ice flows in the City Ship Canal and Buffalo River. The Contractor will demobilize all remaining earth-moving equipment at this time. In the spring of the second growing season planting coverage will be assessed by the Owner's Representative. Any necessary replanting identified during monitoring will be conducted during the second growing season by the Contractor.

7.0 WORK INCLUDED

The Bid Items listed in the following paragraphs and presented in the Proposal Form Table 1-1 (RFP Section 1.0) shall constitute all items to be specifically paid under this Contract. Further definition for establishing methods of measurement and payment can be referenced in Specification Section 01100 Remediation Construction Requirements under Paragraph 3.6 -Measurement and Payment.

Incidental Work Items: A general description of work to be performed under this contract is provided by the Work Summary and Bid Items listed herein. However, this "Summary of Work" is not to be misconstrued by the Bidder as being a complete description of all work. The Bidder is responsible for reading all portions of this RFP and for including all costs for incidental items required to complete construction tasks, regardless of whether an incidental task/item is specifically referenced in the general description of the Bid Item.

Under each applicable pay item, incidental items include but are not limited to furnishing adequate and competent labor; participation in Pre-Construction Meeting, Safety Meetings, Project Planning and Progress Meetings; and a Project Closeout Meeting; protection of utilities not otherwise directed to be replaced or abandoned; health and safety and personal protective equipment (PPE); signs; all survey work including that required for layout (horizontal and vertical controls), for intermediate and final quantities for payment;, and to record "as-built" locations and elevations of all installed work; site supervision and supervision of and coordination with other subcontractors; coordination with regulators during on-site inspections (if necessary); weather delays; clean up and trash removal; and preparing recurring reporting and tracked submittals as listed in (**Attachment 01010-2** and **Attachment 01010-3**, respectively) except Work Plans, which are paid for under Bid Item 1.00, Work Plans, Schedules and Permits. Submittals incidental to the work include Material/Product Specifications, Technical Data, Samples, Calculations, Certifications, Warranties, Equipment Manuals/Procedures, Test Results, Shop Drawings and Record Drawings. Incidental work items also include operating and maintaining:

- all equipment, tools, supplies and materials
- remedial work zones
- temporary office
- temporary sanitary/shower facilities
- temporary utilities
- soil erosion and sedimentation control

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- stock pile management area
- temporary roads
- temporary fence
- decontamination pad
- traffic control measures
- all other temporary facilities needed to accomplish the work.

The construction and removal of the above bulleted items are covered under Mobilization and Demobilization Bid Items, respectively.

7.1 WORK PLANS, SCHEDULES AND PERMITS

7.1.1 Bid Item 1.1 - Work Plans, Schedules and Permits

7.1.1.1 Description: Work for this Bid Item includes the preparation and submittal of work plans and schedules for approval prior to the commencement of construction. Work plans and schedules are expected to include, but not be limited to, a Construction Work Plan (including a Materials Management Plan), a Health and Safety Plan (HASP), , a Quality Assurance/Quality Control Plan (QA/QC), a Storm Water Management Plan and a detailed Construction Schedule.

Work for this Bid Item also includes obtaining all local, State and Federal permits, as necessary for the execution of the work, unless the permit is specifically listed as Honeywell's [or AP's] responsibility in the attached Permit Schedule **(Attachment 01010-4)**. Work for this Bid Item shall include preparation and submittal (including fees) of all Contractor related permits required to complete the work.

7.1.1.2 Measurement. This Bid Item will be measured on a Lump Sum Basis.

7.1.1.3 Payment. Payment will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.2 MOBILIZATION

7.2.1 Bid Item 2.1 ï Temporary Facilities and Controls

7.2.1.1 Description. Work for this Bid Item includes the transportation of all equipment, tools, supplies, materials, and personnel to the Site, as necessary for the execution and completion of the work. This Bid Item also includes furnishing and installing temporary facilities and controls, as shown on the Construction Drawings, as required for the execution of the Work, and/or as approved by Honeywell. Temporary Facilities and Controls are expected to include, but not be limited to furnishing and installing Contractor and Honeywell separate temporary on-site office/trailer space with temporary power; on-site sanitary / shower and other temporary utilities; Contractor equipment/material storage areas (i.e. lay-down areas); water storage facilities; waste staging/storage and soil stockpile management area(s); decontamination pad and associated facilities; on-site truck scale; and truck inspection access. Work for this Bid Item also includes construction of temporary roads; furnishing and installing site security, safety, and protection measures; and establishing remedial work zones, dust control, and personal / traffic control measures (barricades, temporary fencing, and signage) required for the Work. This Bid Item also includes furnishing and installing erosion and sedimentation controls as

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shown on the Construction Drawings in accordance with New York State Best Management Practices. Erosion and sedimentation controls may be installed in phases and relocated as the work progresses as approved by Honeywell and as required for the Work.

7.2.1.2 Measurement. This Bid Item will be measured on a Lump Sum Basis.

7.2.1.3 Payment. Payment will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.2.2 Bid Item 2.2 ï Surveys

7.2.2.1 Description. Work for this item includes the equipment, labor, and materials required to conduct bathymetric and topographic surveys at the locations and in the sequences identified in the Technical Specifications.

7.2.2.2 Measurement. This Bid Item will be measured on a Lump Sum Basis.

7.2.2.3 Payment. Payment will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.3 DEMOLITION [RESERVED]

7.4 EXTRACTION SYSTEM [RESERVED]

7.5 INJECTION SYSTEM [RESERVED]

7.6 EARTHWORK

7.6.1 Bid Item 6.1 ï Katherine Street Peninsula Habitat Subgrade

7.6.1.1 Description. Work for this item includes the equipment, labor, and materials required to install the Katherine Street habitat subgrade material at the limits shown on the Construction Drawings. Work for this Bid Item includes testing of the borrow source(s).

7.6.1.2 Measurement. This Item will be measured on a Lump Sum Basis. Excess material delivered to the site and not used in the work will not be included in the measurement.

7.6.1.3 Payment. Payment will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.6.2 Bid Item 6.2 ï Planting Substrate

7.6.2.1 Description. Work for this item includes the equipment, labor, and materials required to install the planting substrate materials at the limits of EV and SAV planting depths, as illustrated by the EV and SAV planting areas shown on the Construction Drawings. Work for this Bid Item includes testing of the borrow source(s).

7.6.2.2 Measurement. This Item will be measured on a Unit Rate Basis; per SF of planting substrate placed. The measured SF quantity shall be based on surveys performed for payment. Unit Rate Costs shall be extended by the Estimated Bid Quantity to establish a Lump Sum Cost. Excess material delivered to the site and not used in the work will not be included in the measurement.

7.6.2.3 Payment. Payment for this Bid Item will be made for the total value listed for this Bid Item on the Proposal Form when the actual amount of work accepted, based upon document review

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and/or measurements by Honeywell is within plus or minus 5% of the Estimated Bid Quantity. Actual accepted quantities in excess of the 105% of the Estimated Bid Quantity that may result in a higher cost to Honeywell will require the Contractor to request a Construction Change Order before performing such extra work. Actual accepted quantities below 95% of the Estimated Bid Quantity shall result in an automatic credit to Honeywell. The Contractor's Unit Rate Costs, as submitted with their Proposal, shall be equally applied to any extra costs (above 105%) or credits (below 95%).

7.6.3 Bid Item 6.3 ï Gravel Spawning Bed Gravel

7.6.3.1 Description. Work for this item includes the equipment, labor, and materials required to install the Gravel Spawning Bed Gravel at the limits shown on the Construction Drawings. Work for this Bid Item includes testing of the borrow source(s).

7.6.3.2 Measurement. This Item will be measured on a Lump Sum Basis. Excess material delivered to the site and not used in the work will not be included in the measurement.

7.6.3.3 Payment. Payment will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.6.4 Bid Item 6.4 ï Riprap Rock Vanes

7.6.4.1 7.6.4.1: Description. Work for this item includes the equipment, labor, and materials required to install the riprap material at the limits shown on the Construction Drawings. This line also includes the excavation and relocation of existing shoreline sediments where necessary to key-in the rock vanes as shown on the Construction Drawings. Work for this Bid Item includes testing of the borrow source(s).

7.6.4.2 7.6.4.2: Measurement. This Bid Item will be measured on a Lump Sum Basis. Excess material delivered to the site and not used in the work will not be included in the measurement.

7.6.4.3 Payment. Payment will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.6.5 Bid Item 6.5 ï Outfall Scour Protection

7.6.5.1 Description. Work for this item includes the equipment, labor, and materials required to install the riprap and bedding materials at the limits shown on the Construction Drawings. This item also includes the excavation and relocation of existing shoreline sediments where necessary to key-in the outfall scour protection as shown on the Construction Drawings. Work for this Bid Item includes testing of the borrow source(s).

7.6.5.2 Measurement. This Item will be measured on a Unit Rate Basis; per SF of scour protection installed. The measured SF quantity shall be based on surveys performed for payment. Unit Rate Costs shall be extended by the Estimated Bid Quantity to establish a Lump Sum Cost. Excess material delivered to the site and not used in the work will not be included in the measurement.

7.6.5.3 Payment. Payment for this Bid Item will be made for the total value listed for this Bid Item on the Proposal Form when the actual amount of work accepted, based upon document review and/or measurements by Honeywell is within plus or minus 5% of the Estimated Bid Quantity. Actual accepted quantities in excess of the 105% of the Estimated Bid Quantity that may result in a higher cost to Honeywell will require the Contractor to request a Construction Change Order before performing such extra work. Actual accepted quantities below 95% of

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the Estimated Bid Quantity shall result in an automatic credit to Honeywell. The Contractor's Unit Rate Costs, as submitted with their Proposal, shall be equally applied to any extra costs (above 105%) or credits (below 95%).

7.7 SEDIMENT CAPPING

7.7.1 Bid Item 7.1 ï ADM/Pillsbury Armored Cap

7.7.1.1 Description. Work for this item includes the equipment, labor, and materials required to install the ADM/Pillsbury armored cap at the limits shown on the Construction Drawings. The ADM/Pillsbury armored cap includes a filter and armor stone layer as well as a riprap toe protection.

7.7.1.2 Measurement. This Item will be measured on a Lump Sum Basis. Excess material delivered to the site and not used in the work will not be included in the measurement.

7.7.1.3 Payment. Payment for this Bid Item will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress Payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.7.2 Bid Item 7.2 ï City Ship Canal Cap: In-water Fill

7.7.2.1 Description. Work for this item includes the equipment, labor, and materials required to install the City Ship Canal cap at the limits shown on the Construction Drawings. Work for this Bid Item includes testing of the borrow source(s).

7.7.2.2 Measurement. This Bid Item will be measured on a Lump Sum Basis. Excess material delivered to the site and not used in the work will not be included in the measurement

7.7.2.3 Payment. Payment for this Bid Item will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress Payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.7.3 Bid Item 7.3 ï Debris Removal, Loading, and Transport

7.7.3.1 Description. Work for this item includes the equipment, labor, and materials required to remove, load, transport and dispose of debris removed as necessary to construct the required elements of capping and habitat restoration areas to a Honeywell-approved treatment, storage, and disposal facility. The Contractor shall assume disposal at the USACE Buffalo District CDF #4. Transportation shall meet all Federal, State, and local requirements and regulations as required for the execution of the work, and as approved by Honeywell.

7.7.3.2 Measurement. This Item will be measured on a Unit Rate Basis; per CY of debris removed. Unit Rate Costs shall be extended by the Estimated Bid Quantity to establish a Lump Sum Cost. The measured CY will be based on burial pit volume measurements conducted at the USACE Buffalo District CDF #4.

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7.7.3.3 Payment. Payment for this Bid Item will be made for the total value listed for this Bid Item on the Proposal Form when the actual amount of work accepted, based upon document review and/or measurements by Honeywell is within plus or minus 5% of the Estimated Bid Quantity. Actual accepted quantities in excess of the 105% of the Estimated Bid Quantity that may result in a higher cost to Honeywell will require the Contractor to request a Construction Change Order before performing such extra work. Actual accepted quantities below 95% of the Estimated Bid Quantity shall result in an automatic credit to Honeywell. The Contractor's Unit Rate Costs, as submitted with their Proposal, shall be equally applied to any extra costs (above 105%) or credits (below 95%).

7.8 CONTAINMENT SYSTEM [RESERVED]

7.9 PERMANENT WATER TREATMENT SYSTEM [RESERVED]

7.10 SOIL VAPOR TREATMENT SYSTEM [RESERVED]

7.11 IN-SITU TREATMENT [RESERVED]

7.12 WASTE TRANSPORTATION [RESERVED]

7.13 SITE RESTORATION

7.13.1 Bid Item 13.1 ï Anchored Rootwad Log and Log Pole Installation

7.13.1.1 Description. Work for this item includes the equipment, labor, and materials required to provide and install the anchored rootwad logs and log poles shown on the Construction Drawings.

7.13.1.2 Measurement. This Bid Item will be measured on a Lump Sum Basis.

7.13.1.3 Payment. Payment for this Bid Item will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress Payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.13.2 Bid Item 13.2 ï Porcupine Crib Installation

7.13.2.1 Description. Work for this item includes the equipment, labor, and materials required to provide and install the porcupine cribs shown on the Construction Drawings.

7.13.2.2 Measurement. This Bid Item will be measured on a Lump Sum Basis.

7.13.2.3 Payment for this Bid Item will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress Payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.13.3 Bid Item 13.3 ï Coir Bank Buffer Installation

7.13.3.1 Description. Work for this item includes the equipment, labor, and materials required to provide and install the Coir Bank Buffer shown on the Construction Drawings.

7.13.3.2 Measurement. This Item will be measured on a Unit Rate Basis; per LF of Coir Bank Buffer installed. The measured SF quantity shall be based on surveys performed for payment. Unit Rate Costs shall be extended by the Estimated Bid Quantity to establish a Lump Sum Cost. Excess material delivered to the site and not used in the work will not be included in the measurement.

7.13.3.3 Payment. Payment for this Bid Item will be made for the total value listed for this Bid Item on the Proposal Form when the actual amount of work accepted, based upon document review and/or measurements by Honeywell is within plus or minus 5% of the Estimated Bid Quantity. Actual accepted quantities in excess of the 105% of the Estimated Bid Quantity that may result in a higher cost to Honeywell will require the Contractor to request a Construction

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Change Order before performing such extra work. Actual accepted quantities below 95% of the Estimated Bid Quantity shall result in an automatic credit to Honeywell. The Contractor's Unit Rate Costs, as submitted with their Proposal, shall be equally applied to any extra costs (above 105%) or credits (below 95%).

7.13.4 Bid Item 13.4 ï Emergent Vegetation (EV) Installation

7.13.4.1 Description. Work for this item includes the equipment, labor, and materials required to provide and install the EV shown on the Construction Drawings.

7.13.4.2 Measurement. This Bid Item will be measured on a Lump Sum Basis. Lump Sum Costs shall include the installation of EV plants in year one.

7.13.4.3 Payment. Payment for this Bid Item will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress Payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.13.5 Bid Item 13.5 ï Emergent Vegetation (EV) Warranty

7.13.5.1 Description. Work for this item includes the equipment, labor, and materials required to provide and install replacement EV during year two. The Contractor will be required to replace EV plantings that have failed during the warranty period. Actual replacement quantities and installation locations will be determined by the Owner's Representative, as outlined in the specifications. EV installation shall include the equipment, labor, and materials required to provide, install, and remove sufficient herbivory protection to protect the replanted area (s) as required in the technical specifications.

7.13.5.2 Measurement. This Bid Item will be measured on a Unit Rate Basis; per 100 plants installed. Unit Rate Costs shall be extended to establish a Lump Sum Cost. Lump Sum Costs shall include assumed replacement plantings to equal 50% of the original planting quantity.

7.13.5.3 Payment. Payment for this Bid Item will be made for the total value listed for this Bid Item on the Proposal Form when the actual amount of work accepted, based upon document review and/or measurements by Honeywell is within plus or minus 5% of the Estimated Bid Quantity. Actual accepted quantities in excess of the 105% of the Estimated Bid Quantity that may result in a higher cost to Honeywell will require the Contractor to request a Construction Change Order before performing such extra work. Actual accepted quantities below 95% of the Estimated Bid Quantity shall result in an automatic credit to Honeywell. The Contractor's Unit Rate Costs, as submitted with their Proposal, shall be equally applied to any extra costs (above 105%) or credits (below 95%).

7.13.6 Bid Item 13.6 ï Submerged Aquatic Vegetation (EV) Installation

7.13.6.1 Description. Work for this item includes the equipment, labor, and materials required to provide and install the SAV shown on the Construction Drawings.

7.13.6.2 Measurement. This Bid Item will be measured on a Lump Sum Basis. Lump Sum Costs shall include the installation of SAV plants in year one.

7.13.6.3 Payment. Payment for this Bid Item will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable. Progress Payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.13.7 Bid Item 13.7 ï Submerged Aquatic Vegetation (SAV) Warranty

7.13.7.1 Payment. Work for this item includes the equipment, labor, and materials required to provide and install replacement SAV during year two. The Contractor will be required to replace SAV plantings that have failed during the warranty period. Actual SAV

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replacement quantities and installation locations will be determined by the Owner's Representative, as outlined in the specifications.

7.13.7.2 Measurement. This Bid Item will be measured on a Unit Rate Basis; per 100 plants installed. Unit Rate Costs shall be extended to establish a Lump Sum Cost. Lump Sum Costs shall include assumed replacement plantings to equal 50% of the original planting quantity.

7.13.7.3 Payment. Payment for this Bid Item will be made for the total value listed for this Bid Item on the Proposal Form when the actual amount of work accepted, based upon document review and/or measurements by Honeywell is within plus or minus 5% of the Estimated Bid Quantity. Actual accepted quantities in excess of the 105% of the Estimated Bid Quantity that may result in a higher cost to Honeywell will require the Contractor to request a Construction Change Order before performing such extra work. Actual accepted quantities below 95% of the Estimated Bid Quantity shall result in an automatic credit to Honeywell. The Contractor's Unit Rate Costs, as submitted with their Proposal, shall be equally applied to any extra costs (above 105%) or credits (below 95%).

7.13.8 Bid Item 13.8 ï Herbivory Protection

7.13.8.1 Description. Work for this item includes the equipment, labor and materials required to provide and install Herbivory Protection for the Emergent Vegetation shown on the Construction Drawings. The Herbivory Protection design will be submitted by the Contractor and requires approval by the Owner's Representative.

7.13.8.2 Measurement. This Item will be measured on a Unit Rate Basis; per SF of Herbivory Protection installed. The measured SF quantity shall be based on surveys performed for payment. Unit Rate Costs shall be extended by the Estimated Bid Quantity to establish a Lump Sum Cost. Excess material delivered to the site and not used in the work will not be included in the measurement.

7.13.8.3 Payment. Payment for this Bid Item will be made for the total value listed for this Bid Item on the Proposal Form when the actual amount of work accepted, based upon document review and/or measurements by Honeywell is within plus or minus 5% of the Estimated Bid Quantity. Actual accepted quantities in excess of the 105% of the Estimated Bid Quantity that may result in a higher cost to Honeywell will require the Contractor to request a Construction Change Order before performing such extra work. Actual accepted quantities below 95% of the Estimated Bid Quantity shall result in an automatic credit to Honeywell. The Contractor's Unit Rate Costs, as submitted with their Proposal, shall be equally applied to any extra costs (above 105%) or credits (below 95%).

7.14 General Site Improvements [Reserved]

7.15 Demobilization

7.15.1 Bid Item 15.1 ï Demobilization

7.15.1.1 Description. Work for this Bid Item includes the removal and transport of all equipment, tools, supplies, materials, and personnel from the Site upon completion of the work. This Bid Item also includes removal of all temporary facilities and controls required for completion of the work. Temporary facilities and controls include, but are not limited to Contractor and Honeywell separate temporary on-site office/trailer space and temporary power; on-site sanitary / shower and other temporary utilities; Contractor equipment/material storage areas (i.e. lay-down areas); water storage facilities; waste staging/storage and soil stockpile management area(s); decontamination pad and associated facilities; on-site truck scale; and temporary truck inspection access.

Work for this Bid Item also includes removal of temporary roads, temporary site security,

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safety, and protection measures; dismantling remedial work zones, and personal / traffic control measures (barricades, temporary fencing, and signage) required for the Work. This Bid Item includes removal of erosion and sedimentation controls as shown on the Construction Drawings in accordance with New York State Best Management Practices].

7.15.1.2 Measurement. This Bid Item will be measured on a Lump Sum Basis.

7.15.1.3 Payment. Payment will be made upon review and acceptance by Honeywell the total value listed for this Bid Item on the Proposal Form, as applicable. Progress payments will be made as described in Section 2.0 of this RFP based upon estimated percent complete as determined by Honeywell.

7.16 ADDITIVE WORK

7.16.1 Bid Item 16.1 Additive for Performance and Payment Bonds

7.16.1.1 Description. Work for this Bid Item includes providing a performance bond and a payment bond for the full amount of the base bid construction price. Honeywell reserves the right to not include this Bid Item in the Contract.

7.16.1.2 Measurement. This Bid Item will be measured on a Lump Sum Basis.

7.16.1.3 Payment. Payment for this Bid Item will be made upon review and acceptance by Honeywell for the total value listed for this Bid Item on the Proposal Form, as applicable.

8.0 VALUE ENGINEERED COST PROPOSAL (VECP)

8.1 Bidder is encouraged to develop, prepare, and submit proposals to use different than specified materials, equipment, or methods which, in the Bidder's opinion, would improve the operation or the installation specified, or to carry out the Work under contract conditions different from those specified in the Bid Documents, in the form of a VECP.

8.2 A VECP is a technique by which the Bidder may, voluntarily and at their own expense, develop methods for performing contract requirements more economically. The objective of the VECP evaluation is to determine that the Bidder's proposal is applied to contract areas which offer considerable opportunities for savings while being consistent with the functional requirements of the Bid Documents. However, the Bidder shall:

8.2.1 Prepare a Base Bid consistent with the exact requirements of the Bid Documents.

8.2.2 Submit with their Bid, any additional VECP describing in full detail the different materials, equipment, methods, or conditions which they propose as follows:

- a description of the difference between the existing Contract requirement and the proposed requirement and the advantages or disadvantages of each, including any objective test data;
- a list of the Contract requirements which must be changed including Specification changes;
- identification as to the Bid Item for which the VECP applies;
- a description and estimate of costs Honeywell may incur in implementation of the VECP such as testing, evaluation, or operation and maintenance costs;
- an evaluation utilizing Contract stipulated scheduling methods which a Contract modification accepting the VECP would have on the Contract required period of performance; and
- any actions or scheduling which must be implemented in order to achieve maximum cost reduction related to the VECP.

8.2.3 Honeywell may accept or reject in whole or in part any such VECP, without explanation or consideration at discretion. Additionally, VECPs resulting in less than $10,000 savings will not

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be considered.

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9.0 DRAWING INDEX

Sheet No.	Drawing Title	Drawing No.
1	Cover Sheet	T-01
2	General Notes, Legend, and Planting Schedule	G-01
3	Staging Location Options	G-02
4	Existing Conditions – Katherine Street Peninsula	C-01
5	Existing Conditions – City Ship Canal	C-02
6	Existing Conditions – Riverbend (East)	C-03
7	Existing Conditions – Buffalo Color Peninsula and Riverbend (West)	C-04
8	Existing Conditions – Ohio Street Shoreline	C-05
9	Existing Conditions – ADM and Pillsbury	C-06
10	Habitat Restoration Plan View – Katherine Street Peninsula	C-07
11	Cross-Sections – Katherine Street Peninsula	C-08
12	Habitat Restoration Plan View – City Ship Canal	C-09
13	Cross-Sections – City Ship Canal	C-10
14	Habitat Restoration Plan View – Riverbend (East)	C-11
15	Cross-Sections – Riverbend (East)	C-12
16	Habitat Restoration Plan View – Buffalo Color Peninsula and Riverbend (West)	C-13
17	Cross-Sections – Buffalo Color Peninsula and Riverbend (West)	C-14
18	Habitat Restoration Plan View – Ohio Street Shoreline	C-15
19	Cross-Sections – Ohio Street Shoreline	C-16
20	Capping Plan View – ADM/Pillsbury	C-17

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Sheet No.	Drawing Title	Drawing No.
21	Cross-Sections – ADM/Pillsbury	C-18
22	Habitat Restoration Details (1 of 2)	C-19
23	Habitat Restoration Details (2 of 2)	C-20

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10.0SPECIFICATION INDEX

Identification	Specification Title	Included with this Submittal
Section 3.0: Scope of Work/General Requirements		
01010	Summary of Work	■
01100	Remediation Construction Requirements	■
01620	General Requirements, Safety, Health, and Emergency Response	■
Section 4.0: Technical Specifications		
Division 1 ï General Requirements		
00 01 10	Table of Contents	■
01 10 00	Summary of Work	■
01 11 01	Health, Safety, Environmental and Emergency Response	■
01 32 00	Construction Progress Documentation	■
01 33 00	Submittal Procedures	■
01 35 91	Protection of Historic Artifacts	■
01 40 00	Contractor Quality Control	■
01 42 13	Abbreviations and Acronyms	■
01 50 00	Temporary Facilities and Controls	■
01 57 20	Environmental Protection	■
01 57 23	Storm Water Pollution Control	■
01 71 00	Examination and Preparation	■
01 72 20	Decontamination	■
01 74 00	Waste Management and Disposal	■
01 77 00	Closeout Procedures	■
Division 2 ï Site Construction		
02 21 00	Surveys	■
02 56 14	Capping	■
Division 31 ï Earthwork		

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31 05 00	Common Work Results for Earthwork	■
31 11 00	Clearing and Grubbing	■
31 37 00	Riprap	■
Division 32 ï Exterior Improvements		
32 01 90	Operation and Maintenance of Planting	■
32 91 00	Planting Preparation	■
32 92 19	Seeding	■
Division 35 ï Waterway and Marine Construction		
35 44 00	Waterway Habitat Features	■

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Specification Section 01010

SUMMARY OF WORK

ATTACHMENT 01010-1

Project Schedule

ATTACHMENT 01010-1: PROJECT SCHEDULE

Buffalo River AOC

Capping and Habitat Restoration

Buffalo, NY

TASK	DATE
Bid Package Released	5/19/2014
Site Walk with Vendors	6/4/2014
Questions from Vendors Due	6/6/2014
Response to Questions	6/10/2014
Vendor Bids Due	6/17/2014
Notice to Proceed	7/18/2014
Mobilization	7/19/2014
Year One In-Water Work Start	8/11/2014
Year One Winter Demobilization	12/31/2014
Year Two Remobilization	6/1/2015
In-Water Work Window - Buffalo River	6/15 - 12/31
In-Water Work Window - City Ship Canal	6/30 - 12/31
Substantial Completion	9/30/2015
Demobilization	10/30/2015
Warranty Replanting (as needed)	2016

Specification Section 01010

SUMMARY OF WORK

ATTACHMENT 01010-2

Recurring Reporting Schedule

RECURRING REPORTING SCHEDULE

Buffalo River AOC Capping and Habitat Restoration
Buffalo, NY

SPECIFICATION SECTION	SPECIFICATION PARAGRAPH	SUBMITTED ITEM DESCRIPTION	SUBMITTAL SCHEDULE
a	b	c	d
01100	1.2.1 & 1.2.3	Schedules, 3-Week Look Ahead	For each Construction Progress Meeting
01100	1.2.1.3	Weather data, historical	As needed to support schedule extension
01100	1.2.5.2	Overtime, Written requests (as applicable)	3 workdays prior to workday or workweek extension
01100	1.2.1 & 1.2.4	Schedules, Construction Progress	Updates at each billing cycle
01100	1.3.2.2	Schedule - Preliminary Billing	With proposal
01100	1.3.2.3	Schedule - Revised Billing	Kickoff Meeting & monthly thereafter
01100	1.3.3.1 & 1.3.5.2	Invoices	Monthly; when progress payments are applicable
01100	1.3.3.4 &1.3.3.5	Release of Liens Waiver	With invoices
01100	1.3.7.1	Invoice, Final	After Contract Closeout Meeting is complete
01100	1.4.1.1	Daily Construction Reports	[8:00 am of the next scheduled work day]
01100	1.4.1.2	Weekly Construction Report	Tuesday following the week of construction activities
01100	1.3.3.3 &1.4.1.3	Monthly Status Report	Monthly with monthly invoices
01100	1.4.2.4	Substitutions, Request for	Within ten workdays of Contract execution.
01100	1.4.3.1	Request for Information (RFI)	As needed to clarify or deviate from design requirements.
01100	1.4.4.3	Design Change Bulletin (DCB) responses	As requested.
01100	1.5.2	Photographs and/or Video Recordings	Weekly progress reports; As requested.
01100	1.5.4	Correspondence	As initiated or recorded
01100	1.6.3.2	Material Safety Data Sheets (MSDSs)	Within ten workdays prior to delivery of Product.
01100	3.2.1.1(8)	Resume, experience & safety record of Const. Proj. Mngr	With Contractor's Bid Proposal.
01100	3.2.3.1	Contractor and Major Subcontractor Safety Evaluation Pkg.	With Contractor's Bid Proposal.
01100	3.5.5.1	Notice & Sched. of Work affecting Facility Ops (i.e.shutdowns)	At least ten workdays before commencement of Work

RECURRING REPORTING SCHEDULE

Buffalo River AOC Capping and Habitat Restoration
Buffalo, NY

SPECIFICATION SECTION	SPECIFICATION PARAGRAPH	SUBMITTED ITEM DESCRIPTION	SUBMITTAL SCHEDULE
01100	3.6.1.3 & 3.7.3.6	Survey info, calibration certificates, field notes & record drawings	For payment requistions if requested.
01100	3.6.7.2	Bill of Lading, weigh tickets & matl certs of fill mat'l & topsoil	Daily
01100	3.6.6.3	Concrete Construction Dwg markups of deviation (>5% increase)	With Construction Change Order request
01100	3.7.3.5	Notification of survey activities	At least two workdays in advance of survey work,
01100	3.8.4.9	Product Storage Inspection Logs	Monthly
01100	Attach 01100-18	Non-haz waste Bill of Lading or manifest paperwork	When stamped, signed by disposal facility
01100	Attach 01100-18	Estimated volumes of Haz and TSCA Wastes to be generated	[seven working days prior to scheduling transport]
01100	6.2.6	Boring & well construction logs	W/payment requisitions if requested]
01620	4.4	Daily Safety Reports	[By 8:00 of the next scheduled work day]
01620	4.4	Weekly Safety Reports	Tuesday following the week of construction activities
01620	4.4	Safety Incident Reports	As required
01620	4.4	Monitoring / Sampling Results	[Along with Daily Safety Reports]
01620	4.4	Monthly Exposure Hours	by 10th of each month for previous month

Specification Section 01010

SUMMARY OF WORK

ATTACHMENT 01010-3

Submittal Register

SUBMITTAL REGISTER

PROJECT TITLE AND LOCATION:

Buffalo River AOC Capping and Habitat Restoration

PROJECT / CONTRACT NO:

Note: AP/Engineer prepares and presents completed columns (a) through (d) to Contractor (*Subcontractor*) at Kick-off Meeting. Contractor (*Subcontractor*) reviews Columns (c) and (d) to confirm time schedule or inserts actual dates and returns marked-up copy to AP/Engineer within 10 working days. AP/Engineer prepares/maintains for project duration per RES-CP-DC-13, Submittal Review and Control.

REMEDIATION MANAGER:

DESIGN AND CONSTRUCTION MANAGER:

ALIANCE PARTNER / ENGINEER:

CONTRACTOR (*SUBCONTRACTOR*):

ACTION

ACTION CODE KEY
1 - REVIEWED - NO COMMENTS
2 - COMMENTS AS NOTED
3 - REVISE & RESUBMIT
4 - NOT SUBJECT TO REVIEW

SUBMITTAL FORMAT KEY
E - ELECTRONIC
H - HARD COPY CD - COMPACT DISC

SPECIFICATION SECTION	SPECIFICATION PARAGRAPH	SUBMITTED ITEM DESCRIPTION	SUBMITTAL SCHEDULE	CONTRACTOR TRANSMITTAL NUMBER	CONTRACTOR ITEM NUMBER	CONTRACTOR ITEM NAME	MFG OR DESIGNER	SUBMITTAL FORMAT	DATE RECEIVED	REVIEW NEEDED BY	RETURN DATE	REVIEWED BY	ACTION CODE (see key above)	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
01100	1.2.4/1.2.1/4.1.1	Schedule, Baseline	Within 5 days of Notice of Award	1	1.1	Baseline Sch	Contractor	E	10/10/10	10/20/10	10/15/10	RDJ	1	
01100	1.5.3.3	Shop Drawings	Prior to fabrication											
01100	1.5.3.3	Manufacturer's Certified Shop Drawings	Prior to installation											
01100	1.5.3.5	Record Drawings	Within ten workdays of completion of the Work.											
01100	1.5.6.1	Work Plan	Within ten workdays following contract award	1	1.2	Work Plan	Contractor	E	10/10/10	10/20/10	10/15/10	RDJ	3	Insufficient detail on excavation approach
01100	1.5.6.1	Work Plan, Revised	Within five workdays of receipt of comments											
01100	1.5.6.2	Contingency Plan	Submitted within the Work Plan											
01100	1.5.6.3	QA/QC Plan	Submitted within the Work Plan											
01100	1.5.6.4	Health & Safety Plan (HASP)	Submitted within the Work Plan											
01100	1.5.7.1 to 1.5.7.3	OM&M Manuals, Draft	No later than 20 workdays from approval of shop drawings											
01100	1.5.7.4	OM&M Manuals, Complete	20 workdays prior to final inspection.											
01100	1.5.7.7	OM&M Manuals, Final As-Built	Ten workdays after final inspection.											
01100	1.6.1.2	Purchase Orders (less pricing) for critical path / major products	Within fifteen workdays after Contract award											
01100	1.6.2.2	Warranty, duplicate notarized copies	Include in OM&M Manual											
01100	1.6.2.3	Warranty for work delayed beyond date of Substantial Completion.	Within ten workdays after approval											
01100	1.6.3.2	Material Safety Data Sheets (MSDSs)	Within ten workdays prior to delivery of Product.											
01100	1.6.5.2	Off-loading Procedures	At least 10 days workdays prior to lift											
01100	1.6.5.7	Receiving and Inspection Report	As required, once initialed by Contractor											
01100	1.7.2.8	Test certs. for off-site soil / gravel showing contaminant-free	Daily											
01100	1.7.6.9	Calibration Certs, (testing and inspection equip.)	As required by technical specs or upon request by H0N.											
01100	1.8.3.4	Permit applications	Prior to submitting to authorities having jurisdiction											
01100	1.8.3.5	Permits, approved	When available											
01100	1.8.4.4	Inspection Reports/Forms by federal, state, local authorities	When available											
01100	3.2.3.2 & 3.2.3.4	Subcontractor Safety Evaluation Packages (all other)	Before commencing Work on site.											
01100	3.7.1.1	Engineer and Land Surveyor statement of qualifications	Prior to commencing work by any of these professionals											
01100	3.7.3.3	Survey methods and equipment to be used.	At least ten workdays in advance of survey work,											
01100	3.7.3.5 & 3.6.1.2	Survey info, calibration certificates, field notes & record drawings	Project closeout											
01100	3.10.3	Manufacturer's Field Service - Technician Qualifications	Ten workdays in advance of such Work											

SUBMITTAL REGISTER

PROJECT TITLE AND LOCATION:

Buffalo River AOC Capping and Habitat Restoration

PROJECT / CONTRACT NO:

Note: AP/Engineer prepares and presents completed columns (a) through (d) to Contractor (*Subcontractor*) at Kick-off Meeting. Contractor (*Subcontractor*) reviews Columns (c) and (d) to confirm time schedule or inserts actual dates and returns marked-up copy to AP/Engineer within 10 working days. AP/Engineer prepares/maintains for project duration per RES-CP-DC-13, Submittal Review and Control.

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DESIGN AND CONSTRUCTION MANAGER:

ALIANCE PARTNER / ENGINEER:

CONTRACTOR (*SUBCONTRACTOR*):

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SUBMITTAL FORMAT KEY
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SPECIFICATION SECTION	SPECIFICATION PARAGRAPH	SUBMITTED ITEM DESCRIPTION	SUBMITTAL SCHEDULE	CONTRACTOR TRANSMITTAL NUMBER	CONTRACTOR ITEM NUMBER	CONTRACTOR ITEM NAME	MFG OR DESIGNER	SUBMITTAL FORMAT	DATE RECEIVED	REVIEW NEEDED BY	RETURN DATE	REVIEWED BY	ACTION CODE (see key above)	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
01100	6.1.5	Boring & well construction logs	Project closeout											
01100	6.2.1.2	Storm Water Mgmt, Soil Erosion and Sed. Control Plan	Prior to construction activities											
01100	6.3.1.2 & 3.2.1.1 (13)	Mechanical equipment actual alignment data records	[Prior to start-up and commissioning]											
01100	6.3.2.8 & 3.2.1.1 (14)	Piping & pressure bearing system pressure test reports	Immediately following test											
01100	6.4.9 & 3.2.1.1 (14)	"Megger" insulation test results	Prior to energizing conductors											
01100	7.1.1.6 & & 3.2.1.1 (14)	Start-up Performance Test Certificate	Within 30 days of completion of performance test											
01100	7.2.1.6	Written documentation of O&M Training	10 workdays after final inspection (w/ final OM&M Manual)											
01100	8.1.1	Inventory of surplus materials	[Prior to demobilization]											
01100	9.1.2	Inspection reports and Certificates of Occupancy	[Prior to Final Inspection]											
01100	9.1.3 / 9.4.1	Signed and sealed As-Built Survey	At or before Closeout Meeting											
01100	9.1.4	Final Closeout Report	[At or before Closeout Meeting]											
01100	9.1.6.1	Written resolution of punchlist items	[With Written certification of Substantial Completion]											
01100	9.1.7	Written certification of Substantial Completion	Prior to Final Inspection											
01100	9.4.1	Record Drawing Submittals, Final	At or before Closeout Meeting											
01100	9.4.2	Photo / Video Records of Work progress and events, Final	[At or before Closeout Meeting]											
01100	9.4.3 & 9.4.4	Return copies of Contract Docs; other project photos, negatives	[At or before Closeout Meeting]											
01100	9.4.5	Itemized list of missing project document items	[At or before Closeout Meeting]											
01100	9.4.6	Sign-off sheet for contractor and Honeywell	[At Closeout Meeting]											
01620	2.6	Evidence of Sturctural Engineering Survey for Demolition Work	Prior to the start of demolition activiites											
01620	4.1	Contractor Safety Evaluation Form (for each contractor/subcontractor)	[With proposal for major. Two weeks prior to performing work for minor subs]											
01620 & 01100	4.2 / 1.5.6.4	HASP	Within ten workdays following contract award; Prior to on-site activities											
01620	4.3	Certificates of Completion of 24-hr and 40-hr training	Prior to on-site activities; Maintain in file at site.											
01620	4.4	CD-13-1, CD-13-2, and CD-13-3	[Prior to on-site activities.]											
01620	4.4	Contractor's Substance Abuse and Prevention Program Compliance Certificate	[Prior to on-site activities]											
01620	4.4	Employee / Visitor Register	[At or before Closeout Meeting]											
01620	4.4	Training Logs	[Prior to on-site activities; Maintain in file at site.]											

Specification Section 01010

SUMMARY OF WORK

ATTACHMENT 01010-4

Permit Schedule

ATTACHMENT 01010-4: PERMIT SCHEDULE

Buffalo River AOC
Capping and Habitat Restoration
Buffalo, NY

PERMIT	Responsible Preparer	Required Timing for Permit	Regulatory Reviewer
Joint Permit Application which incorporates requirements of Section 10 of the Rivers and Harbor Act of 1899, Section 404 of the Clean Water Act (CWA), Section 401 of the CWA (including NYSDEC Water Quality Certification (WQC) and an Article 15-Protection of Waters Permit), Nationwide Permit 27 for Aquatic Habitat Restoration, Establishment, and Enhancement Activities (NWP 27) and Nationwide Permit 38 for Cleanup of Hazardous and Toxic Waste (NWP 38), both of which are issued by the USACE Buffalo District.	Honeywell	N/A	USACE Buffalo District
Full Environmental Assessment Form and an Environmental Assessment of the capping and habitat restoration in accordance with 6 NYCRR Part 617 State Environmental Quality Review (SEQR).	Honeywell	N/A	NYSDEC
Coordination with the U.S. Coast Guard regarding a Notice to Mariners.	Contractor	Prior to in-water operations	U.S. Coast Guard
Preparation of a Stormwater Pollution Prevention Plan in accordance with the SPDES General Permit for Construction Activity .	Contractor	Prior to staging area construction	NYSDEC
Characterization and suitability determination of maintenance dredge material for beneficial reuse for capping or habitat purposes (if elected for use by Contractor). If material is suitable, additional permitting will be required.	Contractor	Prior to capping activities	NYSDEC
A temporary building permit will be required for any support structures. The City of Buffalo will require a survey, a site plan, and a description of the type and configuration of any structures that will be erected as part of the application.	Contractor	Prior to construction of temporary buildings	City of Buffalo
Applicable permits required by the Contractor (Demolition, Building, Dig Safe, OSHA, Transportation, etc. as required to execute the Work).	Contractor	N/A	Applicable local, state and federal authorities

LUMP SUM/UNIT RATE PROPOSAL
SECTION III
GENERAL REQUIREMENTS

Specification Section 01100
Remediation Construction Requirements

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1 PROJECT ADMINISTRATION

1.1 SCOPE

1.1.1 Summary

1.1.1.1 The Remediation Construction Requirements document summarizes Honeywell's typical requirements regarding Project Administration and Construction Management activities for Remedial Action Work performed for Honeywell.

1.1.1.2 This document is written for use under the Honeywell Lump Sum/Unit Rate contract. It may also be applied to remedial construction projects led by an Alliance Partner (AP) using the Environmental, Remediation, Construction, and Procurement (ERCP) contract in which case the roles indicated in italics and parentheses shall apply.

1.1.1.3 In addition to the applicable requirements set forth in the other Contract Documents the Contractor (*Subcontractor*) shall adhere to the requirements listed in this document, unless otherwise specified.

1.1.1.4 This document is generic in nature and shall be used in conjunction with the Request for Proposal (RFP) (Sections 1.0 through 8.0) to determine which sections of this document are applicable to a given project. In some cases the Technical Specifications may conflict with this document based on project-specific requirements. In such cases, the project-specific Technical Specifications shall have precedence.

1.1.1.5 This document refers to various templates to manage construction information (request for information, change orders, etc). Alternate forms may be used if approved by Honeywell (AP) prior to start of construction.

1.1.1.6 This document is for projects that are being contracted under the Honeywell's Standard RFP process. For contracts where the AP self-performs the work, the AP would be held to the same standards and requirements as specified in this specification section for the Contractor.

1.1.1.7 This document is arranged into nine sections and presents Honeywell's *(AP's)* expectations regarding the work defined by each section, as may be applicable to the scope of work, as follows:

1. Project Administration: Activities and deliverables that potentially impact all phases of the Work.
2. Bidding: Section defines non-commercial aspects of the bidding process.
3. Site Management: Activities and deliverables for various post-contract award Work and ongoing field support activities.
4. Pre-Construction Work: Work activities performed post-contract award and before mobilization is permitted.
5. Mobilization & Site Preparation: Activities to be completed before commencing field Construction Work.
6. Construction Work: Activities and deliverables for Well Installation, Civil, Mechanical, and Electrical/Instrumentation/Control Construction Work.
7. Startup & Commissioning: Turnover requirements for process, monitoring, or other mechanical / electrical / control systems.
8. Site Restoration & Demobilization: Activities to be completed before Contract can be closed-out.
9. Contract Closeout: Final project activities and deliverables.

1.1.2 Reference Documents

1.1.2.1 Unless otherwise stated in the Contract, the Request for Proposal (RFP) (Sections 1.0 through 8.0), plus the Bidders Proposal including Cost Proposal Breakdown, any design

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change bulletins (DCBs) and construction change orders (CCO), define the Project scope of work.

1.1.2.2 Existing topographic information and subsurface investigation data (e.g., soil boring logs) are for reference only. Actual topography and geologic conditions may vary. Verify actual topographic and subsurface information as necessary.

1.1.3 Definitions

1.1.3.1 Refer to RES-ADMIN-02 Definition and Acronyms Summary (**ATTACHMENT 01100-22**) for common definitions and acronyms that are applicable to this Contract. These and other technical-specific terms and acronyms that may be defined in Section 4.0 - Technical Specifications, shall have the same meaning throughout the Contract Documents.

1.2 CONSTRUCTION SCHEDULE

1.2.1 Construction Schedule Requirements

1.2.1.1 Submit and update and maintain itemized bar chart schedules as indicated below. Schedules shall include a Baseline Construction Schedule, Three-Week Look Ahead Schedules and Construction Progress Schedules. These shall be compliant with the project schedule construction milestones provided in **ATTACHMENT 01010-1** of Specification 01010, Summary of Work. General requirements include:

1. Clearly indicate weekly manpower loading for direct, indirect, and subcontract labor and the scheduled start and completion dates for each task item.
2. Schedule must allow for all Work activities, meetings, regulatory permit acquisition, review and comment on all submittals, daily site required permit acquisition (for operating facilities), incidental and temporary work activities.
3. Schedule must allow for normal inclement weather at the job site location during the progress of the Work.
4. Schedule tasks shall be itemized in sufficient detail to accurately track the Work as it progresses and shall directly correlate with Specification 01010, Summary of Work and Contractor's (*Subcontractor's*) Proposal (Section 1.0 Table 1-1).
5. Each schedule task shall be named as indicated in Specification 01010, Summary of Work and shall also identify Honeywell's Code of Account (COA) designation(s).
6. Schedule tasks or subtasks not specifically identified in Specification 01010, Summary of Work shall be named by Contractor (*Subcontractor*), shall be grouped under the appropriate Honeywell designated task and shall be assigned the same COA as the top level COA.

1.2.1.2 Honeywell (*AP*) reserves the right to accept or reject Contractor's (*Subcontractor's*) updated schedule.

1.2.1.3 Honeywell will not grant weather-related schedule extensions unless unusually abnormal weather occurs that can be documented. Submit historical weather data as supporting documentation.

1.2.2 Baseline Construction Schedule

1.2.2.1 An approved Baseline Construction Schedule developed pursuant to RES-CP-WPC-06 shall form the basis for the initial construction schedule and shall be modified in consultation with the Contractor's (*Subcontractor's*) Construction Project Manager and Site Superintendant as field work progresses. Detailed Baseline Construction Schedule shall:

1. Itemize major Work items consistent with Contractor's (*Subcontractor's*) proposal.
2. Establish baseline milestone dates for completion of major Work items.
3. Be submitted within five workdays of award of contract.

1.2.2.2 Refer to RES-CP-WPC-06 Schedule Development (**ATTACHMENT 01100-1**) for Baseline Construction Schedule development requirements.

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1.2.3 Three-Week Look Ahead Schedule Requirements

1.2.3.1 Submit a three-week look ahead schedule with the following:

1. Indicate the planned work activities for each day over the next three weeks including major milestones and project deliverables.
2. Identify coordination items with AP, Honeywell, or others
3. Submit updated schedule for each construction progress meeting. See the attached example schedule (**ATTACHMENT 01100-2**) for format.

1.2.4 Construction Progress Schedules

1.2.4.1 Submit to Honeywell for approval, progress schedule that may adversely impact key milestone dates or the previously accepted completion date prior to implementing the new schedule.

1.2.4.2 Submit updated Construction Progress schedule at each billing cycle to support the monthly reporting requirements in RES-CP-DC-05 (**ATTACHMENT 01100-3**)

1.2.5 Work Hours

1.2.5.1 Work schedules shall be based on five 8-hour days 40 hours per week unless otherwise noted in the Technical Specifications (Section 4.0). Alternate straight-time work hours (e.g. four 10-hour days or working six-days per week) are subject to Honeywell's written acceptance.

1.2.5.2 Contractor *(Subcontractor)* wishing to Work overtime or on a modified workday schedule on its own account (at no additional cost to Honeywell), must obtain Honeywell Construction Representative's or AP Construction Manager's (CM's) written approval. Submit written request for overtime at least three workdays prior to performing such Work.

1.2.5.3 Short unscheduled overtime will be left to the Honeywell Construction Representative's or AP CM's discretion and approval.

1.2.5.4 Overtime: If the Contractor (*Subcontractor*) is in default on any contract provisions and Honeywell determines items such as additional labor, expediting, overtime, second shift or holiday and weekend work are required to maintain satisfactory work progress, these efforts shall be provided by Contractor (*Subcontractor*) at no cost to Honeywell. If the Contractor (*Subcontractor*) is not in default, Honeywell shall pay the Contractor (*Subcontractor*) actual overtime, when requested and authorized in writing by Honeywell for the purposes of schedule acceleration. Contractor (*Subcontractor*) will be reimbursed on a unit price basis with an agreed upon not to exceed cap or as otherwise mutually agreed to in writing in accordance with Change Order procedures for the work contemplated. All such costs shall be substantiated by invoices and time slips checked and approved on a daily basis by Honeywell or AP. Honeywell will reimburse Contractor (*Subcontractor*) for only the overtime portion of the direct labor costs. General and Administrative (G&A), overhead indirect costs and labor associated with these tasks, and inefficiencies or loss of productivity, unless otherwise agreed upon, will not be reimbursed by Honeywell.

1.3 FINANCIAL

1.3.1 Contract Base Price

1.3.1.1 Contract Base price shall be the amount indicated in the executed Contract (Section 2.0) between Contractor (*Subcontractor*) and Honeywell (*AP*).

1.3.2 Billing Schedule

1.3.2.1 Prepare an earned value estimate that indicates Contractor's (*Subcontractor's*) estimated progress billings during the entire Project duration, itemized for each billing cycle.

1.3.2.2 Submit preliminary Billing Schedule with Proposal (See Section 1.0, Attachment 1-1 of RFP).

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1.3.2.3 Submit revised Billing Schedule to Honeywell at Kickoff Meeting then monthly thereafter with invoice showing incremental and total quantity of work performed and percent completed at end of billing cycle.

1.3.2.4 On large projects, Contractor *(Subcontractor)* may be required to prepare a cash flow analysis for cost control. RES-CP-DC-05 Monthly Project Report Preparation (**ATTACHMENT 01100-3**) and RES-CP-WPC-09 Schedule and Cost Control (**ATTACHMENT 01100-4**) will be attached to this specification for contracts that the Contractor *(Subcontractor)* is required to perform these responsibilities.

1.3.3 Invoicing

1.3.3.1 Invoice format shall follow the breakdown in the Line Item Cost Proposal Breakdown, Table 1-1. Invoices for Original Contract work shall be presented with the following information:

- Total Work Completed, which means physical completion and acceptance by Honeywell as being correct and proper. Material and/or equipment delivered and not installed does not constitute completion.
- Less Retention
- Net Invoice to Date
- Less Previous Billing (Net)
- Due This Invoice (Original Contract)
- Change Orders to be included in a separate section, with a brief description of each Change Order, and all the above breakdown described above for Original Contract work
- Grand Total Due for Original Contract plus all CCO work to-date.

1.3.3.2 Submit two copies of all Invoices to Honeywell's (*AP's*) Designee. Electronic submissions may be acceptable on a project-specific basis.

1.3.3.3 Submit updated Construction Progress Schedule (See paragraph 1.2.4) with monthly invoice. Submit Monthly Project Report (see paragraph 1.4.1.3) with monthly invoice.

1.3.3.4 Submit the requisite Release of Lien Waivers documentation per the executed Agreement.

1.3.3.5 Any invoice received without the Construction Progress Schedule, requisite Release of Lien Waivers or Monthly Project Report will be rejected and returned to Contractor *(Subcontractor).*

1.3.3.6 Invoices that do not comply with these requirements may result in a delay of payment or return of Invoice to Contractor (*Subcontractor*) for resubmission.

1.3.4 Retention

1.3.4.1 Amount of the Total Contract Price (Base Price plus cost of any CCOs or minus any Credits owed Honeywell) retained by Honeywell (*AP*) until the Work is complete and accepted by Honeywell.

1.3.4.2 Retention percentage of the total contract price shall be as specified in the Contract (Section 2.0).

1.3.5 Progress Payments

1.3.5.1 Progress payments shall be applicable to projects with a scheduled Work duration of longer than six weeks.

1.3.5.2 Submit monthly invoices to Honeywell (*AP*), when progress payments are applicable.

1.3.5.3 See Measurement and Payments, paragraph 3.6.

1.3.6 Contract Price Changes

1.3.6.1 See Honeywell procedure RES-CP-WPC-08 (**ATTACHMENT 01100-5**) for CCOs.

1.3.7 Final Payment

1.3.7.1 Submit final invoice to Honeywell (*AP*) after Contract Closeout Meeting is complete.

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1.3.7.2 Retention will be released for payment when all punch list items are complete and any outstanding warranty claims are resolved and accepted in writing by Honeywell.

1.3.7.3 Retention will also be released for payment upon Honeywell's receipt of the Contractor's (*Subcontractor's*) Final Release and Waiver of Claims Form included in Section 2.0 of the Construction Documents.

1.4 GENERAL ADMINISTRATION

1.4.1 Progress Reporting & Tracking

1.4.1.1 Daily Activity Report

1. Prepare Daily Construction Reports in accordance with Honeywell procedure RES-CP-DC-03 (**ATTACHMENT 01100-6**).

1.4.1.2 Weekly Construction Report

1. Prepare and submit a Weekly Construction Report in accordance with Honeywell procedure RES-CP-DC-04 (**ATTACHMENT 01100-7**).

1.4.1.3 Monthly Project Report

1. Prepare and submit Monthly Project Report in accordance with Honeywell procedure RES-CP-DC-05 (**ATTACHMENT 01100-3**).

1.4.2 Alternate Approaches & Substitutions

1.4.2.1 All requests for Alternate Approaches and Substitutions (hereafter referred to as Substitutions) shall comply with this section.

1.4.2.2 Obtain Honeywell's (*AP's*) authorization for substitution of any product or construction method that is prescribed when a particular product or method is specified as "or equal" before the Work shall be allowed to proceed.

1.4.2.3 Substitutions that also require Regulatory Agency review and approval are at the risk of the Contractor.

1.4.2.4 Requests for Substitution

1. Submit three copies or electronic copy (pdf) of written requests for substitution within ten workdays of Contract execution.
2. After this period, requests for substitution will only be considered for conditions beyond Contractor (*Subcontractor*) control.
3. After the Contract is executed, limit each request to one proposed substitution (e.g., each substitution should be for a discrete item and not lumped into one larger related item such as a liner material and source of the liner material if both involve substitutions).
4. For products, include the following in the request:
   - Product identification, including make, model, manufacturer's name and address.
   - Manufacturer's product literature, shop drawings, certified performance / test data, and reference standards.
   - Samples, if appropriate.
5. For construction methods, (when prescribed) include the following in the request:
   - Detailed description of proposed method.
   - Drawings illustrating method.
   - Other data Honeywell (*AP*) required to establish that proposed method is equal.

1.4.2.5 Honeywell (*AP*) may request the name of references, address and date of installation for similar projects where the proposed product or construction method was successfully used.

1.4.2.6 Proposed Substitutions will not be accepted if:

1. Substantial revision of Contract Documents will be required, as determined by Honeywell (*AP*).

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2. Completion of any Work will be delayed.
3. Substitutions are not administratively complete and not specifically identified by a formal request for substitution.

1.4.2.7 Honeywell (*AP*) will notify Contractor (*Subcontractor*) in writing of decision to accept or reject request for substitution.

1.4.2.8 If Honeywell (*AP*) determines that a proposed substitute is not equal to that specified, Contractor (*Subcontractor*) shall furnish the product, manufacturer, or method originally specified.

1.4.3 Requests for Information

1.4.3.1 Contractor (*Subcontractor*) may submit Requests for Information (RFIs) to clarify or to request to deviate from design requirements following these procedures:

1. Use RFI Form (**ATTACHMENT 01100-8**) available from Honeywell (*AP*) in Word (.doc) format.
2. Initiate an RFI by completing the "General Information" section (except "Date Information Provided" and "RFI Results in a DCB" boxes) and the "Request" section.
3. Submit to Honeywell (*AP*) to complete the "Date Information Provided", "RFI Results in a DCB" boxes as well as the "Response" section.
4. Honeywell (*AP*) completes remaining sections, prints, signs, scans and distributes back to Contractor (*Subcontractor*) within five work days unless unusual circumstances warrant a mutually agreed upon longer period of time.

1.4.4 Change Management

1.4.4.1 Changes to the original scope of work can be made by:

1. Addenda issued in numerical order prior to award.
2. DCBs issued in numerical order after award.
3. CCOs.

1.4.4.2 Work beyond the original scope of the contract shall not proceed without written authorization by Honeywell (*AP*).

1.4.4.3 Design Change Bulletins

1. Honeywell (*AP*) reserves the right to issue a DCB at any time during the contract as a result of the submittal process, RFIs, progress meeting discussions or other activity where a change in design is desired.
2. Honeywell (AP) prepares the DCB form for Contractor's (*Subcontractor's*) review and signature. Sample DCB Form (**ATTACHMENT 01100-9**) is attached.
3. Contractor (*Subcontractor*) shall return DCB form within five workdays ~~14 calendar days~~ after receipt indicating in the signature box if there is an impact on contract price, which would require initiating a CCO.
4. Unless Contractor (*Subcontractor)* believes a CCO is required, Contractor (*Subcontractor)* shall immediately proceed with performing the requested change in Work.
5. If CCO is required, Contractor (*Subcontractor)* shall NOT execute changes until receipt of an executed CCO or upon further instruction from Honeywell (*AP*) in accordance with Honeywell Construction Change Order procedures referenced below.

1.4.4.4 Construction Change Orders

1. CCOs shall be administered in accordance with the Honeywell procedure RES-CP-WPC-08 (**ATTACHMENT 01100-5**).

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1.4.4.5 Minor Modifications / Deviations in Work

1. The Construction Representative (*QA/QC Engineer*) has the authority to authorize Contractor (*Subcontractor*) to deviate from the Work specified in the Contract Documents, without the initiation of the RFI, DCB or CCO process, if:
   - the work deviation does not alter the performance or aesthetics of the design;
   - the deviation does not affect a quantity for a unit price pay item; and
   - Contractor (*Subcontractor*) agrees that the Work does not change the cost or schedule of the Work and forfeits any later request to initiate a CCO for this deviation.
2. The Construction Representative (*QA/QC Engineer*) shall record deviations in a Deviation Summary Log and present at the Weekly Project Planning and Progress Meeting.
3. Contractor (*Subcontractor*) shall document minor modifications / deviations in the Work that were approved by the Construction Representative (*QA/QC Engineer*) by:
   - Reviewing the Deviations Summary Log prepared and presented at the Weekly Project Planning and Progress Meeting by the Construction Representative (QA/QC Engineer) and agreeing that no CCO is required.
   - Indicating the change by redline in the Record Documents maintained at the job site; and
   - Reporting a description of the change in the Weekly Construction Report.

1.4.5 Acceptance of Work

1.4.5.1 Honeywell will accept all Work in writing.

1.4.5.2 All accepted areas shall be complete and ready for start-up operations.

1.4.5.3 Refer to Sections 7.0 Start-up and Commissioning, 8.0 Site Restoration & Demobilization and 9.0 Contract Closeout for requirements relating to final Acceptance of Work. A checklist of actions required for Final Acceptance of Work is attached for reference (**ATTACHMENT 01100-10**).

1.5 COMMUNICATION

1.5.1 Electronic Data / Documentation Requirements

1.5.1.1 If requested to be in electronic editable format, the following data / document types shall be compatible with the listed electronic file formats and versions listed (earlier versions and formats will be accepted):

1. Calendar: Microsoft Outlook 2003
2. Databases: Microsoft Access 2003
3. Drawings, Construction: AutoCAD 2009
4. e-mail: Microsoft Outlook 2003
5. Graphics, Miscellaneous: Visio Standard 5.0 2003.
6. Photographs, Digital: ".jpg" file format
7. Videos: DVD or “.mpg” format
8. Presentations: Microsoft PowerPoint 2003
9. Schedules: Microsoft Project 2003
10. Spreadsheets: Microsoft Excel 2003
11. Text Documents: Microsoft Word 2003

1.5.2 Photographs & Video Recordings

1.5.2.1 Furnish copies of all photographs or video recordings documenting Work progress to Honeywell (*AP*).

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1.5.2.2 Photographs or video recordings are only permitted at inactive (no longer in operation) Honeywell sites with verbal approval from Honeywell.

1.5.2.3 Photographs or video recordings are only permitted at active (in operating mode) Honeywell sites with written approval from Honeywell.

1.5.2.4 Electronic photograph/video file names shall describe the picture.

1.5.2.5 At a minimum, pictures shall be taken prior to mobilization, during construction (as part of weekly progress reports), and as a record of completed conditions at the site, adjacent properties, access roads, etc. Additional video recordings or other site-specific documentation of pre-work conditions may be required if specified in the Technical Specifications (Section 4.0) of the RFP.

1.5.2.6 Digital media shall be date and time stamped.

1.5.2.7 Refer to Honeywell procedure RES-CP-DC-09 Photo Documentation (**ATTACHMENT 01100-11**) for minimum requirements for construction management personnel to document work activities and associated progress with photographs.

1.5.3 Contractor (*Subcontractor*) Submittals

1.5.3.1 Submittals that are to be included as part of the Contractor's (*Subcontractor's*) Scope of work are summarized in the Submittal Schedule included as **ATTACHMENT 01010-2** of Specification 01010, Summary of Work.

1.5.3.2 Contractor (*Subcontractor*) Submittal Requirements

1. A transmittal letter must accompany all submittals.
2. The transmittal letter shall indicate:
   - Purpose of submittal
   - Type of submittal (Approval, Comment, Record, Certified, As-Built, etc.)
   - Desired return date of submittal
   - Name and telephone number of the person to whom any questions can be directed.
3. Honeywell (*AP*) review time will vary depending on scope.
4. Allow a minimum of five workdays for Honeywell (*AP*) review of any submittal.
5. Contractor (*Subcontractor*) submittals, as required in the Contract Documents, shall consist of the following:
   - Drawings (Shop Drawings, Progress Drawings, As-Built Drawings, etc.)
   - Specifications (for Products furnished, Concrete Design Mix, etc.)
   - Technical Data (Manufacturer Cut Sheets and Performance Information)
   - Calculations
   - Procedures (Rigging, Lifting, Welding, Construction Methods, etc.)

1.5.3.3 Shop Drawings

1. Shop Drawings for Contractor (*Subcontractor*) supplied machinery or fabricated components shall include the following, as may be applicable:
   - All dimensions and other information necessary for lifting, rigging, handling, storage, arrangement, clearances, installation, anchoring and assembly;
   - Tie-ins, hook-ups, utility requirements
   - Provide schedule of shop drawings.
2. Submit three sets or one electronic (pdf) of "Review Set" Shop Drawings to Honeywell (*AP*) and obtain authorization to proceed from Honeywell or Engineer prior to fabrication.
3. Honeywell or Engineer will review, comment or authorize fabrication within ten workdays of receipt of Review Shop Drawings.

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4. Submit at least three sets or one electronic (pdf) of manufacturer's Certified Shop Drawings prior to installation.

1.5.3.4 Construction Progress Drawings

1. Construction Progress Drawing markups shall include:
   - All dimensions and other relevant information, which document the construction work performed and how the progress relates to the original contract documents.
   - Relevant information shall include, but not be limited to, scope changes, previously undocumented underground and above-ground conditions, location, arrangement, orientation, elevation, distance, size, area, volume, etc.
2. A set of unmarked Contract Drawings will be provided to the Contractor (*Subcontractor*) if requested.
3. The drawings shall be continually marked-up to document field changes as the Work progresses.

1.5.3.5 Record Drawings

1. Record Drawings shall be a clearly marked-up set of Contract Drawings and shall illustrate:
   - Construction Progress Drawing information.
   - All field changes, additions, deletions, substitutions, or corrections.
   - All CCO Work must be shown on the Record Drawings.
2. Include supplemental Contractor (*Subcontractor*) Record sketches as required.
3. Submit Record Drawings and records within ten workdays of completion of the Work. Record drawings must be prepared in compliance with Honeywell survey procedures as detailed in RES-CP-WPC-11 – Survey Control and Digitization (**ATTACHMENT 01100-12)** and be in accordance with the specific requirements contained in the Technical Specifications (Section 4.0) of the RFP.

1.5.4 Correspondence

1.5.4.1 Correspondence Requirements

1. Submit three copies or electronic copy (pdf) of all correspondence to Honeywell *(AP)*.

1.5.4.2 Prior to Contract Award

1. Submit all formal correspondence prior to Contract award to Honeywell's Supply Manager (*AP's CM*).
2. All correspondence shall include the Honeywell RFP number, project name and number, and related subject as applicable.
3. All questions concerning commercial documents shall be directed as indicated in the Instructions to Bidders.
4. All technical questions shall be directed as indicated in the Instructions to Bidders.

1.5.4.3 After Contract Award

1. Submit all formal correspondence and questions after Contract award to Honeywell's Construction Representative (*AP's CM*).
2. All correspondence shall include Honeywell's (*AP's*) purchase order number, project name and number, job site location, and related subject, as applicable.

1.5.5 Meetings

1.5.5.1 Meeting Requirements

1. The following is a list of typical meetings:
   - Pre-Bid Meeting
   - Kickoff Meeting

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- Project Planning, Progress Meetings, and Schedules
- Safety Meetings
- Contract Closeout Meetings

2. The following is a list of possible meetings depending on Project requirements:
   - Pre-Installation Meeting
   - Problem or Work Deficiency Meeting
3. The Honeywell Construction Representative or the CM, at their discretion, will hold meetings, not otherwise specified as the need arises, during the contract.

1.5.5.2 Meeting Agenda

1. The meeting organizer shall prepare and distribute a meeting agenda to all invited attendees at least one workday prior to meeting.
2. Weekly Progress Meeting agenda shall follow the general content of the Weekly Construction Report as detailed in Honeywell procedure RES-CP-DC-04, Weekly Construction Report Preparation (**ATTACHMENT 01100-7**). Some topics may not be applicable to a particular project, but the general topics should be followed where pertinent.
3. The agenda for all other meetings shall incorporate the following minimum requirements:
   - Safety: Relevant safety issues for Work planned or in progress. Any staff changes since the previous meeting.
   - Purpose: What the meeting is trying to accomplish.
   - Agenda: The steps to achieve the purpose. Include action items from last meeting, next steps, and agenda for next meeting.
   - Code of Conduct: Treat others with respect, build on other's ideas, make decisions and resolve conflict. Information pertaining the Work shall be treated as confidential property as stated in the Contract (Section 2 of the RFP).
   - Expectations: Determine if agenda meets the group's expectations. Modify agenda as necessary.
   - Roles: Assign roles to keep meeting on track and on schedule (e.g., Leader, Moderator Time Keeper, and Scribe).

1.5.5.3 Meeting Attendance

1. The following groups or individuals shall be represented at meetings by persons familiar with the project and authorized to conclude matters relating to the project, as may be required:
   - Honeywell
   - Contractor (*or AP*)
   - Each major subcontractor
   - Supplier(s)
   - Agency Representative(s)
   - Others having relevant business with the Project Work.

1.5.5.4 Meeting Minutes

1. Meeting organizer shall ensure that meeting minutes are prepared, reviewed, and distributed within 5 working days after meeting to all participants, and those affected by decisions made.
2. Preparation and distribution requirements, sample meeting attendance sheet, meeting minute outline, and action item log are contained within the Honeywell procedure RES-CP-DC-02 (**ATTACHMENT 01100-13**).

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1.5.6 Work Plans

1.5.6.1 Work Plans

1. Work Plan(s) must be agreed to prior to initiating site work.
2. Submit Work Plan to Honeywell *(AP)* within ten workdays of contract award.
3. Honeywell (*AP*) will review and provide written comments for Work Plan within five workdays from receipt.
4. Submit revised Work Plan within five workdays of receipt of Honeywell's (*AP's*) written comments.
5. Work Plan tasks shall correlate with Specification 01010, Summary of Work and Contractor's (*Subcontractor's*) Bid tasks.
6. Work Plan shall include at a minimum the following items.
   - Full detail for all phases of Contractor's (*Subcontractor's*) Work
   - Project Directory
   - Organization chart with the names and authority levels
   - Honeywell's Remediation Manager, Design and Construction Manager, Supply Manger, Construction Representative, QA/QC Engineer (*and AP's Project Manager, Construction Manager, and QA/QC Engineer)*
   - Contractor's (*Subcontractor's*) Construction Project Manager, Site Superintendant, Site Health & Safety Representative
   - Subcontractor's Representative(s)
   - Contingency Plan
   - Quality Assurance / Quality Control Plan
   - Health and Safety Plan
7. Refer to the Technical Specifications (Section 4.0) for content requirements for other activity-specific Work Plans that may be required for the project.

1.5.6.2 Contingency Plan

1. Contingency plan shall include detailed procedures for dealing with:
   - Emergency or spill when loading, transferring or transporting of hazardous or TSCA waste, fuel, oil and lubricants (if applicable)
   - Excavated or detected subsurface waste containers or gas cylinders (if applicable).
   - Health and Safety incidents
   - Regulatory inspections
   - Major weather events
   - Other incidents requiring immediate work stoppage
   - Technical contingency plans for managing water, waste, or obstructions

1.5.6.3 Quality Assurance / Quality Control Plan (QAP)

1. Quality Assurance/Quality Control Plan (QAP)
   - All required sample collection, inspection and test requirements and methods
   - Projects not requiring a project specific QAP will have all inspections listed as part of the respective Technical Specifications (Section 4.0).

1.5.6.4 Health & Safety Plan (HASP)

1. Prepare and comply with Health & Safety Plan as per Specification 01620.

1.5.7 Operation, Maintenance and Monitoring Manual

1.5.7.1 This paragraph is limited to projects where Operation, Maintenance and Monitoring (OM&M) activities are part of the Contractor's (*Subcontractor's*) Scope of Work. Construction of most

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systems will make these activities applicable. It is also applicable for construction work requiring long-term maintenance such as mowing of a capped area.

1.5.7.2 Unless otherwise specified in the Technical Specifications (Section 4.0), Contractor (*Subcontractor*) shall prepare portions of the OM&M Manual that pertain to operation and maintenance, whereas the Engineer (*AP*) will prepare the system compliance monitoring portions of the Manual. The Responsible, Accountable, Consult, Informed (RACI) chart in **Attachment 01100-14** defines general responsibilities for this work, unless otherwise superseded by the Technical Specifications (Section 4.0) of the RFP.

1.5.7.3 OM&M Manual Requirements

1. Binder(s) having durable vinyl covers, three-hole, D-ring, 3" thick maximum x 8-1/2" wide x 11" inch tall format.
2. Binder cover shall indicate title "OPERATION, MAINTENANCE AND MONITORING MANUAL", machinery, process or system description, project name, project number, project location, date prepared.
3. Furnish Table of Contents for each volume, with each Product or system description identified, typed on white paper, in parts as follows:
4. Subdivide binder contents with permanent dividers, logically organized as described below; with tab titles clearly printed under reinforced laminated plastic tabs.
5. Part 1: Introduction
   - Provides facility, system, and equipment summary pertinent to operator's needs. Avoid general site background / regulatory information, which can otherwise be referenced or included as Appendix material, if necessary.
   - Key contacts directory, listing names, addresses, and telephone numbers of Honeywell Construction Representative (*Construction Manager*), Contractor, Subcontractors, and major equipment suppliers
   - OM&M health & safety
   - Site entry and exit procedures
   - Personnel training and license requirements
   - Waste management
   - Permit summary
6. Part 2: System Description / Design Basis / Operation
   - Arrange by main System or Product and subdivide accordingly by subassemblies and individual Products. Include photos of each System, Product or subassembly.
   - Equipment description and function with design basis / criteria
   - Instrumentation and controls
   - Operation sequence
   - Standard Operating Procedures (SOPs)
   - JHAs
7. Part 3: System Start-up / Shutdown Procedures
   - Operating instructions
8. Part 4: Routine Operation, Maintenance and Reporting
   - Arrange by main System or Product and subdivide by subassemblies and individual Products; Include photos of each System, Product or subassembly.
   - Categorize and label Products corresponding to the piping and instrumentation diagrams (P&ID) nomenclature or from other relevant drawings. Include make, model, serial number, as applicable and include in tabular form:

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- Names, addresses, and telephone numbers of Subcontractors, original equipment manufacturer (OEM), and local suppliers (vendors) for each assembly, subassembly or Product
- Parts list, spare parts, special tools, lubricants (manufacturer / product number) and alternate lubricant, if applicable for each component
- Range and performance information, as applicable
- Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents

- Operations / maintenance requirements on a daily, weekly, monthly, quarterly, semi-annual, and annual basis.
- As needed maintenance
- Reporting

9. Part 5: Alarm Conditions and Emergency Response
10. Part 6: Troubleshooting
11. Part 7: Remediation Progress Monitoring and Reporting (as applicable for system-wide regulatory sampling / inspections)
    - Inspection schedule
    - Reporting schedule
    - Contingency actions
12. Part 8: Treatment Systems Monitoring and Reporting (as applicable for treatment regulatory monitoring /sampling)
    - Monitoring requirements
    - Reporting schedule
    - Contingency actions
13. Procedures for Revising OM&M Manual
14. Appendices:
    - Record drawings; shop drawings and product datasheets
    - OEM installation operation and maintenance manuals marked clearly with model and product number and identified by P&ID nomenclature. Installation instruction shall include tolerances, alignment, calibration, set points, capacity, size, outputs; tie-ins, hook-ups, utility requirements.
    - Air and water balance reports
    - Certificates
    - Permits
    - Site-Wide Health and Safety Plan (if referenced from Part 1)
    - Quality Assurance Project Plan
    - Manufacturer's SOPs
    - Inspection forms
    - On-site equipment inventory
    - Warranties and warranty period along with supplier contact
    - Testing documentation such as:
        - piping pressure and leak test certifications;
        - motor rotation voltage and current testing, electrical conductor resistance and continuity testing;

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- well construction logs with installed pump and motor specifications and megger testing results.

- Inspection, startup and final installation acceptance reports with the specific acceptance criteria. Include final program configurations of:
  - all programmable components such as VFD's, auto dialers pH, level, temp controllers.
  - all components that have adjustable switches such as pressure, temp, level switches.
  - an electronic copy of any/all plc programming, accurate and complete I/O list and hard copy of PLC ladder logic.
- Commissioning reports pertaining to installation (physical attributes), operation (controls and instrumentation) and performance (function as a system) as applicable.

1.5.7.4 Submit Draft OM&M Manuals for all Contractor (*Subcontractor*) supplied Machinery and Systems no later than 20 workdays after approval of shop drawings. The Draft OM&M Manuals for equipment shall also be submitted in electronic format.

1.5.7.5 Submit one copy of complete OM&M Manual to Honeywell (*AP)* 30 workdays prior to final inspection. The complete OM&M Manual shall also be submitted in electronic format.

1.5.7.6 Honeywell's Construction Representative (*Construction Manager*) will add system monitoring sections and will review, comment and return the OM&M Manual within ten workdays.

1.5.7.7 Revise content of all document sets as required prior to final submission. A final copy should be submitted at least five workdays in advance of operator training to allow operations personnel to review.

1.5.7.8 Submit three complete bound sets of final OM&M Manual to Honeywell (*AP*) within ten workdays after final inspection.

1.6 MATERIALS MANAGEMENT

1.6.1 Procurement

1.6.1.1 Contractor (*Subcontractor*) supplied materials shall be ordered after Contract award or as authorized by Honeywell (*AP*) in writing.

1.6.1.2 Submit copies of Purchase Orders (PO) [less pricing] within fifteen workdays after Contract award to Honeywell Construction Representative (*Construction Manager*) for critical path items and major products when such items are critical to the successful on-time completion of the Work. Purchase Orders shall show promised delivery dates.

1.6.1.3 Immediately indicate long delivery items that will adversely affect project schedule.

1.6.1.4 Furnish all materials other than those specifically indicated as supplied by Honeywell (*or AP*) in the Contract Documents.

1.6.2 Warranties

1.6.2.1 Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

1.6.2.2 Insert duplicate executed (and notarized if required by the technical specifications) copies of all warranties into OM&M Manual, if Manuals are being provided, or otherwise submit for Honeywell's (*AP's*) review to be turned over to Honeywell as part of Final Submittals.

1.6.2.3 For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten workdays after acceptance, listing date of acceptance as start of warranty period.

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1.6.3 Compliance with Regulations

1.6.3.1 Obtain required certifications, permits and inspections and comply with all federal, state, local, regulations governing transportation, handling, storage and use of products.

1.6.3.2 Submit Material Safety Data Sheets (MSDSs) to Honeywell Construction Representative (*Construction Manager*) for all products having MSDS's ten workdays prior to delivery of such Product to the site.

1.6.3.3 MSDS(s) and chemical list/inventory must be maintained and readily available at all times for on-site use.

1.6.4 Transportation and Handling

1.6.4.1 Transport and handle products in accordance with federal, state and local regulations, MSDS, manufacturer's instructions and Honeywell (*and AP*) requirements.

1.6.5 Receiving

1.6.5.1 Receive and off-load all Products supplied by Honeywell (*or AP*).

1.6.5.2 Submit off-loading procedure(s) at least ten workdays prior to lift for Honeywell's (*AP's*) review.

1.6.5.3 The Honeywell Construction Representative (*Construction Manager*) must authorize Contractor's (*Subcontractor's*) off-loading procedures for all major products supplied by Honeywell (*or AP*).

1.6.5.4 Upon receipt of Honeywell (*or AP*) or Contractor (*Subcontractor*) supplied Products, **IMMEDIATELY** inspect for damage, confirm quantities and verify for compliance with specifications.

1.6.5.5 Notify Honeywell Construction Representative (*Construction Manager*) and transporter immediately, in writing, any shortages, damage or irregularities in shipment.

1.6.5.6 Photograph product damage or irregularities from shipment.

1.6.5.7 Submit copy of completed Receiving and Inspection Report to Honeywell (*and AP*) in accordance with the procedure RES-CP-WPC-05 **(ATTACHMENT 01100-15)**.

1.6.5.8 Maintain copies of all report forms at the Project site.

1.6.5.9 Provide equipment and personnel to unload and handle Products.

1.6.5.10 Prevent damage and defacement of Products.

1.7 QUALITY

1.7.1 References and Standards

1.7.1.1 All products and workmanship shall be in accordance with the latest versions and amendments of all applicable codes and standards specified in the Contract Documents that are in current use by the authorities having jurisdiction, as well as any applicable federal, state, and local codes, ordinances, and regulations.

1.7.1.2 For products or workmanship specified by association, trade or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

1.7.1.3 Where various specified requirements conflict, the more stringent quality standards or more precise workmanship requirements shall govern.

1.7.1.4 Should manufacturers' instructions conflict with Contract Documents, request clarification from Honeywell before proceeding.

1.7.2 Products

1.7.2.1 Use only new and unused products in good condition and as specified in the Contract Documents for the execution of the Work.

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1.7.2.2 Materials or products removed from existing premises shall only be reused as specifically permitted by the Contract Documents.

1.7.2.3 Use only products specified when a specific product name, manufacturer, supplier, model, or catalog number is identified in the Contract Documents or when specifications state that no substitution are permitted.

1.7.2.4 Select product that is compatible with other similar products already installed or where multiple Product options are specified.

1.7.2.5 To the maximum extent practicable, provide products of the same kind and from a single source.

1.7.2.6 Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce Work of specified quality.

1.7.2.7 Maintain test certificates for soils, crushed rock or gravel from off-site sources showing composition and material is contaminant-free on site, accessible for use at all times.

1.7.2.8 Submit copies of test certificates for soils, crushed rock or gravel from off-site sources showing composition and material is contaminant-free to the Honeywell Construction Representative (*Construction Manager*) daily, or as otherwise specified in the Technical Specifications (Section 4.0) of the RFP.

1.7.3 Workmanship

1.7.3.1 Product and workmanship quality shall comply with applicable industry standards or manufacturer recommendations and these Contract Documents as a minimum.

1.7.3.2 Work is to be performed by persons qualified through training and experience to produce required or specified quality.

1.7.4 Preparation

1.7.4.1 Verify that existing site conditions and substrate are capable of structural support or attachment of new Work being applied or attached or otherwise acceptable for subsequent Work.

1.7.4.2 Verify any conditions specifically described in the specifications.

1.7.4.3 Verify that utility services and tie-ins are available, of the correct characteristics, and in the correct locations.

1.7.4.4 Verify that field measurements are as indicated on construction drawings, shop drawings or as instructed by the manufacturer.

1.7.4.5 Clean and prepare anchorage or mating surfaces.

1.7.4.6 Beginning new Work in an area indicates acceptance of existing known conditions of that area by Contractor.

1.7.5 Installation

1.7.5.1 Comply with manufacturers' instructions; adhere to each step in sequence.

1.7.5.2 Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Honeywell (*AP*) before proceeding.

1.7.5.3 Adjust products to appropriate dimensions, tolerance, position, orientation and alignment before securing Products in place.

1.7.5.4 Immediately report any deviation from manufacturers' written instructions to Honeywell (*AP*).

1.7.6 Inspection, Testing and Sampling

1.7.6.1 All material and workmanship is subject to Honeywell's (*and AP's*) inspection and acceptance at any location where investigation, excavation, fabrication, installation or erection is performed.

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1.7.6.2 Coordinate with Honeywell (*AP*) required project inspections, testing and sampling including, but not limited to, Machinery, construction, operations, permits, work conditions, health, safety environment, work in progress, completed work, etc. throughout the duration of the project.

1.7.6.3 Fully assist the Honeywell Construction Representative (*Construction Manager*) with tools, scaffolding, labor, etc., as may be required for inspections.

1.7.6.4 Permit access to Honeywell (*and AP*) or its' designee and officials having jurisdiction for inspection, testing and sampling.

1.7.6.5 Notify Honeywell Construction Representative (*Construction Manager*) at least two workdays before performing any scheduled tests or inspections.

1.7.6.6 All tests and inspections required by the Contract Documents shall be made by a technician qualified by training and experience or testing laboratory and shall be carried out in the presence of the Honeywell Construction Representative (*Construction Manager*) or designee.

1.7.6.7 Reports shall document test results, inspection observations, indicate compliance status and shall identify for which Specification the tests or inspection was performed.

1.7.6.8 The Contractor (*Subcontractor*) and Honeywell Construction Representative (*Construction Manager*) or designee must cosign all test reports.

1.7.6.9 Measuring, inspection, and testing equipment

1. Measuring, inspection, and testing equipment will be calibrated as required by the specifications and, when applicable, industry standards or the authorities having jurisdiction.
2. Where no calibration standards exist, the basis used for calibration shall be noted.
3. A documented procedure is required for all equipment that is to be calibrated.
4. All calibrated equipment shall be in good condition and shall be labeled or tagged indicating the current status and identifying who performed the calibration and the date.
5. Provide copy of calibration certificate when required by the specifications or requested by Honeywell Construction Representative (*Construction Manager*).
6. Any environmental limitations shall be noted and strictly followed.
7. Unauthorized adjustment of calibrated equipment is not permitted.
8. Immediately notify Honeywell Construction Representative (*Construction Manager*) when testing equipment used on the project is out of calibration.

1.7.6.10 When specified in the Contract Documents, Honeywell (*AP*) will appoint, employ and pay for specified services of an independent inspection or sampling firm.

1. The independent firm will perform inspections and other services specified in the specifications and as required by Honeywell.
2. Inspecting may occur on or off the project site as required by Honeywell (*AP*).
3. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access and assistance by incidental labor as requested.
4. Notify Honeywell (*AP*) ten workdays in advance for Work requiring independent inspection or sampling services.

1.7.7 Analytical Services

1.7.7.1 Honeywell (*AP*) shall arrange for analytical laboratory services, except when required for Contractor's (*Subcontractor's*) use or if otherwise indicated in the Contract Documents. Contractor (*Subcontractor*) shall utilize Honeywell approved laboratories when providing analytical services.

1.7.7.2 Coordinate any analytical services required for the remediation and Contractor's operations including scheduling, bottle delivery, sample collection, labeling, documentation, sample shipment, data evaluation and data summary.

1.7.7.3 Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

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1.7.7.4 The same independent firm shall perform re-testing due to Contractor (*Subcontractor)* controlled non-conformance issues as directed by Honeywell. Contractor (*Subcontractor*) will be responsible for the re-testing costs.

1.7.8 Nonconforming Conditions

1.7.8.1 Nonconforming conditions are those that cannot be resolved within the scope of existing specifications and will also include design errors.

1.7.8.2 Report all nonconforming conditions to the Honeywell Construction Representative (*Construction Manager*) in writing unless otherwise instructed in writing by Honeywell.

1.7.8.3 Prepare and maintain a non-conformance report which lists and describes the nonconforming conditions, identifies recommendations, assigns responsibility, assigns due date, and tracks status. Update and review the nonconformance reports as part of weekly status reports. An example Nonconforming Conditions Report (**ATTACHMENT 01100-16**) is available from Honeywell (*AP*) in Excel (.xls) format.

1.7.8.4

1.7.8.5 Where possible, the affected item or area will be segregated, labeled or otherwise marked denoting nonconforming condition.

1.7.8.6 No further work may continue on the affected item or area without written consent from Honeywell.

1.8 RISK MANAGEMENT

1.8.1 General

1.8.1.1 For other than ERCP Contracts, the Risk Management Plan developed as part of the Basis of Cost and Schedule Report shall be reviewed and updated by the Contractor in the course of construction activities. Refer to RES-CP-WPC-07, Cost Estimating Development (**ATTACHMENT 01100-17**) for specific requirements.

1.8.2 Environmental

1.8.2.1 Continually monitor Work area for appearance, discoloration and odors. Use field screening instruments as needed to determine presence of contamination, as may be specified in the Technical Specifications (Section 4.0) of the RFP.

1.8.2.2 Minimize and monitor for air emissions including fugitive dusts, volatile organic compounds, smoke and odors as detailed in the Contractor's (Subcontractor's) Health and Safety Plan and as may be specified in the Technical Specifications (Section 4.0) of the RFP.

1.8.2.3 Minimize wind and water erosion, contact with storm water and spillage when handling all soils, sediments, debris, and construction materials.

1.8.2.4 Store contaminated equipment and materials in designated lay-down or holding areas only.

1.8.3 Health & Safety

1.8.2.1 Health and Safety requirements are provided in Specification 01620, General Requirements Safety, Health, and Emergency Response.

1.8.4 Permits & Other Permissions

1.8.4.1 Permits obtained by Honeywell (*or AP*) are listed in **ATTACHMENT 01010-3** of Specification 01010, Summary of Work.

1.8.4.2 Obtain all construction licenses, plan reviews and permits in connection with the work unless otherwise stated in Specification 01010, Summary of Work.

1.8.4.3 Contractor *(Subcontractor*) shall immediately notify Honeywell *(and AP*) in writing of violation of any ordinance, law or code.

1.8.4.4 Honeywell (*and AP*) shall review permit applications prepared by Contractor (*Subcontractor*) prior to submitting application to authorities having jurisdiction for approval.

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1.8.4.5 Copies of all approved permits shall be given to Honeywell Construction Representative (*Construction Manager*).

1.8.4.6 Access agreements that are obtained by Honeywell or Contractor (*Subcontractor*) for all affected properties with all affected property owners must be in place prior to Contractor (*Subcontractor*) commencing work.

1.8.5 Building Code Compliance

1.8.5.1 Apply for and procure all necessary Building Code and other locally required permits, permissions and approvals necessary to perform the work, from the appropriate authorities having jurisdiction.

1.8.5.2 Honeywell (*AP*) will provide Construction Drawings as included in the Contract Documents that may be used to obtain building permits. Additional drawings (stamped, if required) that may be needed for permits are the responsibility of the Contractor (*Subcontractor*) unless specific additional drawings are identified and requested as part the Contractor's (*Subcontractor's*) proposal and agreed to by Honeywell (*AP*).

1.8.5.3 Administer all Code required inspections throughout all phases of Construction including Certificate of Occupancy, as may be required.

1.8.5.4 Submit to Honeywell's Construction Representative (*Construction Manager*) copies of all Inspection Reports, including final acceptance inspection forms by federal, state, local or other governmental authorities.

2 BIDDING

2.1 BIDDING

2.1.1 Refer to Section 1.0 - BIDDER INFORMATION of the Request for Proposal (RFP) for bidding information.

2.2 PRE-BID MEETING

2.2.1 Honeywell (*AP*) will schedule a pre-bid meeting prior to the Proposal due date to be conducted at the project site at the time and date specified in the Request for Proposal.

2.3 SITE INSPECTION

2.3.1 Prior to Contractor's Bid Proposal submittal, Contractor (*Subcontractor*) shall visit the site.

2.3.2 As part of the pre-bid meeting, a site visit will occur to allow the Contractor (*Subcontractor*) to examine and evaluate existing site conditions, topography, available utilities, foundations, surface water and drainage conditions.

2.3.3 Any follow-up visits shall be coordinated with Honeywell's Design Engineer (*AP*).

2.3.4 Unless otherwise specified, a Honeywell (*AP*) Representative must be present during all site visits.

3 SITE MANAGEMENT

3.1 SITE ACCESS & SECURITY

3.1.1 Only personnel in the employ of Honeywell or its Contractors, Subcontractors, or Suppliers shall be allowed on site. No other personnel are allowed on site without the express written approval of Honeywell.

3.1.2 Only vehicles authorized by the Honeywell Construction Representative (*Construction Manager*) shall be allowed onsite. All others must remain in designated areas, parking areas or off site.

3.1.3 The Contractor's (*Subcontractor's*) employees shall access the site via agreed to point of entry.

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3.1.4 Maintain a sign-in / sign-out log(s) for the duration of the site activities.

3.1.5 All personnel must sign-in upon site entry and sign-out upon site exit.

3.1.6 For projects requiring badges, all personnel must wear ID badges in a visible and conspicuous location at all times while on site. Badge visibility may not always be practical at all times when wearing Tyvek or other PPE levels as approved by the Honeywell Construction Representative (Construction Manager).

3.1.7 Administer the distribution and return of Worker and visitor ID badges.

3.1.8 Replace lost or stolen ID badges within 24 hours of loss.

3.1.9 Contractor (*Subcontractor*) is solely responsible for security of Contractor (*Subcontractor*) Work, equipment and Products, and any Products supplied by Honeywell (*or AP*) to Contractor (*Subcontractor*), until final acceptance by Honeywell (*and the AP*). Honeywell (*or AP*), may provide security (e.g., guards, fencing) for non-work hours, but does not absolve Contractor (*Subcontractor*) of responsibility.

3.2 EXECUTION, COORDINATION OF WORK, AND ROLES AND RESPONSIBILITIES

3.2.1 Contractor (*Subcontractor*)

3.2.1.1 Contractor (*Subcontractor*) shall:

1. Provide specific attention to the execution of this Contract and assure there is full-time supervision throughout the entire contract duration.
2. Assure that Contractor's (*Subcontractor's*) Construction Project Manager, Site Superintendent, Site Health and Safety Representative, workers and all Subcontractors fully comply with all of the Construction Document requirements.
3. Direct the Work of Contractor's (*Subcontractor's*) workers and Subcontractors.
4. Address worker or Subcontractor questions regarding the Work.
5. Utilize recognized engineering and survey practices to:
   - Establish elevations, lines, levels and utility locations, slopes, and invert elevations;
   - Locate and lay out construction features including necessary stakes for cut, fill, placement and grading operations;
   - Verify set-backs and easements.
6. Confirm drawing dimensions and elevations.
7. Verify locations and elevations of existing utilities at point of connection with new services well in advance of new construction.
   - Notify Honeywell (*AP*) of potential conflicts between new or existing utilities or construction before installing the particular item of work.
   - Employ responsible and competent Construction Project Manager qualified by experience and training to capably supervise all phases of the work. This experience must include:
     - Commitment to safety procedures and their enforcement
     - Job planning, forecasting, and scheduling
     - Utilization of effective manpower, equipment, and material control techniques
     - Construction change estimating ability and execution authority
     - Ability to manage and interface with all Subcontractors
     - Administrative organization and execution of all contract requirements
8. Submit resume (including work experience and safety record) of the proposed Construction Project Manager with Contractor's Bid Proposal.
9. Authorization by Honeywell shall be required prior to the assignment, transfer or dismissal of the Construction Project Manager.

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10. When, in the opinion of Honeywell Construction Representative (*Construction Manager*), the Construction Project Manager is insufficiently qualified or fails to meet the Contract requirements, the Contractor (*Subcontractor*) shall immediately remedy the situation to Honeywell's (*AP's*) satisfaction.
11. Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.
12. Conduct all Work in accordance with Contractor's Work Plan, Contractor's Health and Safety Plan (HASP), applicable federal, state, and local laws, statutes, or codes and Honeywell policies.
13. Provide written verification that equipment is properly installed.
14. Provide written documentation of testing.
15. Meet with the Honeywell Construction Representative (*Construction Manager*) prior to construction start.
16. Accommodate special site safety requirements.
17. Coordinate, conduct and document any on-site and off-site project meetings as specified herein.
18. Provide information regarding all project Work aspects, schedules and submittals for Honeywell review and comment.
19. Incorporate or otherwise respond to Honeywell (*AP*) submittal comments or reported deficiency observations.
20. Coordinate Work of various crafts having interdependent responsibilities for installing, connecting to and placing Systems into service.
21. Coordinate space requirements, supports and installation of mechanical and electrical Work, which are either indicated on Drawings or are called for in the Specifications.
22. Coordinate locations of fixtures and outlets with finish elements.
23. Coordinate completion and clean up of Work areas as the Work progresses in preparation for Substantial Completion or as may be designated for Honeywell's occupancy.

3.2.1.2 Equipment, Tools and Supplies

1. Provide all equipment, tools and supplies necessary to perform the required work described by the Contract Documents.
2. All tools and equipment must be maintained in a safe condition.
3. All equipment, tools and supplies shall be of sufficient quantity to assure the successful completion of the work in accordance with the Contract schedule.

3.2.1.3 Contractor (*Subcontractor*) On-Site Resources

1. The Contractor (*Subcontractor*) shall:
   - Mobilize equipment, materials, labor and any other resources, of appropriate capability and size, and only as necessary, to productively perform the Work items for which these resources are required.
   - Demobilize equipment, materials, labor and other resources immediately after the Work items for which these resources are required are complete or when the Work cannot be productively performed.
   - Provide equipment that is appropriately sized and suitable for the intended Work. Equipment shall be neither oversized (beyond recommended factor of safety) nor undersized (below recommended factor of safety). Equipment shall only be used for its intended use. Equipment shall be operated, inspected and maintained in accordance with applicable OSHA, manufacturer and industrial standards.
   - In instances where Honeywell (*or AP*) may be responsible to cover the costs for Contractor's (*Subcontractor's*) on-site resources, such as during periods of down time

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created or directed by Honeywell (*or AP*), the Contractor (*Subcontractor*) shall mitigate the costs for these resources to the maximum extent possible. Contractor (*Subcontractor*) and Honeywell (*AP*) shall evaluate potential alternatives such as demobilizing equipment, suspending labor resources, etc. Failure to meet these obligations, depending on the severity, may result in Honeywell's (*AP's*) reduction in or suspension of Contractor's Scope of Work or termination of the Contract.

3.2.2 Honeywell (*AP*)

3.2.2.1 Honeywell Construction Representative (*Construction Manager*) will:

1. Address Contractor questions regarding the Work.
2. Not direct the Work of Contractor's workers or Subcontractors.
3. Only address issues regarding the Work with Contractor's Construction Project Manager or other designated representative(s).
4. Stop work whenever such stoppage may be necessary to ensure the proper and safe execution of the work.
5. Define any special work and specific site safety requirements (for Operating Facility).
6. Make periodic inspections of work in progress.
7. Participate in all on-site and off-site project coordination meetings.
8. Review and comment on all project Work aspects, schedules, and submittals, and will inform Contractor of any observed deficiencies to ensure compliance with Contract Documents.
9. Act as the point of contact for site activities.

3.2.3 Lower Tier Subcontractors

3.2.3.1 All lower tier subcontractors shall submit a completed Contractor Safety Evaluation Package **(SECTION 1.0 - ATTACHMENT 1-2** of the RFP) to Contractor (*Subcontractor*) or demonstrate they have a current Honeywell health and safety grade.

3.2.3.2 Contractor (*Subcontractor*) shall compile and submit as indicated on the form all Subcontractor Contractor Safety Evaluation Packages prior to commencing site Work.

3.2.3.3 Contractor Safety Evaluation Packages for all major subcontractors shall be submitted along with the Bid proposal.

3.2.3.4 Additional or new Subcontractors (major or minor) must complete the Contractor Safety Evaluation Package in accordance with the RFP (Section 1.0) and be agreed to by Honeywell (*and the AP*) prior to their initiating site Work.

3.3 CONSTRUCTION MEETINGS

3.3.1 Project Planning and Progress Meetings

3.3.1.1 The Contractor's Construction Project Manager (*Construction Manager*) shall hold regularly scheduled on site Project Planning and Progress Meetings with all subcontractors and Honeywell.

3.3.1.2 Meeting shall be held weekly unless otherwise agreed to by Honeywell.

3.3.1.3 Contractor (*AP*) will notify Honeywell of meeting location, date and time.

3.3.2 Safety Meetings

3.3.2.1 Conduct Daily and Weekly Safety meetings in accordance with the requirements of Specification 01620. Weekly safety meetings may be combined with weekly project progress meetings.

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3.3.3 Pre-installation Meeting

3.3.3.1 The Contractor's Construction Project Manager (*Construction Manager*) shall hold a pre-installation meeting at the site prior to commencing work when required in the Specifications.

3.3.3.2 Notify Honeywell's Construction Representative, Remediation Manager, Design and Construction Manager and Supply Manager at least four workdays in advance of the proposed meeting date.

3.3.3.3 Prepare agenda and preside at meeting.

3.3.3.4 Review conditions of installation, preparation and installation procedures.

3.3.3.5 Review coordination requirements for other Work or for ongoing facilities operations.

3.3.4 Problem or Work Deficiency Meeting

3.3.4.1 Either Contractor (*Subcontractor*) or Honeywell (*AP*) shall initiate a meeting when and if a problem or deficiency is present or likely to occur.

3.3.4.2 The meeting shall define and resolve the problem or work deficiency.

3.3.5 Agenda and Minutes

3.3.5.1 Refer to Subparagraph 1.5.5 "Meetings" under Paragraph 1.5 "Communication" for minimum requirements for meeting agenda and minutes.

3.4 UTILITY HAZARDS

3.4.1 Before starting work in any area, locate and identify any active or inactive underground or overhead utilities that could present a hazard. If utilities are to remain in place, provide adequate means of protection during construction activities.

3.4.2 Contractor (*Subcontractor*) shall obtain all "Dig Safe" permits prior to commencement of any invasive subsurface activities unless otherwise indicated in Section 01010 **Attachment 01010-4, Permit Schedule** of Specification 01010, Summary of Work.

3.4.2.1 Coordinate with Operating Facility to locate on-site underground utilities before attempting excavation work or other invasive work. Refer to Paragraph 3.5 Working in Operating Facilities for coordination with the facility to locate on-site utilities (i.e., possible geophysics, test pitting etc).

3.4.2.2 Should uncharted, or incorrectly charted piping or other utilities be encountered during excavation, consult the Utility Owner immediately for directions. Cooperate with Honeywell and utility companies in keeping respective services and facilities in operation.

3.4.2.3 Do not interrupt existing utilities serving facilities occupied and used by Honeywell or others, except when permitted in writing and then only after acceptable temporary utility services have been provided.

3.5 WORKING IN OPERATING FACILITIES

3.5.1 Compliance with Operating Facility General Rules and Practices

3.5.1.1 Refer to Paragraph 1.1.3 for Definition of an Operating Facility.

3.5.1.2 Contractor (*Subcontractor*) is responsible for the costs for complying with Operating Facility rules and practices.

3.5.1.3 Never interfere with the ongoing operations unless otherwise permitted in Contract Documents or as agreed to in advance in writing by Honeywell.

3.5.1.4 Coordinate with Operating Facility prior to commencing construction to review the proposed work and review potentially applicable Operating Facility procedures and requirements. Review, discuss and comply with:

1. Applicable site established General SOPs such as Work Permitting, Lockout and Tag-out procedures, Decommissioning and Commissioning procedures

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2. Union/non-union worker environment (ensure labor harmony)
3. Contractor parking restrictions
4. Vehicular access and speed limit restrictions
5. Temporary storage restrictions
6. Temporary Facility restrictions
   - Construction Trailers
   - Toilet Facilities
   - Utilities
   - Drinking water
7. Temporary fence requirements
8. Construction gate requirements and any labor action concerns.
9. Housekeeping requirements
10. Waste management requirements and coordination needs
11. Management of Change requirements and facility involvement in changes)
12. Communication requirements
    - Facility management
    - Discrete operational areas
    - Functional leaders
    - Public relations
    - Regulators
    - Code enforcement officials
    - First responders
    - Other officials
    - Other third-parties
13. Work logistics, planning and coordination with facility
14. Work permit requirements
15. Work hour restrictions
16. Work area restrictions
17. Open excavations near working areas (passer-bys)

3.5.1.5 Coordinate with Operating Facility to locate on-site underground utilities before attempting excavation work. Work may entail performing a thorough underground search using noninvasive geophysical surveys and / or test pitting where indicated on the Contract Drawings or Technical Specifications. An Excavation Permit may be required before any excavation can be performed.

3.5.1.6 Do not operate any existing Facility valves, gates, switches, instrumentation, controls, and other items of equipment or utilities required for execution of Contractor's (*Subcontractor's*) Work without Facility Operation's expressed written permission.

3.5.1.7 All Work shall be complete, tested and ready for Commissioning prior to “Transfer of Care, Custody and Control” to Honeywell.

3.5.1.8 Obtain a properly executed Work Permit (General, Hazardous or Hot Work) as required.

3.5.2 Compliance with Operating Facility Security Requirements.

3.5.2.1 Coordinate with Operating Facility prior to commencing construction to review the proposed work with respect to the Facility security requirements. Review, discuss and comply with:

1. Background Checks, if required, before any work commences.
2. Restricted access to certain areas.
3. Involved/restrictive facility required badge process.
4. Sign-in/out process for site and/or various areas.
5. Use of Cameras (typically restricted or prohibited entirely).
6. Surrendering of cameras and picture phones at the gate.
7. Emergency Contact requirements.
8. Facility security is not responsible for providing Contractor (Subcontractor) required security for their employees, materials or work area.

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3.5.3 Compliance with Operating Facility Health, Safety and Environmental Requirements.

3.5.3.1 Coordinate with Operating Facility prior to commencing construction to review the proposed work with respect to the Facility Health, Safety and Environmental requirements. Review, discuss and comply with:

1. Facility specific Health, Safety and Environmental SOPs
2. Informing the facility of all planned activities well in advance especially:
   - Crane work, critical lifts
   - Excavation and Trenching (barricade / road plate)
   - Lock out / Tag out – Zero Energy
   - Fall protection
   - Confined space entry
3. Facility Operating Permits
   - Air Emissions
   - Liquid waste discharge/disposal
   - Solid waste storage/handling and disposal (Large quantity generator)
   - Any special facility specific regulatory requirements (DOE, NRC, etc.)
4. Keeping facility workers, visitors and trespassers safe for every task during normal work hours and leaving the site properly secured against hazards at the end of every day.
5. Informing the facility how RES work may affect their SOPs related to permits, regulatory compliance, or other Facility activities.

3.5.4 Connection to Existing Facilities

3.5.4.1 All Work shall be tested, calibrated, inspected and in working condition before final tie-ins are made to an existing Facility.

3.5.4.2 Prior to making any tie-ins or hot taps to existing electric, water, sewer, air, steam or process piping systems, Contractor (*Subcontractor*) must receive Facility approval and obtain all applicable Work Permits

3.5.4.3 Temporary connections shall be made permanent at the next scheduled Facility outage or sooner as may be practicable.

3.5.4.4 All permanent connections must meet applicable Specification, Facility, regulatory and other compliance requirements.

3.5.5 Coordination with Facility Operations

3.5.5.1 Schedule and execute operations so as to avoid interference with the operations of the existing facilities and Work of others.

1. Submit to Honeywell (*and AP*) and Facility Operations written notice and itemized Work schedule at least ten workdays before commencement of Work that may affect the operations of the Facility, such as shutdowns, tie-ins, process bypass loops and modification to existing electrical, control, safety or security systems.
2. Unscheduled interruptions resulting from remedial work under the Contractor's (*Subcontractor's*) responsibility must be returned at once to normalcy through temporary or permanent means.
3. Interruption of service to Operating facilities exceeding eight hours in any 24-hour period is not allowed unless specifically accepted in writing by Facility Operations management.

3.6 MEASUREMENT & PAYMENT

3.6.1 Measurement & Payment Requirements

3.6.1.1 Refer to Section 01010 for Bid Items and Section 2.0 (Contract) of the RFP for payment terms and conditions.

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3.6.1.2 Tolerance shall be ± 0.01 foot for field measurements, unless otherwise specified herein and within RES-CP-WPC-11 Survey Control and Digitalization (**ATTACHMENT 01100-12)** or within the Technical Specifications (Section 4.0).

3.6.1.3 When using surveys for measurement and payment:

1. Site Superintendent shall sign Surveyor's field notes..
2. Keep duplicate field notes on file and provide copy to Honeywell Construction Representative (*Construction Manager*).
3. Certify digitally calculated quantities for payment purposes.

3.6.1.4 Reconciliation of any additional as-built quantities shall be done in accordance with Honeywell's CCO procedure.

3.6.2 Lump Sum / Unit Rate Bid Items

3.6.2.1 Each lump sum task will be paid at 100% of the proposal bid price, on a per task basis, when the actual work performed is within plus or minus 5% of the estimated bid quantity.

3.6.2.2 Any actual quantities in excess of 105% of the estimated bid quantities that may result in an extra cost to Honeywell will require the Contractor to request a CCO before performing such extra work.

3.6.2.3 Any actual quantities below 95% of the estimated bid quantities shall result in an automatic credit to Honeywell.

3.6.2.4 The Contractors bid proposal unit rates shall be equally applied to extra costs (above 105%) or credits (below 95%) to determine the actual cost or credit of the task.

3.6.3 Lump Sum Basis

3.6.3.1 Lump sum items with no unit rate specified shall be measured as a single item. Unless otherwise specified, lump sum items will be paid when the work is 100% complete and ready for its intended use or the next phase of construction.

3.6.3.2 Lump sum items with unit rate specified shall be measured on a unit rate basis as per the Contractors proposal. Payments will be made in accordance with the progress payment provisions specified.

3.6.4 Length Basis

3.6.4.1 Length basis items shall be measured along the item's centerline in accordance with the Contract Documents. Payments will be made in accordance with the progress payment provisions specified.

3.6.5 Area Basis

3.6.5.1 Area basis items shall be measured to a sufficient accuracy to calculate the actual surface area within limits specified in the Contract Documents. Payments will be made in accordance with the progress payment provisions specified.

3.6.5.2 For areas of a regular geometric nature, the minimum measurements required to perform such calculations are acceptable.

3.6.5.3 For areas of complex configuration, area shall be calculated using appropriate surveying or similar techniques.

3.6.5.4 Calculate areas to ± 1/10 square foot or ± 1/100 square yard as may be appropriate.

3.6.6 Volume Basis

3.6.6.1 Volume basis items shall be measured to a sufficient accuracy to calculate the actual volume within limits specified in the Contract Documents and as further defined below. Payments will be made in accordance with the progress payment provisions specified.

3.6.6.2 Excavation & Backfill

1. For excavation of impacted material (e.g., soil):

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- After clearing and grubbing and before commencing excavation, survey ground surface elevations and establish ground surface area as excavation datum for excavation volume calculation unless otherwise specified in Specification Section 01010 Summary of Work, specific Bid Item.
- As the work progresses and as may be required to determine bottom area and full depth of excavation, **survey** bottom of excavation surface elevations and area to determine excavation terminus.
- Excavation beyond the specified boundary limits, including but not limited to, materials excavated for slope stability, safety or other construction facilitation are considered over excavation and shall be excluded from the volume calculations for excavation payment purposes.

2. For backfill using on-site fill material:
   - Use excavation survey information if available, unless otherwise specified in Specification Section 01010 Summary of Work, specific Bid Item.
   - If excavation survey information is not available, survey bottom of excavation surface elevations and area to determine excavation datum for backfill volume calculation.
   - After on-site backfill material is placed and compacted, survey ground surface elevations and establish top of backfill surface area as backfill terminus.
   - If on-site fill material (or topsoil, as the case may be) is brought to finished grade, use final grade measurements as backfill terminus.
3. For backfill using imported fill material or topsoil:
   - Unless otherwise specified, utilize all available on-site fill material and topsoil first as may be practicable.
   - Follow similar procedure as outlined for using on-site fill material, except use top of placed and compacted fill from on-site sources as the datum as may be applicable.
   - Submit copies of all Bills of Lading, certified weigh tickets and material quality certifications to the Honeywell Construction Representative (*Construction Manager)* daily for all imported fill material and topsoil.
4. Use datum and terminus survey measurements to calculate in-situ volume of material excavated or backfill placed to ± 1/100 of a cubic yard.

3.6.6.3 Cast-in-Place Concrete

1. The volume shall be calculated using the dimensions of the finished concrete construction as shown on the Construction Drawings.
2. Where field conditions necessitate a deviation from the Construction Drawings that will significantly add to the cast-in-place concrete volume (>5% total increase), Contractor shall follow the CCO Process.
3. Contractor shall markup Construction Drawings with deviations noted and furnish copies to Honeywell Construction Representative (*Construction Manager*) with an RFI or CCO request, as applicable.
4. Calculate cast-in-place concrete volume to ± 1/100 of a cubic yard.

3.6.7 Weight Basis

3.6.7.1 Items specified as measured on a weight basis shall be measured using a certified scale in accordance with the manufacturer's recommendations and applicable agencies having jurisdiction.

3.6.7.2 Submit copies of all Bills of Lading (if applicable) and certified weigh tickets to the Honeywell Construction Representative (*Construction Manager*) daily.

3.6.7.3 Using the data collected from the certified weight tickets calculate the weight of material to ± 20 pound or ± 1/1000 of a ton. Payments will be made in accordance with the progress payment provisions specified.

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3.7 ENGINEERING & SURVEY SERVICES

3.7.1 Qualification Requirements

3.7.1.1 Submit Engineer and Land Surveyor statement of qualifications to Honeywell (*AP*) for review and acceptance before commencing any Work requiring these services as defined below.

3.7.1.2 Any special survey requirements and deliverables such as global positioning system, data management, formatted drawings and figures, etc., will be stipulated in the Technical Specifications (Section 4.0) of the RFP and shall be in conformance with RES-CP-WPC-11 – Survey Control and Digitization **(ATTACHMENT 01100-12)**. Contractor (*Subcontractor*) shall verify surveying subcontractor meets all the requirements stipulated in this section, and in the Technical Specifications (Section 4.0) of the RFP.

3.7.2 Engineering

3.7.2.1 Professional Engineer, when required per the Technical Specifications (Section 4.0) of the RFP for the successful completion of the work, must be licensed in the State where the Work will take place and the appropriate discipline for the service provided.

3.7.3 Surveying

3.7.3.1 All surveying work shall be in conformance with RES-CP-WPC-11 –Survey Control and Digitization **(ATTACHMENT 01100-12)**. The following paragraphs summarize some minimum requirements.

3.7.3.2 Land Surveyor, when needed for the successful completion of the work or for measurement payment purposes, must be registered in the State where the Work will take place.

3.7.3.3 Sequence surveying in each designated area as may be appropriate for Work or as otherwise directed by the Honeywell Construction Representative (*Construction Manager*).

3.7.3.4 Submit for Honeywell's (*AP's*) written approval at least ten workdays in advance of survey work, survey methods and equipment to be used. Work done using methods or equipment not agreed to by Honeywell (*AP*) shall be subject to removal and replacement.

3.7.3.5 Notify Honeywell (*AP*) at least two working days in advance of survey activities planned.

3.7.3.6 Submit related surveyor information, calibration certificates, field notes and record drawings.

3.7.4 Survey Control Points

3.7.4.1 Survey Control Point Requirements

1. Establish survey control reference points prior to starting work.
2. Use appropriate offset staking method for grade markers and other construction control points that interfere with the Work.
3. Protect and preserve survey control points during construction.
4. Site reference points shall not be relocated without Honeywell's (*AP's*) prior written approval.
5. Report dislocated, damaged or destroyed reference point to Honeywell (*AP*) promptly.
6. Replace dislocated, damaged or destroyed survey control points as per original survey.

3.7.4.2 Survey Monuments

1. Off-site control monuments shall be used as a reference for on-site monuments (when specified), as on-site monuments are expected to settle during construction.
2. The horizontal control datum shall be as indicated on the Construction Drawings, typically state plane coordinates, U.S. foot (North American Datum 1983 [NAD83]), unless otherwise indicated.
3. The vertical control datum shall be as indicated on the Construction Drawings, typically the National Geodetic Vertical Datum 1927 (NGVD27), unless otherwise indicated.

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4. On-site monuments (when specified) shall be checked not less than monthly against off-site monuments until job completion.
5. Reference site survey and reference points to off-site control monuments and record locations of all survey control points, using the Control Datum, on Record Drawings.

3.8 TEMPORARY FACILITIES

3.8.1 Temporary Facility Requirements

3.8.1.1 Furnish, when appropriate, sufficient temporary facilities for field office, sanitary, construction and drinking water, storage, telephone, fax machine, health, safety or other facilities required to successfully complete the work in hot, cold, wet or other inclement weather.

3.8.1.2 The Honeywell Construction Representative (*Construction Manager*) will designate areas for construction trailers or offices, parking, lay-down, and storage of Products and equipment.

3.8.1.3 Electrical power, water, gas and other utility connections available on site are defined within the Contract Documents

3.8.1.4 Utility connections to existing sources are subject to Honeywell authorization.

3.8.2 Potable Water

3.8.2.1 Provide and maintain an adequate supply of clean potable water for construction, testing, decontamination, cleanup, dust control, safety, equipment and domestic consumption, and any facilities needed to convey or store the water.

3.8.3 Sanitary Facilities

3.8.3.1 Provide and maintain an adequate number of sanitary, chemical type, temporary toilets for the use of personnel employed by the Contractor (*Subcontractor*), Subcontractors, Honeywell (and *AP*) and authorized visitors. These facilities shall conform to the requirements of all state, county and local ordinances and shall be kept clean and maintained in good working order at all times.

3.8.4 Storage

3.8.4.1 Furnish, as necessary, temporary buildings or trailers required for the storage and protection of Honeywell (*or AP*) or Contractor (*Subcontractor*) supplied Products.

3.8.4.2 All Products shall be stored neatly and in such a way to allow for Contractor's (*Subcontractor's*) Work, activities of the Operating Facility and others authorized to access the site to proceed in a safe and orderly manner.

3.8.4.3 Provide facilities to store and protect Products received on site.

1. Maintain adequate cover and other protection in accordance with industry best practice, MSDS or manufacturer's guidelines, as may be applicable.
2. Store sensitive Products in weather tight, climate controlled enclosures.
3. Maintain Product with documentation, MSDS, seals, nameplates, match marks and labels intact and legible.

3.8.4.4 Establish adequate exterior storage (lay-down) area as may be applicable for efficient materials handling throughout project duration.

3.8.4.5 Cover with impermeable sheet covering, provide ventilation to prevent condensation and prevent contact with ground for:

1. Products subject to degradation or weather / moisture damage.
2. Fabricated Products stored outside.

3.8.4.6 Store materials on solid flat surfaces in a well-drained area.

1. Prevent mixing with foreign matter.
2. Keep covered with impermeable sheeting if weather impacts are a concern.

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3. Control storm water runoff and run-on.

3.8.4.7 Provide off-site storage and protection when site does not permit adequate on-site storage or protection.

3.8.4.8 Machinery stored for three months or more shall be maintained in accordance with industry best practices and manufacturer guidelines.

1. Maintenance shall include, but is not limited to:
   - Lubrication of non-painted or exposed carbon steel surfaces
   - Lubrication of bearings and shaft rotation
2. Maintain a moisture and dirt free environment for air movers, compressors, pumps, etc.
3. Include necessary details for these machinery maintenance items in the construction Work Plan.
4. Record all maintenance activities on monthly inspection log.

3.8.4.9 Inspect to verify Products are undamaged and in acceptable condition at least monthly.

1. Maintain detailed Inspection Log for all Products.
2. Submit copies of inspection log entries to the Honeywell Construction Representative (*Construction Manager*) monthly.

3.9 PROTECTION OF WORK

3.9.1 Protect and preserve all Products and Work that has been or will be performed by Contractor (*Subcontractor*), Subcontractors, Honeywell, or others from Contractor's (*Subcontractor's*) operations, the actions of others working in the same areas, loss, damage, weather affects or tidal fluctuations.

3.9.2 Immediately notify the Honeywell Construction Representative (*Construction Manager*) of any lost, damaged, deteriorated or otherwise defective Product or Work.

3.9.3 Exercise extreme care to prevent damage to existing telephone lines, power lines, water mains, sewer or gas lines, and other above ground or below ground structures.

3.9.4 Immediately notify the Honeywell Construction Representative (*Construction Manger*) of any damage to existing aboveground or below ground structures, as well as the utility or third parties having jurisdiction over the damaged facilities.

3.9.5 Replace all missing items.

3.9.6 Replace any damaged or defective Products or Work to the condition required by the appropriate specification.

3.9.7 Alternately, the Contractor (*Subcontractor*) may petition the Honeywell Construction Representative (*Construction Manager*) for written permission to repair, clean or restore any damaged or defective Products or Work to the condition required by the appropriate specification.

3.9.8 Obtain approval from the Construction Representative (*Construction Manager*) for all materials, methods and procedures used to repair, clean, or restore damaged Products and Work.

3.10 MANUFACTURERS' FIELD SERVICES

3.10.1 When specified in the Contract Documents, provide services of an authorized Vendor technical representative to:

1. Supervise the field construction activities, installation, adjustment and testing.
2. Monitor and instruct for quality and workmanship for the Product supplied.
3. Inspect, check and agree to installation prior to start-up.
4. Instruct operations and maintenance personnel.

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3.10.2 Vendor's technician is subject to Honeywell (*AP*) approval.

3.10.3 Submit technician qualifications ten workdays in advance of such Work.

3.11 HOUSEKEEPING

3.11.1 Keep the Site neat at all times and free of accumulation of scrap, trash, rubbish and debris related to site work.

3.11.2 Maintain all parking areas, roadways and traffic areas impacted by site work free of spilled materials, tracked soil and debris on a daily basis.

3.11.3 Maintain work areas, passageways and stairs in and around buildings or other structures in a clear, unobstructed and orderly manner.

3.11.4 Soil, rubbish, debris, waste material, etc. on rights-of-way, roadways, railways and in support areas must be collected and placed in a designated area within the work zone each day.

3.11.5 Site Superintendent shall inspect such Work areas daily before Work begins, as the workday ends and whenever working conditions change to ensure housekeeping practices are observed.

3.11.6 Debris shall be promptly removed from Work Areas during the course of construction as it is generated.

3.11.7 Immediately clean up any spillage and return to its originally intended use, if appropriate, or dispose of in accordance with the Contract Documents.

3.12 MANAGING WASTE MATERIAL

3.12.1 Managing Waste Material Requirements

3.12.1.1 Manage all handling, segregation, construction water, stabilization, containerizing, storage and loading for transportation all waste materials resulting from the performance of the Work. Manage all waste material in accordance with **ATTACHMENT 01100-18**.

3.12.1.2 Transportation and disposal responsibilities of hazardous and TSCA waste shall be as defined in Specification 01010, Summary of Work.

3.13 PROHIBITIONS

3.13.1 Prohibited construction practices include, but are not limited to, the following:

3.13.1.1 For any stream corridor, wetland, surface water or unspecified location:

1. Dumping of spoil material
2. Indiscriminate, arbitrary, or capricious operation of equipment
3. Pumping of silt-laden water from trenches or other excavations
4. Disposal of trees, brush, and other debris

3.13.1.2 Permanent or unspecified alteration of the flow line of any stream.

3.13.1.3 Dynamite or other explosive blasting.

3.13.1.4 Open burning of construction project debris.

3.13.1.5 Disposal of de-watering fluids without authorization.

3.14 STANDBY TIME (DELAY TIME)

3.14.1 Standby time is defined as time that Contractor (*Subcontractor*) is not permitted to conduct scheduled productive work tasks for influences outside the control of the Contractor (*Subcontractor*) and not discussed or presented in the Specification 01010, Summary of Work or any other part of the Contract Documents.

3.14.2 Standby time does not apply to those items specifically defined as being included in Specification 01010, Summary of Work. Standby time likewise does not apply to work items that are considered incidental to the Work as defined by the Contract Documents.

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3.14.3 Standby time will apply to those tasks, as approved in writing by Honeywell (*and the AP*), that are delayed or otherwise interrupted by the following:

3.14.3.1 Change in the Scope of Work as initiated by other parties other than the Contractor (*Subcontractor*) or their designees,

3.14.3.2 Change in the design as initiated by parties other than the Contractor (*Subcontractor*) or their designees,

3.14.3.3 Changes in site conditions,

3.14.3.4 Work stoppage for the convenience of Honeywell.

3.14.4 The following provisions will be included as further definition and applicability of Contractor standby time:

3.14.4.1 Obtain Honeywell (*and AP*) agreement in writing for all labor and equipment standby costs.

3.14.4.2 Contractor (*Subcontractor*) shall specify all requirements with itemized and total costs associated with overtime, weekend or holiday standby requirements. Honeywell (*and AP*) acceptance of these requests shall be obtained in writing.

3.14.4.3 Honeywell (*AP*) will not provide standby compensation to the Contractor (*Subcontractor*) for any equipment or labor that is on site for the Contractor's (*Subcontractor's*) convenience and is not necessary for the work that is impacted by standby activities

3.14.4.4 Honeywell (*AP*) will not provide standby compensation to the Contractor (*Subcontractor*) for any equipment or labor that was not scheduled to be used on the day that Honeywell (*or the AP*) initiated the action for the standby time. Likewise, if the action occurred on a weekend or holiday, compensation will not be made for any equipment or labor that is on site the first work day following the off-hour event.

3.14.4.5 A standby event does not necessarily impact the entire project. If other productive tasks can be performed during the time when one or more discrete work tasks are impacted by the delay, the Contractor (*Subcontractor*) shall redirect resources to other work activities to mitigate the requirement for standby time.

3.14.4.6 Honeywell (*AP*) will not pay standby time for any equipment or labor that can be or is used productively for other work tasks.

3.14.4.7 No standby time will be paid for weekends or Federal Holidays.

3.14.5 Honeywell (*AP*) will expect to develop a cost basis for Contractor (*Subcontractor*) standby time for each Contract and further break down the cost structure to capture the costs required for each work item included in Specification 01010, Summary of Work. The costs for standby time will be developed with the following provisions:

3.14.5.1 Standby for equipment will be paid based upon the lesser of the following:

1. A prorated amount of the daily rate for equipment on site three workdays or less, or,
2. A prorated amount of the weekly rate for equipment on site three workdays or more, or,
3. A prorated amount of the monthly rate for equipment on site for 14 workdays or more, including mobilization, demobilization and standby time.
4. All prorated amounts shall be on an hourly basis not to exceed 8 hours per workday.

3.14.5.2 Standby for labor will be paid on the following basis:

1. Straight time hourly rate.
2. On the day that a standby is initiated, if Honeywell (*or AP*) announces standby before 10:00 a.m., all employees scheduled to work that day and were on site for their scheduled work, will be paid for up to 4 hours of work. If Honeywell (*or AP*) announces standby after 10:00 a.m., all employees scheduled to work that day and were on site for their scheduled work will be paid for up to 8 hours of work.
3. Only those employees that are necessary to be on site for health, safety, environmental and security reasons, as accepted by Honeywell (*and the AP*) in writing, will be paid for 8 hours per workday for the duration of the standby event. Contractor (*Subcontractor*) shall

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not be compensated for any employees not accepted by Honeywell (*and the AP*) as necessary for a standby event.

4 PRE-CONSTRUCTION WORK

4.1 APPROVAL SUBMITTAL(S)

4.1.1 Refer to Paragraph 1.2.1, "Construction Schedule Requirements" for Baseline Construction Schedule submittal requirements.

4.2 KICKOFF MEETING

4.2.1 The Honeywell Construction Representative (*Construction Manager*) will schedule a pre-construction kickoff meeting at the site or other convenient location before Work starts.

4.2.2 The meeting will provide an overview of the following project requirements:

4.2.2.1 Project Scope, Schedule, Invoicing Procedure, CCO Procedure, Contractor Submittals, Working in Operating Facilities, Site Access and Security, Health and Safety, Temporary Facilities, Coordination of Work, Permit Requirements, Materials Management, QA/QC, Managing Waste.

5 MOBILIZATION & SITE PREPARATION

5.1 MOBILIZATION

5.1.1 Provide and setup field office(s), office supplies, sanitary facilities, change trailers, First Aid and PPE supplies, temporary power, small tools and equipment.

5.1.2 Coordinate with Honeywell (*AP*) the following mobilization activities:

5.1.2.1 Location of field offices, sanitary facilities, lay-down areas and temporary storage facilities.

5.1.2.2 The agreed to location for construction field offices, storage, site access, parking and employee entry to Facility shall be as identified in the Construction Documents and will be reaffirmed at the kickoff meeting.

5.2 LAYOUT OF WORK AND SITE CONDITIONS

5.2.1 Within ten workdays after moving onto the job site, inspect any previous work performed by others (e.g., foundations, anchor bolts, pipe stub ups, valve locations) upon which Contractor's subsequent work will depend.

5.2.2 Accept, reject or note exceptions to all such previous work through written notification to the Honeywell Construction Representative (*Construction Manager*).

5.2.3 Verify the existence of any overhead or underground obstructions.

6 CONSTRUCTION WORK

6.1 GENERAL

6.1.1 Paragraph 6 provides minimum requirements for projects having minor site, mechanical or electrical scope and where more detailed technical specifications are not provided. For more complex construction work and when detailed technical specifications are provided, refer to the Technical Specifications (Section 4.0) of the Contract. If there is a conflict between these general requirements and the technical specifications, the technical specifications shall govern.

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6.2 WELL INSTALLATION

6.2.1 Obtain required permits unless indicated as provided by others in Specification 01010, Summary of Work.

6.2.2 Decontaminate all rigs and equipment between each borehole and upon completion of work.

6.2.3 Borings not completed as wells shall be backfilled with neat cement grout or equivalent.

6.2.4 Develop each installed well per direction of Honeywell's *(AP's)* representative or as otherwise specified in the Technical Specifications (Section 4.0) of the RFP.

6.2.5 Manage soil cuttings, development water, decontamination water and other waste residuals as indicated in RES-CP-WPC-12 – Waste Management **(ATTACHMENT 01100-18)** and the Technical Specifications (Section 4.0) of the RFP.

6.2.6 Provide boring and well construction logs for all installed wells. A template for also recording pertinent information to streamline information download into Honeywell's Environmental Management database, is available from Honeywell (*AP*) in Excel (.xls) format (**ATTACHMENT 01100-19**).

6.2.7 At a minimum, well / boring locations shall be surveyed for record drawing submission.

6.2.8 Refer to the Technical Specifications for additional well submittal and installation requirements.

6.3 CIVIL WORK

6.3.1 Storm Water Management, Soil Erosion and Sedimentation Control

6.3.1.1 When required by the Specification 01010, Summary of Work or the Technical Specifications (Section 4.0) of the RFP, provide necessary Storm Water, Erosion Control, and Sedimentation Control Plan and measures.

6.3.1.2 Storm Water Management, Soil Erosion and Sedimentation Control Plan

1. Submit to Honeywell (*AP*) a detailed Storm Water Management, Soil Erosion and Sedimentation Control Plan for construction and the one-year post-construction guarantee period. Plan should be submitted prior to construction activities for Honeywell (*AP*) review and approval.
2. Maintain copy of this plan at the site
3. At a minimum, the plan shall include:
   - Chronological completion dates for each temporary (and permanent) measure for controlling erosion and sediment.
   - Location, type and purpose for each temporary measure to be undertaken.
   - Dates when those temporary measures will be removed.
   - Materials to be used.

6.3.1.3 Storm Water Control Requirements

1. Provide storm water runoff control, treatment and disposal measures in accordance with the approved plan.
2. Address any deficiencies noted by Honeywell (*AP*) or regulatory agencies.

6.3.1.4 Soil Erosion Control and Sedimentation Control Requirements:

1. Install erosion and sedimentation control measures prior to all construction activities.
2. Maintain control measures during earthwork activities.
3. Keep land disturbance to a minimum and schedule re-stabilization immediately after any disturbance, as is practicable.
4. Inspect all control measures weekly, immediately after each rainfall of greater than 1/2 inch in any given week and at least daily during prolonged rainfall.
5. Repair any failed control measure immediately. Perform maintenance as needed.

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6. Remove all sedimentation and erosion control barriers after completion of construction and permanent control measures are installed.
7. Conform to all State, County and Local erosion and sedimentation control measures and (if applicable) as specified in the Storm Water Management, Soil Erosion, and Sedimentation Control Plan (or equivalent plans).
8. Immediately adjust or institute additional control measures if planned control measures are not effective or satisfactory to the regulatory agencies having jurisdiction.

6.3.1.5 Soil Erosion Control Measures: Measures shall include temporary berms, diversions or other barriers including hay or straw bales, stone, silt fences or other agreed to materials that are constructed to retain sediment on-site by retarding and filtering storm runoff and prevent migration of silts and sediment to receiving waters. Unless otherwise shown on the drawings or detailed in the Technical Specifications (Section 4.0) of the RFP:

1. Anchor all topsoil stockpiles with straw mulch and encircle with hay bales.
2. Silt fences or hay bales shall be installed at the toe of all critical cut and fill slopes.
3. Protect catch basins (sumps) with silt fences, hay bales or other approved means throughout or until all disturbed areas are stabilized.
4. Grade surfaces per the Contract Documents and manufacturer guidelines, prior to installation of erosion control fabric.
5. Diversion terraces shall be installed on the uphill side of disturbed areas to divert surface runoff away from unstable slopes and the project area, as may be required.
6. Interceptor channels shall be used across disturbed areas where the slope is running parallel to direction of trenches to divert runoff to outlets on lower side of disturbed area and shall be arranged to minimize erosion impact, as may be required.
7. Trench barriers of earth-filled sacks or piled stone, stacked to top of trench shall be constructed to prevent trench washout after installation of piping, if backfill operations are delayed, as may be required. Trench shall be sloped in the direction of piping.
8. Tie hay/straw bales securely. Unless otherwise specified, utilize two #3 concrete reinforcing bars or two 2" x 2" hardwood stakes for each hay/straw bale to secure to the ground.

6.3.1.6 Sediment Control Measures

1. Periodically remove sediment from temporary control structures and permanent drainage facilities as needed.
2. Dispose of sediment per the Contract Documents. Prevent additional erosion or pollution.
3. Sediment barriers shall be constructed at storm drain sumps, across minor swales / ditches and other low-strength temporary applications, as may be required.
4. Unless otherwise specified, construct silt fences using reinforcement geotextile prefabricated to 24" height units with 4' stake spacing.
5. Unless otherwise specified, install 2" x 2” x 36" hardwood post or standard T or U section steel posts (1.33 #/lf min.) for silt fences.

6.3.2 Earthwork

6.3.2.1 Conduct all earthwork activities to mitigate dispersion of volatile organic emissions and fugitive dust beyond the Work Area.

6.3.2.2 Comply with all requirements of the Storm Water Management, Soil Erosion and Sedimentation Control Plan for the duration specified in the Plan.

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6.4 MECHANICAL WORK

6.4.1 Equipment

6.4.1.1 Installation of Machinery and materials

1. Use certified shop drawings, installation drawings and manufacturer instructions when installing Machinery.
2. Mechanics shall be competent, experienced and skilled in handling, setting, aligning, leveling and adjusting the Products and shall install Products in accordance with manufacturer recommendations.
3. Use proper tools, equipment and materials to rig and assemble Products to prevent deforming or marring the surface of shafts, drive components, mating surfaces, threaded parts, etc.
4. Furnish all fasteners, supports, brackets, bracing and other appurtenances required for a complete installation.
5. Do not force or drive couplings, gears, sheaves, etc. on machinery shafts nor subject them to an open flame or torch. Use only oil bath heater or similar method.
6. Apply a molybdenum disulphide anti-seize compound to all threads in mechanical connections such as bolts, studs, cap screws, tubing, etc. unless otherwise indicated.
7. Products shall not be altered or repaired, and no burning or welding will be permitted on any parts having machined surfaces, except by written permission of Honeywell (*AP*).
8. No rigging shall be done from any structure without the permission of Honeywell.
9. Furnish and install appropriate fittings or plugs in lubrication holes to prevent entry of moisture or foreign material.

6.4.1.2 Alignment & Leveling of Equipment

1. Equipment shall be carefully set and aligned on foundations to proper orientation and elevation and shimmed to true level.
2. Equipment baseframe shall be tightened to bear against shims.
3. Equipment shall be checked after securing to foundations and, after confirmation of level and elevation, shall be grouted in place.
4. Rotating equipment shall be initially aligned using stainless steel shims while equipment is free from any external loads.
5. Correctly align piping to associated equipment to prevent stress at pipe connections. Springing of pipe to align with mating equipment flanges is not permitted.
6. Misaligned holes shall be reamed. "Driving" of fasteners or keys is not permitted.
7. Check rotating equipment angular and parallel alignment and adjust to manufacturer's specifications before testing or placing any Machinery into service.
8. Submit actual alignment data records to Honeywell (*AP*).

6.4.1.3 Equipment: Anchor, Shim and Grout

1. Furnish anchor or expansion bolts, as specified or otherwise required.
2. Use expansion bolts only where shown or agreed to by Honeywell (*AP*).
3. Anchor and expansion bolts shall be of specified materials with heavy hex head nuts.
4. Anchorage items shall conform to Contract Document requirements.
5. Provide all steel shims, grout packing or other materials necessary to properly level and secure equipment in place.
6. Wedging is not permitted.
7. Use least number of flat shims possible in leveling equipment.
8. Shims shall be clean and free of slag.

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9. When requested by Honeywell (*AP*), demonstrate that all elements so required are level and plumb.
10. Grouting shall conform to Contract Document requirements.

6.4.2 Piping and Pressure Bearing Systems

6.4.2.1 Follow routing shown for pipes, ducts and conduit as closely as practicable; place runs parallel with lines of building.

6.4.2.2 Utilize spaces efficiently to maximize accessibility for other installations, for maintenance and for repairs.

6.4.2.3 In finished areas (except as otherwise indicated), conceal pipes, ducts and wiring within the construction.

6.4.2.4 Furnish all fasteners, gaskets, lubricants, sealants, hangers, supports, brackets, braces, bracing and other appurtenances required for a complete installation.

6.4.2.5 Tighten connections requiring gaskets evenly all around to ensure uniform stress over the entire gasket area.

6.4.2.6 Pressure test all piping and pressure bearing Systems in compliance with American Society of Mechanical Engineers, American Petroleum Institute or other relevant industrial standards.

6.4.2.7 Maintain all Pressure Test Reports on site and accessible at all times.

6.4.2.8 Submit copy of Pressure Test Report to the QA/QC Engineer immediately following test.

6.5 ELECTRICAL, INSTRUMENTATION, AND CONTROL WORK

6.5.1 Use certified shop drawings, installation drawings and manufacturer instructions when installing electrical and instrumentation equipment.

6.5.2 Electricians shall be competent, experienced and licensed (as indicated in the Technical Specifications [Section 4.0] of the RFP and in accordance with state and local regulations). For instrumentation work, they shall be skilled in adjusting and troubleshooting the Products and shall install Products in accordance with manufacturer recommendations.

6.5.3 Comply with the following codes, standards, regulations and specifications:

6.5.3.1 National Electrical Code (NFPA No. 70 - most recent edition)

6.5.3.2 Life Safety Code (NFPA No. 101 - most recent edition)

6.5.3.3 Electrical Safety in the Workplace (NFPA No. 70E - most recent edition)

6.5.3.4 National Electric Safety Code (NESC – most recent edition)

6.5.3.5 Occupational Safety and Health Act (OSHA) - regarding construction practices

6.5.3.6 Utility Company standards, specifications and requirements

6.5.3.7 State and local electrical codes, building codes and fire codes for the locale where the work is to be performed.

6.5.3.8 Underwriters Laboratory, Inc. (UL)

6.5.3.9 National Electrical Manufacturers Association (NEMA)

6.5.3.10 American National Standards Institute (ANSI)

6.5.3.11 National Electrical Contractors Association (NECA) 1 – Good Workmanship in Electrical Construction

6.5.4 Install junction and pull boxes in readily accessible locations. Access to boxes shall not be blocked by equipment, piping, ducts and the like. Provide all necessary junction or pull boxes required due to field conditions and as required by the National Electrical Code. All mounting heights shall comply with latest Applicable Codes. All work shall comply with NECA 1.

6.5.5 Panelboards, cabinets, large pull boxes, large junction boxes, cable support boxes and starters shall be secured to structural members of walls, ceiling and the floor slab, as applicable and not supported from conduits suspended ceilings or other light construction. Small panelboards may be supported on drywall or similar wall construction.. Racks for

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support of conduit and heavy electrical equipment shall be secured to building construction by substantial structural supports. All work shall comply with NECA 1.

6.5.6 All distribution equipment (substations, switchboards, motor control centers, distribution panel boards, transformers, transfer switches, disconnects, starters, control panels, etc.), switchboard and distribution panel over current devices, motor control center devices, individually mounted motor controllers, disconnect switches, bus plugs, control devices, etc., shall have an engraved lamacoid tag, mounted adjacent to the manufacturer's nameplate, indicating the equipment's designation and identification number per the Contract Documents or site standards.

6.5.7 All equipment shall be labeled in accordance with OSHA, NFPA and code requirements.

6.5.8 For all feeder wiring rated 600 volts or less, provide 1,000 volt insulation resistance test prior to energizing feeders. Use a motor driven equipment for all tests. Test voltage shall be applied until readings reach a constant value and until three (3) equal readings, each one (1) minute apart, are obtained. Minimum reading shall be 45 megohms for feeder conductors. Document test results and submit for approval prior to energizing conductors.

6.5.9 Install, wire, configure and test all instrumentation. Unless otherwise noted, mount devices and equipment at heights measured from finished floor to device/equipment centerline as follows:

Device / Equipment	Height (in)
Toggle switches (up position "on")	48
Receptacle outlets (long dimension vertical, ground pole nearest floor)	18
Receptacle outlets, above baseboard heaters	30
Receptacle outlets, hazardous areas	48
Receptacle outlets, weatherproof, above grade	24
Telephone outlets	18
Telephone outlets, wall mounted	48
Fire alarm manual station	48
Fire alarm audio/visual station	90
Branch circuit panelboards, to top of backbox	72
Distribution panelboards, to top of backbox	72
Terminal cabinets, control cabinets, annunciator panels, to top of backbox	72
Disconnect switches, motor starters, enclosed circuit breakers	48

6.5.10 Locate devices / equipment in locations shown on the drawings or in accessible areas acceptable to Honeywell (*AP)*. Where structural or other interferences prevent compliance with mounting heights listed above, consult Honeywell (*AP*) to change location before installation.

6.5.11 Conduits:

6.5.11.1 Generally conceal throughout except where exposure is permitted by Honeywell (*AP*) or shown exposed on the Drawings.

6.5.11.2 Install exposed conduits either parallel or perpendicular to structural members and group together where possible.

6.5.11.3 Install conduits supported from building walls with at least 1/4-in. clearance from the wall to prevent accumulation of dirt and moisture behind the conduit.

6.5.11.4 Support long "drops" of small conduit by structure or several drops tied together to provide rigid, straight, plumb and neat appearing installation.

6.5.12 After the Instrumentation and Process Control System is completed, or when otherwise requested by Honeywell (*AP*), demonstrate the total system operation and make final adjustments to the system. If any system or piece of equipment within a system fails to

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function properly, rectify such defects or inadequacies and make a final demonstration as requested by Honeywell (*AP*).

6.5.13 All systems shall be adjusted, tested, inspected and turned over to Honeywell in final working order acceptable to Honeywell (*AP*).

6.5.14 Contractor (*Subcontractor*) shall implement Honeywell's Lock-Out Tag-Out Safety Procedures specified in RES-CP-XX-XX (**ATTACHMENT 01100-20**) for all electrical work.

7 STARTUP & COMMISSIONING

7.1 STARTUP

7.1.1 General Requirements

7.1.1.1 Coordinate all start-up activities of various Systems included in the project.

7.1.1.2 Notify Honeywell (*AP*) at least ten workdays prior to start-up of each System. Approved OM&M manuals shall be available prior to training.

7.1.1.3 Verify the following:

1. Each piece of Machinery or System has been checked for proper lubrication, drive rotation, belt tension, control sequence and for conditions which may cause damage.
2. Tests, meter readings and specified electrical characteristics agree with those required by the equipment or system manufacturer.
3. Wiring and support components for equipment are complete and tested.

7.1.1.4 Comply with the requirements of applicable manufacturer's representative and in accordance with manufacturers' instructions.

7.1.1.5 Adjust operating equipment to ensure smooth and unhindered operation.

7.1.1.6 Within 30 days of completion of the performance test, submit a certificate from the manufacturer (or installer, as may be appropriate) stating the following:

1. Equipment was satisfactorily installed and tested and is ready for operation.
2. Operating and maintenance personnel were suitably instructed in the operation, lubrication and care of the equipment.
3. Manufacturer or authorized (key) manufacturer representative should certify in writing proper installation and training was provided.
4. Honeywell (*AP*) will determine who is responsible for utilities, chemicals, etc. during the start-up.
5. A prove-out period should be included to ensure that the facility as a whole operates as intended.
6. Contractor (*Subcontractor*) may be responsible for updating the OM&M manual during system operations, if activities are changed or further defined. These responsibilities, if required, shall be as defined in Specification Section 01010, Summary of Work and/or the Technical Specifications (Section 4.0) of the RFP.

7.2 COMMISSIONING

7.2.1 Commissioning Plan

7.2.1.1 Development and submittal of a commissioning plan may be required depending upon the complexity of the project. Refer to the Technical Specifications for Commissioning and Plan requirements. Refer to RES-CP-WPC-04, Commissioning Plan (**ATTACHMENT 01100-21**), if this Plan is required.

7.2.2 Operation and Maintenance Training

7.2.2.1 Unless otherwise specified, training time shall be a minimum of one eight-hour workday.

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7.2.2.2 Utilize OM&M Manuals as basis for instruction. Review contents of manual with Honeywell (*and/or AP*) in detail to explain all aspects of operation and maintenance.

7.2.2.3 Demonstrate operation and maintenance of Products to Honeywell and OM&M Contractor (if applicable) (*and AP*) at least ten workdays prior to date of final inspection.

7.2.2.4 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of Machinery.

7.2.2.5 Demonstrate seasonal requirements for Machinery or Systems requiring seasonal operation.

7.2.2.6 Provide written certification of O&M Training in Final "As-Built" OM&M Manuals to be submitted within ten workdays after final inspection.

8 SITE RESTORATION & DEMOBILIZATION

8.1 SITE RESTORATION

8.1.1 Complete site restoration in accordance with the Technical Specifications (Section 4.0) of the RFP. If not specifically specified, restore to current (or better) conditions.

8.2 DEMOBILIZATION

8.2.1 Submit an inventory listing all surplus materials.

8.2.2 Unless otherwise directed by Honeywell (*or AP*), remove all Temporary Work, tools and equipment at Work completion.

8.2.3 Properly decontaminate all tools and equipment before removal from site.

8.2.4 Properly decontaminate all supplies and materials before removal from site, or manage as waste materials in accordance with the requirements of this specification.

8.2.5 Remove all Temporary Facilities at the conclusion of the project.

9 CONTRACT CLOSEOUT

9.1 CLOSEOUT PROCEDURE

9.1.1 Notify Honeywell and Facility Operations (*and AP*) when Work is Substantially Complete.

9.1.2 Submit inspection reports and Certificates of Occupancy as required by the Contract Documents or by authorities having jurisdiction.

9.1.3 Submit Signed and sealed as-built survey showing final grades and lines.

9.1.4 Submit the Final Closeout Report which shall include the following information:

9.1.4.1 Project Summary highlighting project objectives were achieved

9.1.4.2 Health and Safety Closeout Documentation

9.1.4.3 Final OSHA Man-hour summary

9.1.4.4 Off-site disposal Record

9.1.4.5 Project Photographs

9.1.4.6 An assessment of the project schedule and cost variance

9.1.5 Accompany Honeywell and Facility Operations (*and AP*) on Substantial Completion inspection and document Punch List items as needed.

9.1.6 Rectify all Punch List items.

9.1.6.1 Submit detailed written resolution for each Punch List item.

9.1.7 Submit to Honeywell and Facility Operations (*and AP*) written certification of Substantial Completion that addresses the following:

9.1.7.1 Contract Documents reviewed and updated or markups provided.

9.1.7.2 Work is complete, inspected and in accordance with Contract Documents.

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9.1.7.3 Work is ready for Honeywell (*and AP*) Final inspection.

9.1.8 Accompany Honeywell and Facility Operations (*and AP*) on Final inspection and verify all Punch List items have been rectified to Honeywell's (*and AP's*) satisfaction.

9.1.9 Repeat Punch List and final inspection processes until there are no items to be addressed.

9.2 SURPLUS MATERIAL

9.2.1 Upon completion of the project, inventory surplus materials.

9.2.2 Surplus materials purchased by contractor via Lump Sum contract remains the property of the contractor and must be removed from the site.

9.2.3 Surplus materials purchased/supplied by Honeywell remains the property of Honeywell and are to be stored on-site in area determined by Honeywell.

9.3 SPARE PARTS AND MAINTENANCE PRODUCTS

9.3.1 Provide spare parts, maintenance and any other extra Products in quantities specified in the Contract Documents.

9.3.2 Deliver to Project site and place in location as directed by Honeywell; obtain receipt prior to final payment.

9.3.3 All spare parts should be securely labeled with equipment name, part description, and number, quantity, etc.

9.4 FINAL DOCUMENTATION SUBMITTAL

9.4.1 Submit final "Record Drawing" Contract Submittals at or before Closeout Meeting.

9.4.2 Submit OM&M Manuals and Warranties. Refer to Paragraphs 1.5.7, OM&M Manual and 1.6.2, Warranties.

9.4.3 Submit Commissioning documentation, if not already included within OM&M Manual appendices.

9.4.4 Submit final Photographic / Video Records of Work progress and events.

9.4.5 Return all copies of Contract Documents.

9.4.6 Surrender all other project related photographs, negatives and videos (whether provided by Honeywell or otherwise acquired by Bidder)

9.4.7 For any missing documentation or records, provide an itemized listing of each missing item with appropriate designation name and number, and a statement explaining why Contractor is unable to return specific items.

9.4.8 Provide sign-off sheet for contractor and Honeywell.

9.5 CLOSEOUT MEETING

9.5.1 Attend Project Closeout Meeting

9.5.2 Project Closeout Meeting shall be scheduled within eight (8) weeks of project completion.

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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-1
RES-CP-WPC-06
Schedule Development
(NOT APPLICABLE)

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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-2
Example Three-Week Look-Ahead Schedule

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THREE-WEEK LOOK-AHEAD SCHEDULE

[Project Location] _____Facility
[Project Name]
Three-Week Look-Ahead: [November 16th through December 4, 2009]

Item #	Description of Work	Dates on Site							Dates on Site							Dates on Site				
		Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Mon	Tues	Wed	Thurs	Fri
		11/16	11/17	11/18	11/19	11/20	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1	12/2	12/3	12/4
	[Prime Contract Activities - see examples below]																			
1	Complete installation of 8-inch FRP	X	X																	
2	Complete pressure testing of installed piping		X	X																
3	Heat trace and insulate 8-inch FRP		X	X																
4	Extend PVC to Precoat Tank?		X	X																
5	Off-load GAC vessels				X															
6	Install GAC vessels and piping on pad					X														
7	Installation of 6-in FRP&PVC @ GAC vessels						X	X												
8	Assist with hydrating new adsorbers															X	X			
9	Final Tie-in of 6-in FRP at VOC stripper																X			
10	Assist with start-up																	X		
11	Relocate temporary GAC units																		X	
12	Remove existing adsorbers and PVC piping																		X	
13	Ship/scrap old adsorbers and piping																			X
	[MEP Subcontract activities]																			
14	Wiring and conduit for new backwash pump	X	X	X																
15	Verify rotation of backwash pump			X																
16	Connect Heat Trace to power				X															
17	Relocate ASSY 14 RIO Panel					X														
18	Start up backwash pump for precoat filling?					X														
19	On-call for wiring modification if necessary								X							X		X		
	[Equipment Vendor Activities]																			
20	Ship GAC Vessels																			
21	Deliver GAC Vessels				X															
22	Load GAC vessels with Carbon															X				
23	Inspect Installation															X				
24	Start-up Assistance/Operator Training/Orientation																	X		
	[Equipment Vendor Activities]																			
25	Inspect backwash pump installation (10 AM)				X															
26	Operator Training/Orientation					X														
	[HONEYWELL APS]																			
27	Control program modifications					X														
28	On-call for program modifications @ startup								X									X		
	[HONEYWELL O&M Activities]																			
29	Plant shut down					X														
30	Assist with GAC filling															X				
31	Assist with GAC hydration															X	X			
32	Set up/test surplus backwash water supply																X	X		

EXAMPLE

Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-3
RES-CP-DC-05
Monthly Project Report Preparation
(NOT APPLICABLE)

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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-4
RES-CP-WPC-09
Schedule and Cost Control

RES-CP-WPC-09 not yet available. See Sections 1.2 and 1.3 for general schedule and cost control guidelines and attachment 01100-5 for change order procedures.

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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-5
RES-CP-WPC-08
Construction Change Order Procedure

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1.0 APPLICABILITY

1.1 This procedure is an attachment to the governing contract and presents the only acceptable procedure to be followed for the completion of extra work under the contract.

1.2 Contractor will manage, execute, supervise, coordinate and is responsible for the estimate, quality, completeness and effectiveness of the extra work performed by its own personnel or subcontractor. All approvals referred to herein will be confirmed in writing on each appropriate Construction Change Order (CCO) form.

1.3 Construction Change Orders: Form CC-145, Lump Sum, Form CC-146, Cost Plus, and/or Form CC-147, Unit Price will be issued to support all work required and performed by Contractor which work is in addition to the Scope of Work defined in the contract.

1.4 When an Alliance Partner (AP) is acting as prime Contractor, the AP shall manage CCOs from subcontractors according to this procedure. In such cases references to the Contractor shall generally apply to the subcontractor and the role of the Construction Representative will be handled by the AP's Construction Manager and will have the authority described in Section 4.7 to approve subcontractor CCOs.

1.5 When an AP or Engineer is conducting construction oversight of a Honeywell Contractor, the AP Construction Manager may take on the role of the Construction Representative but will have the authority described in Section 4.7 to approve CCOs only if specifically authorized in writing by Honeywell.

1.6 This procedure is applicable to all Corporate RES sites. It establishes minimum requirements that must be met by all project sites.

1.7 In addition to complying with this procedure, RES sites must comply with all applicable national, state, and local regulations.

1.8 RES sites or project teams must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate site's procedure.

1.9 Whenever a Honeywell RES Procedure is more stringent than the applicable national, state, and local regulations, the Honeywell RES Procedure shall apply.

2.0 OVERVIEW

2.1 Initiating and Monitoring of CCOs.

3.0 DEFINITIONS

3.1 See Section 8.0 for definition of underlined terms.

3.2 See RES-ADMIN-02 for additional RES program definitions and acronyms.

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4.0 REQUIREMENTS

4.1 Authorities / Responsibilities

4.1.1 *Contractor* – May initiate need for extra work, returns completed CCO form for Honeywell approval, executes work detailed in approved CCO form, and monitors CCO status, including cost.

4.1.2 *Construction Representative (or AP when AP is acting as a third party agent)* – May initiate need for extra work, initiates CCO paperwork, and approves* completed CCO form. Also responsible for monitoring CCO status, including cost.

*Note: See Sections 1.4 and 1.5 for approval limitations.

4.1.3 *Honeywell Construction Manager* – May approve CCOs. Requests issuance of change order to the appropriate purchase order to cover authorized CCOs.

4.1.4 *Supply Manager* - Issues a change order to the appropriate purchase order.

4.2 Initiating of Construction Change Order - Request and Pricing Procedure.

4.2.1 Contractor or Construction Representative recommends need for extra work.

4.2.2 Construction Representative prepares top half of appropriate CCO form, including a detailed Scope of Work and conditions necessitating the work. Forwards CCO form to the Contractor for calculation and entry of the total cost of the work and the effect extra work will have on the schedule (if any).

4.2.3 Contractor completes and signs CCO form with Total Lump Sum Cost, or Total Control Cost Estimate for the extra work specified and the effect on the schedule and submits to Construction Representative.

Note: Total cost is defined as all costs associated with the CCO and shall include all labor, materials, supervision, rental of equipment and Mark-ups for overhead and profit and any costs related to schedule extension.

4.3 Review and Approval of CCO

4.3.1 The Construction Representative reviews contractor's specified cost and change(s), if any, to schedule. The Construction Representative forwards the CCO to the Design and Construction Manager and Honeywell Construction Manager for review and approval. The CCO is approved by signature of the Honeywell Construction Manager and returned to the Construction Representative. The Construction Representative returns the signed CCO form to Contractor as authorization to proceed with work.

4.3.2 Contractor begins work outlined on CCO form. **IT IS TO BE CLEARLY UNDERSTOOD THAT NO EXTRA WORK IS TO BE PERFORMED BY CONTRACTOR UNLESS AND UNTIL CONTRACTOR HAS RECEIVED WRITTEN**

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AUTHORIZATION FROM HONEYWELL IN THE FORM OF AN APPROVED CCO FORM, EXCEPT IN THE CASE OF AN EMERGENCY WORK ORDER REQUEST MADE IN WRITING (OR EMAIL) BY HONEYWELL.

4.3.3 The Construction Representative distributes authorized copies of CCO form at a minimum to the Honeywell Construction Manager, Design and Construction Manager, Supply Manager, and Job File (Jobsite).

4.4 Revision of Purchase Order

4.4.1 Honeywell Construction Manager issues to Supply Manager on a monthly basis, a request for issuance of a change order to cover authorized CCO's.

4.4.2 Supply Manager issues a change order to the appropriate purchase order consistent with Remediation Manager's request, covering all authorized CCO's.

4.5 Construction Change Order Status Report

4.5.1 Attachment 6.2.4, Form CC-148, Construction Change Order Status Report is prepared, submitted, reviewed and distributed monthly as follows:

- Contractor submits a draft of Form CC-148, with adequate data to support information reported thereon to Construction Representative.
- Contractor monitors current cost against Total Control Cost authorized on Form CC-145, 146 or 147. Notifies Construction Representative when expenditures equal 80% of control estimates. Alerts Remediation Manager or Design and Construction Manager of any likely overrun of control cost.
- Construction Representative, when required, initiates Form CC-145 or 146 or 147 for a revised control cost following the same procedure as original Construction Change Order using the same CCO No. followed by an "R" suffix.
- Construction Representative reviews CC-148 and verifies percent complete.
- CCOs are also summarized and tracked in the Weekly Construction Report (see RES-CP-DC-04)

4.6 Contractor distributes CC-148 as an addendum to the Monthly Project Report (see RES-CP-DC-05). Distribution shall be as determined for the Monthly Project Report, Terms of Payment

4.6.1 All CCO costs shall be tracked and indicated separately from regular contract work on Contractor invoices. Payments will be made in accordance with terms of the contract upon presentation of complete documentation affirming that the Extra Work was satisfactorily performed according to an approved CCO.

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4.7 Construction Representative Authority:

4.7.1 The Construction Representative, if one is designated for the project, has the authority to approve individual CCO's up to a cost of $2,500.

4.7.2 If a CCO total cost is greater than $2,500, authorization from the Honeywell Construction Manager is required and must be secured prior to start of any work on the CCO.

4.7.3 If the authorized Honeywell P.O./Contract includes funds for additional Work associated with changed or unknown site conditions, the Construction Representative shall:

- Notify the Honeywell Construction Manager for verbal approval when such funds have been depleted by 50% before any further CCO's may be approved.
- Notify the Honeywell Construction Manager for written approval when such funds have been depleted by 80% before any further CCO's may be approved.

4.7.4 The Construction Representative shall not approve any CCO's that will be in excess of the authorized Honeywell P.O./Contract amount without prior written approval by Honeywell.

4.7.5 The authorization provided in sections 4.7.1 through 4.7.4 shall apply to AP subcontracted work. Any CCO involving AP internal labor / expenses will require prior written approval by Honeywell.

5.0 REFERENCE DOCUMENTS

5.1 Honeywell Contract

5.2 RES-ADMIN-02 - Definitions and Acronyms Summary

5.3 RES-CP-DC-04 – Weekly Construction Report Preparation

5.4 RES-CP-DC-05 - Monthly Project Report Preparation

6.0 ATTACHMENTS

6.1 Flowcharts:

6.1.1 CCO Initiation and Processing

6.1.2 CCO Tracking

6.2 Construction Change Order Forms:

6.2.1 Form CC-145, Lump Sum

6.2.2 Form CC-146, Cost Plus

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6.2.3 Form CC-147, Unit Price

6.2.4 Form CC-148, Construction Change Order Status Report

7.0 REVISION LOG

Revision Number	Section Number	Revised By	Revision Date	Description of Change
1	1.4,1.5, & 4.7	J. Mojka	09/21/2010	Revised wording of Construction Manager authorities for CCO approval
0	All	J. Mojka	04/19/2010	Initial Issue

8.0 DEFINITIONS

None	

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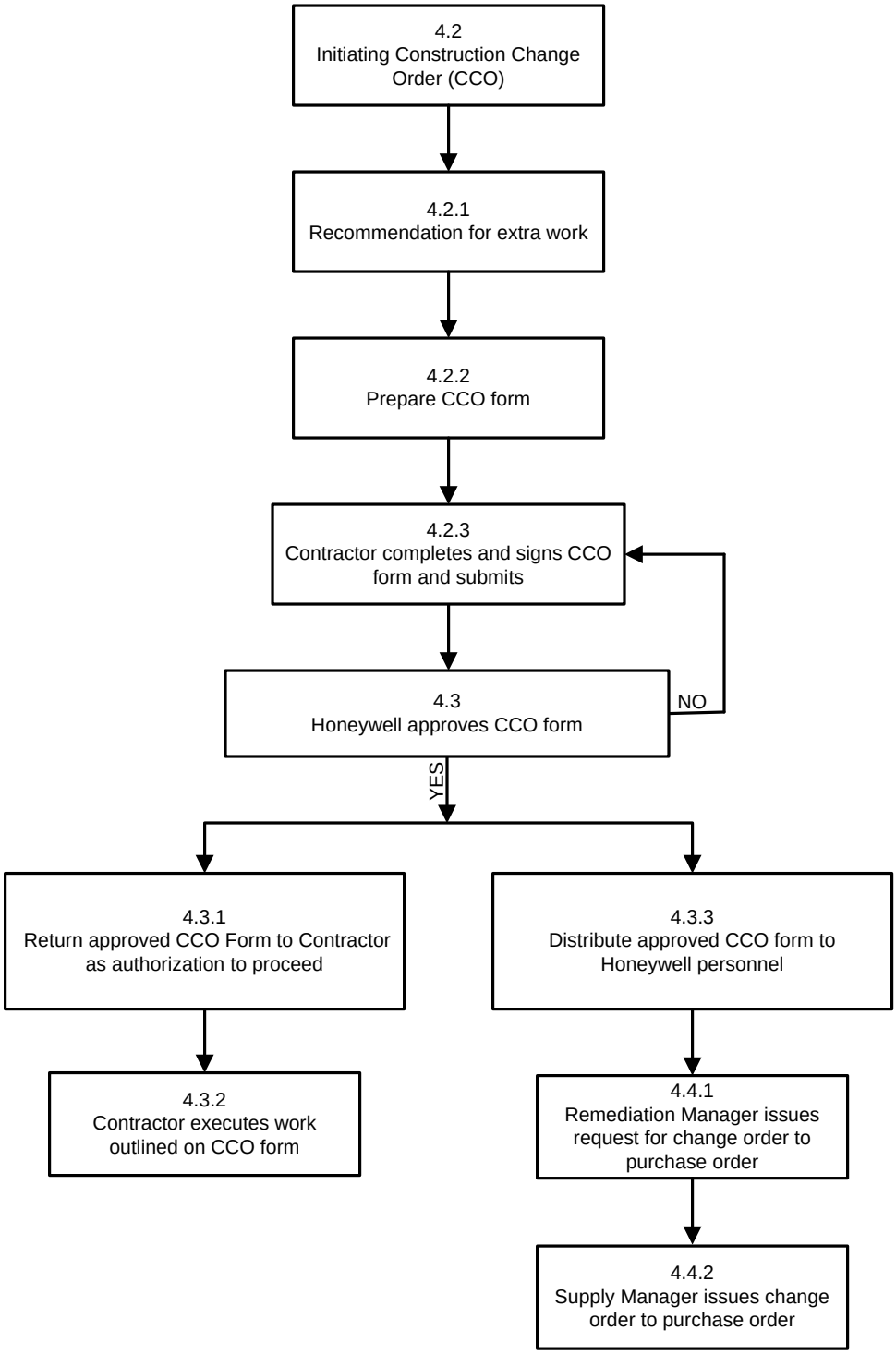
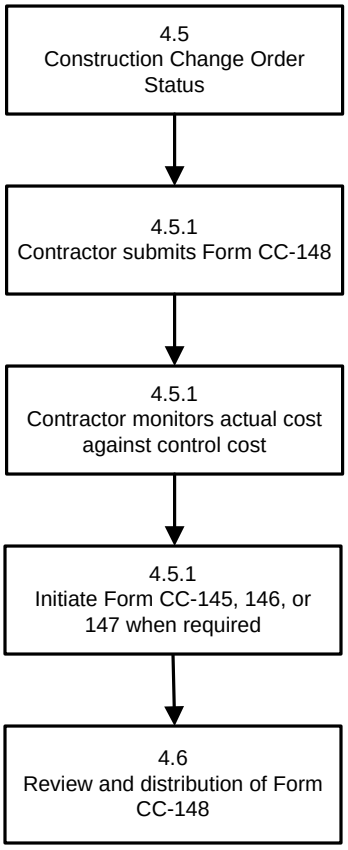
CONSTRUCTION CHANGE ORDER PROCEDURE

CCO INITIATION AND PROCESSING FLOWCHART



CONSTRUCTION CHANGE ORDER PROCEDURE

CCO TRACKING FLOWCHART



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CONSTRUCTION CHANGE ORDER
LUMP SUM

Purchase Order No.	
Contractor	

RES Site No. - Cost Code # _____ $ _____ # _____ $ _____	**Project No.**	**CC Order No.**
	A.R. No.	**Date Initiated**

Scope of Extra Work (define with specificity): A

Conditions Necessitating Work: B

Cause:

- ☐ 1. Scope Change:
  - ☐ 1.1 Plant
  - ☐ 1.2 Process/Project
  - ☐ 1.3 Safety/Regulatory
  - ☐ 1.4 Other _____ C
- ☐ 2. Design Error/Omission
- ☐ 3. Vendor Defect
- ☐ 4. Vendor Deliveries
- ☐ 5. Overtime
- ☐ 6. Weather
- ☐ 7. Site Conditions
- ☐ 8. Interferences

Initiated by Honeywell: _____ **Title:** _____

Contractor: _____ **The Total Firm Lump Sum Cost to Complete the Extra Work Described Above:** $ _____

THIS WORK DOES/DOES NOT CHANGE THE CONTRACTUAL COMPLETION DATE

○ Does NOT Change ○ Does Increase _____ Days ○ Does Decrease _____ Days

Prepared by Contractor by:	**Approved for Contractor:**	**Authorized by Honeywell:**
Name: _____	**Name:** _____	**Name:** _____
Date: _____	**Date:** _____	**Date:** _____

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CONSTRUCTION CHANGE ORDER
COST PLUS

Purchase Order No.	
Contractor	

RES Site No. - Cost Code # _____ $ _____ # _____ $ _____	Project No.	CC Order No.
	A.R. No.	Date Initiated

Scope of Extra Work (define with specificity): A

Conditions Necessitating Work: B

Cause:

- ☐ 1. Scope Change:
  - ☐ 1.1 Plant
  - ☐ 1.2 Process/Project
  - ☐ 1.3 Safety/Regulatory
  - ☐ 1.4 Other _____ C
- ☐ 2. Design Error/Omission
- ☐ 3. Vendor Defect
- ☐ 4. Vendor Deliveries
- ☐ 5. Overtime
- ☐ 6. Weather
- ☐ 7. Site Conditions
- ☐ 8. Interferences

Initiated by Honeywell: _____ **Title:** _____

COST CONTROL ESTIMATE

DIRECT COSTS	**Direct Labor (Bare)**		
	Materials		
	Equipment Rental		
	Subcontractor		
	Taxes, Insurance & Fringes on Bare Labor		
	Total Direct Costs	$	-
OVERHEAD & PROFIT	_____ % of Direct Bare Labor Costs		-
	_____ % of Material Costs		-
	_____ % of Equipment Rental Costs		-
	_____ % of Subcontractor Costs		-
	Total Cost Overhead & Profit	$	-
TOTAL	**Control Cost Estimate**	$	-

THIS WORK DOES/DOES NOT CHANGE THE CONTRACTUAL COMPLETION DATE

○ Does NOT Change ○ Does Increase _____ Days ○ Does Decrease _____ Days

HONEYWELL HAS THE RIGHT TO REJECT ALL COSTS WHICH ARE IN EXCESS OF CONTRACTOR'S CONTROL COST ESTIMATE

Prepared by Contractor by:	Approved for Contractor:	Authorized by Honeywell:
Name: _____	Name: _____	Name: _____
Date: _____	Date: _____	Date: _____

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CONSTRUCTION CHANGE ORDER
UNIT PRICE

Purchase Order No.	
Contractor	

RES Site No. - Cost Code # _____ $ _____ # _____ $ _____	Project No.	CC Order No.
	A.R. No.	Date Initiated

Scope of Extra Work (define with specificity): A

Conditions Necessitating Work: B

Cause:

- ☐ 1. Scope Change:
  - ☐ 1.1 Plant
  - ☐ 1.2 Process/Project
  - ☐ 1.3 Safety/Regulatory
  - ☐ 1.4 Other _____ C
- ☐ 2. Design Error/Omission
- ☐ 3. Vendor Defect
- ☐ 4. Vendor Deliveries
- ☐ 5. Overtime
- ☐ 6. Weather
- ☐ 7. Site Conditions
- ☐ 8. Interferences

Initiated by Honeywell: _____ **Title:** _____

COST CONTROL ESTIMATE

Unit of Work	Cost per Unit	Est. No. of Units	Extended Cost
			-
			-
			-
			-
			-
			-
			-
		Total Control Cost Estimate	$ -

THIS WORK DOES/DOES NOT CHANGE THE CONTRACTUAL COMPLETION DATE

○ Does NOT Change ○ Does Increase _____ Days ○ Does Decrease _____ Days

HONEYWELL HAS THE RIGHT TO REJECT ALL COSTS WHICH ARE IN EXCESS OF CONTRACTOR'S CONTROL COST ESTIMATE

Prepared by Contractor by:	Approved for Contractor:	Authorized by Honeywell:
Name: _____	Name: _____	Name: _____
Date: _____	Date: _____	Date: _____

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CONSTRUCTION CHANGE ORDER
STATUS REPORT

Contractor:	Purchase Order No.	Period:
______________	______________	___/___/___ *through* ___/___/___

CC Order No.	Description	Amount	Basis*	Cause	Percent Completed
					%
					%
					%
					%
					%
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Basis: * LP = Lump Sum, UP = Unit Price, CP = Cost Plus

Cause: 1. Scope Change, 1.1 Plant, 1.2 Process/Project, 1.3 Safety/Regulatory, 1.4 Other, 2. Design Error/Omission, 3. Vendor Defect, 4. Vendor Deliveries, 5. Overtime, 6. Weather, 7. Site Conditions, 8. Interferences

Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-6
RES-CP-DC-03
Daily Construction Report Preparation
(NOT APPLICABLE)

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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-7
RES-CP-DC-04
Weekly Construction Report Preparation
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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-8
Request for Information Form

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REQUEST FOR INFORMATION

GENERAL INFORMATION	
Project Name:	**RFI No.:**
	Date Information Required:
Project Location:	**Date Information Provided:**
Site Owner:	**Project No.:**
Client:	**RFI Results in a Design Change Bulletin:**
Contractor(*Subcontractor*):	☐ Yes, DCB No. ___ ☐ No

REQUEST		
Information Requested:		
Relevant Design Documents:	**Attachments:** ☐ Yes ☐ No	
RFI Originator:	**Initial:**	**Date:**

RESPONSE			
RFI Received By:		**Initial:**	**Date:**
Honeywell (AP) Response:			
Honeywell (AP) Review:			
Individual	**Discipline**	**Initial**	**Date**
Distribution:			

Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-9
Design Change Bulletin

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DESIGN CHANGE BULLETIN

Project Name:	**DCB No.:** **Effective Date:**
Project Location: **Site Owner:**	**Associated RFI:** ☐ Yes, RFI No. ___ ☐ None
Client: **Contractor (*Subcontractor*):**	**Project No.:**
Description of Change/Modification:	
Reason for Change/Modification: ☐ Unforeseen or Differing Site Conditions ☐ Design Revision ☐ Owner/Client Request ☐ Other (describe)	**Explanation or Reason:** **Attachments:** ☐ Yes ☐ No
Additional Comments:	**Design Documents Affected:**

Honeywell (AP) Review:

Individual	Discipline	Initial	Date

Contractor (*Subcontractor*) Review: **(Name / Signature):**	**Does DCB Result in CCO?** ☐ Yes ☐ No **Date**

Distribution:

Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-10
Work Acceptance Checklist
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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-11
RES-CP-DC-09
Photo Documentation
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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-12
RES-CP-WPC-11
Survey Control and Digitization

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1.0 APPLICABILITY

1.1 This procedure is applicable to surveying and mapping activities at all Corporate Remediation and Environmental Services (RES) sites in the United States. It establishes minimum engineering, construction, and remedial investigation survey requirements that must be met by all project sites.

1.2 In addition to complying with this procedure, RES sites must comply with all applicable national, state, and local regulations governing survey and/or mapping as appropriate.

1.3 RES sites or project teams must review this procedure for any conflicts or additions based on jurisdictional requirements, and add additional jurisdictional requirements to the appropriate site's procedure.

1.4 Whenever a Honeywell RES Procedure varies from applicable national, state, or local regulations, the most stringent procedure/regulation will apply provided the applicable national, state, and local regulations are met.

2.0 OVERVIEW

2.1 This procedure establishes surveying requirements with respect to contracts, scopes of work, personnel, equipment, accuracy, and precision as well as horizontal and vertical datums, units of measure, quality control reporting and evaluation, and electronic data deliverable (EDD) formatting and review. This procedure is intended to be used in combination with a project-specific scope of work.

3.0 DEFINITIONS

3.1 See Section 8.0 for definition of underlined terms.

3.2 See RES-ADMIN-02 for additional RES program definitions and acronyms.

4.0 REQUIREMENTS

4.1 General Requirements

4.1.1 Required Language for Contract Documents - The following language is to be included in the project-specific scope of work or contract documents:

All data and deliverables prepared in support of, or as a result of, this survey are the property of Honeywell. The Surveyor also understands and agrees that Honeywell may reproduce the drawings and use all or part of the information provided on the drawings. This includes any reports prepared in connection with the investigative work for this site without incurring obligation for additional compensation to the Surveyor. The original drawings, copies of field notes, and any required survey reports shall be and shall remain the property of Honeywell. All required documents and copies of field notes shall be submitted to Honeywell upon completion of the work.

4.1.2 Survey Scope

4.1.2.1 Survey scope shall be defined prior to the survey and shall be provided to the surveyor. The scope shall define the survey requirements in accordance with this procedure and identify project-specific deviations or additions. Survey scope shall

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be developed on a project-specific basis and shall consider, to the extent practical, gathering information for future project stages such that repeat mobilizations for survey are limited.

4.1.2.2 Example survey scope elements for typical design and construction project phases are provided in Attachment 6.1.

4.1.3 Personnel

4.1.3.1 Surveys requiring a feature mapping accuracy of less than 0.5 feet and the products directly derived from them (i.e. coordinate lists, maps, Computer Aided Drafting (CAD) files, survey reports, etc.) are to be completed under the direct supervision of a PLS licensed and in good standing with the state where the work is being conducted. It is the responsibility of the supervising PLS to ensure that all work complies with state and local regulations.

4.1.3.2 Surveys that do not require a feature mapping accuracy of less than 0.5 feet may be conducted without the supervision of a PLS in accordance with the legal definition of surveying established by the applicable state or territory where the project is located.

4.1.4 Equipment - Either conventional equipment or GNSS equipment may be used, but the equipment must be able to provide the applicable accuracy specified in this procedure.

4.1.5 Coordinate Systems and Datums

4.1.5.1 When requesting survey, review coordinate system and datum used for previous site survey and maintain consistency with previous surveys unless project conditions warrant a change

4.1.5.2 Horizontal Datum and Projection - Unless otherwise defined by the project-specific scope documents, the horizontal coordinate system will be the appropriate SPCS (NSRS2007 or NAD83) using the latest adjustment for the specified area. The surveyor shall confirm that the horizontal coordinate system and datum are consistent with the coordinate system and datum previously used on the project site, based upon legacy survey data provided by Honeywell.

4.1.5.3 Vertical Datum - Unless otherwise defined by the project-specific scope documents, the vertical coordinate system will be the NAVD88. The surveyor shall confirm that the vertical coordinate system and datum are consistent with the coordinate system and datum previously used on the project site, based upon legacy survey data provided by Honeywell.

4.1.5.4 Unit of Measure - The unit of measure is the U.S. Survey Foot, unless U.S. Survey Foot conflicts with the standard used with the applicable SPCS. Several states specify the International Foot as the unit of measure. If the state has not adopted legislation for the foot definition for their SPCS, the state Department of Transportation (DOT) or local standard definitions may be used.

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4.1.5.5 Coordinate Precision - Unless otherwise defined in the project-specific scope document, the surveyor will report feature *X* and *Y* coordinates to the nearest 0.01 foot and *Z* to the nearest 0.01 foot (0.1 foot for unpaved ground surface elevations).

4.2 Recreational Grade GPS Surveys

4.2.1 Recreational grade receivers are limited to autonomous accuracy (10-20 meters) due to the lack of real time correction or post processing capabilities. The use of recreational grade GPS receivers is not recommended. If this technology is to be used it must be pre-approved in writing by the project manager.

4.3 Mapping or Resource Grade GPS Surveys

4.3.1 For the collection of sampling data such as soil borings, sediment cores, or monitoring wells, the oversight of a PLS may not be necessary. Mapping grade technology is commonly used by sampling crews who are locating a proposed and prescribed location for the sample. This technology may not be suitable for final post-excavation confirmatory sampling, permanent survey record, legal documentation, regulatory compliance or other project purposes. Use of this technology must be pre-approved in writing by the project manager as in some cases Consent Orders, regulatory agency approved work plans or state laws may have more rigorous requirements.

4.3.2 Equipment - The most commonly used GPS receivers for these tasks are mapping or resource grade, single frequency receivers. When collecting spatial information about features, often times mapping grade GPS receivers are suitable. These receivers are specifically designed for collecting feature and attribute information, providing significant data storage capacity, and achieving higher than autonomous accuracy by operating in real time differential correction mode in the field or using software to post-process the data back in the office. It will have the capability to load a custom data dictionary with feature attributes, as well as the ability to set the required coordinate system or projection.

4.3.3 Accuracy

4.3.3.1 Accuracy evaluation and reporting will conform to FGDC Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy (Reference Document 5.2).

4.3.3.2 Planimetric accuracy will vary based on project requirements. Positional accuracy will conform to the appropriate class and map scale listed in the project scoping documents as defined in FGDC Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy (Reference Document 5.2) Section 3.

4.3.3.3 The selected mapping grade receiver should have an autonomous horizontal accuracy of 10-20 meters with no correction and 0.5-3 meters with real-time or post-processing correction.

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4.3.3.4 If real-time differential correction is not used in the field, the data collected must be post-processed using GPS processing software before being used to generate a Geographic Information System (GIS) data file or EDD. The GPS processing software must be able to download GPS observation files from the receiver, and perform differential correction

4.3.4 Personnel

4.3.4.1 Field work should be performed by staff that has had adequate training in GPS and GIS or has a surveying or mapping background.

4.3.4.2 Field staff should have a thorough understanding of fundamental GPS concepts and receiver operation including how critical parameter settings affect data collection efficiency and quality.

4.3.4.3 The staff should have familiarity with the types of features that are to be located, and must be able to recognize and interpret features in the field.

4.3.5 Procedures will vary between receiver models. In general, the user will collect the feature position, populate attributes, and EDD-required feature attributes that will be stored in the receiver for later downloading.

4.4 Control Surveys

4.4.1 Accuracy - Unless superseded by accuracy requirements for a specific type of survey, general accuracy requirements are as follows:

4.4.1.1 Horizontal - Control surveys performed with GNSS will meet a 1 cm horizontal positional standard for local accuracy and a 2 cm standard for network accuracy at the 95% confidence level as defined in the FGDC Geospatial Positioning Accuracy Standards, Part 2: Standards for Geodetic Networks (Reference Document 5.1). Control surveys performed by conventional traverse will be Second Order, Class I, as outlined in Table A-1 of the FGDC Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management (Reference Document 5.3).

4.4.1.2 Vertical - Vertical control work will be Second Order, Class I as outlined in Table A-2 of the FGDC Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management (Reference Document 5.3). GNSS and trigonometric leveling will not be used for the determination of control survey elevations. Elevations of all set control monuments will be generated from a closed and adjusted differential level loop beginning and ending at an existing site benchmark with each new monument being turned through. Preferably, at least one additional existing site benchmark will be included in the loop. Side shots are not permitted.

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4.4.2 Control Monument Network

4.4.2.1 Control networks will be established to meet the applicable horizontal and vertical accuracy requirements specified in this procedure. The surveyor shall research, recover, and confirm the existing horizontal and vertical control networks found on or near the site.

4.4.2.2 Spacing between local control monuments shall not exceed 1000 feet.

4.4.2.3 A minimum of three local control monuments are required on a site for future project use. If existing monuments are not available, new monuments should be established.

4.4.2.4 When establishing a new control monument, the following requirements should be taken into account to the greatest possible extent:

- Stability - Free from vibration, subsidence, settlement, heaving, erosion, lateral movement, unstable slopes.
- Permanency - Safe from current or future construction activities. Not located in corrosive soils.
- Accessibility - On client or public property. Accessible by vehicle. Not in a secured area;
- Safety - Away from potentially harmful conditions like traffic, falls, electricity, and chemicals;
- Vertical Visibility - An unobstructed view of the sky to 10 degrees above the horizon;
- Horizontal Visibility - Line of site between close proximity points;
- Network Geometry - Appropriate geographic distribution and spacing;
- Recoverability - Well marked;
- Survey Value - Close to the project;
- Physical Monument Standards

4.4.2.5 Unless otherwise defined in the project-specific scope document, new control monument materials and design shall be selected so that they are sufficiently durable, stable and permanent. Monuments must remain present and hold their position for the expected duration of the project.

4.4.2.6 The Army Corps of Engineers' monument standards as defined in Reference Document 5.5, EM 1110-1-1002, Engineering and Design - Survey Markers and Monumentation are recommended.

4.5 American Land Title Association / American Congress on Surveying and Mapping (ALTA/ACSM) Land Title Surveys

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4.5.1 Boundary surveys will be performed in accordance with this Standard Operating Procedure (SOP) and the Honeywell Requirements for ALTA/ACSM Land Title Surveys as defined in Attachment 6.2.

4.5.2 Accuracy for survey control and boundary features will conform to 2005 Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys as defined in Reference Document 5.6 and requirements established by the applicable state or territory where the project is located.

4.5.3 At a minimum, surveys shall include items 1, 2, 3, 4, 6, 7(a), 7(b)(1), 7(c), 8, 9, 10, 11(a) 13, 14, 16 and 17 and 18 of Table A of the 2005 Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys as defined in Reference Document 5.6. (See also Attachment 6.2)

4.6 Engineering and Construction Surveys

4.6.1 Control Accuracy

4.6.1.1 Horizontal - Control surveys performed with GNSS will meet a 1 cm horizontal positional standard for local accuracy and a 2 cm standard for network accuracy at the 95% confidence level as defined in the FGDC Geospatial Positioning Accuracy Standards, Part 2: Standards for Geodetic Networks (Reference Document 5.1). Control surveys performed by conventional traverse will be Second Order, Class I, as outlined in Table A-1 of the FGDC Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management (Reference Document 5.3).

4.6.1.2 Vertical – Vertical control work will be Second Order, Class I as outlined in Table A-2 of the FGDC Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management (Reference Document 5.3). GNSS and trigonometric leveling will not be used for the determination of control survey elevations. Elevations of all set control monuments will be generated from a closed and adjusted differential level loop beginning and ending at an existing site benchmark with each new monument being turned through. Preferably, at least one additional existing site benchmark will be included in the loop. Side shots are not permitted.

4.6.2 Feature Accuracy

4.6.2.1 Feature accuracies defined below are for a typical project and may be modified to meet specific project requirements.

4.6.2.2 Feature accuracies will meet the recommended values in Appendix A of FGDC Geospatial Positioning Accuracy Standards, Part 4 for General Construction Site Plans & Specs with a scale of 40 ft/in, a positional tolerance of 0.1 feet for horizontal and vertical and a contour interval of 1 foot.

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4.7 Remedial Investigation Surveys

4.7.1 Control Accuracy

4.7.1.1 Horizontal - Control surveys performed with GNSS will meet a 2 cm horizontal positional standard for local accuracy and a 4 cm standard for network accuracy at the 95% confidence level as defined in the FGDC Geospatial Positioning Accuracy Standards, Part 2: Standards for Geodetic Networks (Reference Document 5.1). Control surveys performed by conventional traverse will be Second Order, Class II, as outlined in Table A-1 of the FGDC Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management (Reference Document 5.3).

4.7.1.2 Vertical - Vertical control work will be Third Order as outlined in Table A-2 of the FGDC Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management (Reference Document 5.3). GNSS and trigonometric leveling will not be used for the determination of control survey elevations. Elevations of all set control monuments will be generated from a closed and adjusted differential level loop beginning and ending at an existing site benchmark with each new monument being turned through. Preferably, at least one additional existing site benchmark will be included in the loop. Side shots are not permitted.

4.7.2 Feature Accuracy

4.7.2.1 Feature accuracies defined below are for a typical project and may be modified to meet specific project requirements.

4.7.2.2 Feature accuracies will meet the recommended values in Appendix A of FGDC Geospatial Positioning Accuracy Standards, Part 4 for General Construction Site Plans & Specs with a scale of 40 ft/in, a positional tolerance of 0.1 feet for horizontal and vertical and a contour interval of 1 foot. Well casing elevations will meet a 0.01 foot positional tolerance.

4.8 Photogrammetric Surveys

4.8.1 All photogrammetric work shall be executed in accordance with this SOP and the attached Planimetric and Topographic Mapping Specifications for Photogrammetric Surveys (Attachment 6.3), Digital Terrain Model Specifications for Photogrammetric Surveys (Attachment 6.4), and the Digital Orthophoto Specifications (Attachment 6.5).

4.8.2 Feature Accuracy - All final mapping deliverables shall conform to United States National Map Accuracy Standard as defined in Reference Document 5.7.

4.8.3 Photo Control - A control diagram shall be delivered to the photogrammetrist upon completion of the photo control surveys. All deliverables for this task are to be signed and stamped by a PLS.

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4.8.4 Aerial Mapping Camera - The aerial photography must be obtained using a precision aerial mapping camera equipped with Forward Motion Compensation (FMC), a 6-inch focal-length lens with a minimum Area Weighted Average Resolution (AWAR) of 90, and a current (within the last three years) calibration certificate meeting United States Geologic Survey (USGS) specifications for photogrammetric mapping. The camera calibration report must be submitted for review and approval prior to aerial photography acquisition.

4.8.5 Annotation - Each exposure is to be labeled in ink across the top, in the direction of the flight, with the following information: Photo Acquisition Date, Scale, Project Number (to be provided), Flight Number, and Exposure Number.

4.8.6 Analytical Aerial Triangulation - The results of the A/T must be acceptable as a basis for the specified project mapping scale. The positional (x, y) accuracy of pass points and tie points must be within 1/15,000 of the flying height when compared to their true ground position. The vertical (z) accuracy of pass points and tie points must be within 1/12,000 of the flying height above ground when compared to their true ground elevation. The x, y, z, RMS of the exposure stations and targeted ground control points shall be such to insure that the pass and tie point accuracy criteria are achieved. The consultant shall deliver an aerial triangulation report which shall include a brief narrative of the process, including hardware and software used, the aerial triangulation results, including results of intermediate processes, and a field control listing.

4.8.7 Digital Terrain Modeling (DTM) and Contour Mapping - The photogrammetrist shall provide a 3D CAD file containing contours, breaklines, edgelines, and random elevation points covering the entire project mapping area. Spot elevations shall be shown at locations required by the attached DTM specifications. The top and bottom contours of all depressions shall contain tick marks pointing inward in the direction of the lower elevation. Final delivered CAD files will contain north arrow, grid tics, photo centers, and control point locations.

4.8.8 Planimetric Feature Mapping – The photogrammetrist will collect all planimetric features clearly visible in the aerial photography within the project mapping area, according to industry standard map content requirements, for the specified project mapping scale. Deliverables shall fully comply with the attached Planimetric and Topographic Mapping Specifications (Attachment 6.3).

4.8.9 Digital Orthophoto Imagery - The photogrammetrist shall produce digital orthophoto imagery with the appropriate ground pixel resolution for the specified project mapping scale that meets all ASPRS Class I accuracy requirements. The digital orthophoto imagery shall be geo-referenced to the project coordinate system. Methods and procedures for generation of the digital orthophoto imagery shall comply with the attached Digital Orthophoto Specifications (Attachment 6.5).

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4.8.10 Hydrographic Surveys - Hydrographic surveying is the ability to accurately acquire 3-dimensional high resolution survey data points of underwater terrain or objects. This applies to singlebeam and multibeam techniques which both use acoustic measuring devices through the water column that provide these results. This type of surveying is unique in that data collected is not visibly observed by the surveyor. Therefore, strict guidelines must be followed to not only collect the data accurately, but to also post-process and deliver the data accurately and with the highest confidence level possible. Most all of the electronics used in the hydrographic surveying industry have highly accurate specifications, however these specifications are applicable to controlled environments and equivalent accuracies are rarely obtained in real world conditions. This is normally due to user error resulting in abnormal equipment setup in the field, improper calibration measures, misunderstanding datum transformations, insufficient water level measurements, or poor surveying habits. This SOP will serve as a guideline for planning a hydrographic survey and also to help achieve the reality of a 95% confidence level in the data acquisition.

4.9 Hydrographic Surveying Technologies

4.9.1 Project Planning - Consideration of a singlebeam or multibeam survey data set is necessary on any given project and is an important factor during the planning stages. This decision can ultimately affect budget and schedule. Understanding the project requirements will help decide which technology should be used.

4.9.2 Singlebeam

4.9.2.1 Singlebeam method is one of the simplest forms of electronic acoustic surveying and may be considered as an option for data acquisition even though it does have some limitations. Survey data is continuously collected in rapid fashion directly under the transducer using only one sound source. Extremely reliable and accurate depths are recorded everywhere the survey vessel travels. Singlebeam method should be used if a coarse data set is required. Examples would be maintenance dredging projects, repeatability surveys, or any areas where high resolution data is not required.

4.9.2.2 Line spacing, or planned track lines, should remain consistent throughout the entire project. 50-foot line spacing should be considered for all projects unless justified otherwise. Long river surveys, that may be several miles in length, may be spaced a longer intervals, such as 100-feet or even 500-feet depending on the project specifications.

4.9.2.3 A baseline is an imaginary line that is used to generate planned track lines for data collection. Track lines are created perpendicular to the baseline. As a general rule, track lines should be created perpendicular to a major change in elevation, such as a slope. This is common when approaching a shoreline.

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4.9.2.4 Vessel Tracking. When planned track lines are established, every effort in the field should be made to maintain a consistent survey vessel course along each track line. Wind, Currents and tides can cause unintended departures from track lines. The survey vessel should not be more than 10-feet off course unless there are obstructions that must be avoided. Whenever possible, vessel tracking should be employed and information should be tied to and recorded simultaneously with the vertical survey information so that course corrections can be made to the survey. This is particularly important for areas where it is difficult to operate the vessel on the planned track. This approach will generate consistent surface models for contouring if required.

4.9.3 Multibeam

4.9.3.1 Multibeam is a high resolution full coverage method that should also be considered if conditions are favorable. Though costs have diminished over the years with multibeam electronics, it can be figured that the cost will run 1.5 to 2 times higher than that of a singlebeam survey. Considering the amount of data that will be collected, it may be well worth the cost. Multibeam acoustics follow the same concept as singlebeam does, but with many acoustic pings being sent out from the transducer in a wide array. Multibeam can cover an array, or swath, that is three times the water depth. As an example, if the water depth is 50 feet, the swath of the multiple pings will cover some 150 feet in width. Not all projects require this type of application, especially shallow draft projects. This is because the swath of coverage becomes very narrow in shallow water. This technology is sophisticated, but there is a concern that operators and users are not properly trained to ensure understanding calibration requirements and appropriate application limitations. Multibeam method should be used on projects that require a high resolution data set of the area being surveyed. Examples include unusual seabed conditions, or areas that may have objects or obstructions that can be missed by singlebeam track lines.

4.9.3.2 Multibeam coverage should be at a minimum of 200%. This means that enough overlap should be acquired to achieve 2 times coverage of the survey area. This follows standard best practices and will also help strengthen the precision of the data set.

4.9.3.3 Shallow Draft - If water levels are less than 2 feet in depth, it may not be possible to access the survey area in a standard hydrographic equipped survey vessel. If walking the site is unsafe, then extreme shallow draft boats or even an air boat may be required. In conditions such as this, it will be very difficult to collect the data electronically using any transducer. Therefore, typical topographic surveying techniques should be used.

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4.9.3.4 Poling to Measure Shallow Depths - In order to measure the shallow depths in these types of surveys, a plate at the bottom of a measuring rod should be considered instead of the point that is normally used for a topographic measurement. The plate (i.e. 6 inches in diameter) will embrace the mud line and provide more of an accurate representation of the mud line if the density of the material is lighter.

4.9.4 Frequencies

4.9.4.1 Singlebeam High Frequency (200 kHz) - A high frequency echosounder is a first return system. This means that the acoustic pings sent from the transducer will begin their return from the first bottom detected, regardless of the density of material. High frequency is the most commonly used frequency in hydrographic surveying.

4.9.4.2 Singlebeam Low Frequency (24-33 kHz) - A low frequency echosounder is not a first return system. Lower frequency sound pings will penetrate and perhaps trace the harder sub-bottom surface. Low frequency surveys are sometimes difficult to interpolate and post-processing time can increase with this type of data collection. Acceptance of this type of survey is at the hands of a hydrographic surveyor's knowledge of analyzing the seabed characteristics. Because of this, repeatability between two independent low frequency data sets can be difficult to accomplish. Low frequency data collection should be used during dredging projects where extremely low density materials exist, known as "fluff". They should also be considered in sediment transport studies within rivers or drainage tributaries.

4.9.4.3 Singlebeam Dual Frequency - Dual frequency transducers are available which house both high frequency and low frequency signal returns. Both can be collected and stored simultaneously. It is recommended that all low frequency surveys be accompanied with high frequency data as well. This will give an indication of the thickness between the bottom and sub-bottom, if it indeed exists.

4.9.4.4 Multibeam Frequency (240 kHz) - Multibeam systems are, at this point in time, only capable of acquiring data at a high frequency level.

4.9.5 Vertical Corrections

4.9.5.1 Datum - Understanding the vertical datum is very important and how they are derived. As a general rule, all hydrographic survey data should be tied to NAVD88 unless specified otherwise. If data is to be collected in a different datum, it should be well documented in the project's field notes.

4.9.5.2 Tide and Water Level Fluctuation - Since all hydrographic survey data, whether elevation or depth mode, is tied to the water level, it should be well documented.

4.9.5.3 Recording Intervals - Water levels should be recorded during data collection at a minimum of 30-minute increments, or lesser increments if major changes are noticeable. These could be in areas that have substantial tidal variances, storm

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surges and seiches, flash floods, dam operations or in rivers that have drawdowns or high CFS flow.

4.9.6 Horizontal Positioning Techniques

4.9.6.1 DGPS - This application is useful where meter level positioning of the soundings data is tolerable. DGPS corrections can be obtained by the on-board DGPS receiver software which uses the signal from a second land-based receiver. These land based receivers transmit GPS signals for navigational uses and meter level positioning. There are various methods of obtaining meter level positioning and are as follows:

- United States Coast Guard (USCG) Radio Beacon System - A user with a marine radio beacon receiver and a GPS receiver with the ability to accept and apply pseudo range corrections can obtain a relative accuracy of 0.5 to 3 meters. This accuracy is dependent on many factors including the design and quality of the user's GPS receivers, distance from the reference station and the satellite geometry
- WAAS - This is a system that has been useful in determining meter level positional accuracy for hydrographic surveys where USCGS beacons are out of range or the reference stations are too far from the project site.
- OmniStar - A subscription based service capable of obtaining differential corrections worldwide. Use of this system eliminates reliance on the USCG Beacons or WAAS. Positional accuracies are meter level.

4.9.6.2 RTK – This technique must be used when centimeter level positional accuracy is required.

4.9.7 Typical Accuracy

4.9.7.1 Horizontal - The horizontal positional accuracy is determined in the initial mission planning stage of the project. This will determine which method will be required or will be tolerable for the scope of the project. The method of data acquisition will determine the horizontal positional accuracy of the data. Positional accuracy will be performed as outlined in Table 1 of the FGDC Geospatial Positioning Accuracy Standards, Part 5: Standards for Nautical Charting Hydrographic Surveys (Reference Document 5.4).

4.9.7.1.1 Dredging Surveys - In most cases meter level accuracy will be sufficient for dredging projects, unless superseded by specific project precision requirements. DGPS is well suited for this application.

4.9.7.1.2 Sedimentation Surveys - In most cases, meter level accuracy will be sufficient for sedimentation projects, unless superseded by specific project precision requirements. DGPS would be well suited for this application.

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4.9.7.1.3 Design Surveys - A higher order of accuracy may be appropriate for data acquisition on design surveys where construction will occur in areas of significant relief such as side slopes of lakes, rivers, streams or channels. In applications such as sheet pile or piling design or construction over submerged materials, it is critical that the bottom elevation locations are within a positional tolerance better than meter level. A higher order of accuracy can be obtained by utilizing RTK GPS methods.

4.9.7.2 Vertical - The vertical precision for hydrographic measurements will be dependent on the measurement methods utilized. There are three general methods for obtaining elevations of the submerged materials: electronic acoustic soundings methods from a vessel or watercraft; manual depth soundings from a vessel or watercraft using a graduated sounding rod or lead line; direct bottom readings using GPS RTK methods or a land-based total station.

4.9.7.2.1 Acoustic Measurement Method - This method is performed using an acoustic echo sounder from a vessel or water craft. Acoustic methods are usually performed in depths greater than 5 feet. As a minimum, horizontal and vertical precision requirements will be as outlined in Table 1 of the FDGC Geospatial Accuracy Standards Part 5: Standards for Nautical Charting Hydrographic Surveys (Reference Document 5.4). However, depending on the project specifics, the Project Manager or Honeywell Representative may implement tighter precision values if deemed necessary (i.e. Horizontal Accuracy to 1 m or less).

4.9.7.2.2 Manual Sounding Method - This method is performed when acoustic methods are not available or where the electronic acoustic instrumentation cannot be mounted on the vessel or water craft. This method can be used in most depths of water, preferably less than 50 feet deep. As a minimum, horizontal and vertical precision requirements will be as outlined in Table 1 of the FDGC Geospatial Accuracy Standards Part 5: Standards for Nautical Charting Hydrographic Surveys (Reference Document 5.4). However, depending on the project specifics, the Project Manager or Honeywell Representative may implement tighter precision values if deemed necessary (i.e. Horizontal Accuracy to 1 m or less).

4.9.7.2.3 Direct Bottom Readings - This method is performed primarily in shallow water where direct measurements can be obtained using GPS RTK methods or direct measurements from a land-based total station. Vertical Precision will be the same as those utilized for a typical Engineering and Construction Survey.

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4.9.8 Data Deliverables

4.9.8.1 XYZ ASCII - Final hydrographic survey data should be compiled in an XYZ ASCII text file that can be integrated into any CAD software.

4.9.8.1.1 Singlebeam data should include all track lines surveyed at a minimum density of 3-feet between soundings.

4.9.8.1.2 Multibeam data should include one data point per 1-foot by 1-foot grid cell for the entire area that was surveyed.

4.9.8.1.3 Hydrographic maps - Maps should show soundings spaced in accordance with the scale of the drawing. Structures, such as docks, that are shown on bathymetry maps should be well-referenced. Ideally, the structure should be tied-in horizontally using the same positioning system that was used to collect the survey data.

4.10 Monitoring Surveys

4.10.1 Equipment

4.10.1.1 Real-time Monitoring - Conventional equipment or GNSS equipment may be used as long as the equipment is able to meet the accuracies specified in this procedure.

4.10.1.2 Periodic Monitoring - Conventional equipment, GNSS or high definition laser scanning equipment may be used as long as the equipment is able to meet the accuracies specified in this procedure.

4.10.2 Control Accuracy

4.10.2.1 Horizontal - Control surveys performed with GNSS will meet a 5 mm horizontal positional standard for local accuracy and a 1 cm standard for network accuracy at the 95% confidence level as defined in the FGDC Geospatial Positioning Accuracy Standards, Part 2: Standards for Geodetic Networks (Reference Document 5.1). Control surveys performed by conventional traverse will be Second Order, Class I, as outlined in Table A-1 of the FGDC Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management (Reference Document 5.3).

4.10.2.2 Vertical - Vertical control work will be First Order, Class I as outlined in Table A-2 of the FGDC Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management (Reference Document 5.3). GNSS and trigonometric leveling will not be used for the determination of control survey elevations. Elevations of all set control monuments will be generated from a closed and adjusted differential level loop beginning and ending at an existing site benchmark with each new monument being turned through. Preferably, at least one additional existing site benchmark will be included in the loop. Side shots are not permitted.

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4.10.3 Monumentation

4.10.3.1 Reference - A reference point typically is located away from the structure and is to be "occupied" during the survey. Each must have long term stability of less than 0.5 mm both horizontally and vertically with respect to the surrounding area. Reference points can be either a steel pipe pile or cast-in-place reinforced concrete pile. If a steel pipe pile is used, the nominal diameter will be no less than 20 cm, while the wall thickness will be no less than that for standard weight pipe. If using a cast-in-place reinforced concrete pile, the nominal diameter will also be no less than 20 cm. Further information on specific monument design and installation is provided in EM 1110-1-1002, Survey Markers and Monumentation.

4.10.3.2 Monitoring – A monitoring (or object) point is located directly on the structure and is to be "monitored" during the survey. Each must have long term stability of less than 0.5 mm both horizontally and vertically with respect to the surrounding area. A permanent one (1) mm diameter reference mark, or forced centering device, should be used for every monitoring point monument. Further information on specific monument design and installation is provided in EM 1110-1-1002, Survey Markers and Monumentation.

4.11 Quality Control Reporting and Evaluation

4.11.1 The PLS is responsible for quality assurance for the survey work performed, when applicable.

4.11.2 Quality Management Plan (QMP) - The survey company shall provide a QMP prior to award of a contract on a Honeywell project. Once submitted, a QMP may be used on subsequent projects but will be subject to review to ensure that content is current and applicable. If necessary, Honeywell may request that the QMP be updated to reflect any necessary changes.

4.11.2.1 At a minimum, the quality management plan should include field work checks, equipment calibration, office calculations, and a final peer review.

4.11.2.2 An example QMP Table of Contents is provided as Attachment 6.6.

4.12 Post-Survey Report

4.12.1 The surveyor will prepare a survey report that includes the following as a minimum requirement:

- Reference to the scope of the work and any deviations and/or additions.
- Dates of survey field work and crew members.
- Procedures and equipment used.
- Applicable site figures and vicinity maps.
- Any problems, complications, or unusual circumstances encountered.

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- Descriptions of primary control points, base stations, Satellite Based Augmentation Systems or Virtual Reference Networks used.
- Survey control network diagram.
- Copies of all field notes and electronically collected notes.
- Horizontal traverse and vertical level loop closures and adjustment computations.
- GPS baseline processing and loop closure reports.
- Least Squares Network Adjustment reports.
- The PLS's seal, signature and certificate that work was done under the PLS's supervision and that all information contained in the document are true and accurately shown.

4.12.2 An example Post-Survey Report Table of Contents is provided as Attachment 6.7.

4.12.3 CAD Standards

4.12.3.1 All CAD files are to be provided in AutoCAD or MicroStation format.

4.12.3.2 Layer/Level Naming Standard - All electronic drawing layering shall conform to the U.S. National CAD Standard (NCS), American Institute of Architects (AIA) [not International Standards Organization (ISO)] standard as published for the National Institute of Building Sciences (Reference Document 5.8). The CAD Layer Naming Convention is provided as Attachment 6.8.

4.12.3.3 CAD Methodology - Global control of all entities shall be "By layer." Sufficient layering shall be deployed to allow for logical control of entities with like entities residing on the same layer/level. Drawings shall be delivered in a plottable state with unplotted layers being frozen. A legend shall be provided that includes, and describes, all linetypes/linestyles and blocks/cells (symbology) used in the drawing file. If a sealed drawing is required, a PDF shall accompany the drawing file to illustrate that the data has been reviewed, signed, and sealed by the appropriate professional.

4.13 Data Deliverables

4.13.1 EDD file as specified in Attachment 6.9.

4.13.2 Geographic and grid coordinate listings for surveyed points.

4.13.3 If applicable and when coordinate point data are associated with line or shape features, provide a 3-dimensional CAD file containing topographic and planimetric features, boundaries, one foot contours, DTM data, north arrow, bar scale, legend and appropriate text labels.

4.13.4 For CAD files containing topographic surfaces, also provide the DTM or TIN files used to generate the surfaces.

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4.13.5 If applicable, a hard copy map shall be developed at a scale that allows all points and features to be clearly shown on 22 × 34 or 24 × 36 inch sheets.

4.14 Quality Control Evaluation by Alliance Partner

4.14.1 Quality Control evaluation will be conducted under the direct supervision of a licensed PLS.

4.14.2 Confirm all documents submitted bear the PLS's seal, signature, and certification.

4.14.3 Confirm that applicable accuracy requirements were achieved.

4.14.4 Confirm that the locations surveyed were within the range of the control network.

4.14.5 Confirm control and qualifier data is provided in metadata, as required.

4.14.6 Confirm project scope was completed and specifications were met.

4.14.7 Review survey report for obvious omissions, errors, or defects.

4.15 EDD Formatting

4.15.1 The surveyor will provide coordinates and attribute data for point data in the format shown in Attachment 6.9, as a tab-delimited txt file. Refer to the list of Location types in Attachment 6.9 for point data that should be included in the EDD.

4.15.2 Point data associated with line or area features will not be required in the EDD and will be submitted within the CAD plot. .

4.16 EDD Review by Alliance Partner

4.16.1 The EDD will be reviewed by a GIS or CAD operator with a minimum of 2 years of professional experience. The file should be inserted into a site base map to verify the coordinate system is accurate.

4.16.2 EDD format and data requirements will be reviewed by the project data manager prior to upload to EIM.

4.16.3 The control point coordinates and attribute information provided in the post survey report must be provided in the EDD.

4.16.4 All required EDD fields must be completed.

4.16.5 EDD fields with associated valid values must follow the list provided in Attachment 6.9. New valid values may be requested and approved by the consultant data manager.

4.16.6 Coordinates must be converted to latitude (decimal degrees) and longitude (decimal degrees), and corresponding fields in EDD must be completed.

4.16.7 For remedial investigation sites, the EDD must be loaded to the Locus EIM database.

4.16.8 Location and control metadata must be imported to GIS or CAD projects, as required.

4.16.8.1 CAD files should be digitally archived in eportal and consultant project files. Files should be provided to Honeywell at project closeout.

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5.0 Reference Documents

5.1 FGDC Geospatial Positioning Accuracy Standards, Part 2: Standards for Geodetic Networks
http://www.fgdc.gov/standards/projects/FGDC-standards-projects/accuracy/part2/chapter2

5.2 FGDC Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy
http://www.fgdc.gov/standards/projects/FGDC-standards-projects/accuracy/part3/chapter3

5.3 FGDC Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management
http://www.fgdc.gov/standards/projects/FGDC-standards-projects/accuracy/part4/FGDC-endorsed-standard

5.4 FGDC Geospatial Positioning Accuracy Standards, Part 5: Standards for Nautical Charting Hydrographic Surveys
http://www.fgdc.gov/standards/projects/FGDC-standards-projects/accuracy/part5/FGDC-STD-007.5-2005.pdf

5.5 EM 1110-1-1002, Engineering and Design - Survey Markers and Monumentation
http://140.194.76.129/publications/eng-manuals/em1110-1-1002/toc.htm

5.6 2005 Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys
http://www.alta.org/standards/standards.cfm

5.7 United States National Map Accuracy Standards
http://rmmcweb.cr.usgs.gov/nmpstds/nmas.html

5.8 The United States National CAD Standard
http://www.buildingsmartalliance.org/index.php/ncs/

5.9 Specification Section 01100, Remediation Construction Requirements

6.0 Attachments

6.1 Example Survey Scope Elements
6.2 Honeywell Requirements for ALTA/ACSM Land Title Surveys
6.3 Planimetric Feature Mapping Specifications for Photogrammetric Surveys
6.4 Digital Terrain Model Specifications for Photogrammetric Surveys
6.5 Digital Orthophoto Specifications
6.6 Example QMP Table of Contents
6.7 Example Post-Survey Report Table of Contents
6.8 CAD Layer Naming Convention
6.9 EDD Template and Definitions

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7.0 Revision Log

Revision Number	Section Number	Revised By	Revision Date	Description of Change
0	All	C. French	10/07/2011	Initial Issue

8.0 Definitions

ACSM	American Congress on Surveying and Mapping
ALTA	American Land Title Association
Datum	A reference from which position measurements are made; often associated with a model of the shape of the earth and used as the basis of elevations or a geographic coordinate system.
DGPS	Differential Global Positioning System
EDD	Electronic Data Deliverable
Locus EIM	A web-based Environmental Information Management (EIM) system developed by Locus Technologies, Inc. that Honeywell uses to manage sampling, analytical, geological and geotechnical data collected during the investigation, cleanup, and long-term monitoring of remediation sites.
Federal Geographic Data Committee (FGDC)	An interagency committee that promotes the coordinated development, use, sharing, and dissemination of geospatial data on a national basis. Numerous stakeholder organizations participate in FGDC activities representing the interests of state and local government, industry, and professional organizations.
GIS	Geographic Information System
Global Navigation Satellite Systems (GNSS)	Satellite systems that provide global positioning to determine longitude, latitude, and heights through radio signals broadcast from satellites to electronic receivers. The U.S. Global Positioning System (GPS) and Russian GLObal NAvigation Satellite System (GLONASS) systems are currently operational. European (Galileo) and Chinese (Compass) systems are being developed.
GPS	Global Positioning System
National Spatial Data Infrastructure (NSDI)	The nationwide data-publishing effort of the FGDC. The NSDI is a physical, organizational, and virtual network designed to enable the development and sharing of the nation's digital geographic information resources.

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National Spatial Reference System of 2007 (NSRS2007)	The latest adjustment of NAD83 based on high accuracy reference positions from the Continuously Operating Reference Station (CORS) network.
North American Datum of 1983 (NAD83)	The latest horizontal control datum for the United States, Canada, Mexico, and Central America, based on the Geodetic Reference System 1980 (GRS80) ellipsoid with a geocentric origin.
North American Vertical Datum of 1988 (NAVD88)	The latest vertical control datum established by the minimum-constraint adjustment of Canadian-Mexican-U.S. leveling observations. It held fixed the height of the primary tidal bench mark, referenced to the new International Great Lakes Datum of 1985 local mean sea level height value, at Father Point/Rimouski, Quebec, Canada.
Professional Land Surveyor (PLS)	A term used to denote a licensed or registered land surveyor. Licensing requirements are established by each state and generally consist of education, experience and examination components.
Real Time Kinematic (RTK)	A method used in GNSS surveying where a base receiver or Virtual Reference Network is used to provide a correction factor to a roving receiver in real time.
Satellite Based Augmentation System (SBAS)	A system that broadcasts a correction factor from a network of continuously operating GNSS base stations to a roving GNSS receiver via communication satellites.
State Plane Coordinate System (SPCS)	A coordinate system defined by statute to standardize the conversion from geodetic (latitude, longitude) to grid (X, Y or northing, easting) coordinates with minimal distortion introduced.
Virtual Reference Network	A network of continuously operating GNSS base stations that broadcasts a correction factor to a roving GNSS receiver via a cellular modem or radio link.

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EXAMPLE SURVEY SCOPE ELEMENTS

1. INTRODUCTION

1.1. The following survey elements common to investigations, design, and construction, projects may be used as guidance when developing a specific survey scope.

2. BOUNDARY/PROPERTY

- Property markers including iron pipes, pins or rods, stone monuments, or other identifying markers.
- Deed book/page or reception number for the Site property and adjoiners.
- Copies of the deeds or vesting documents for the properties that comprise the Site.
- Easements, encumbrances and rights-of-way within or adjoining the Site property.
- Lot, block, Subdivision and map number for the Site and adjoining properties.
- Recorded surveys, Subdivision and Plats.
- Current recorded property owners for the Site and adjoining properties.
- Highway or railroad maps used to establish Site property boundary.

3. SITE FEATURES

- Fencing and gates
- Privacy, decorative and retaining walls
- Curbing (designate type, e.g., concrete, paved)
- Curb top and bottom (flowline) elevations.
- Railroad tracks
- Access ramps
- Concrete pads
- Bollards
- Sidewalks and stairs
- Stairs
- Site ground cover features including paved, concrete, gravel, stone, landscaped, and vegetated areas.
- Buildings including locations of entrances (man doors, vehicle doors), locations of loading docks, height (stories) and finish floor elevations.
- Miscellaneous structures (bridges, decks, docks, canopies, towers, etc.)
- Spot elevations at locations including building slabs; containment areas and sumps.
- Other prominent site features.

4. BELOW GROUND UTILITIES

- Located as possible by visual observation without excavation.

- Utility size, material type, pipe depth/invert, manhole rim elevations, and structure identification numbers.
- Storm drain systems (inlets, catch basins, manholes, pipes, trenches, pump stations, headwalls and culverts)
- Sanitary sewer systems (manholes, pipes, and force mains)
- Process sewer systems (manholes, pipes, and force mains)
- Gas mains (valves, manholes and pipes)
- Water mains (valves, manholes, vaults and pipes)
- Electric (manholes, vaults, pull/junction boxes, lines, conduits and banks)
- Communication (telephone, cable TV and fiber optic manholes, vaults, pull/junction boxes, lines, conduits and banks)
- Instrumentation (manholes, vaults, pull/junction boxes, lines, conduits and banks).
- Any local utility drawings or maps used to establish utility locations through the property or any identified easements.

5. ABOVE GROUND UTILITIES

- Roof drain systems (scuppers and down spouts).
- Storm drain systems (force main and the outlet pipe from the building to sanitary sewer).
- Gas main (meters and tanks).
- Water mains (tanks, post indicator valves, meters, hydrants, vents, wells and spigots)
- Electric (meters, electric panels, transformers, power poles, light poles, guy anchors, towers and overhead lines).
- Communication (telephone, cable TV and fiber optic cabinets, risers, antennas, dishes, poles and lines).
- Public Irrigation (Mainline, laterals, boxes, valves, pump station facilities, risers, canals and ditches.)
- Instrumentation and control systems (panels).
- Any local utility drawings or maps used to establish utility locations through the property or any identified easements.

6. ENVIRONMENTAL MONITORING

- Wells
- Piezometers
- Soil boring locations
- Test pit locations
- Surface/soil sediment locations

7. **SPECIAL SITE-SPECIFIC INFORMATION**
   - Delineated wetlands as identified by wetland flagging.
   - Creek or drainage sections.
8. **TOPOGRAPHY (DEFINE MINIMUM ACCURACY AND PRECISION)**
   - Pre-design
   - Pre and post excavation for payment quantities (Refer to Specification Section 01100 for survey and computational accuracy requirements for measurement and payment purposes)
   - As-built (record)

ALTA/ACSM LAND TITLE SURVEY

If checked, the following items are to be included in the ALTA/ACSM LAND TITLE SURVEY:

1. __X__ Monuments placed (or a reference monument or witness to the corner) at all major corners of the boundary of the property, unless already marked or referenced by an existing monument or witness to the corner.

2. __X__ Vicinity map showing the property surveyed in reference to nearby highway(s) or major street intersections(s).

3. __X__ Flood zone designation (with proper annotation based on Federal Flood Insurance Rate Maps or the state or local equivalent, by scaled map location and graphic plotting only.)

4. __X__ Gross land area (and other areas if specified by the client).

5. ____ Vertical relief with the source of information (e.g. ground survey or aerial map), contour, interval, datum and originating benchmark identified.

6. ____ (a) Current zoning classification, as provided by the insurer

   ____ (b) Current zoning classification and building setback requirements, heights and floor space area restrictions as set forth in that classification, as provided by the insurer. If none, so state.

7. __X__ (a) Exterior dimensions of all buildings at ground level

   __X__ (b) Square footage of:

   __X__ (1) exterior footprints of all buildings at ground level;

   ____ (2) other areas as specified by the client

   __X__ (c) Measured height of all buildings above grade at a defined location. If no location is specified, the point of measurement shall be identified.

8. __X__ Substantial features observed in the process of conducting the survey (in addition to the improvements and features required under Section 5 above) such as parking lots, billboards, signs, swimming pools, landscaped areas, etc.

9. __X__ Striping, number and type (e.g. handicapped, motorcycle, regular, etc.) parking spaces in parking areas, lots and structures.

10. ____ (a) Determination of the relationship and location of certain division or party walls designated by the client with respect to adjoining properties (client to obtain necessary permissions).

    ____ (b) Determination of whether certain walls designated by the client are plumb (client to obtain necessary permissions).

11. __X__ Location of utilities (representative examples of which are listed below) existing on or

serving the surveyed property as determined by:

_X_ (a) Observed evidence

____ (b) Observed evidence together with evidence from plans obtained from utility companies or provided by client, and markings by utility companies and other appropriate sources (with reference as to the source of information).

- Railroad tracks, spurs and sidings;
- Manholes, catch basins, valve vaults and other surface indications of subterranean uses;
- Wires and cables (including their function, if readily identifiable) crossing the surveyed property, and all poles on or within ten feet of the surveyed property. Without expressing a legal opinion as to the ownership or nature of the potential encroachment, the dimensions of all encroaching utility pole cross members or overhangs; and
- Utility company installations on the surveyed property.

Note – With regard to Table A, item 11(b), source information from plans and markings will be combined with observed evidence of utilities to develop a view of those underground utilities. However, lacking excavation, the exact location of underground features cannot be accurately, completely and reliably depicted. Where additional or more detailed information is required, the client is advised that excavation may be necessary.

12. ____ Governmental Agency survey-related requirements as specified by the client, such as for HUD surveys, and surveys for leases on Bureau of Land Management managed lands.

13. _X_ Names of adjoining owners of platted lands according to current public records.

14. _X_ Distance to the nearest intersecting street as specified by the client.

15. ____ Rectified orthophotography, photogrammetric mapping, laser scanning, and other similar products, tools or the basis for the showing of the location of certain features (excluding boundaries) where ground measurements are not otherwise necessary to locate those features to an appropriate and acceptable accuracy relative to a nearby boundary. The surveyor shall (a) discuss the ramifications of such methodologies (e.g. the potential precision and completeness of the data gathered thereby) with the insurer, lender and client prior to the performance of the survey and, (b) place a note on the face of the survey explaining the source, date, precision and other relevant qualifications of any such data.

16. _X_ Observable evidence of current earth moving work, building construction, or building additions.

17. _X_ Proposed changes in street right-of-way lines, if information is available from the controlling jurisdiction. Observed evidence of recent street or sidewalk construction repairs.

18. _X_ Observable evidence of site use as a solid waste dump, sump or sanitary landfill.

19. ____ Location of wetland areas as delineated by appropriate authorities.

20. _X_ (a) Locate improvements within any offsite easements or servitudes benefitting the surveyed property that are disclosed in the Record Documents provided to the surveyor and that are observed in the process of conducting the survey (client to obtain necessary permissions).

____ (b) Monuments placed (or a reference monument or witness to the corner) at all major corners of any offsite easements or servitudes benefitting the surveyed property and disclosed in Record Documents provided to the surveyor (client to obtain necessary permissions).

21. ____ Professional Liability Insurance policy obtained by the surveyor in the minimum amount of $_____ to be in effect throughout the contract term. Certificate of Insurance to be furnished upon request.

22. _X_ Other: Indication of access to a public way such as curb cuts and driveways marked.

PLANIMETRIC AND TOPOGRAPHIC MAPPING SPECIFICATIONS FOR PHOTOGRAMMETRIC SERVICES

1 INTRODUCTION

1.1 All planimetric and topographic mapping acquired by photogrammetric mapping techniques shall use industry standard equipment and procedures. All features must be captured and delivered in a CAD ready format. Contour mapping must be generated from the project's digital terrain model (DTM) surface. Requirements for the DTM surface are covered in the Digital Terrain Model Specifications. All topographic and planimetric mapping shall meet or exceed ASPRS Standards for the project-specified scale and contour interval.

2 PHOTOGRAMMETRIC MAPPING EQUIPMENT

2.1 The work to be completed shall be performed on a precision analytical or softcopy stereo plotter. Authority staff must approve the type of stereoscopic plotting instruments and any interfaced software or peripheral equipment (such as CAD-related software) prior to its use on a project. The Consultant shall submit proof of recent calibration and regularly performed maintenance work (performed within the last twelve months) for the equipment to be used on the project.

2.2 Double-projection and analog stereoscopic instruments shall not be used.

3 MAP CONTENT REQUIREMENTS

3.1 In addition industry standard map content requirements, the following criteria and specific map content requirements shall also be fulfilled:

- The final map shall contain a 5-inch grid (at final map output scale) of coordinate ticks as well as the project's accurately labeled horizontal and vertical field control points.
- The mapping limits/boundary, sheet numbers, and orientation of the final map sheets shall be shown on an index map to be supplied with the final mapping deliverables.
- If the contract calls for the mapping deliverables to be broken into separate map sheets, adjacent map sheets/files shall butt-match exactly. Match lines shall be delineated and labeled.
- Where the meaning of a symbol is obscured by adjacent topography, the object shall be clearly labeled.
- Where the symbols available do not properly describe a planimetric feature, the feature shall be clearly labeled.
- For linear projects, labels shall be oriented so that the project beginning shall be to the left and the project end shall be to the right.
- Unless otherwise specifically required, labels shall be oriented on site projects so that they are readable when north is predominantly to the top of the map.
- The mapping shall conform to the layers, line codes, line weights, line colors, line types, and symbols specified by the client requirements.
- A mapping symbology legend shall be placed in the CAD file to the right (east) of the mapping area. The legend shall be scaled to the final map scale.
- CAD file deliverables shall be provided in the most current version in use by the Authority at the time of delivery.
- Unless specifically authorized, the use of reference files or pen tables to achieve particular plotted effects is not allowed; each mapping file must be stand-alone.

- Each file shall contain map features for one or more stereo models. Individual stereo models shall not be separated into more than one file, regardless of size. The entire project mapping shall be merged into one file where possible but in no case (without specific written permission) shall the files exceed more than twenty megabytes each in size.
- Files shall be compiled with coordinate values to the nearest one-thousandth (1/1000) of a foot.
- All digital data shall be recorded directly as a function of the stereo-plotter operation. Post digitizing of a graphic or hard copy map compilation is not permitted.
- The completed map(s) shall show horizontal and vertical control monument locations, benchmark locations, contours, the grid system, and all topographic and planimetric features required by the contract language.
- Unless changed by other wording in the contract, all streets and named cultural, topographic, and drainage features shall be properly and adequately labeled on the final maps so as to be complete within each map sheet/tile.
- The photo center of the aerial photographs used in the stereo compilation shall be indicated on the final maps by an appropriate symbol and label.
- State plane coordinate grids shall be shown with 1/2-inch-long cross-ticks spaced at 5 inch intervals at final map scale. Grids shall also be labeled around the perimeter of the map. Grids on adjacent map sheets/tiles shall be a continuation of the 5-inch grid interval. In addition to this requirement, if the project is a linear, adjoining maps shall have at least two grid ticks in common to both maps. Intermediate grids shall be used when necessary to fulfill this requirement. Any such intermediate grids need not be labeled.
- Perimeter grid ticks shall be labeled with their cardinal directions; North or East.
- Every fifth contour shall be of heavier line weight. Care shall be exercised in labeling contours to insure that the elevation of any contour is readily discernible. Contour designations shall not be abbreviated. All digits shall be shown on the contour maps.
- Labels shall be oriented to follow the contours and shall be readable from the same direction as other text. The distance along a contour between labels shall not exceed 8 inches at map scale. Unless otherwise noted, there shall be no break in the contour for the contour label. Where possible, contour labels shall be in diagonal stacks one above another along the line of the slope. The labels will be 0.12 inches in height at final map scale.
- Contours may be hidden from view (but not eliminated) when the lines fall closer than 10 contours per one-half inch (1/2”), provided that all contours at the top and bottom of slope changes are shown. In no event shall the index contours be hidden.
- Contours shall reflect the crown or cross slope of all paved areas, including paved ditches, and shall truly depict all drainage ways.
- In areas of comparatively level terrain where contours are more than 2 inches apart (at final map scale), the contours shall be supplemented by spot elevations spaced 2 inches apart (at final map scale) in each direction to form a rectangular grid. Where trees or buildings

preclude exact adherence to a grid pattern, the pattern may be varied, but the density and spacing of spot elevations shall insure that no place on the map is more than 1 inch from either a contour or spot elevation.

- Where the profile gradient is 2 percent or less, spot elevations shall be shown at intervals not greater than 2 inches apart at final map scale, along the center of levees, roads, ditches, and railroads. Spot elevations shall be shown at all saddles, crests, summits, depressions, and road intersections regardless of gradient where the feature is 0.5 inches or larger in size at final map scale.
- Spot elevations shall be shown at intervals not to exceed 2 inches (at final map scale) along the boundary of the area to be mapped at locations where the nearest contour is over 1 inch from the boundary.
- All spot elevations shall be labeled with decimal values rounded to the nearest one-tenth of a foot. Labels shall be placed parallel to the bottom of the map and positioned so that they do not obscure other map features.
- All parks, playgrounds, cemeteries, hospitals, and similar places of public gatherings shall be labeled. Street maps or other published information may be used as a source for this data and field inspection or verification will not be required.
- Drainage lines shall be shown in all drainage features indicated by the contours where the drainage is over 5 inches in length at final map scale. Drainage lines shall be digitized in the direction of flow.
- Roads, streets, and sidewalks shall be shown as the separation between curb faces, hard surface edges, travel paths, or shoulder lines.
- The surface type of all roads, parking areas, drainage ditches, and other improved areas, except for private residential features, shall be identified and labeled as to type, i.e., asphalt, concrete, brick, and drainage ditches, as interpreted from the aerial photographs.
- Features that are interpreted from the photography as being under construction shall be labeled as such, and partially completed planimetric features shall be shown with dashed lines.
- Any features visible on the photography which cannot be readily identified as to the feature type shall be shown by a standard symbol and shall be located and shown on the map by dashed lines.
- The plotted position of all coordinate grid ticks and/or grid lines, and all monuments, except benchmarks, shall not vary more than 0.01 inch (at map scale) from their coordinate position.
- The width of all curbed streets, vehicular structures, traffic lanes, and highway surfaces whose edges are well defined shall not vary more than 0.025 inches (at final map scale) from their true width. The lines delineating curbs shall be the face of the curb (i.e., the side of the curb closest to the centerline of the street).
- Contours shall meet or exceed the contracted map accuracy standard requirement except as follows:

  - In areas where the ground is obscured by dense brush, shadows, or tree cover, contours shall be plotted as accurately as possible, while making maximum use of spot elevations obtained from the stereoscopic model in places where the ground is visible.
  - In areas where spot elevations can be obtained, at least 90 percent of all contours shall be within one contour interval or one-half the average height of the ground cover, whichever is the greater. All contours shall be within two contour intervals, or within the average height of the ground cover, whichever is the greater. Dashed lines shall indicate contours in such areas.
- The accuracy tolerance allowed for contours shall not affect the requirement that contours reflect the crown or cross slope of all paved areas.

DIGITAL TERRAIN MODEL SPECIFICATIONS FOR PHOTOGRAMMETRIC SURVEYS

1. INTRODUCTION

1.1 Digital terrain model (DTM) deliverables shall be capable of producing an accurate triangulated irregular network (TIN) file which, when provided as input to commercially available terrain modeling software, will produce semi-smooth and accurate ground contours. The interpolated contours shall meet ASPRS Standards for the project-specified scale and contour interval.

2. DATA TYPES

2.1 DTM deliverables shall consist of five types of data:

- Obscure area shapes
- Skeletal breaklines
- Terrain breaklines
- Boundary shape breakline(s)
- Spot elevation points

3. DTM DATA COLLECTION AND CONTENT REQUIREMENTS

3.1 Ninety percent of all digitized elevations for this data shall be accurate to within one-quarter of the height of the vegetation in areas where the ground is not visible. The "ground not visible" areas are to be outlined on a unique and consistent layer. The contours generated in these areas shall be dashed.

3.2 Each set of data shall be separated onto its own unique layer. The data shall conform to the layers, line codes, line weights, line colors, line types, and symbols specified by the client requirements.

3.3 All breakline data shall be stored as continuous line strings or polylines in project x-y-z coordinate values for each point along the connected vertices of the line string. These line strings shall be connected and unbroken for each unique breakline feature.

3.4 Skeletal breakline features are taken along drains, ridges, at the top and toe of man-made and natural banks, and at any other sharp change in the ground surface.

3.5 Terrain breaklines are lines on rolling or smooth ground. Some TIN and contour interpolation software packages treat the vertices of these breaklines as spot elevation data points. The purpose of terrain breaklines is to ensure a logical shape for the contours by depicting the existing shape of the terrain surface. Three or more lines must be taken along a rounded ridge, one on top, and two or more on the shoulders. A rounded knoll or smooth slope will require concentric or parallel terrain breaklines perpendicular to the final generated contours.

3.6 The boundary shape breakline(s) must form a closed shape around the boundary of the entire project DTM and around each sub-area DTM if the entire site is made from more than one DTM file.

3.7 Spot elevation data shall be stored as unconnected point data with real world x,y,z coordinates for each independent point. There are two criteria for obtaining spot elevation data. The first criterion is that they must be strategically placed in the areas between breaklines to ensure that triangles formed in these areas are uniform and that they accurately depict the shape of the terrain. The second criterion is that no point on the ground is over 1 inch from either a breakline or another spot elevation point at final map scale.

3.8 For ease of handling and for computing productivity reasons, each DTM file and/or sub-area DTM file shall contain no more than a maximum of 200,000 triangles. A graphic representation of the TIN file must be reviewed. Triangles with a height greater than five times the base should be avoided, and should be used in the model only after review and inspection proves that they accurately represent the existing surface.

3.9 The slope between individual points on a breakline must depict the true profile of the ground. No two points along a breakline may be more than 2 inches apart at final map scale. A line formed between adjacent spot elevation points or between a spot elevation point and a breakline point must represent the true ground profile between those points.

3.10 Seventy to ninety percent of the DTM file shall be breakline data and the remaining ten to thirty percent shall be spot elevation point data. Unless specifically allowed by the contract, DTMs generated from contours or spot elevation grids are not an acceptable format and will be rejected.

3.11 Final 3D CAD contour deliverables must match (within the required map accuracy standards) the contours interpolated by the terrain modeling software using the final DTM data deliverable.

DIGITAL ORTHOPHOTO SPECIFICATIONS

1. INTRODUCTION

1.1 Digital orthophoto deliverables shall be delivered as accurately geo-referenced true-scale RGB color images that are directly readable, without translation, using industry standard CAD and GIS software. The orthophoto imagery shall meet United States National Map Accuracy Standards for the project's specified final horizontal map scale.

2. DIGITAL TERRAIN MODEL (DTM) DATA

2.1 The digital orthophoto imagery shall be prepared using DTM data captured on analytical or softcopy stereo plotter equipment. The content of the DTM must comply with the requirements of the Digital Terrain Model Specifications.

3. FILM SCANNING

3.1 Prior to scanning, all exposures are to be inspected for dust, dirt, scratches, or any other foreign objects or markings that would degrade image quality. All such markings which are present on the film are to be removed without damaging the film. The scanned digital exposures shall be previewed and their corresponding histograms adjusted to capture the final image with optimum density, contrast and saturation levels. All fiducial marks must be clearly visible in each scanned exposure.

3.2 The scanner to be used must be a photogrammetric quality, transmissive scanner specifically designed and manufactured for use on aerial film. The unit must have a geometric repeatability of 1 micron and must be minimally capable of scanning resolutions at or below 12.5 microns. Scanner specifications and the most recent calibration test results may be required by the contractor for approval prior to project start-up.

3.3 The scan resolution must be finer than or equal to the final required image resolution. Scanning at a finer pixel size then resampling to the final output resolution shall be acceptable. Scanning at a coarser pixel size and interpolating, or "down sampling," is not acceptable.

4. IMAGE ORTHORECTIFICATION

4.1 The DTM data shall be merged with the photogrammetric orientation parameters and the raw scanned digital image file, and a complete differential rectification shall be carried out with a specifically developed set of algorithms that remove image displacement caused by topographic relief and by the tip and tilt of the aircraft at the moment of exposure. The contractor shall use the cubic convolution resampling algorithm for generation of the orthophoto image files.

5. IMAGE RADIOMETRIC CORRECTION

5.1 The contractor shall analyze and correct for radiometric variation caused by terrain changes, sun angle, film emulsion, and other causes. Histogram enhancements, including linear contrast stretch, user-selected contrast stretch, histogram normalization, and histogram clipping, shall be used to reduce or eliminate radiometric inconsistencies throughout the entire imagery data set.

6. MOSAICKING AND INTERNAL IMAGE TILE EDGE MATCHING

6.1 Mosaicking refers to the stitching together of portions of multiple source images to produce a single digital orthophoto image. The contractor must use all imaging tools necessary to ensure that join lines between individual images are not visible. Tone and contrast must be consistent throughout the final mosaicked orthophoto imagery. Where two or more images are mosaicked, the image judged to have the best radiometric qualities shall be used as the

reference image. All other images shall have their color, contrast and brightness values adjusted to that of the reference image. Join lines between overlapping images shall be chosen to minimize or eliminate tonal variations. Localized adjustment within areas of the image for the brightness values shall be performed to minimize or eliminate tonal differences between join areas.

7. Adjacent Image Tile/Sheet Edge Matching

7.1 Adjacent digital orthophoto image tiles as well as all image tiles throughout the project area must match precisely, both spatially and radiometrically. Visual inspections must be completed to ensure that no offset of ground features exist between adjacent orthophoto images. The Contractor shall make every effort to reduce or eliminate offsets caused by elevated features, especially at bridges and overpasses.

8. Visual Inspection and Image Completeness

8.1 Visual inspection and verification shall be performed for image accuracy and completeness to ensure that no gaps, inconsistencies in quality, or image misplacements exist within each image, between map tiles, or over the larger project-wide area. Any image containing more than 5 percent cloud or haze coverage over key features or relevant project areas will not be accepted and must be regenerated by the contractor.

8.2 Each final digital orthophoto image must be visually inspected. All control points that are visible on the aerial photography must be visited on screen to compare their X/Y coordinate values to the field surveyed ground coordinate values. Each digital orthophoto image must also be checked and corrected to ensure acceptable and consistent tone balance as well as density, contrast, and brightness qualities.

9. Image Formatting

9.1 Imagery shall be delivered as 24-bit RGB color georeferenced files. The preferred imagery format is an uncompressed TIFF; however MrSID, JPEG or others may be acceptable and may be used if pre-approved in writing. Each image file shall be accompanied by a corresponding world file containing georeferencing and pixel size information. The images shall be named and filed in a logical manner to facilitate ease of retrieval.

10. Deliverables

10.1 Deliverables for the digital orthophoto component shall include the final digital orthophoto imagery and the corresponding world files.

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- 2.2 Survey Control
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- Appendix A.1 Final Coordinates and Benchmarks
  - A.1.2 Coordinate System and Datum Statement
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2. SURVEY DETAILS
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- 2.2 Scope of Work (including deviations and additions)
- 2.3 Coordinate System Parameters
  - 2.3.1 Horizontal and Vertical Datums, including Epoch
  - 2.3.2 Projection and Zone
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5.1 Control Coordinate Tabulation Sheet
5.1.1 Point ID
5.1.2 Latitude
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5.1.4 Ellipsoid Height
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5.1.7 Elevation
5.1.8 Description or Code
5.1.9 Notes or Attributes
5.2 Control Monument Diagram
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CAD LAYER NAMING CONVENTIONS

CAD file deliverables for Honeywell projects shall be compliant with the American Institute of Architects (AIA) CAD Layer Guidelines naming standard which is included in the U.S National CAD standards. The naming convention consists of two or more codes separated by dashes. The first code (the discipline code) is typically one or two letters and designates the discipline that is associated with the elements on the level. The letter V is used to represent the surveying and mapping disciplines and an additional letter may be used to distinguish sub-disciplines. Similarly, civil engineering is represented by the letter C. For "working" or no-plot layers that include calculations, construction lines or other data that need to be saved, the W discipline code should be used. The discipline code is followed by a four letter major code, which describes the general category of the feature. The major code is followed by one or two four letter minor codes that provide additional detail about a particular feature. The system is designed to be customizable to account for features that may not be included in the example layers. Additional discipline codes and major and minor codes are listed in the AIA guidelines.

Discipline Codes:

V	Survey / Mapping
VA	Aerial Survey
VF	Field Survey
VI	Digital Survey
VJ	User Defined
VK	User Defined
VU	Survey Combined Utilities
W	Work or construction layers (not plotted)

Example Layers:

V-ANNO	Annotation
V-ANNO-LEGN	Legends, symbol keys
V-ANNO-LOGO	Company logo
V-ANNO-NOTE	Notes
V-ANNO-TTLB	Border and title block
V-BLDG	Buildings and primary structures
V-BLDG-DECK	Buildings and primary structures: deck (attached, no roof overhead)
V-BLDG-OTLN	Buildings and primary structures: outline
V-BLDG-OVHD	Buildings and primary structures: overhead
V-BLDG-PRCH	Buildings and primary structures: porch (attached, roof overhead)
V-BNDY	Political boundaries
V-BNDY-BORO	Political boundaries: borough
V-BNDY-CITY	Political boundaries: city
V-BNDY-CNTY	Political boundaries: county
V-BNDY-CORP	Political boundaries: corporation
V-BNDY-NATL	Political boundaries: national
V-BNDY-PROV	Political boundaries: province

V-BNDY-STAT	Political boundaries: state
V-BNDY-ZONE	Political boundaries: zoning
V-BORE	Borings
V-BORE-HOLE	Borings: holes
V-BORE-WELL	Borings: monitoring well
V-BORE-PERC	Borings: percolation test
V-BORE-PIEZ	Borings: piezometer
V-BORE-TPIT	Borings: test pits
V-BRDG	Bridge
V-BRDG-BENT	Bridge: top of bent
V-BRDG-CNTJ	Bridge: construction joint
V-BRDG-CNTR	Bridge: center
V-BRDG-CTLJ	Bridge: control joint
V-BRDG-DECK	Bridge: deck
V-BRDG-EXPJ	Bridge: expansion joint
V-BRDG-FALT	Bridge: fault / break line
V-BRDG-GRAL	Bridge: guard rail
V-BRLN	Building restriction line
V-BZNA	Buffer zone area
V-CATV	Cable television system
V-CATV-OVHD	Cable television system: overhead
V-CATV-POLE	Cable television system: pole
V-CATV-UGND	Cable television system: underground
V-CHAN	Navigable channels
V-CHAN-BWTR	Navigable channels: breakwater
V-CHAN-CNTR	Navigable channels: center
V-CHAN-DACL	Navigable channels: de-authorized channel limits, anchorages, etc.
V-CHAN-DOCK	Navigable channels: decks, docks, floats, piers
V-CHAN-NAID	Navigable channels: navigation aids
V-COMM	Telephone communications
V-COMM-MHOL	Telephone communications: manhole
V-COMM-OVHD	Telephone communications: overhead
V-COMM-POLE	Telephone communications: pole
V-COMM-UGND	Telephone communications: underground
V-CTRL	Control points
V-CTRL-BMRK	Control points: benchmarks
V-CTRL-FLYS	Control points: fly station
V-CTRL-GRID	Control points: grid
V-CTRL-HORZ	Control points: horizontal
V-CTRL-HVPT	Control points: horizontal / vertical
V-CTRL-PNPT	Control points: panel points
V-CTRL-TRAV	Control points: transverse

V-CTRL-VERT	Control points: vertical
V-DRIV	Driveways
V-DRIV-ASPH	Driveways: asphalt
V-DRIV-CNTR	Driveways: center
V-DRIV-CONC	Driveways: concrete
V-DRIV-CURB	Driveways: curb
V-DRIV-CURB-BACK	Driveways: curb: back
V-DRIV-CURB-FACE	Driveways: curb: face
V-DRIV-CURB-FLOW	Driveways: curb: flowline
V-DRIV-CURB-LIPP	Driveways: curb: lip of pan
V-DRIV-FLNE	Driveways: fire lane
V-DRIV-GRVL	Driveways: gravel
V-DRIV-MRKG	Driveways: pavement markings
V-DRIV-UPVD	Driveways: unpaved surface
V-DTCH	Ditches or washes
V-DTCH-BOTM	Ditches or washes: bottom
V-DTCH-CNTR	Ditches or washes: center
V-DTCH-EWAT	Ditches or washes: edge of water
V-DTCH-TOPD	Ditches or washes: top
V-ESMT	Easements
V-ESMT-ACCS	Easements: access (pedestrian only; private access)
V-ESMT-CATV	Easements: cable television system
V-ESMT-CONS	Easements: conservation
V-ESMT-CSTG	Easements: construction / grading
V-ESMT-ELEC	Easements: electrical
V-ESMT-FDPL	Easements: flood plain
V-ESMT-INEG	Easements: ingress / egress (vehicles; private access)
V-ESMT-LSCP	Easements: landscape
V-ESMT-NGAS	Easements: natural gas line
V-ESMT-PHON	Easements: telephone line
V-ESMT-ROAD	Easements: roadway
V-ESMT-ROAD-PERM	Easements: roadway: permanent
V-ESMT-ROAD-TEMP	Easements: roadway: temporary
V-ESMT-RWAY	Easements: right-of-way (public access)
V-ESMT-SGHT	Easements: sight distance
V-ESMT-SSWR	Easements: sanitary sewer
V-ESMT-STRM	Easements: storm sewer
V-ESMT-SWMT	Easements: storm water management
V-ESMT-TRAL	Easements: trail or path (public access)
V-ESMT-UTIL	Easements: utility lines
V-ESMT-WATR	Easements: water supply
V-FLHA	Flood hazard area

V-FLHA-025Y	Flood hazard area: 25 year mark
V-FLHA-050Y	Flood hazard area: 50 year mark
V-FLHA-100Y	Flood hazard area: 100 year mark
V-FLHA-200Y	Flood hazard area: 200 year mark
V-FUEL	Fuel systems
V-FUEL-EQPM	Fuel systems: equipment (pumps, motors)
V-FUEL-MHOL	Fuel systems: manhole
V-FUEL-PIPE	Fuel systems: piping
V-FUEL-TANK	Fuel systems: storage tanks
V-FUEL-UGND	Fuel systems: underground
V-HYDR	Hydraulic structure
V-HYDR-BAFL	Hydraulic structure: baffle block and splash pad
V-HYDR-BASN	Hydraulic structure: stilling and settling basins
V-HYDR-CNDT	Hydraulic structure: diversion/bypass conduits/culvers
V-HYDR-COFF	Hydraulic structure: coffer dam
V-HYDR-DAM~	Hydraulic structure: dam
V-HYDR-FISH	Hydraulic structure: fish ladder/passage
V-HYDR-FLUM	Hydraulic structure: flume
V-HYDR-INTK	Hydraulic structure: intake
V-HYDR-NOVR	Hydraulic structure: non-overflow structure
V-HYDR-PENS	Hydraulic structure: penstock
V-NGAS	Natural gas
V-NGAS-EQPM	Natural gas: equipment (pumps, motors)
V-NGAS-MHOL	Natural gas: manhole
V-NGAS-PIPE	Natural gas: piping
V-NGAS-TANK	Natural gas: storage tanks
V-NGAS-UGND	Natural gas: underground
V-PLNT	Plants and landscape
V-PLNT-BUSH	Plants and landscape: bushes and shrubs
V-PLNT-CTNR	Plants and landscape: container or planter
V-PLNT-EDGR	Plants and landscape: planting bed edger
V-PLNT-TREE	Plants and landscape: trees
V-PLNT-TURF	Plants and landscape: lawn areas
V-POND	Ponds
V-POND-EDGE	Ponds: edge
V-POND-SWAY	Ponds: spillway
V-POND-TOPB	Ponds: top of bank
V-POWR	Power
V-POWR-INST	Power: instrumentation (meters, transformers)
V-POWR-MHOL	Power: manhole
V-POWR-OVHD	Power: overhead
V-POWR-POLE	Power: pole

V-POWR-STRC	Power: structures
V-POWR-UGND	Power: underground
V-PRKG	Parking lots
V-PRKG-ASPH	Parking lots: asphalt
V-PRKG-CNTR	Parking lots: center
V-PRKG-CONC	Parking lots: concrete
V-PRKG-CURB	Parking lots: curb
V-PRKG-CURB-BACK	Parking lots: curb: back
V-PRKG-CURB-FACE	Parking lots: curb: face
V-PRKG-CURB-FLOW	Parking lots: curb: flowline
V-PRKG-CURB-LIPP	Parking lots: curb: lip of pan
V-PRKG-DRAN	Parking lots: drainage slope indications
V-PRKG-FLNE	Parking lots: fire lane
V-PRKG-GRVL	Parking lots: gravel
V-PRKG-MRKG	Parking lots: pavement markings
V-PRKG-SIGN	Parking lots: signage
V-PRKG-STRP	Parking lots: striping
V-PRKG-UPVD	Parking lots: unpaved surface
V-PROP	Property boundary
V-PROP-BRNG	Property boundary: Bearings and distance labels (survey coordinates)
V-PROP-CRNR	Property boundary: corners
V-PROP-RSRV	Property boundary: reservation
V-PROP-SBCK	Property boundary: setback lines
V-PROP-SUBD	Property boundary: subdivision (interior) lines
V-PVMT	Pavement
V-PVMT-ASPH	Pavement: asphalt
V-PVMT-CONC	Pavement: concrete
V-PVMT-GRVL	Pavement: gravel
V-RAIL	Railroad
V-RAIL-CNTR	Railroad: center
V-RAIL-EQPM	Railroad: equipment (gates, signals, etc.)
V-RAIL-TRAK	Railroad: track
V-RIVR	River
V-RIVR-BOTM	River: bottom
V-RIVR-CNTR	River: center
V-RIVR-EDGE	River: edge
V-RIVR-TOPB	River: top of bank
V-ROAD	Roadways
V-ROAD-ASPH	Roadways: asphalt
V-ROAD-CNTR	Roadways: center
V-ROAD-CONC	Roadways: concrete
V-ROAD-CURB	Roadways: curb

V-ROAD-CURB-BACK	Roadways: curb: back
V-ROAD-CURB-FACE	Roadways: curb: face
V-ROAD-CURB-FLOW	Roadways: curb: flowline
V-ROAD-CURB-LIPP	Roadways: curb: lip of pan
V-ROAD-FLNE	Roadways: fire lane
V-ROAD-GRVL	Roadways: gravel
V-ROAD-MRKG	Roadways: pavement markings
V-ROAD-SIGN	Roadways: signage
V-ROAD-UPVD	Roadways: unpaved surface
V-RRAP	Riprap
V-RWAY	Right-of-way
V-RWAY-BRNG	Right-of-way: Bearings and distance labels (survey coordinates)
V-RWAY-CNTR	Right-of-way: center
V-RWAY-CTLA	Right-of-way: controlled access
V-RWAY-LMTA	Right-of-way: limited access
V-RWAY-MRKR	Right-of-way: marker
V-RWAY-STAN	Right-of-way: stationing
V-SECT	Section
V-SECT-BRNG	Section: Bearings and distance labels (survey coordinates)
V-SECT-CRNR	Section: corners
V-SECT-QTRS	Section: quarter section
V-SECT-SXTS	Section: sixteenth section
V-SECT-TSHP	Section: township or range
V-SOIL	Soils
V-SITE	Site features
V-SITE-EWAT	Site features: edge of water
V-SITE-FENC	Site features: fences
V-SITE-ROCK	Site features: large rocks and rock outcroppings
V-SITE-RTWL	Site features: retaining wall
V-SITE-SIGN	Site features: signage
V-SITE-VEGE	Site features: trees, shrubs, and other vegetation
V-SSWR	Sanitary sewer
V-SSWR-MHOL	Sanitary sewer: manhole
V-SSWR-PIPE	Sanitary sewer: piping
V-SSWR-STRC	Sanitary sewer: structures
V-SSWR-UGND	Sanitary sewer: underground
V-STEM	Steam system
V-STEM-INST	Steam system: instrumentation (meters, valves, pumps)
V-STEM-MHOL	Steam system: manhole
V-STEM-PIPE	Steam system: piping
V-STEM-STRC	Steam system: structures
V-STEM-UGND	Steam system: underground

V-STRM	Storm sewer
V-STRM-DTCH	Storm sewer: ditches or washes
V-STRM-HWAL	Storm sewer: headwall
V-STRM-MHOL	Storm sewer: manhole
V-STRM-PIPE	Storm sewer: piping
V-STRM-POND	Storm sewer: retention pond
V-STRM-STRC	Storm sewer: structures
V-STRM-UGND	Storm sewer: underground
V-SURV	Survey
V-SURV-DATA	Survey: data
V-SWLK	Sidewalks
V-SWLK-ASPH	Sidewalks: asphalt
V-SWLK-CONC	Sidewalks: concrete
V-TOPO	Topographic feature
V-TOPO-DEPR	Topographic feature: depression
V-TOPO-EWAT	Topographic feature: edge of water
V-TOPO-GRID	Topographic feature: grid
V-TOPO-MAJR	Topographic feature: major contours
V-TOPO-MINR	Topographic feature: minor contours
V-TOPO-SOUN	Topographic feature: soundings
V-TOPO-SPOT	Topographic feature: spot elevations
V-TRAL	Trails or paths
V-TRAL-ASPH	Trails or paths: asphalt
V-TRAL-CONC	Trails or paths: concrete
V-TRAL-GRVL	Trails or paths: gravel
V-TRAL-MRKG	Trails or paths: pavement markings
V-TRAL-SIGN	Trails or paths: signage
V-TRAL-UPVD	Trails or paths: unpaved surface
V-WALL	Walls
V-WALL-CTLJ	Walls: control joint
V-WALL-NSBR	Walls: noise barrier
V-WALL-RTWL	Walls: retaining wall
V-WALL-SHEA	Walls: structural bearing or shear walls
V-UNID	Unidentified site objects
V-UNID-CABL	Unidentified site objects: cable systems
V-UNID-PIPE	Unidentified site objects: piping
V-UNID-TANK	Unidentified site objects: storage tanks
V-UNID-UTIL	Unidentified site objects: utility lines
V-UNID-UTIL-OVHD	Unidentified site objects: utility lines: overhead
V-UNID-UTIL-UGND	Unidentified site objects: utility lines: underground
V-WATR	Water supply
V-WATR-INST	Water supply: instrumentation (meters, valves, pumps)

V-WATR-MHOL	Water supply: manhole
V-WATR-PIPE	Water supply: piping
V-WATR-STRC	Water supply: structures
V-WATR-UGND	Water supply: underground
V-WETL	Wetlands
W-BRKL	Break / fault lines
W-BRKL-BOTB	Break / fault lines: bottom of bank
W-BRKL-FLOW	Break / fault lines: flowline (lowest point of ditch)
W-BRKL-TOPB	Break / fault lines: top of bank
W-PNTS	Survey points
W-PNTS-ABUT	Survey points: abutment
W-PNTS-ACTL	Survey points: aerial horizontal and vertical control points
W-PNTS-BLDG	Survey points: building points
W-PNTS-BLIN	Survey points: baseline
W-PNTS-BRDG	Survey points: bridge survey points
W-PNTS-BRKL	Survey points: break line points
W-PNTS-BROW	Survey points: brush row points
W-PNTS-BRSH	Survey points: brush points
W-PNTS-CABL	Survey points: underground cable systems
W-PNTS-CURB	Survey points: curb
W-PNTS-DASP	Survey points: description attributes for survey points
W-PNTS-DECK	Survey points: deck
W-PNTS-DRIV	Survey points: driveway
W-PNTS-EASP	Survey points: elevation attributes for survey points
W-PNTS-EXPJ	Survey points: expansion joint
W-PNTS-GRND	Survey points: ground
W-PNTS-MHOL	Survey points: manhole
W-PNTS-MRKG	Survey points: pavement markings (yellow / white stripes)
W-PNTS-NGAS	Survey points: natural gas line
W-PNTS-PASP	Survey points: point number attributes for survey points
W-PNTS-PIPE	Survey points: piping (driveway / roadway culverts)
W-PNTS-POLE	Survey points: pole (power, telephone, etc.)
W-PNTS-PVMT	Survey points: pavement
W-PNTS-SIGN	Survey points: signage
W-PNTS-SPOT	Survey points: spot elevation points
W-PNTS-SSWR	Survey points: sanitary sewer
W-PNTS-STRM	Survey points: storm sewer
W-PNTS-SWLK	Survey points: sidewalks
W-PNTS-TREE	Survey points: tree
W-PNTS-TROW	Survey points: tree row
W-PNTS-WATR	Survey points: water supply
W-TINN	Triangulated irregular network

W-TINN-BNDY	Triangulated irregular network: boundary
W-TINN-FALT	Triangulated irregular network: fault / break lines
W-TINN-VIEW	Triangulated irregular network: triangulation view
W-TINN-VOID	Triangulated irregular network: void regions

EIM Table Name	Column Name	Data Type	Description	Required	ValidValue
LOCATION	LOCATION_ID	VARCHAR(30)	ID/Name assigned to the sampling location. Should be same as well ID if well has only one screen. If well has multiple screens, each different screened interval should be assigned its own unique Location ID.	**Y**	N
LOCATION	BARCODE_NO	VARCHAR(30)	Stores the barcode number that identifies a location, may not apply to all sites.	N	N
LOCATION	LOCATION_TYPE	VARCHAR(10)	Type of sampling location. Associated with list of valid values.	**Y**	**Y**
LOCATION	NORTHING	VARCHAR(16)	Northing or Y coordinate of a sampling location.	**Y**	N
LOCATION	EASTING	VARCHAR(16)	Easting or X coordinate of the sampling location.	**Y**	N
LOCATION	GROUND_ELEVATION	VARCHAR(8)	Ground elevation at the location.	N	N
LOCATION	LATITUDE_DECIMAL	FLOAT	Decimal latitude value reported to 6 decimal places.	**Y**	N
LOCATION	LONGITUDE_DECIMAL	FLOAT	Decimal longitude value reported to 6 decimal places. Value will be negative for sites west of the Prime Meridan.	**Y**	N
LOCATION	ESTABLISHING_COMPANY	VARCHAR(40)	Name of company that first sampled/established the sampling location. Associated with a list of valid values.	N	**Y**
LOCATION	ESTABLISHING_DATE	DATETIME	Date sampling location was established/first sampled.	N	N
LOCATION	SURVEY_DATE	DATETIME	Date location was surveyed.	**Y**	N
LOCATION	SURVEYED_BY	VARCHAR(30)	Nameof individual who surveyed the location.	**Y**	N
LOCATION	SURVEYING_COMPANY	VARCHAR(40)	Name of company who surveyed the location. Associated with a list of valid values.	**Y**	**Y**
LOCATION	LOCATION_DESC	VARCHAR(200)	Description of the sampling location.	N	N
LOCATION	LOCATION_COMMENTS	VARCHAR(2000)	Additional Comments entered in the LOCATION table.	N	N
LOCATION	CUSTOM_LOCATION_1	VARCHAR(50)	Custom Field 1 in LOCATION table	N	N
LOCATION	CUSTOM_LOCATION_2	VARCHAR(50)	Custom Field 2 in LOCATION table, can be used to store additional attribute information about the location.	N	N
LOCATION	CUSTOM_LOCATION_3	VARCHAR(50)	Custom Field 3 in LOCATION table, can be used to store additional attribute information about the location.	N	N
LOCATION	LOCATION_STATUS	VARCHAR(20)	Status of the location, ie. Active or Abandoned. Associated with list of valid values.	N	**Y**
LOCATION_METADATA	COORDINATE_SYSTEM	VARCHAR(100)	Description of the sampling location coordinate system. Associated with a list of valid values.	**Y**	**Y**
LOCATION_METADATA	DATUM_DESCRIPTION	VARCHAR(100)	Description of the datum, such as top of well casing.	**Y**	N
LOCATION_METADATA	DATUM_METHOD_CODE	VARCHAR(10)	Method used to determine the datum elevation. Associated with a list of valid values.	**Y**	**Y**
LOCATION_METADATA	ELEVATION_ACCURACY	VARCHAR(20)	Accuracy range (+/-) of the elevation measurements.	**Y**	N
LOCATION_METADATA	ELEVATION_DATUM_CODE	VARCHAR(10)	Reference datum for the elevation measurements. Associated with a list of valid values.	**Y**	**Y**
LOCATION_METADATA	ELEVATION_METHOD_CODE	VARCHAR(10)	Method used to determine the ground and/or reference elevations of the sampling location. Associated with a list of valid values.	**Y**	**Y**
LOCATION_METADATA	ELEVATION_UNITS	VARCHAR(10)	Units of measurement of the elevation accuracy value. Associated with a list of valid values.	**Y**	**Y**
LOCATION_METADATA	LOCATION_ACCURACY	VARCHAR(20)	Accuracy range (+/-) of the easting and northing values.	**Y**	N
LOCATION_METADATA	LOCATION_DATUM_CODE	VARCHAR(10)	Reference datum of the northing and easting values. Associated with a list of valid values.	**Y**	**Y**
LOCATION_METADATA	LOCATION_DATUM_EPOCH	VARCHAR(20)	Time stamp or moment in time used as a reference for the origin of a moving location.	N	N
LOCATION_METADATA	LOCATION_METHOD_CODE	VARCHAR(10)	Method used to determine the easting and northing values. Associated with a list of valid values.	**Y**	**Y**
LOCATION_METADATA	LOCATION_UNITS	VARCHAR(10)	Units of the horizontal accuracy value. Associated with a list of valid values.	**Y**	**Y**

EIM Table Name	Column Name	Data Type	Description	Required	ValidValue
LOCATION_METADATA	LOCATION_METADATA_COMMENTS	VARCHAR(255)	Comments associated with an entry in the LOCATION_METADATA table.	N	N
LOCATION_METADATA	REFERENCE_POINT	VARCHAR(50)	Describes the place at which geologic coordinates were established.	**Y**	N
LOCATION_METADATA	SOURCE_SCALE_CODE	VARCHAR(10)	For locations that are digitized from a map or estimated from another source, Scale of the map or other source used to determine the easting and northing. Associated with a list of valid values.	N	**Y**
LOCATION_METADATA	STEP_OR_LINEAR	VARCHAR(1)	Flag used only for re-surveys of well elevations. If a section of the well casing was removed or added then the code for Step is used as the value. If nothing was added or removed from the last survey, then the code for Linear is used. Associated with a list of valid values.	N	**Y**
LOCATION_METADATA	WITHIN_FACILITY_FLAG	VARCHAR(1)	Flag (Y/N) used to indicates whether this sampling location is within facility boundaries. Associated with a list of valid values.	**Y**	**Y**
LOCATION_REFERENCE_ELEVATION	REFERENCE_ELEVATION	VARCHAR(8)	Reference/measuring point elevation of well or other location. Only required for well location types RW and MW.	C	N
LOCATION_REFERENCE_ELEVATION	REFERENCE_ELEVATION_DESC	VARCHAR(100)	Description of reference/measuring point elevation. A typical entry here is TOC (short for Top Of Casing).	C	N
LOCATION_REFERENCE_ELEVATION	REFERENCE_ELEVATION_FOR_CODE	VARCHAR(1)	Coded value identifying the type of measurement taken from a given reference elevation. Associated with list of valid values.	C	**Y**
LOCATION_REFERENCE_ELEVATION	REFERENCE_ELEVATION_SURVEY_DATE	DATETIME	Date reference elevation was surveyed.	C	N
LOCATION_REFERENCE_ELEVATION	REFERENCE_ELEVATION_SURVEYED_BY	VARCHAR(30)	Name of individual who surveyed the reference elevation.	C	N
LOCATION_REFERENCE_ELEVATION	REFERENCE_ELEVATION_SURVEYING_COMPANY	VARCHAR(40)	Name of company who surveyed the reference elevation. Associated with a list of valid values.	C	**Y**

Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-13
RES-CP-DC-2
Meeting Minutes Preparation Procedure
(NOT APPLICABLE)

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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-14
OM&M Manual Preparation
RACI CHART
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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-15
RES-CP-WPC-05
Receipt Inspection / Materials Management

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1.0 APPLICABILITY

1.1 This procedure applies to all RES projects involving Remedial Action or Remedial Construction activities which have a spend >$200,000 in a calendar year. The procedure may be applied to smaller projects as deemed appropriate by the Honeywell Design and Construction Manager.

1.2 It is the responsibility of the Construction Manager and Contractor to implement this procedure.

1.3 It is the responsibility of the Construction Manager, Contractor, and Engineer to comply with this procedure.

1.4 This procedure is applicable to all Corporate RES sites as described in Section 1.1. It establishes minimum requirements that must be met by all project sites.

1.5 In addition to complying with this procedure, RES sites must comply with all applicable national, state, and local regulations.

1.6 RES sites or project teams must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate site's procedure.

1.7 Whenever a Honeywell RES Procedure is more stringent than the applicable national, state, and local regulations, the Honeywell RES Procedure shall apply.

2.0 OVERVIEW

2.1 This procedure establishes the requirements for the completion of receipt inspections for general goods. This procedure applies to Quality Assurance, Environmental Health and Safety, Engineering and Construction Management personnel when performing Receiving Inspection, at RES Construction Sites, of quality-affecting material received from suppliers and vendors.

3.0 DEFINITIONS

3.1 See Section 8.0 for definition of underlined terms.

3.2 See RES-ADMIN-02 for additional RES program definitions and acronyms.

4.0 REQUIREMENTS

4.1 Authorities / Responsibilities

4.1.1 *Honeywell Design and Construction Manager (or designee)* – Reviews all material petitions for non-conforming material submittals by the Contractor, receives copies of all Receiving Inspection Reports (RIR).

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4.1.2 *Honeywell Remediation Manager* – Directs overall site remediation strategy for the site. Receives copies of the RIR's.

4.1.3 *Project Engineer* – Responsible for compliance with all design plans and specifications. Responsible for technical inspection of received goods.

4.1.4 *Construction Manager* – Responsible for implementation and adherence to the receiving inspection procedure. It is the responsibility of the Construction Manager to request a technical inspection when required. The Construction Manager reviews the RIR for completeness and accuracy. The Construction Manager will initiate the RIR for material received that was purchased by Honeywell.

4.1.5 *Contractor* – Individual or group contracted to perform construction services. Initiates receipt inspection in the form of a RIR. For projects executed under the Environmental Remediation, Construction, and Procurement contract, references to Contractor shall apply to the Alliance Partner subcontractors.

4.1.6 *QA/QC Engineer* – Inspects materials for compliance with specification and signs as technical inspector.

4.1.7 *Site Administrative Assistant (when applicable)* – Representative responsible for distributing and filing RIRs.

4.2 It is the responsibility of the Contractor to initiate the receipt inspection. It is the responsibility of the Construction Manager or his designee to review the RIR for completeness and accuracy. It is the responsibility of the Project Engineer to inspect materials for compliance with the specification prior to use of the material.

4.3 General

4.3.1 Quality-affecting material received will undergo receipt inspection.

4.3.2 The receiving inspection function is initiated after material is received and extends to the point that the material is made available for use.

4.4 Receiving Documents

4.4.1 The Contractor and Construction Manager will have the following documents if applicable to complete the receiving inspection:

- Receiving copy of the PO
- Material certifications (if required)
- Drawing of the ordered item (if required)
- Packing list

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- Certificate of Conformance (COC)
- Applicable technical specifications or requirements

4.5 Attachment 6.1 presents the acceptable process to be followed for the inspection and documentation of the receipt and inspection of materials received at the project site.

4.6 Receiving Inspection

4.6.1 General Goods are received at the construction entrance.

4.6.2 It is the responsibility of the Contractor to initiate the RIR for Contractor-purchased materials.

4.6.3 It is the responsibility of the Construction Manager to initiate the RIR for materials purchased by the Alliance Partner or Honeywell.

4.6.4 Material will be inspected by the Contractor or Construction Manager (or designee) for all requirements of the PO, drawings, specifications, and other characteristics, as required.

4.6.5 When deemed necessary, the Contractor or Construction Manager will verify purchased product at a supplier's premises. This requirement will be identified in the supplier's PO with specific verification arrangements and the method of product release.

4.6.6 Materials requiring an RIR will be verified for the following:

- PO Number
- Part number (if required)
- Certification to be original or exact photo copies on the testing company's letterhead
- Lot number or other traceable identification number (reports will be traceable to the material)
- Signature of authorized company representative, typed/printed name, title, date
- Mechanical properties which must represent the final state of the material
  - Foreign certifications must be translated / converted into English / Current U.S. units of measure.
  - Material certification data will be quantitative and meet the requirements of the specification.

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- Reports will specify material specifications, revisions/amendment, class, condition, grade, etc. of the material as tested.

4.6.7 Depending on who purchased the material, the Contractor or Construction Manager will complete and sign the RIR. Attachment No. 6.2 is an example of a Receipt Inspection Report.

4.6.8 The Contractor will submit the completed RIR to the Construction Manager for review.

4.6.9 The Construction Manager (or designee) will verify the RIR for completeness and accuracy and initial for acceptance. The Construction Manager and Project Engineer will jointly decide if a technical inspection is necessary. If a technical inspection is required, the RIR will be sent to the Project Engineer.

4.6.10 A technical inspection will be completed by the Project Engineer prior to the use of materials. The Project Engineer will sign the RIR for acceptance of the material.

4.6.11 If the RIR is not acceptable to the Construction Manager or Project Engineer, the RIR will be returned to the Contractor for reissue.

4.7 Acceptance and Rejection

4.7.1 Acceptable material is made available to the Contractor for storage or staging, as applicable.

4.7.2 Where any requirement of the PO is not met, it will be tagged as non-conforming.

4.7.3 Inspected material that is non-conforming is identified as non-conforming by labeling or tagging, and is marked as “Hold,” “Rework,” or “Reject / Return to Vendor,” as appropriate.

4.7.4 Material that is non-conforming will be returned to the vendor or the Contractor must petition the Engineer in writing to use the material as is. Material that is non-conforming must be accepted by the Engineer in writing prior to its use.

4.7.5 When the verification review is complete, and the material has been inspected and accepted, the Construction Manager will initial and date the RIR to signify review and acceptance.

4.7.6 RIR Records will be maintained at the Construction Site and forwarded to the Honeywell Design and Construction Manager at the end of the job.

5.0 REFERENCE DOCUMENTS

5.1 RES-ADMIN-02 - Definitions and Acronyms Summary

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6.0 ATTACHMENTS

6.1 Flowchart

6.2 Receipt Inspection Report

7.0 REVISION LOG

Revision Number	Section Number	Revised By	Revision Date	Description of Change
1	All	S. Pearson	05/20/2010	Revised to fit new RES template. Updated personnel titles to match RES standard titles. Deleted definitions already found in RES-ADMIN-02
0	All	D. Ambrose	5/19/2008	Initial Issue

8.0 DEFINITIONS

None	

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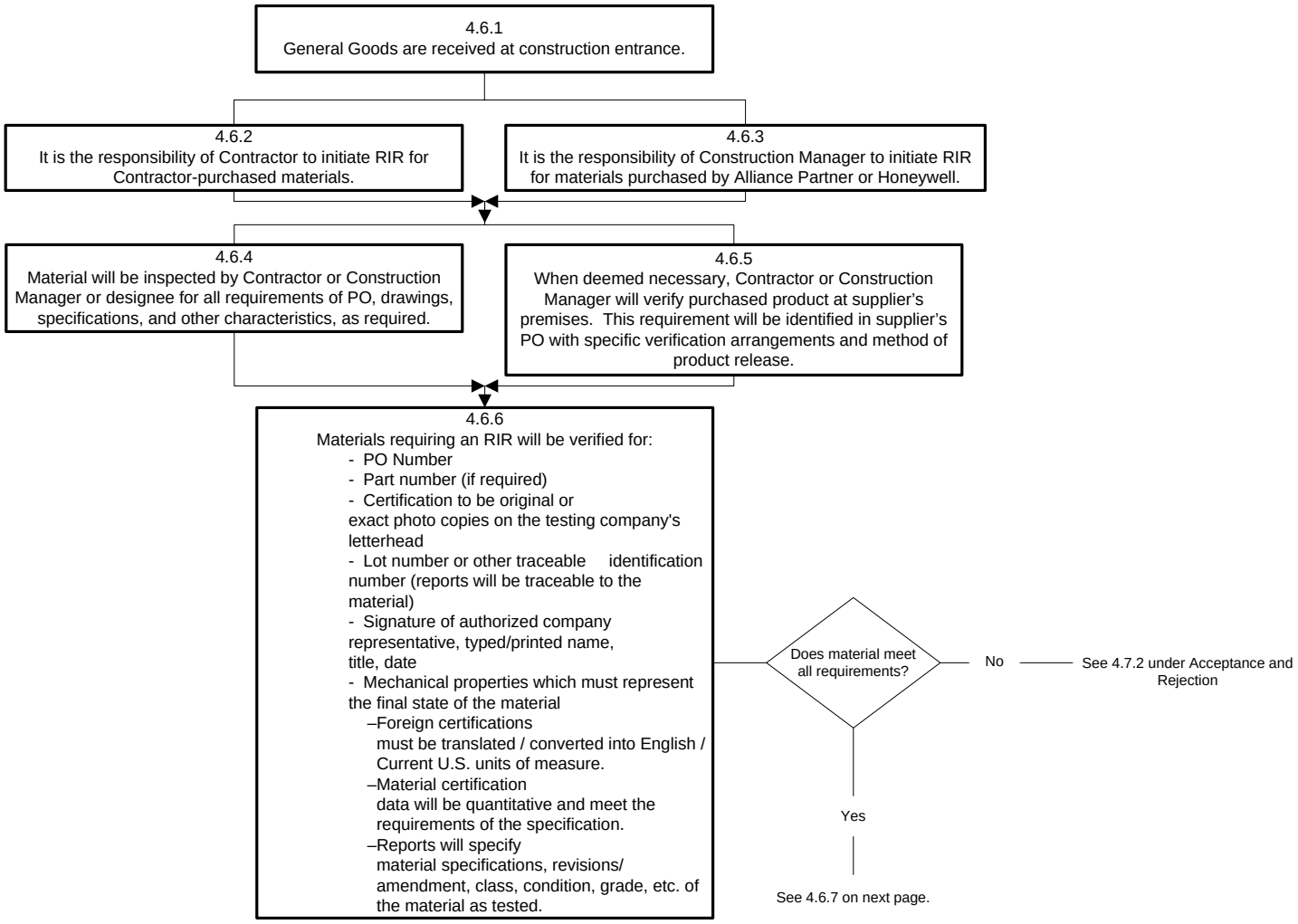
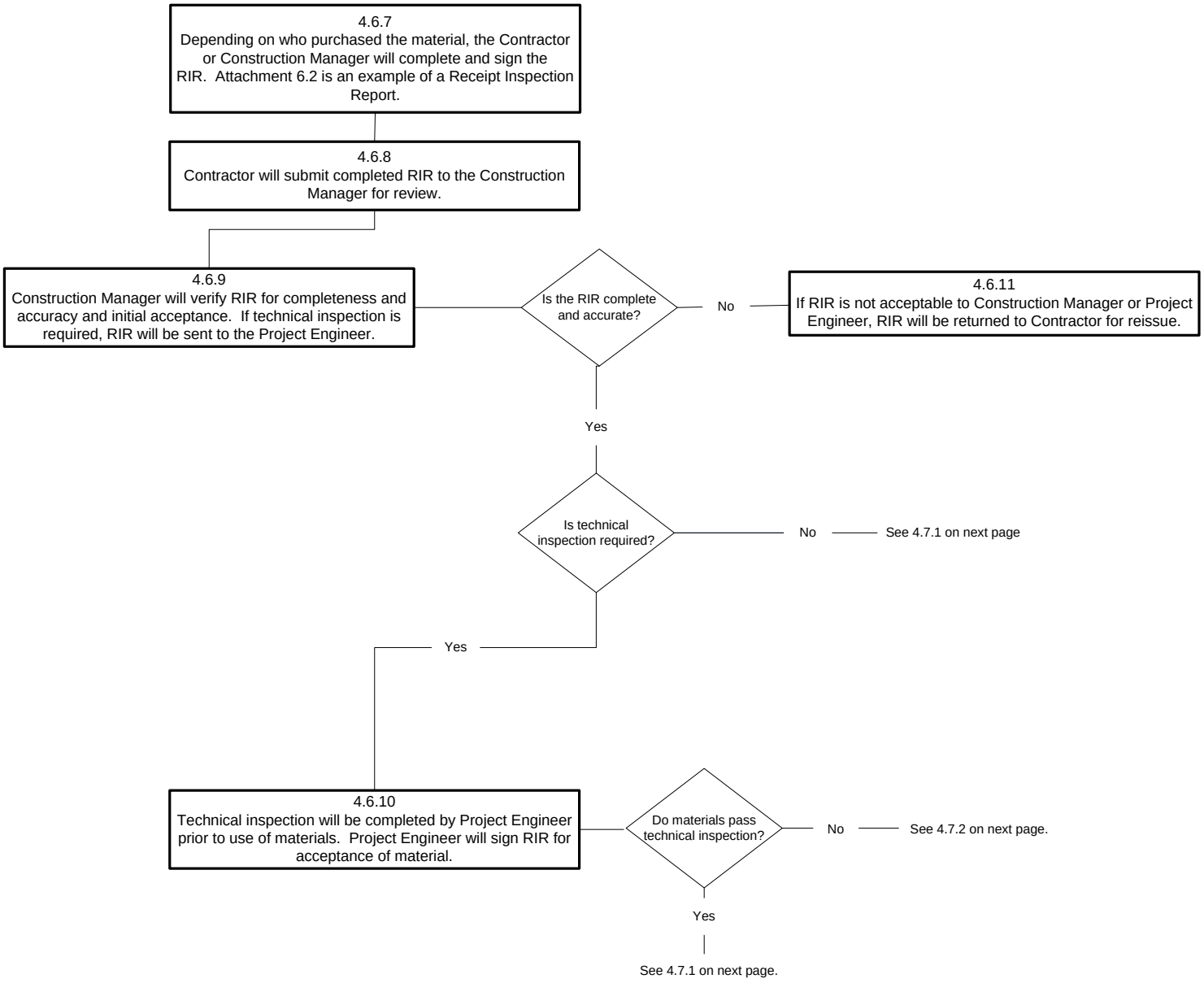
4.6 Receiving Inspection



4.6 Receiving Inspection (continued)



4.7 Acceptance and Rejection

4.7.1
Acceptable material is made available to Contractor for storage or staging, as applicable.

4.7.2
Where any requirement of PO is not met, it will be tagged as non-conforming.

4.7.3
Inspected material that is non-conforming is identified as non-conforming by labeling or tagging, and is marked as "Hold," "Rework," or "Reject / Return to Vendor," as appropriate.

4.7.4
Material that is non-conforming will be returned to vendor or Contractor must petition Engineer in writing to use material as is. Material that is non-conforming must be accepted by Engineer in writing prior to its use.

4.7.5
When the verification review is complete, and the material has been inspected and accepted, the Construction Manager will initial and date the RIR to signify review and acceptance.

4.7.6
RIR Records will be maintained at the Construction Site and forwarded to the Design and Construction Manager at the end of the job.

Honeywell RES

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Receiving Inspection Report

Location:									Contract Number:
Received From:									Receiving Report Number:
Address:									Date:
QC Inspection by:		QC Date:		Inv. Or Packing Slip No.:		Inv. Or Packing Slip Date:			PO Number:
Boxes	Barrels	Bags	Crates	Bundles	Drums	Kegs	Reels	Total Packages	Received By:
									Received At:

Line	Quantity	Unit	Description	Over	Short
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Shipped Via:		Car #	Payment:	Show O.S.&D. Report No. in the space provided if over, short or damaged noted above.	O.S.&D. Report No.:
Waybill No.:	Freight Bill (Pro) No.:	Weight:	Amount:		

For Receiving Clerk Use Only:		
Itemized by: Date:	Entered by: Date:	Finalized by: Date:

Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-16
Nonconforming Conditions Report

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NONCONFORMING CONDITIONS REPORT

Project Name:
Project Location:
Project Number:
Contractor (*Subcontractor*):
Rev. / Date:

No.	Condition Description	Date Reported (1)	Recommendation	Action By	Due Date	Comments/Status
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

(1) Insert date that Contractor (Subcontractor) reports the nonconfroming conditon to the Honeywell Constrction Representative (Construction Manager).

NONCONFORMING CONDITIONS REPORT

Project Name:
Project Location:
Project Number:
Contractor (*Subcontractor*):
Rev. / Date:

No.	Condition Description	Date Reported (1)	Recommendation	Action By	Due Date	Comments/Status
1	Contract Drawing C-2 elevations at headwall are higher than actual surveyed elevations.	11/18/09	Initiate RFI to evaluate elevation impact on headwall design / concrete quantity.	Contractor	[illegible]/09	11/20/09 - RFI issued. 11/24/09 - AP issued DCB 11/27/09 - DCB completed w/ no change in contract price. 11/30/09 - Nonconforming Condition Closed out at Progress Meeting
2	Catchbasin delivered on 12/1/09 is possibly cored at wrong invert elevations.	12/02/09	Recheck delivered [illegible]ens[illegible]s with shop drawi[illegible] con[illegible] vend[illegible] for ne[illegible] delivery, if required.	[illegible]actor	12/04/09	12/7/10 - Vendor contacted. Waiting for reply.
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

(1) Insert date that Contractor (Subcontractor) reports the nonconfroming conditon to the Honeywell Constrction Representative (Construction Manager).

Example

Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-17
RES-CP-WPC-07
Cost Estimating Development
(NOT APPLICABLE)

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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-18
RES-CP-WPC-12
Waste Management

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1.0 APPLICABILITY

1.1 This procedure applies to the management of all hazardous and non-hazardous waste from Remediation and Evaluation Services (RES) construction and/or operation and maintenance (O&M) sites.

1.2 This procedure is applicable to all Corporate RES sites. It establishes minimum requirements that must be met by all project sites.

1.3 In addition to complying with this procedure, RES sites must comply with all applicable national, state, and local regulations.

1.4 RES sites or project teams must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate site's procedure.

1.5 Whenever a Honeywell RES Procedure is more stringent than the applicable national, state, and local regulations, the Honeywell RES Procedure shall apply.

2.0 OVERVIEW

2.1 This standard provides minimum program requirements for the management of hazardous and/or defined non-hazardous wastes.

2.2 Conformance to this standard will help minimize risk and liability through control of waste management and disposal processes. This standard provides the minimum framework that Honeywell shall use for the safe handling of both hazardous and non-hazardous wastes.

2.3 All Honeywell RES sites worldwide are expected to actively manage their waste streams as an integral part of the overall Health, Safety and Environment (HSE) effort.

2.4 Each Honeywell RES site, after carefully and systematically evaluating each waste stream, shall make decisions that are in the best interests of the local Honeywell site and/or project, the surrounding communities and Honeywell. This approach requires the identification of all waste streams and their related possible treatment methods. It promotes the effort that sites will choose disposal methods and ultimate waste management facilities based on an informed decision and process, not merely cost/benefit analysis. It provides Honeywell with an approval process by which all waste generated by Honeywell will be ultimately disposed of at a Honeywell-approved waste management facility.

3.0 DEFINITIONS

3.1 See Section 8.0 for definition of underlined terms.

3.2 See RES-ADMIN-02 for additional RES program definitions and acronyms.

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4.0 REQUIREMENTS

4.1 Authorities / Responsibilities

4.1.1 *Design and Construction Manager and/or Remediation Manager* – Responsible/Accountable for:

4.1.1.1 Ensuring that all waste streams are managed appropriately, including correct identification, classification, storage, treatment and disposal;

4.1.1.2 Assigning who will be contracted for waste characterization and transportation of hazardous wastes (See Section 4.4.2.5 regarding signing of manifests);

4.1.1.3 Contracting the disposal of all hazardous wastes requiring off-site disposal directly with the disposal facility; and

4.1.1.4 Verifying all disposal facilities selected by the Contractor are approved in advance and in writing.

4.1.2 *Supply Manager* – Responsible for contracting for the disposal of all hazardous wastes requiring off-site treatment/disposal directly with the Treatment, Storage, and Disposal Facility and may also contract directly for non-hazardous waste.

4.1.3 *Construction Manager* or *Alliance Partner Operation, Maintenance, and Monitoring (OM&M) Site Manager (in consult with the Remediation Manager)* – Responsible/Accountable for:

4.1.3.1 Identifying and classifying all waste streams through generator knowledge, site history, analysis or other recognizable standards (including but not limited to the “derived from” and “contained in” rules), and for overseeing that the waste identification and classification made by the Contractor or Subcontractor is in accordance with the remedial design and contract documents.

4.1.3.2 Overseeing that hazardous and non-hazardous waste streams are properly stored, transported and documented by the Contractor or Subcontractor according to Honeywell procedures and/or national, state/provincial or local requirements, whichever is stricter. Reports any noted deficiencies to the Construction Project Manager, or other designated representative for the Contractor / Subcontractor, for implementing corrections.

4.1.4 *Construction Project Manager. OM&M Contractor Project Manager,* or other authorized representative for the Contractor or Subcontractor – Responsible for the field activities involving properly documenting, handling, storing and transporting wastes produced from site activities in accordance with national, state/provincial or local requirements and Honeywell procedures including Specification Section 01100,

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Remediation Construction Requirements and other contract-specific technical specifications.

4.1.5 *RES Waste Approval Team (WAT) Representative* – Responsible for the following:

4.1.5.1 Maintaining communications between the RES project teams, Corporate Health, Safety, Environment, and Remediation (HSER) and the Waste Approval Team (WAT) on new or changing Honeywell internal waste approval process requirements;

4.1.5.2 Maintaining communications between the RES project teams, Corporate HSER and the WAT on new external requirements;

4.1.5.3 Providing other assistance as needed to ensure RES sites use only Honeywell approved waste management facilities.

4.2 Waste Inventory and Characterization

4.2.1 A waste inventory shall be maintained that identifies each hazardous waste and non-hazardous waste, its origin(s), the regulatory/hazard classification and a determination of chemical and physical characteristics and composition.

4.2.2 Characterization of each waste on the waste inventory must be completed by generator knowledge or laboratory analysis as follows:

4.2.2.1 Where generator knowledge is sufficient to properly classify a waste and the waste is clearly either hazardous or non-hazardous, this may be used in place of analysis, but must be documented.

4.2.2.2 Where a generated waste has the potential to be hazardous, it shall either be classified hazardous based on generator knowledge in accordance with the paragraph above or shall be analyzed to confirm it is non-hazardous.

4.2.2.3 Where laboratory analysis of waste is required by law, the location shall conduct such laboratory analysis.

4.2.2.4 Where there are applicable government-mandated waste classifications, these may be used as an equivalent record of chemical analysis. Retesting is also called for any time that the characterization or classification of a waste stream may have changed.

4.2.3 Each RES site shall maintain a record of chemical analysis of their waste streams in accordance with Paragraph 4.2.2 above.

4.2.3.1 All characterizations of each hazardous and non-hazardous waste on the waste inventory must be re-done, at a minimum, every five years (e.g., long-term OM&M sites), and the RES site shall maintain records of such re-characterizations. This

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requirement applies to characterizations based on generator knowledge as well as characterizations based on laboratory analysis.

4.2.3.2 Waste characterizations must also be re-done and documented any time that the characterization or classification of a waste stream may have changed, for instance as a result of site condition, raw material, process, or operational changes.

4.2.3.3 Each RES site shall audit the waste inventory and characterization records on an annual basis to ensure that they are complete, and that re-characterizations have been performed in accordance with this standard. This annual audit shall be documented and may be done more frequently if necessary, to account for changes due to new or altered activities.

4.3 On-site Waste Management Practices

4.3.1 Contractor (or Subcontractor) shall manage all handling, segregation, construction water, stabilization, containerizing, storage and loading for transportation of all waste materials resulting from the performance of the Work.

4.3.2 All waste storage, staging and loading areas shall be in a location determined by Honeywell, the Construction Manager, the Alliance Partner OM&M Site Manager, and/or any regulatory agency having jurisdiction for the project.

4.3.3 Hazardous wastes shall be managed in accordance with Resource Conservation and Recovery Act (RCRA) or Toxic Substance Control Act (TSCA) regulations.

4.3.4 Refer to Section 4.8 for record keeping requirements.

4.3.5 Waste Handling

4.3.5.1 Silt and Sediments: Silt and sediments from erosion control devices shall be handled similarly to excavated materials.

4.3.5.2 Construction Water: Construction Water shall be collected and drummed, loaded into tankers, temporarily stored for reuse and/or treated through a wastewater treatment facility (as applicable) for disposal in a safe and environmentally responsible manner. Construction water includes groundwater, wastewater, rinsates, dewatering effluents, decontamination fluids and other uncontaminated non-hazardous aqueous liquid.

4.3.6 Waste Segregation

4.3.6.1 Rubbish, construction debris, hazardous wastes and non-hazardous wastes shall be segregated based on generator knowledge.

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4.3.6.2 Non-hazardous wastes (contaminated or uncontaminated) shall be further segregated in a similar manner.

4.3.6.3 Wastes of unknown classification shall be kept separate from other wastes and managed as if they were hazardous until a waste determination has been made.

4.3.6.4 If wastes cannot be classified based solely on generator knowledge, the Contractor or Subcontractor shall collect waste samples as directed by Honeywell, the Construction Manager, or the Alliance Partner OM&M Site Manager.

4.3.7 Waste Storage

4.3.7.1 Each location, where necessary, shall have clearly designated waste accumulation area(s), near the point of waste generation for small volumes of wastes, and as few as possible waste storage area(s), to which wastes from accumulation areas are moved promptly. Wastes, non-wastes and incompatible materials shall be segregated.

4.3.7.2 Wastes shall be accumulated and stored in containers or tanks, unless other means of containment are allowed by law or not prohibited by law and/or provide equivalent means of injury and pollution prevention.

4.3.7.3 Soil storage areas shall be covered and secured, or an alternate means for runon and runoff protection provided when not in active use. Staging piles for hazardous remediation waste must meet requirements in 40 CFR 264.554 and the state and local equivalent regulations.

4.3.7.4 Drummed hazardous waste shall be stored in accordance with applicable RCRA regulations for drum management.

4.3.7.5 Containers for non-hazardous wastes shall be "sealed" non-leaking dumpsters, or equivalent, maintained to prevent leakage.

4.3.7.6 Waste accumulation and storage areas shall be inspected weekly and documentation maintained.

4.3.7.7 Any material that spills out of containers shall be immediately cleaned and placed back into the waste containers.

4.3.7.8 An accurate inventory and record of wastes in waste storage areas shall be maintained. At RES sites, Contractor shall submit itemized estimated volumes for Hazardous and TSCA Wastes to be generated by proposed operations (e.g., decontamination waste, used PPE, emergency response waste).

4.3.7.9 Public access to waste storage areas shall be prevented.

4.3.7.10 Wastes shall be labeled in accordance with applicable regulations.

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4.3.7.11 Waste storage shall not exceed applicable limits.

4.3.7.12 Visually inspect all containers of wastes for leaks or damage prior to being loaded for transportation and off-site disposal. Transfer contents of leaking or damaged container to another container or overpacks, and re-inspect prior to loading. Clean up, containerize and label spilled materials for disposal in accordance with the Contract Documents and applicable regulations.

4.3.7.13 Hazardous wastes are not to be stored for longer than 90 days without prior authorization from Honeywell.

4.3.7.14 Construction debris and and/or uncontaminated non-hazardous waste shall be stored within appropriate containers (metal dumpsters with secure lids or covered roll off containers). Dumpsters should be emptied every two weeks, when full, or at the discretion of the Site Superintendent. There shall be no liquid allowed in the containers.

4.4 Off-site Waste Management Practices

4.4.1 Honeywell shall agree to the selection of disposal facilities in advance, in writing.

4.4.2 Hazardous & TSCA Waste

4.4.2.1 Hazardous waste shall be treated and/or disposed only at Honeywell-approved waste management facilities. Approval shall include identification of the ultimate destination of treatment residuals. The Honeywell Design and Construction Manager will provide the current list of approved facilities at the time bids are solicited for disposal. Off-site deep well injection of hazardous waste is prohibited.

4.4.2.2 Honeywell (or the AP, when agreed to by the Honeywell Remediation Team) will contract the disposal of all hazardous requiring off-site disposal directly with the disposal facility. Honeywell, with input from the AP, will decide who will be contracted for waste characterization and transportation.

4.4.2.3 Disposal and transportation responsibilities shall be defined in the Scope of Work.

4.4.2.4 Allow at least seven working days for Honeywell to review and agree to the characterization and manifest documentation prior to scheduling transportation.

4.4.2.5 A Honeywell Representative will sign all waste profile sheets for waste characterization and manifest(s) for off-site waste disposal of all regulated site generated waste, unless a Delegation of Authority document (Attachment 6.4) is in place allowing a Contractor or Subcontractor to sign on behalf of and agent for Honeywell.

4.4.2.6 The shipper who has contracted the transporter shall verify that the transporter has the appropriate permit and placards before releasing each load of waste for

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disposal. In the instance that Honeywell is the shipper, Honeywell's designated representative will perform this verification.

4.4.2.7 Universal wastes shall be managed as hazardous waste unless otherwise directed by national, state or local regulations.

4.4.3 Non-Hazardous Wastes

4.4.3.1 Dispose of non-hazardous wastes at permitted off-site facility, as required, using a permitted waste transporter.

4.4.3.2 A non-hazardous waste shipping paper or Bill of Lading, signed by Honeywell or designated representative (see Section 4.4.2.5), shall accompany each waste shipment. The original paperwork, stamped received and signed by the disposal facility, shall subsequently be returned to Honeywell. Honeywell reserves the right to contract directly with the disposal facility, under a Transportation, Disposal and Recycling (TDR) Agreement or have the Contractor / Subcontractor sign a TDR Agreement and perform on behalf of Honeywell.

4.4.3.3 Copies of all waste disposal paperwork shall be submitted to Honeywell.

4.4.3.4 The permit status of facilities (other than Honeywell-approved facilities) used for non-hazardous waste management shall be reviewed annually by the RES Project Team to confirm validity and ongoing capability to manage Honeywell waste. These reviews of non-hazardous waste facilities (except facilities for office trash, food waste and uncontaminated debris) shall be completed using the Table Top Audit Tool (Attachment 6.2). A site inspection is also recommended. The project team should review the Audit Tool results and determine the site acceptability.

4.4.4 Dispose of waste oils and petroleum products generated during RES site work in a safe and environmentally responsible manner.

4.5 Reporting

4.5.1 Each location shall report to Honeywell on a quarterly basis the tons of hazardous waste (including TSCA waste) shipped from the site for disposal (see Attachment 6.3).

4.6 Training

4.6.1 The Construction Manager shall assure that appropriate personnel receive adequate training with respect to international, federal, state and local regulations, as applicable, so they are competent to perform the waste-related duties assigned to them.

4.6.2 Each location shall provide documented annual training for employees involved with hazardous wastes. This training may be scaled to the specific level of waste activity: generation, handling (on-site waste transfer and consolidation) or management; and shall address hazards, precautions and on-site/off-site management requirements, as

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appropriate. Elementary training for waste generators on hazards and precautions may be incorporated into existing job hazard instruction programs. Dangerous goods shipping training is required for those signing shipping papers, preparing containers for transport, and loading and unloading hazardous materials. Training should be consistent with the relevant RCRA and DOT regulations.

4.7 Communication

4.7.1 RES and RES sites are responsible for communicating waste management non-conformances or non-compliances to Corporate HSER and applicable regulatory authorities consistent with Honeywell HSER Reporting system.

4.8 Records

4.8.1 Each location shall maintain records of the disposition of its wastes. Waste manifests, or other such means as prescribed by applicable law, are the primary method by which documentation is to be maintained. RES site records shall be maintained indefinitely until otherwise authorized for removal in accordance with Honeywell record retention policy and federal, state and local regulations. In all cases, the stricter requirement is to apply.

4.8.2 Waste management records may include but are not limited to: waste profiles, waste inventory and characterizations, waste analysis, waste manifests, bills of lading, weight slips, purchase orders, contracts/agreements, inspection records, training records, audit records, incident reports, management reviews, emergency response, etc.

4.8.3 If a government agency mandates the use of certain waste treatment / disposal facilities, documentation of that requirement is to be maintained at the RES location and RES project file. For example, in the U.S., waste generated and transferred off-site as a result of remediation activities subject to CERCLA, must be sent to a facility that is found acceptable to EPA under the Off-Site Rule.

4.8.4 RES and RES sites shall establish and maintain processes to ensure:

4.8.4.1 The identification, collection, indexing, access, filing, storage, maintenance and disposition of waste management records (as appropriate and in compliance with national, state, and local regulations).

4.8.4.2 That waste management records are maintained to demonstrate compliance with Corporate HSER and applicable regulatory requirements and conformance with Honeywell HSE management system requirements.

4.8.4.3 That waste management records are legible, identifiable, and traceable to an activity, product or service.

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4.8.4.4 That waste management records are stored in a suitable environment that prevents damage, deterioration and/or loss, and are readily retrievable.

4.8.4.5 That waste management records are retained in accordance with established and recorded retention times.

4.8.5 Waste management record identification, disposition, responsibilities and retention times are identified in Honeywell Corporate Policy 105 - Retention Guidelines, as well as HSEMS 210 – HSE Document and Records Management.

4.9 Audit and Program Review

4.9.1 Each site shall perform a documented annual evaluation of the entire Waste Management System.

4.9.2 The annual evaluation shall include a thorough review of the following:

4.9.2.1 The implementation of the RES Waste Management Standard to determine conformance.

4.9.2.2 Regulatory required waste shipment manifests/records/logs, information of all waste management facilities that have been used over the course of last year, and WAT records/approvals for all waste management facilities.

4.9.2.3 All documentation giving evidence that specific waste management facilities are required to be used by governmental mandate.

4.9.2.4 Hazardous waste operator knowledge and competency.

4.9.2.5 Training records to determine if all required training was appropriately conducted and attended by the site/project personnel.

4.9.2.6 The availability of all the records required to be maintained by this standard.

4.9.3 The results of the evaluation shall be communicated to the RES Project Team (see Section 4.1 Authorities/Responsibilities). Any major non-conformances shall be entered into the Event Reporting System as a Tier 2 event. All corrective actions that are necessary to improve the process shall be documented and completed.

4.9.4 All records shall be maintained per Honeywell Records Retention Policy and/or applicable legal requirements. In all cases the stricter requirement is to apply.

5.0 REFERENCES

5.1 Honeywell Corporate Policy 105 – Retention Guidelines

5.2 HSEMS 210 – HSE Document and Records Management

5.3 HSEMS 521 – Medical Waste Management Standard

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5.4 RES-ADMIN-02 – Definitions and Acronyms Summary

5.5 Specification Section 01100, Remediation Construction Requirements

6.0 ATTACHMENTS

6.1 Waste Management Facility Approval Process Map

6.2 Non-hazardous Waste Disposal Site Audit Tool [CONFIDENTIAL - FOR HONEYWELL INTERNAL USE ONLY. Do not attach when RES-CP-WCP-12 is appended to Section 01100 Remediation Construction Requirements or other Bidding Documents.]

6.3 Quarterly RES Hazardous Waste Report

6.4 Delegation of Authority Template

7.0 REVISION LOG

Revision Number	Section Number	Revised By	Revision Date	Description of Change
0	All	S. Visnic	3/25/2011	Initial Issue.

8.0 DEFINITIONS

Hazardous Waste	Waste defined as hazardous, toxic, dangerous, or as a hazardous contaminant or pollutant by a government entity or by any environmental law or regulation having the purpose of protection of human health or the environment (e.g., Resource Conservation and Recovery Act wastes). Included in this definition are specific chemical wastes governed under the Toxic Substances Control Act (TSCA) including polychlorinated biphenyls (PCBs). Some international government entities or environmental laws may replace this term with other terms such as “special” or “dangerous” to designate such waste. Medical waste is covered by this standard if the local, state, or country classifies this waste as hazardous waste. All other medical waste is excluded from this definition and this standard, and is covered by the Medical Waste Management Standard (HSEMS 521).
Non-Hazardous Waste	All other waste from construction and O&M activities or that resulted from any remediation process that is not hazardous waste, as defined above. Asbestos is usually included as non-hazardous waste unless specifically designated as a hazardous waste by a governmental entity. Uncontaminated office trash, food waste and uncontaminated construction/demolition debris are excluded from this definition and exempted from this standard.

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Project Team	The group of personnel assembled on a project-specific basis that include, as a minimum, the Honeywell Remediation Team and Alliance Partner / Engineer's designated staff with assigned project roles and responsibilities.
RES WAT Representative	Honeywell RES representative designated as a member of the WAT.
Waste Accumulation Area	An area, at or near the point of generation of waste, where waste is collected, and under control of the area/site operator not to exceed one 55-gallon drum of each type of waste, for short-term staging. The U.S. regulations refer to these areas as satellite accumulation areas with requirements in 40 CFR 262.34(c)(1)).
Waste Approval Team (WAT)	A cross-business team representing all of the Honeywell business units and Corporate HSER charged with the responsibility for approving hazardous waste management facilities for the Company globally.
Waste Management	The accumulation, transportation, segregation and disposal of hazardous wastes and other wastes including the short- and long-term risk from disposal of the waste if not completely destroyed in the treatment process. Waste Management can include handling, recycling, recovery, treatment, storage and disposal of wastes.
Waste Storage Area	An area where wastes are collected for longer-term storage, prior to being moved off site for treatment or disposal.

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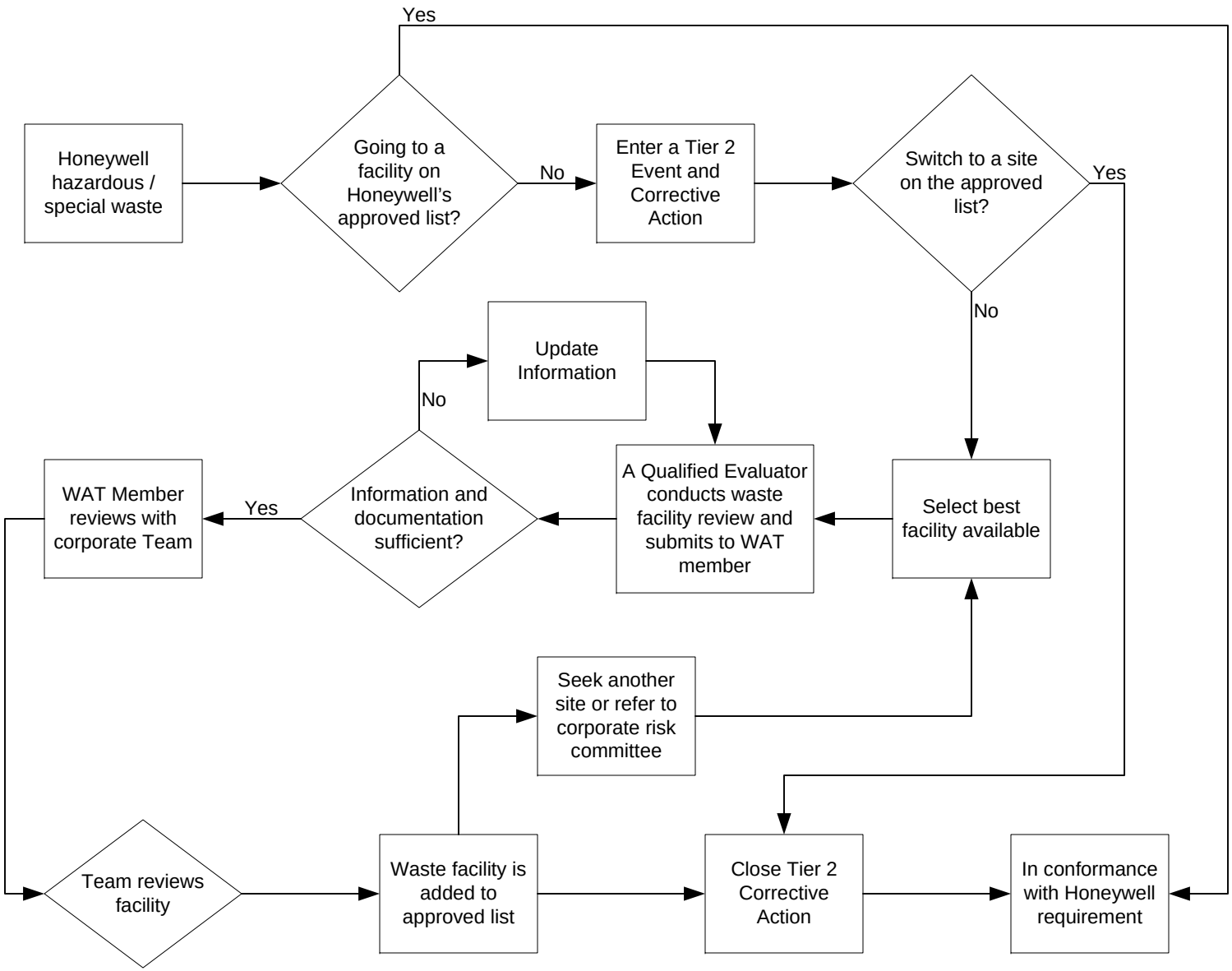
HONEYWELL DISPOSAL FACILITY APPROVAL PROCESS FLOWCHART



WAT = Waste Approval Team

HONEYWELL - NONHAZARDOUS WASTE MANAGEMENT SITE - FULL APPROVAL EVALUATION TOOL

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Site Name:
Site Street Address:
Site City:
Site State/Province:
Site Country:

Services Provided By Site:

Evaluator Name:
Affiliation:

Date Tool Completed: **(MM/DD/YY)**

Local Environment

					See Comments
1	Closest Residential/Medical/ Educational Land Use:	Adjacent	<1KM	>1KM	
2	Predominant Land use Within 1 KM	Residential	Commercial/ industrial	Undeveloped	
3	Land Use Prior to Current Use	Industrial	Commercial	Greenfield/Residential	
4	Years Used for Waste Management	>15	5 to 15	<5	
5	Surface Geology Permeability	High Permeability -	Moderate Permeabilty	Low Permeability	
6	Depth to Groundwater	<10 meters	10-30 meters	>30 meters	

HONEYWELL - NONHAZARDOUS WASTE MANAGEMENT SITE - FULL APPROVAL EVALUATION TOOL

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					Comments
7	Closest Drinking Water Well	<1KM	1-2KM	>2KM	
8	Site-related Groundwater Impacts	No data or data shows major impacts	Data indicates minor impacts	Data shows no impacts	
9	Groundwater Contamination Control System	Needed/ineffective	Effective	None needed	
10	Spill/release History	Evidence/history of uncontained spills	Evidence/history of contained spills	No evidence of spills	
11	Spill Control for Process Areas (storage, transfer etc.)	Little or None	Partial or non-impervious	Full impervious containment	
12	Process Area Runoff Testing	No treatment - no testing	Partial treatment and testing	Full treatment & testing	
13	Downstream Distance to Nearest Surface Water Withdrawal for Drinking Water	< 2KM	2-5 KM	>5 KM	
14	Waste Management Methods Env. Risk	Landfill/ponds land appliaction	Treatment/ destruction	Consolidation & transfer	
15	Hazardous Residuals Management	Unknown	Offsite & Adequate	On-site & adequate	
16	Highest risk waste handled:	Haz. chlorinated organics	Other Haz. solids, sludges, metals	low risk - oil, debris, non-haz, scrap	

HONEYWELL - NONHAZARDOUS WASTE MANAGEMENT SITE - FULL APPROVAL EVALUATION TOOL

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Site HSE Systems

17	Waste Acceptance Criteria/Documents	No procedures & Documentation	Partial Procedures & Documentation	Sound Procedures & Documentation	**Comments**
18	Safety processes/performance	Poor	Average	Better	
19	Major Hazard Preparedness Planning	None	Partial plan	Full contingency plan	
20	Cumulative HSE Staff Experience	<5 years	5-10 yrs	>10 years	
21	2 Year Compliance History	Significant excursions/NOVs	Minor problems	No excursions	
22	Env. Management Systems	None	Customized program	ISO 14000 or equivalent	
23	O&M of Critical Process Control Equipment	No procedures or systems	Some procedures some data mngt.	Procedures In place data managed	
24	Financial Strength for Environmental Liabilities	No information or inadequate resources	Marginal resources	Adequate resources to cover liabilities	

QUARTERLY HAZARDOUS WASTE

Mgr*	Project	Project Name	2010 Q1 Tons	2010 Q2 Tons	2010 Q3 Tons	2010 Q4 Tons	Total 2010
[Example]							
JPM	R35015	Syracuse - Semet/Willis IRM	30.85	19.11			
JPM	R35046	Syracuse - Settling Basins 1-8	1.35	0.00			
JPM	R37676	Syracuse - Onondaga Lake	0.00	0.38			
JPM	R37910	Syracuse - Willis Avenue	2.97	0.00			
		Total	**35.17**	**19.49**	**0.0**	**0.0**	

DELEGATION OF AUTHORITY [TEMPLATE]

Honeywell International Inc.

Delegation of Authority

I, [Honeywell Representative Name], [Honeywell Represtentative Title], Corporate Remediation & Evaluation Services of Honeywell International Inc., a Delaware corporation (the "Corporation"), pursuant to the authority vested in me by the Board of Directors of the Corporation pursuant to Policy 101 of the Corporation's Policy Manual, do hereby delegate to [Name, Title] of [Company Name], a [State] corporation, individually and with power to subdelegate, the authority to cause [Company Name] on behalf of Honeywell International Inc. to prepare and sign Hazardous Waste Manifests and supporting waste profile, waste certification documents, as needed, for [hazardous waste generation or management activity] at [Facility or Cleanup Site, Site Address]. This Delegation of Authority is effective from [insert start Date] to [insert end Date]. [Company Name] shall provide qualified and trained individuals to prepare, review and execute all Hazardous Waste documents. [Company Name] shall take such other actions as the aforementioned individuals may deem applicable, necessary or appropriate to effectuate the work products contemplated herein, in each case, in the name and on behalf of the Corporation, on the terms and conditions presented to me or such other terms and conditions as the aforementioned individuals may deem appropriate.

[Honeywell Representative Signature]

_____

[Honeywell Representative Name]
[Honeywell Representative Title]

Date: [insert Date of signature]

Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-19
Boring And Well Construction Data Entry Form
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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-20
RES-HS-08
Lock-Out Tag-Out
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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-21
RES-CP-WPC-04
Commissioning Plan
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Specification Section 01100
Remediation Construction Requirements

ATTACHMENT 01100-22
RES-ADMIN-02
Definitions and Acronyms

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1.0 APPLICABILITY

1.1 This procedure is applicable to all Corporate RES sites. It establishes minimum requirements that must be met by all project sites.

1.2 In addition to complying with this procedure, RES sites must comply with all applicable national, state, and local regulations.

1.3 RES sites or project teams must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate site's procedure.

1.4 Whenever a Honeywell RES Procedure is more stringent than the applicable national, state, and local regulations, the Honeywell RES Procedure shall apply.

2.0 OVERVIEW

2.1 The purpose of this procedure is to provide a consistent and concise list of definitions of common RES program terms and acronyms used in generating or updating RES procedures, polices and guidelines.

2.2 The summary list in this procedure serves as a master list of definitions and acronyms for general reference.

3.0 DEFINITIONS

3.1 Section 8.0 lists common RES program definitions of terms and acronyms that are referred to in multiple procedures.

3.2 Words or phrases that are not well known, or that have multiple definitions, or that are industry jargon or symbols, and abbreviations that are unique to a certain procedure shall be defined in the specific RES procedure, following RES-ADMIN-01.

4.0 REQUIREMENTS

4.1 None

5.0 REFERENCE DOCUMENTS

5.1 RES-ADMIN-01 – RES Operating Procedure Template

6.0 ATTACHMENTS

6.1 Organization Chart – Traditional Contract (Alliance Partner/Engineer in Oversight Role to Honeywell Contractor)

6.2 Organization Chart – ERCP Contract - (Alliance Partner/Engineer as Prime Contractor with Honeywell with a single prime subcontractor)

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6.3 Organization Chart – Direct Hire Contract (Alliance Partner/Engineer as Prime Contractor with specialty subcontractors as needed)

6.4 Organization Chart – OM&M Consolidation Program Sites

7.0 Revision Log

Revision Number	Section Number	Revised By	Revision Date	Description of Change
2	6.0 & 8.0	AMEC	03/30/2012	Revised / added organization chart, acronyms, terms, and job titles (Revision effective date 3/12/2012)
1	All	AMEC	04/19/2010	Revised to fit new RES template. Added Organizational Charts Revised / added acronyms, terms, and job titles
0	All	Hague	11/28/2007	Initial Issue

8.0 Definitions

Accountable	An individual or group that has overall accountability for the success of a given Task. The Accountable role is typically more strategic and managerial in nature. The Accountable party may execute the Task themselves, delegate the Task to another party or hire a third party to execute the Task.
Alliance Partner(s)	For the purposes of the Alliance Master Services Agreement (AMSA) refers to either one or all – CH2M Hill, AMEC, O'Brien and Gere, or Parsons. Honeywell may at times request other firms to follow the role of an Alliance Partner on specific projects.
Alliance Incentive Program	A method to be used to financially incentivize Honeywell's Alliance Firms to seek-out and implement cost saving and cost avoidance techniques and practices in the management of Honeywell's remediation projects.
Alliance Master Services Agreement	An agreement among Honeywell and the Alliance Partners to provide professional services in support of selected Honeywell Projects and Program Initiatives.
Alliance Program	A subset of RES Projects and RES Program Initiatives that are assigned to the Alliance Firms.

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Alliance Sites	A subset of RES Projects that are assigned to the Alliance Firms.
Annual Operating Plan	A plan developed annually for each site in the RES portfolio that details the site status, the planned activities for each year, and summarized risks associated with that site. The annual operating plan by site gets rolled up into an annual operating plan for RES as a whole.
Assembly	Complete group of Products combined into a single Operating Unit to simplify field installation.
Asset Management	A process for the identification, procurement, tracking and/or deployment of either fixed or portable assets that are used in the support of RES Projects.
Assigned Resources	Alliance Firm personnel identified, by mutual agreement with Honeywell, to provide professional services exclusively in support of Honeywell Projects and/or Program Initiatives.
Authority Having Jurisdiction	Refers to any and all Federal, State, or Local (for US sites) or (any and all National, Regional, or Local for non-US sites) Agencies, Boards, Bureaus, Departments or Code Enforcement Officials as well as Industrial, Trade or Surety organizations that publish enforceable Codes, Standards or other guidance documents or perform enforceable inspections or testing.
Bid Evaluation and Recommendation Summary	Deliverable submitted to Honeywell to: 1) objectively evaluate the proposals and bids received from the RFP process; 2) recommend and provide rationale for selected contractors, materials, equipment, or other suppliers/vendors for the planned construction work; 3) document the procurement process.
Bidder	Any firm that is providing bids for a Honeywell issued Request for Proposal.
Blanket Purchase Order	A commercial document used to request one of the Alliance Partners (or International Consultants) to supply an undefined scope of services in return for payment. The full scope of services is defined by a combination of the AMSA (or IMSA), TAR and PO Release.
Change Order	A written revision issued by Honeywell to a Honeywell PO. Not to be confused with a CCO, as defined below.

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Collocated Resources	Alliance Firm personnel identified, by mutual agreement with Honeywell, to provide professional services at a Honeywell office or other mutually agreed upon Honeywell location.
Completion of Work	Completion of a specific project task and the entire project shall be defined in the Technical Specifications (Section 4.0) of the Construction Contract Documents. Completion of a work task or the project will be achieved once all the criteria contained in the Technical Specifications have been met. The term Substantially Complete will also be defined in the Technical Specifications.
Constructability	The optimum use of construction knowledge and experience in planning, design/engineering, procurement, and field construction operations to achieve overall project objectives.
Construction Change Order	Procedure used when an out of scope change is made that may require an adjustment to the Project Scope, Budget, Performance, Schedule, Quality, or may impact Purchase Order value, or other significant change to the project that requires Honeywell's Approval.
Construction Manager	Alliance Partner's Construction Manager authorized to manage the day-to-day activities of the Partner's workers and Subcontractors, act as Alliance Partner's agent for all field related Work, and provide construction management support for Honeywell Contractors.
Construction Project Management Review	A Honeywell constructability and implementation project review required for all RA projects that are valued at or above $250K.
Construction Project Manager	Contractor's Project Manager, or in case of ERCP contracts the Subcontractor's Project Manager, or their designee authorized to act as their agent for all Project related activities.
Construction Representative	Honeywell on-site employee that acts as Honeywell's field representative.
Consumables	Those Work elements that may or may not be specifically detailed in the Contract Documents but are considered necessary to complete the Work as defined by the Contract Documents. Consumables shall include, but not be limited to, small tools, accessories, fabrication supplies, fuel, gasses, lubricants, etc.

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Contract Documents	Shall include: Contract, General and Special Conditions to the Contract, Contract Exhibits, Instruction to Bidders document, Remediation Construction Requirements, Drawings, Specifications, Contractor's Proposal(s), Purchase Order and subsequent revisions, Award Letter, Attachments, Addenda and Construction Change Orders, as may be appropriate for a given phase of Work or for a given Project.
Contractor	The successful bidder or the Alliance Partner named in the Honeywell Contract as Contractor, their subsidiaries, assigns, officers, employees, Subcontractors, suppliers and designees.
Cost Codes	Honeywell designated numbering scheme used to identify work tasks for the purposes of financial tracking in Honeywell's Financial Management System (FMS).
Cost Estimate, Class 1	A cost estimate that is prepared at 90 percent design and is within plus 10 percent or minus 5 percent of the project cost at completion.
Cost Estimate, Class 2	A cost estimate that is prepared at 60 percent design and is within plus 20 percent or minus 10 percent of the project cost at completion.
Cost Estimate, Class 3	A cost estimate that is prepared at 30 percent design and is within plus 30 percent or minus 20 percent of the project cost at completion.
Cost Estimate, Class 4	A cost estimate that is prepared at feasibility phase of project and is within plus 50 percent or minus 30 percent of the project cost at completion.
Cost Estimate, Class 5	A cost estimate that is prepared for alternative screening level analysis and is within plus 100 percent or minus 50 percent of the project cost at completion.
Data Management Plan	A project specific plan that addresses the Data Management requirements for the project and ensures compliance with Honeywell's Data Management Program.
Design and Construction Manager	Honeywell's Design and Construction representative designated to assist the Remediation Manager with design and construction related activities and responsible for project compliance with Honeywell Design and Construction procedures.

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Director of Design and Construction	Honeywell director with overall authority for RES design and construction projects.
Document Management	A process that is a subset of Knowledge Management that enables the effective administration, storage and/or retrieval of either electronic or hardcopy documents.
Due Diligence	The process of investigation into the details of a potential business transaction, such as an examination of and verification of material facts related to current operations and management and the potential risks and liabilities associated with the transaction.
Engineer	Refers to the Design Engineering Firm of record for the project or their authorized designee.
Environmental Remediation, Construction, and Procurement	The construction terms between Honeywell and an Alliance Partner.
e-Portal	The in-house, web based file and data storage and management system for Honeywell, RES.
Equal	Products or methods that are different from those specified in the Contract Documents and determined to be equal as agreed to in writing by Honeywell or the Engineer.
Feasibility Study	*See Remedial Investigation/Feasibility Study.*
Financial Management System	Reserved.
Flash Reports	A monthly report generated for individual RES sites within ePortal that summarizes project objectives, project status, budget status, key pending trigger events, safety, and other highlights.
Health and Safety Officer	Alliance Partner's designated individual or organization responsible for all site health and safety issues.
Health and Safety Plan	A work plan that defines the site-specific health and safety requirements necessary to safely execute Field activities for a particular project.

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Honeywell	Honeywell International, Inc. their subsidiaries, assigns, officers, employees, and designees.
Honeywell OM&M Program Manager	The Honeywell Design and Construction Manager responsible for management and oversight of the OM&M program.
Honeywell Remediation Team	Management personnel to include, at a minimum, the Director of Design and Construction, Design and Construction Manager, Supply Manager, Remediation Portfolio Director, and Remediation Manager.
Incentive(s)	*See Alliance Incentive Program.*
Incidentals	Those Work elements that may or may not be specifically detailed in the Contract Documents but are considered necessary to facilitate the Work as defined by the Contract Documents. Incidentals shall include, but not be limited to: home office support; field office and sanitary facilities; tools; equipment; PPE; supplies; wage burdens; insurance; transportation; freight; electrical power; water supply; monitoring, inspection & testing; sanitary; telephone, facsimile, etc.
International Consultant(s)	For the purposes of the International Master Services Agreement (IMSA) refers to either one or all of the following: ERM, MWH, URS.
International Master Services Agreement (IMSA)	An agreement among Honeywell and The International Consultants to provide professional and other related services in support of selected Honeywell Projects and Program Initiatives.
International Program	A cumulative subset of all of the RES Projects and RES Program Initiatives that are assigned to all of the International Consultants.
Interim Remedial Measure	A response action taken at a Site to reduce the potential for human or environmental exposure to Site constituents. An IRM may be implemented prior to completion of investigations and evaluations of remedial alternatives and may be incorporated into the final overall Site remedy.
International Sites	A discrete subset of RES Projects that are assigned to each of the International Consultants.
Investigation Derived Waste	Waste materials resulting from a field investigation.

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Knowledge Management	The process of creating, disseminating, and utilizing knowledge information or data.
Machinery	Refers to process equipment, pumps, mixers, air movers, etc.
Master Service Agreement	Contracting Agreement between Honeywell and a service provider (e.g., an analytical laboratory) or between an Alliance Partner and a Subcontractor that is not project or site specific.
Material Receiving Report	A report which formally documents the receipt of Alliance Partner procured materials and equipment.
Meeting Minutes	Means of recording and distributing project information obtained in meeting with Honeywell, construction management personnel, subcontractors, the design engineer, or other third parties. They provide a written record of decisions reached and opinions expressed, and are a means for clarifying the intent of the parties concerned.
Metrics	Parameters used to indicate or track the performance of the Alliance Partners (or International Consultants) in executing their responsibilities.
Non-Assigned Resources	Alliance Partner personnel that provide professional services in support of Honeywell Projects and/or Program Initiatives and projects for other Clients of the Alliance Partner.
Non-Collocated Resources	Alliance Partner personnel that provide professional services in support of Honeywell Projects at an Alliance Partner office or other mutually agreed upon Alliance Partner location.
Operation, Maintenance and Monitoring (OM&M)	Refers to post Remedial Action activities that are necessary to ensure that the remedy provides the level of performance and reporting necessary to meet Regulatory compliance on an ongoing basis.
OM&M Contractor	The company contracted to perform the routine OM&M activities.
OM&M Consolidation Program	The Honeywell OM&M consolidation program under which OM&M for multiple sites are grouped by region and contracted to an OM&M Contractor as a group.
OM&M Management Team	The Alliance Partner contracted by Honeywell to oversee and implement the requirements of the OM&M Program.

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OM&M Management Team Site Lead	Delegated appointee to oversee the overall aspects of their assigned OM&M site
Over Short & Damage Report	A report used to formally document shipment irregularities found during the receiving and receipt inspection process.
PO Release	The process of authorizing work to be performed under a Blanket PO.
Procurement Plan	Deliverable submitted to Honeywell to describe: 1) the intended subcontracts, equipment, and material purchases for the work; 2) the estimated amounts to be paid under each subcontract or purchase; 3) the subcontracts and purchases that are most critical to the satisfactory performance of the work; and 4) the intended method of procurement (i.e., sole source, competitive bid by AP, e-Auction).
Products	Any materials, machinery, equipment or supplies that are needed to accomplish the Work.
Program[matic] Initiatives, [RES]	A collection of Tasks that are necessary to support all or a select number of RES Projects.
Project	The Scope of Work performed within the constraints defined by the Contract Documents.
Project Accountant	Alliance Partner's designated individual responsible for assisting the Project Manager with Honeywell and subcontractor invoices, and tracking construction project budgets.
Project Criteria Package	Document(s) developed by or for Honeywell to describe Honeywell's program requirements and objectives for a Design-Build Project, including use, space, price, time, site and expandability requirements, as well as submittal requirements and other requirements governing Contractor's performance of the Work. Honeywell's Project Criteria may include conceptual documents, design criteria, performance requirements and other Project-specific technical materials and requirements.
Project Delivery Method	The approach for contracting and executing the construction project (generally traditional Design/Bid/Build; Alliance Partner as Prime [Environmental Remediation Construction and Procurement or "Type 2" Contract]; Design/Build, or some other hybrid delivery model).

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Project Engineer	Alliance Partner's (for ERCP contracts) or Engineer's designated Project Engineer authorized to act as liaison for all project related activities.
Project Execution Plan	Document compiled prior to construction activity that defines the general scope of work, project organization, responsibilities, standard procedures, and oversight/QA/QC functions for the project.
Project Management Plan	The document that translates the Project Strategy, defined by the Site Strategic Plan, into the tactical and logistical requirements necessary for the efficient, effective and safe implementation of the Project Work.
Project Manager	Alliance Partner's designated Project Manager authorized to act as liaison for all project related activities and may be authorized by Honeywell's Remediation Manager to have broader project responsibilities.
Purchase Order	A commercial document used to request a supplier to furnish goods or services in return for payment and may provide specifications and quantities as may be appropriate.
QA/QC Construction Representative	Contractor's, or in the case of ERCP contracts the Subcontractor's, designated individual responsible for implementing all site QA/QC requirements.
QA/QC Engineer	Honeywell's or Alliance Partner's designated individual or organization responsible for all site QA/QC requirements.
RACI Chart	A diagram to describe the roles and responsibilities of various teams or people in delivering a project or operating a process. It defines personnel roles as Responsible (R), Accountable or Approver (A), Consulted (C), or Informed (I).
Record Documents	Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications that have been annotated to show changes made during construction.
Record of Decision	The Record of Decision (ROD) is a public document that explains which cleanup alternatives will be used to clean up a Superfund site.

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Requisition	The document or process of requesting a purchase order for a vendor or contractor that has been selected through a competitive bid or other process.
Reserve	Funds allocated for future remediation costs. Revised annually based on a five-year projection.
References	Third parties familiar with a supplier or service provider that may be contacted during Prequalification/Evaluation of Suppliers, Contractors and Service Providers.
Remedial Action	Remediation Project phase where the remedy is implemented.
Remedial Action and Remedial Construction Projects	Phases of a project involving physical or chemical removal, treatment, capping, transfer, or disposal or contaminated environmental media or placement of permanent or semi-permanent infrastructure to achieve a site clean up or restore the site. Examples include but are not limited to: excavations and dredging, capping, barrier walls, sheet pile placement, slurry walls, tank removals, groundwater treatment systems, vapor-phase extraction systems, dual-phase recovery systems, in situ remedies (i.e., chemical oxidation, in situ bioremediation), pipe placement, asbestos removal, and building decontamination, demolition and dismantlement. In general, remedial construction projects primarily involve non-professional services work. Operation, Maintenance, and Monitoring (OM&M) Services are covered under separate procedures.
Remedial Design	Remediation Project phase where the Remedial Action plans and specifications are developed.
Remedial Investigation/Feasibility Study	Remediation Project phase where the nature and extent of the site impacts are determined and the appropriate remedial technology is selected.
Remediation Manager	Honeywell Remediation Manager authorized to act as Honeywell's agent for all project related activities.
RES Business Model	The sum total of Honeywell policies, processes, procedures, program initiatives, tools, standards, specifications and other guidance or enablers used in the implementation of RES Projects.

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Responsible	An individual or group that has responsibility for the successful implementation of a given Task. The Responsible role is typically more tactical and logistical in nature. The Responsible party will typically execute the Task themselves, however they may need to delegate the Task to another party or hire a third party to execute the Task as may be appropriate. The Responsible party usually has a reporting requirement to the Accountable party.
Sampling and Analysis Plans	A work plan that defines the scope, performance and other relevant requirements for field sampling and laboratory analysis for a given Project or Task.
SAP™	"Systems Applications and Products" Honeywell's corporate electronic database for business applications including financial, asset, accounting, operations and materials. The SAP™ work flow with respect to authorization of Corporate RES projects is: 1. Each TAR entered into SAP™ for RES review is assigned a Shopping Cart Number 2. Each Shopping Cart approved by designated RES managers becomes a Purchase Requisition 3. The HON Purchasing Department creates and then approves a P.O. for each Purchase Requisition
Site	A place or setting of the Project, or where services are to be rendered.
Site Administrative Assistant	Contractor's field representative responsible for executing all administrative duties.
Site Health and Safety Manager	Alliance Partner's designated on-site representative responsible for overseeing the project-specific health and safety measures.
Site Health and Safety Representative	Contractor's, or in the case of ERCP contracts the Subcontractor's, designated individual responsible for on-site implementation of the project-specific health and safety measures on a daily basis.
Site Strategic Plan	Defines Honeywell's strategy for the site and explains any relevant business drivers, legal or regulatory considerations, budgetary and other constraints and other relevant site information that is strategic in nature.

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Site Superintendent	Contractor's Site Superintendent, or in the case of ERCP contracts the Subcontractor's Site Superintendent, or their designee authorized to act as the overseer of field work and liaison for all field related activities.
Structures	Structures include, but are not limited to, foundation, buildings, machinery, supports, platforms, paving, secondary containment, utility services and piping both above and below grade.
Subassembly	Partial group of Products combined into multiple Subassemblies. When combined, the Subassemblies form a complete Assembly.
Subcontractor	Organization or individual having an Agreement with the Contractor to perform some portion of the Work.
Subcontracts Administrator	Alliance Partner's representative responsible for prequalifying and procuring materials, equipment, and subcontractors.
Substantial Completion	The date when the work is sufficiently complete for Honeywell's intended use, all building and safety inspections are satisfactory and complete and all necessary certificates of occupancy are in hand and critical documentations (including O&M Manuals and warranties) are complete.
Supply Manager (i.e. Honeywell Procurement Manager)	Honeywell Purchasing Representative that will be responsible to handle all material supply management issues related to the Request for Proposal, issuance of the Purchase Order and award of the Contract, etc.
System	One or more Products, Machinery Elements, Assemblies, and appurtenances that perform a defined process.
Task	Refers to any individual or group of Work items that are implemented in the execution of a Project. May also refer to sub-tasks, meetings, events or deliverables.
Task Authorization Report	The written document used to either initiate or revise Project Work associated with Professional Services.

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Temporary Work	Nonpermanent Work that may or may not be specifically detailed in the Contract Documents but is considered necessary to construct the Work as defined by the Contract Documents. Temporary Work shall include, but not be limited to, temporary lights; temporary utility connections, decontamination facilities; temporary containment areas; fence and gates; site security measures; construction roads and site entrance; lay-down area; secure storage; soil erosion control; construction water control; etc.
Trigger Event	A natural, technical, regulatory, or administrative event that occurs that results in potential expenditures being categorized as probable and triggers the need for an adjustment to reserve.
Waste	May include hazardous and non-hazardous soils, sediments, drill cuttings, groundwater, wastewater, residues, drummed wastes, chemicals, RCRA empty drums, cylinders, disposable personal protective equipment (PPE), decontamination fluids, and construction debris, etc.
Waste Material	May include hazardous and non-hazardous soils, sediments, drill cuttings, groundwater, wastewater, residues, drummed wastes, chemicals, RCRA empty drums, cylinders, disposable personal protective equipment (PPE), decontamination fluids, and construction or demolition debris, etc.
Work	All material, equipment, labor, supervision, services, consumables, incidentals and temporary work, necessary for a complete and functional end product ready for its intended use, as defined by the Contract Documents.
Work Area	That area that lies within a perimeter as delineated by the Contract Documents.

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Work breakdown structure	A tree structure used to define and group project work elements in a way that helps organize and define the total work scope of the project. For a project element to be recognized as a task (or subtask, sub-subtask, activity, etc.) in the work breakdown structure, it must meet five criteria: a definable beginning and end; a finite duration, with at least one start and one stop date; an associated level of effort; a state of completion that can be estimated at any time; and a reviewable internal or external deliverable at the task's completion. Project elements can be tasks, subtasks, sub-subtasks, and/or activities.
Work Order	The written document used to either initiate or revise Project Work associated with non-Professional Services.

ACRONYM DEFINITIONS

AMSA	Alliance Master Services Agreement
AOP	Annual Operating Plan
AP	Alliance Partner
BCSR	Basis of Cost and Schedule Report
CAD	Computer Aided Design
CCO	Construction Change Order
CM	Construction Manager
CO	Change Order
COC	Certificate of Conformance
CP	Construction Phase
CPM	Construction Project Management
DCB	Design Change Bulletin
ERCP	Environmental Remediation, Construction, and Procurement
FCC	Federal Communications Commission
FMS	Financial Management System
FS	Feasibility Study
H&S	Health and Safety
HASP	Health and Safety Plan
HSE	Health, Safety and Environment
HSO	Health and Safety Officer
ID	Identification
IDW	Investigation Derived Waste

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IMSA	International Master Services Agreement
IRM	Interim Remedial Measure
JHA	Job Hazard Analysis
MRR	Material Receiving Report
MSA	Master Service Agreement
O&M	Operations and Maintenance
OM&M	Operation, Maintenance, and Monitoring
OS&D	Over Short & Damage Report
OSHA	Occupational Safety and Health Administration
PC	Pre-construction Phase
PEP	Project Execution Plan
PHA	Process Hazard Analysis
PM	Project Manager
PMP	Project Management Plan
PMWP	Project Management Work Plan
PO	Purchase Order
PPE	Personal Protective Equipment
PQCM	Project Quality Control Manager
QA	Quality Assurance
QC	Quality Control
RA	Remedial Action
RACI	Responsible, Accountable or Approver, Consulted, Informed
RD	Remedial Design
RES	Remediation and Evaluation Services
RFP	Request for Proposals
RI	Remedial Investigation
RIR	Receiving Inspection Report
RM	Remediation Manager
ROD	Record of Decision
SAMP	Sampling and Analysis Plans
SAP	Systems, Applications, and Products
SM	Supply Manager
SPACER	Safety Topic, Purpose, Agenda, Code of Conduct, Expectations, Roles
SS	Site Superintendent
SSP	Site Strategic Plan

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T&D	Transport and Disposal
TAR	Task Authorization Report
TE	Trigger Event
US	United States
USACE	United States Army Corps of Engineers
WBS	Work Breakdown Structure
WPC	Work Process Control

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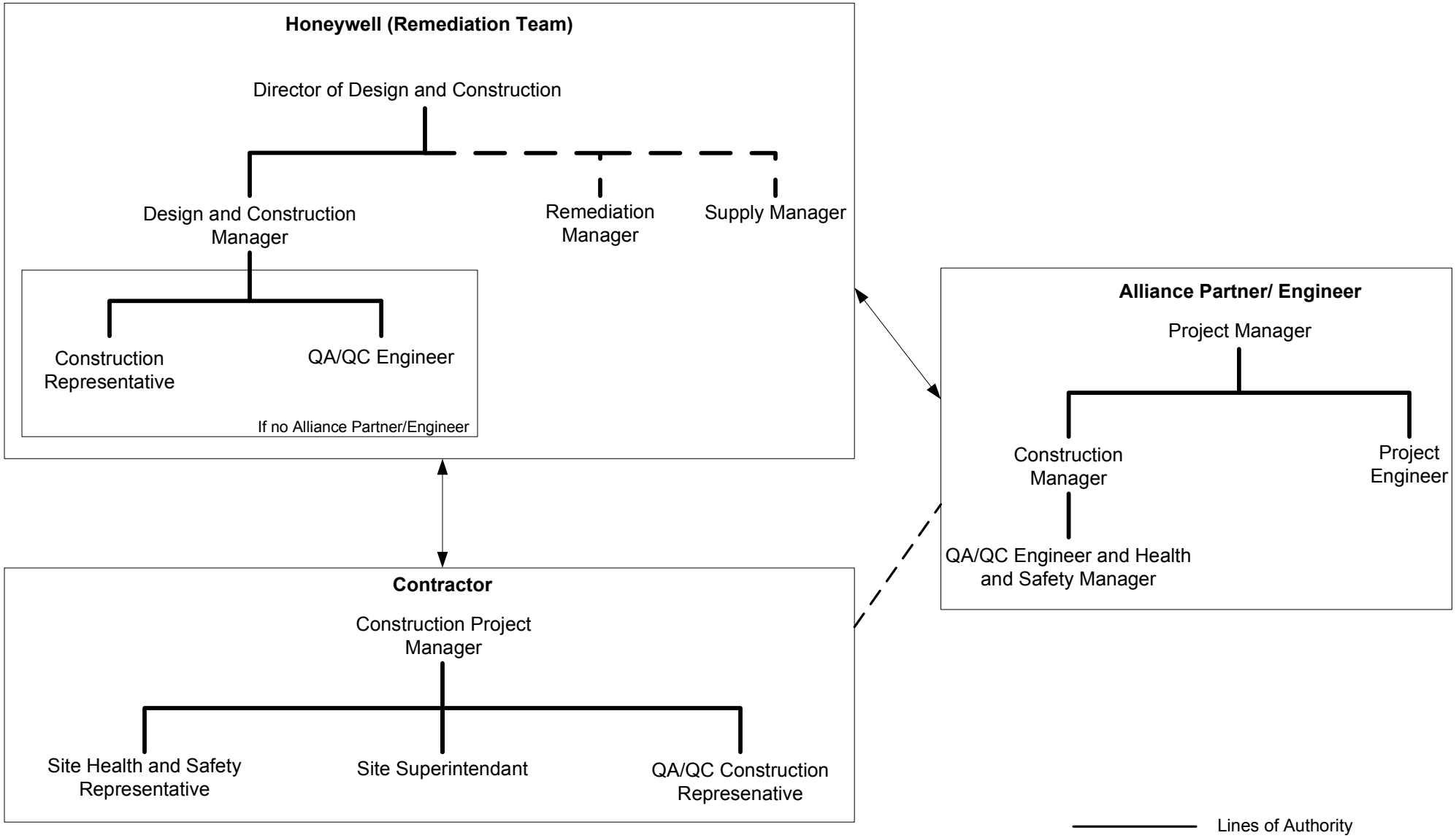
ORGANIZATION CHART – TRADITIONAL CONTRACT (ALLIANCE PARTNER/ENGINEER IN OVERSIGHT ROLE TO HONEYWELL CONTRACTOR)



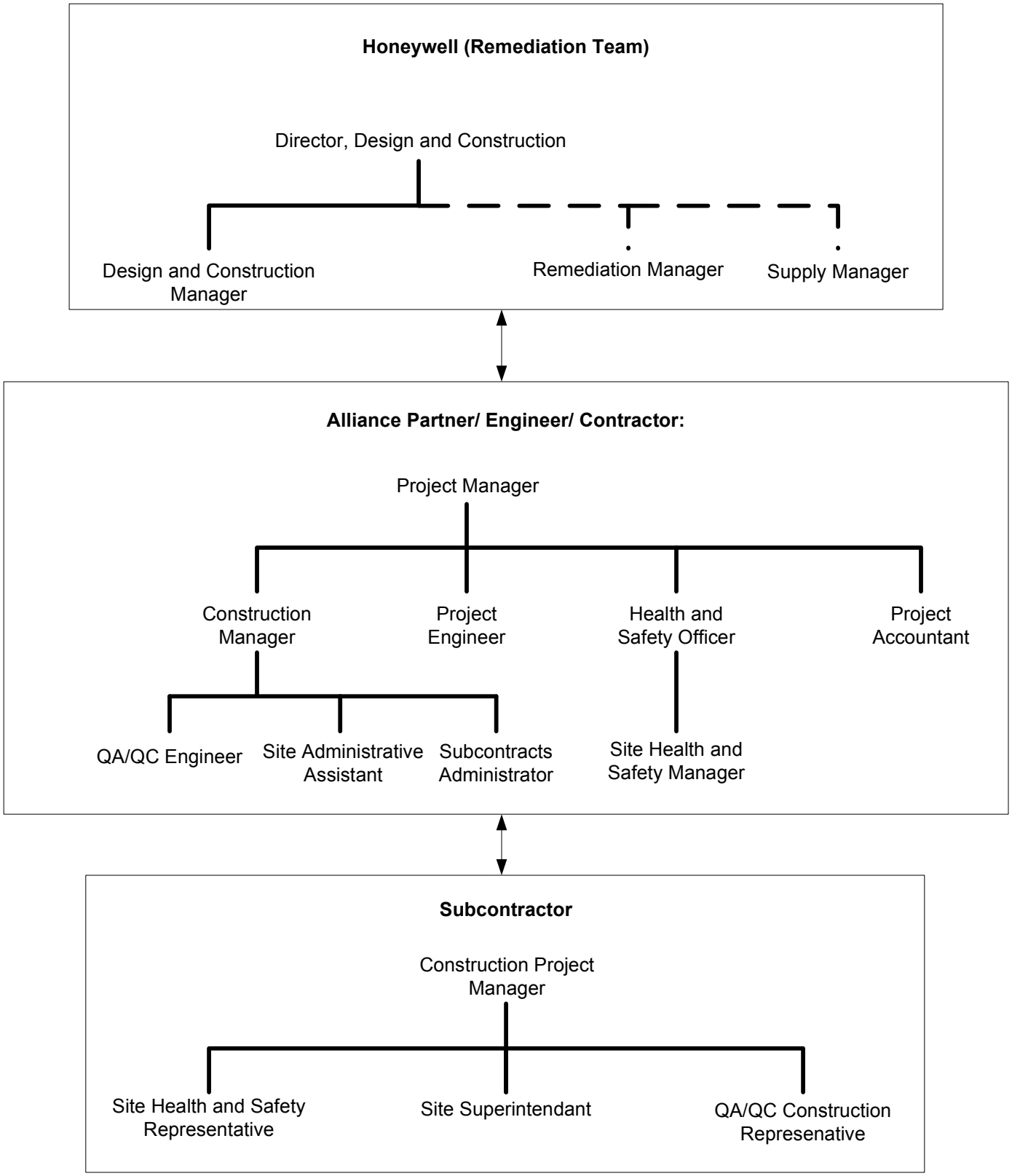
Lines of Authority

Lines of Communication

Contractual Relationship

Note: Organization chart shows general project roles and relationships. Site-specific organization charts may vary.

ORGANIZATION CHART – ERCP CONTRACT (ALLIANCE PARTNER/ENGINEER AS PRIME CONTRACTOR WITH HONEYWELL WITH A SINGLE PRIME SUBCONTRACTOR)



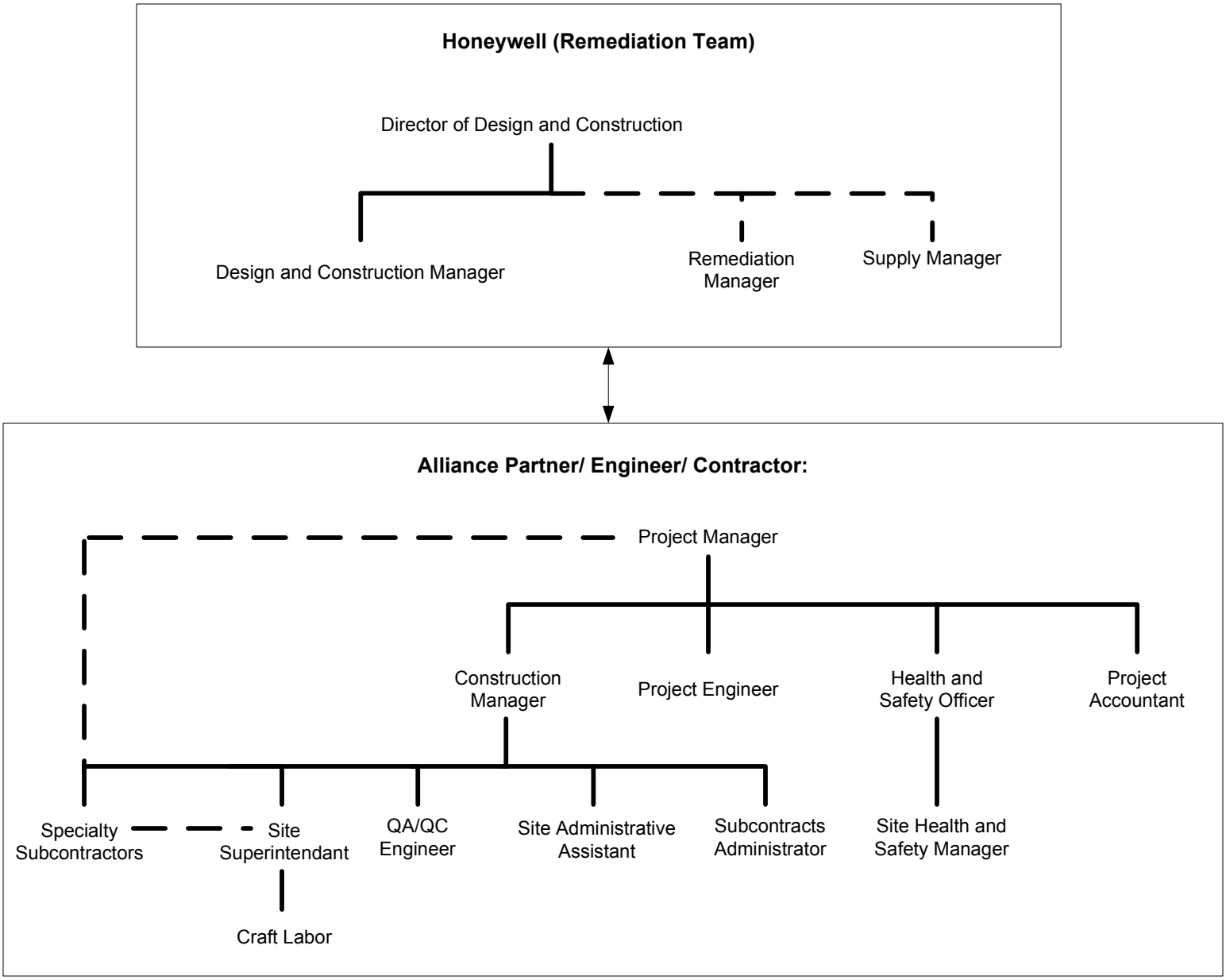
Note: Organization chart shows general project roles and relationships. Site-specific organization charts may vary.

Lines of Authority

Lines of Communication

Contractual Relationship

ORGANIZATION CHART – DIRECT HIRE CONTRACT (ALLIANCE PARTNER/ENGINEER AS PRIME CONTRACTOR WITH HONEYWELL WITH SPECIALTY SUBCONTRACTORS AS NEEDED)



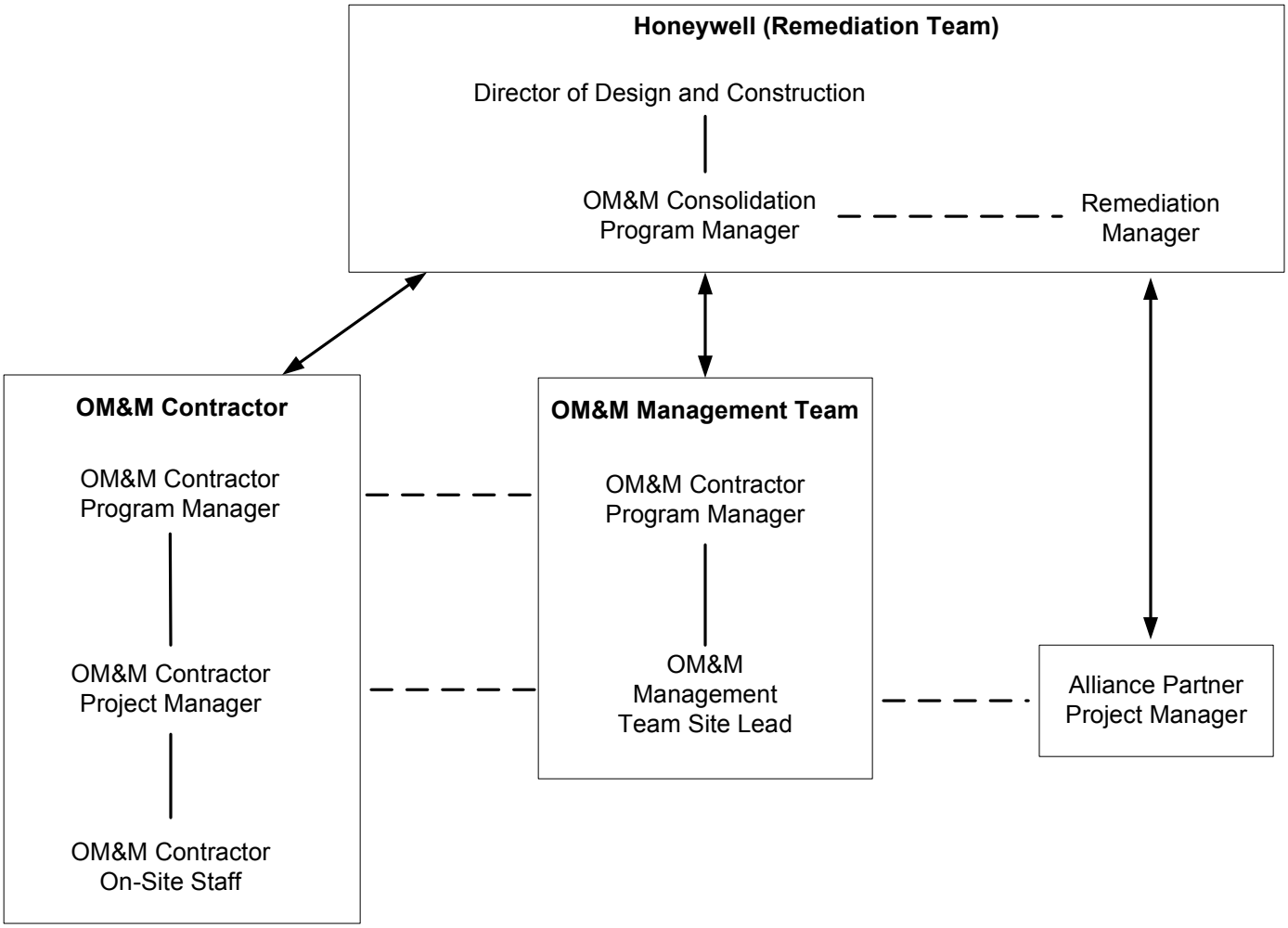
Note: Organization chart shows general project roles and relationships. Site-specific organization charts may vary.

Lines of Authority

Lines of Communication

Contractual Relationship

ORGANIZATION CHART
OM&M CONSOLIDATION PROGRAM SITES



Note: Organization chart shows general project roles and relationships. Site-specific organization charts may vary.

Lines of Authority

Lines of Communication

Contractual Relationship

LUMP SUM/UNIT RATE PROPOSAL
SECTION III
GENERAL REQUIREMENTS

Specification Section 01620
General Requirements Safety, Health and Emergency Response

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1 GENERAL

1.1 Any disregard for the provisions of the following Health and Safety requirements shall be deemed just and sufficient cause for termination of the Contract Agreement or any Contract without compromise or prejudice to the rights of Honeywell (Client).

1.2 This document is written for use under the Honeywell Lump/Unit Rate contract. It may also be applied to Alliance Partner (AP) subcontractors under and Honeywell-AP Environmental, Remediation, Construction, and Procurement (ERCP) contract in which case the requirements indicated for the Contractor shall apply to the Alliance Partner's Subcontractor.

1.3 The Contractors and all its subcontractors shall receive a Health and Safety grade from Honeywell prior to working at a site. Contractors or subcontractors with an "A" or "B" rating have demonstrated an acceptable safety program and performance history and are approved to work on Honeywell RES sites and must meet all other Honeywell Contract requirements. All companies with a "C" or "D" rating must develop an acceptable Risk Management Plan that must be reviewed and accepted by Honeywell (or the AP for ERCP contracts). Additional oversight may be required under the Risk Management Plan which may include, but is not limited to, full-time supervision of all subcontractor activities, and requiring the subcontractor to provide full-time health and safety professionals to implement and support required safety programs, safety assessments, and audits. The following Safety Metrics are targets in the grading process; however, other factors are also included in the grading:

- Experience Modification Rate (EMR) at or below 1.00,
- OSHA Total Case Incident Rate (TCIR) at or below industry average,
- Lost Workday Case Incident Rate (LWCIR) at or below industry average.

1.4 The Contractor shall have a competent person or persons, as required under the Occupational Safety and Health Act (OSHA), to inspect the Work and to supervise the conformance of the Work with the regulations under the Act.

1.5 The Contractor shall provide a Site Health and Safety Representative (SHSR) for all field projects. The SHSR shall be responsible for ensuring the site-specific Health and Safety Plan (HASP) adequately addresses the hazards and controls associated with site work activities and that all Contractor or Contractor's subcontractor employees comply with all provisions in the HASP. The SHSR may be a multi-duty

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employee, but should have specific dedicated time to implement a safe work environment for all work activities.

1.5.1 For all heavy construction (i.e., use of heavy equipment such as drill rigs, cranes, earth moving equipment), Level A/B, or confined space activities, the Contractor shall provide at least one full-time dedicated SHSR during such activities whose ONLY responsibility is to ensure the health, safety and welfare of all Contractor and Contractor's subcontractor employees participating in the project. This individual shall also be responsible to ensure that the Contractor's or Subcontractor's competent person for the construction activities performs daily inspections of all protective structures and devices implemented by the Subcontractor to ensure the safe, continual and un-interrupted functioning of the ongoing operational activities for the duration of this Contract.

1.6 The Contractor shall become familiar and comply with Honeywell's applicable project and site-specific Health, Safety, Fire Protection, Emergency Response, Operational Permits and other relevant requirements.

1.7 The Contractor shall become familiar with and comply with Honeywell procedures.

1.7.1 RES-HS-01, Contractor Safety {ATTACHMENT 01620-01).

1.7.2 RES-HS-02, Line Breaking (ATTACHMENT 01620-02)

1.7.3 RES-HS-11, Event Notification / Communication (ATTACHMENT 01620-03)

1.7.4 RES-HS-05, Incident Investigation (ATTACHMENT 01620-04)

1.7.5 RES-HS-04, Fall Protection (ATTACHMENT 01620-05)

1.7.6 RES-HS-07, Confined Space (ATTACHMENT 01620-06)

1.7.7 RES-HS-08, Lock Out / Tag Out (ATTACHMENT 01620-07)

1.7.8 RES-HS-03, Excavation (ATTACHMENT 01620-08)

1.7.9 RES-HS-09, Contractor Substance Abuse and Prevention Compliance Program (ATTACHMENT 01620-09)

2 REGULATORY AND HONEYWELL-SPECIFIC REQUIREMENTS

2.1 The Contractor and its subcontractors shall comply with all applicable federal, state, and local laws, ordinances, codes, rules, regulations, policies, and governmental interpretations thereof. The Contractor shall be responsible for the health and safety of its workers and subcontracted workers at this Site.

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2.2 Contractor, its employees and subcontractors shall comply with all safety rules common to the construction trades and shall abide by all safety standards and practices in use by Honeywell (or Third Party Owner/Operator [TPO/O] if Honeywell is not the property owner/operator). At a minimum, the Contractor and its subcontractors shall comply with CD-13-1 *Safety & Occupational Health; Compliance* (ATTACHMENT 01620-10) CD-13-2 *Contractor's Safety Declaration)* (ATTACHMENT 01620-11), and CD-13-3 *Contractor's Employee Safety Declaration* (ATTACHMENT 01620-12). Each on-site Contractor employee and lower-tier subcontractor employee must sign the Employee Safety Declaration Form CD-13-3 prior to starting work.

2.3 A Site Kick-Off meeting is mandatory, at which time the selected Contractor shall familiarize itself with Honeywell's (or TPO/O) applicable rules, including those site-specific safety and fire protection requirements. Contractor shall comply with Honeywell's (or TPO/O) safety and fire protection rules, as well as any other applicable Federal, State, and Local laws or regulations.

2.4 The Contractor shall ensure that remediation work performed at active Honeywell (or TPO/O) facilities is coordinated with the management of the facility and that all facility rules and requirements are followed by their employees.

2.5 Prior to commencement of field activities, the Contractor shall certify that personnel employed at, or who later become employed at the Site, who are directly involved with activities that have the potential for exposure to hazardous waste, including direct employees as well as employees of subcontractors, have completed an appropriate 24- or 40-hour health and safety training course in accordance with 29 CFR 1910.120(e) and 29 CFR Part 1926.65(e). Certificates of completion of appropriate 24- or 40-hour training shall be maintained at the Site for all employees engaged in activities with the potential exposure to hazardous waste.

2.6 Prior to the start of demolition activities (if applicable), the Contractor shall conduct an engineering survey of the structure(s) to determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where personnel may be exposed shall also be similarly checked. The engineering survey shall be conducted by a competent person, in accordance with 29 CFR 1926, Subpart T. The Contractor shall submit to the Engineer in writing, evidence that such a survey has been performed. The Engineer will forward written evidence to Honeywell.

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2.7 The Contractor shall prepare a site-specific Health and Safety Plan (HASP) in accordance with Sections 4 and 6 below.

2.8 The Contractor shall be solely responsible for the preparation, implementation, and oversight of the HASP. Any review and comments by Anchor QEA Engineering, PLLC, Honeywell, or any third party does not relinquish the Contractor of its responsibility for the health safety and welfare of site personnel under the Contract.

2.9 The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970.

2.10 Except as may by prohibited by local laws, contractors and/or subcontractors performing and individuals directly supervising the use of heavy construction-type equipment, the operation of treatment plants, the conduct of safety sensitive/at-risk work (e.g., lock-out/tag-out, confined space entry, hot work, dredging, and similar activities), or other activities designated by Honeywell shall comply with Honeywell's Substance Abuse and Prevention Requirements. (If this provision is prohibited by local laws, the Contractor is responsible for providing Honeywell with evidence of such legal prohibition.)

2.10.1 The Honeywell Substance Abuse and Prevention Requirements (See Attachment 01620-09) prohibits the use, manufacture, sale, possession, or transfer of illegal drugs, alcohol and controlled substances on Honeywell project premises. Violation of this contract requirement may be considered by Honeywell to be a material breach of contract and subject the Contractor to all remedies available to Honeywell at equity, contract, and law. In addition, Contractor is advised that violation of this contract requirement shall be considered in the evaluation of the Contractor as being qualified to supply personnel under future contracts with Honeywell. Contractor's attention is directed specifically to the contract terms (See Section 2.0 of the RFP) including, but not limited to the Substance Abuse and Prevention Requirements and the contract articles indemnity, and termination. The Contractor and each subcontractor is required to provide certification that its substance abuse and prevention program is in compliance with the Honeywell Substance Abuse and Prevention Requirements as detailed in Honeywell procedure RES-HS-12, Contractor Substance Abuse and Prevention Compliance Program.

2.11 Provide necessary barricades, covers, guards and other protective measures to keep all personnel that can enter the affected areas during the course of their normal activities, safe from all construction hazards.

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2.12 Honeywell reserve[s] the right to restrict Contractor's use of Products that represent an unreasonable risk to workers or the public based upon MSDS, Manufacturer information or Governmental Guidelines.

2.13 Contractor is required to cooperate with Environmental, Health, and Safety audits conducted by Honeywell or the Alliance Partner and respond to the findings and recommendations generated from such audits.

3 EMERGENCY PHONE NUMBERS AND HSER EVENT REPORTING

3.1 Emergency phone numbers (Fire, Medical, Police) and a map detailing the route/directions to the nearest hospital shall be conspicuously posted by Contractor at the Site, and all personnel involved with the Work shall be informed of this location.

3.2 Event reporting includes fatalities, catastrophes, injuries, motor vehicle accidents, environmental releases or incursions, fire, explosion, property damage, and near misses. Events must be reported in accordance with Honeywell's HSER (Adverse) Event Reporting System (ATTACHMENT 01620-03). Contractors must maintain on site a written investigation report that includes at a minimum all of the information required by the Honeywell HSER Event Reporting requirements.

4 SUBMITTALS

4.1 Submit to Honeywell (AP), the completed Contractor Safety Evaluation Form (see Section 1 of the RFP) to document verification of all Contractor and subcontractor compliance with Honeywell Safety Metrics prior to the Contractor performing any work.

4.2 The Contractor shall submit to Honeywell prior to commencement of any on-site activities the Contractor prepared HASP (see Section 6) for review and comment. Review and comment of the HASP may also be required by additional parties including regulatory agencies and/or third party owners/operators.

4.3 Certificates of completion of training applicable to the Work and medical clearances applicable to the Work shall be maintained at the Site for all employees engaged in activities with the potential exposure to hazardous waste.

4.4 In addition, the Contractor shall submit the following items:

- CD-13-1 - Safety & Occupational Health Compliance (ATTACHMENT 01620-10);

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- CD-13-2 - Contractor's Safety Declaration (ATTACHMENT 01620-11);
- CD-13-3 - Contractor's Employee Safety Declaration (ATTACHMENT 01620-12);
- Contractor's Substance Abuse and Prevention Program Compliance Certification (see ATTACHMENT 01620-09)
- Daily and weekly Safety Reports as part of daily and weekly construction reports;
- Incident Reports (see RES-HS-05 [ATTACHMENT 01620-04]);
- Employee/Visitor Register;
- Monitoring/Sampling Results;
- Training Logs; and
- Monthly Exposure-Hours Report (ATTACHMENT 01620-13).

5 PREPARATION FOR SITE ACTIVITY

5.1 The Contractor shall be solely responsible for the safety of its employees, subcontractors, suppliers, and other parties at the work area as a result of the Contractor's direction.

5.2 Determination of the appropriate level(s) of worker safety equipment and procedures shall be made by the Contractor.

5.3 Should any unforeseen or site-specific safety-related factor, hazard, or condition become evident during the performance of Work at the Site, it shall be the Contractor's responsibility to bring such to the attention of Honeywell both verbally and in writing immediately for resolution. At all times, the Contractor shall take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

5.4 The Contractor shall be responsible for the safe operation and storage of any equipment used or brought on-site during the Work.

6 HEALTH AND SAFETY PLAN

6.1 The Contractor shall prepare a site-specific Health and Safety Plan (HASP) in accordance with the requirements of 29 CFR 1910.120 and 29 CFR 1926.65, and all other applicable OSHA regulations and published guidelines. This HASP shall cover all personnel who will be employed by the Contractor to perform Work at the Site, including direct employees as well as employees of subcontractors and others as

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may be required by the Contract Documents. Duplication of the general information contained in the Contractor's Safety and Health Program is unnecessary and shall be incorporated by reference. The level of detail provided in the HASP shall be tailored to the type of work, complexity of operations to be accomplished, and hazards anticipated. The HASP must be reviewed and approved by a Certified Safety and Health Professional.

6.2 The Contractor shall be responsible for preparation of a site-specific HASP, its implementation, and related requirements as specified herein. This plan shall address at a minimum, but not be limited to, the following components:

6.2.1 Identification of Key Personnel - Identify, by name and by title, the on-site and off-site health and safety personnel responsible for the implementation of health and safety procedures.

6.2.2 Training - Describe health and safety training requirements for all supervisory and on-site personnel. Training requirements shall also include attending an initial site orientation prior to engaging in any on-site activities. Sign-off sheets acknowledging attendance shall be provided.

6.2.3 Medical Surveillance - Certify that all supervisory and on-site personnel have received appropriate medical examinations and are able to conduct the tasks required for this project. This includes medical examinations required by 29 CFR 1910.120(f) and 29 CFR Part 1926.65(f), respiratory protection medical evaluations, respirator fit test requirements, and any site-specific biological monitoring requirements. Medical clearances shall be maintained at the Site for all employees engaged in activities with the potential exposure to hazardous waste.

6.2.4 Hazard/Risk Analysis - Identify and provide a means of mitigating all foreseeable chemical and physical hazards associated with the Work. A Job Hazard Analysis must be completed for each Work task.

6.2.5 Work Zones - A site plan, which depicts the designation of zones including: (1) Exclusion Zones (EZ), (2) Contamination Reduction Zones (CRZ), and (3) Support Zones (SZ). The level of personal protection for each zone shall be specified by the Contractor.

6.2.6 Personal Safety Equipment and Protective Clothing - Identify personal safety equipment and protective clothing to be used and available on-site. This shall include identification of expected levels of protection (e.g., B, C, and D) for each task, and the action levels and protocols for determining and implementing personal protective equipment (PPE) upgrades/downgrades.

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6.2.7 Emergency Response and Contingency Plan - Identify and provide procedures for emergencies arising during Work activities. A route map and directions to the nearest hospital shall also be included.

6.2.8 Equipment Cleaning - Describe methods and procedures for decontamination of equipment.

6.2.9 Material Safety Data Sheets - Provide Material Safety Data Sheets (MSDSs) for all chemical materials to be brought on, handled, stored, and/or otherwise used at the site by the Contractor. Provide an inventory of all chemicals brought on site by all Contractors and Subcontractors in accordance with HAZCOM requirements. All chemical containers must be labeled and all personnel handling or using chemicals must be trained in accordance with HAZCOM requirements.

6.2.10 Noise Level - Describe methods and procedures for controlling noise levels, as produced by construction activities, to safe and tolerable limits as set forth by OSHA and any applicable state or local codes or ordinances. All construction activities presenting a potential noise nuisance (potential to generate complaints from facility or adjacent properties) shall be provided with noise muffling devices.

6.2.11 Dust Management - Describe methods and procedures for managing dust produced by site activities. Describe monitoring methods and action levels to necessitate implementation of dust management measures. The use of any materials other than clean potable water for dust management is prohibited unless approved by Honeywell.

6.2.12 Equipment Maintenance – Contractor HASP shall address specific health and safety considerations associated with the maintenance of all equipment, tools and electrical devices. Contractor shall specify maintenance locations, anticipated work activities and related worker protections, spill response, containment and cleanup, storage of chemical materials, fuels and lubricants, during vehicle maintenance activities.

6.2.13 Fall Protection - The HASP shall address the fall hazards and controls associated with site work activities. Walking/working surfaces (horizontal and vertical surfaces) at remediation construction sites with an unprotected side or edge that is 6 feet (1.8 m) or more above a lower level shall be protected by the use of guard rail systems, safety net systems, or personal fall arrest systems. Walking/working surfaces (horizontal and vertical surfaces) at routine operation and maintenance sites with an unprotected side or edge that is 4 feet (1.2 m) or more above a lower level shall be protected by the use of guard rail systems, safety net systems, or personal fall arrest systems. Contractor and all subcontractors shall comply with 29 CFR 1926, Subpart M Fall Protection, or the equivalent state requirements. Fall protection shall meet

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the minimum requirements of Honeywell procedure RES-HS-05, Fall Protection (ATTACHMENT 01620-05).

6.2.14 Confined Space Entry - The Contractor shall identify the presence or absence of confined space entry work activities. If entry into tanks, process equipment, sumps, sewers, manholes, trenches, or other spaces identified as a confined space is identified as a work activity, a confined space entry program must be included in the HASP. The confined space entry program must include requirements for labeling confined spaces, permit requirements, monitoring requirements, PPE, retrieval equipment, training requirements, and emergency response procedures. Confined space entry program shall meet the minimum requirements of Honeywell procedure RES-HS-07, Confined Space (ATTACHMENT 01620-06).

6.2.15 Crane Safety - The HASP shall address the hazards and controls associated with crane, hoist, and rigging operations. This includes personnel training/certification, crane equipment inspection, positioning, and operations; general hoist operations; and rigging equipment inspection and use for material handling via cranes and hoists. Critical lift procedures and planning shall be addressed as required. Contractor] and all subcontractors shall comply with 29 CFR 1926 Subpart N Cranes, Derricks, Hoists, Elevators, and Conveyors, or the equivalent state standards.

6.2.16 Hot Work - The Contractor shall include the requirements for a hot-work permit system for any welding, burning, open flame, spark-producing or similar activity (for example, abrasive grinders, abrasive saws). The permit should include, as a minimum, fire prevention procedures, PPE, and cylinder safety. Provide a fire watch, and necessary safety equipment (welding screen/blankets, agreed to fire extinguishers, fire hoses, firewater etc.) while performing any Hot Work.

6.2.17 Utility Clearance – The HASP shall address the requirements for buried utility clearance prior to performing work activities. Sources of information to identify buried utilities include use of a utility locator service, plant drawings, locations of sanitary and storm sewers, electrical conduits, water supply lines, natural gas lines, fuel tanks and lines, and facility personnel knowledgeable of utility location. The HASP shall assess the risk from overhead power lines and ensure adequate clearance distance is maintained.

6.2.18 Hazardous Energy Control - The HASP shall include hazardous energy control requirements if work activities have the potential to expose Contractor employees or others working at the site to hazardous energy sources. This includes activities related to the installation, maintenance, service, repair, decommissioning, or dismantlement of machines, equipment, piping, processes, or systems. The

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Contractor shall provide trained and authorized employees to conduct lock out/tag out operations. This section shall include a site-specific lockout/tagout procedure. It must identify all machines, equipment, electrical installations, processes, or systems that are included in the procedure. Lock out / tab out shall meet the minimum requirements of Honeywell procedure RES-HS-08, Lock Out / Tag Out (ATTACHMENT 01620-07).

6.2.19 Line Breaking - The HASP shall include line breaking procedures if work activities have the potential to expose Contractor employees or others working at the site to hazardous materials contained within enclosed pipes or vessels. This includes activities related to the installation, maintenance, service, repair, decommissioning, or dismantlement of machines, equipment, piping, processes, or systems. This section shall include a site-specific line breaking procedure. It must identify all machines, equipment, piping, processes, or systems that are included in the procedure. Line breaking shall meet the minimum requirements of Honeywell procedure RES-HS-02, Line Breaking (ATTACHMENT 01620-02).

6.2.20 Excavation - The HASP shall address the hazards and controls associated with excavation activities conducted by the Contractor and all subcontractors. Excavation is defined as any man-made cut, cavity, trench, or depression in an earth surface that is formed by earth removal. Excavation hazards include, but are not limited to, cave-ins, falls, falling objects, hazardous atmospheres, unstable structures, and excavating into underground utilities. Contractor and all subcontractors shall comply with 29 CFR Subpart P Excavations, or the equivalent state requirements. Excavations shall meet the minimum requirements of Honeywell procedure RES-HS-03, Excavation (ATTACHMENT 01620-08).

6.2.21 Scaffolds and Ladders - The HASP shall address the hazards and controls associated with the use of scaffolds and ladders to perform work activities. This requirement applies to the use of various types of scaffolds including, but not limited to, pole, tube and coupler, fabricated frame, horse, ladder jack, outrigger, interior hung, needle beam, suspended, adjustable suspended, and mobile. It also applies to the various types of ladders that may be used to perform work activities including, but not limited to, step, extension, and fixed. Hazards that should be addressed include falls to different levels, being struck by falling objects, and exposure to unstable scaffolds and work platforms.

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Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-01
RES-HS-01
Contractor Safety

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1.0 APPLICABILITY

1.1 This procedure is applicable to all Corporate RES sites where there will be $250,000 or more spent on an IRM, remedial action, or demolition project (not including waste transportation and disposal). It establishes minimum requirements that must be met by all applicable sites.

1.2 In addition to complying with this procedure, RES sites must comply with all applicable national, state, and local regulations.

1.3 RES sites or project teams must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate site's procedure.

1.4 Whenever a Honeywell RES Procedure is more stringent than the applicable national, state, and local regulations, the Honeywell RES Procedure shall apply.

2.0 OVERVIEW

2.1 The purpose of this procedure is to promote and achieve a premier level of safety performance for each construction employee working on RES projects.

2.2 The Honeywell RES Contractor Safety Booklet will be used on RES sites. The Booklet will be provided to Contractor employees who work at the site a minimum of 40 hours on a specific remedial action or demolition project. At the discretion of the Honeywell RES Design & Construction Manager or Remediation Manager, the Booklets can be used on smaller projects.

2.3 This procedure does not replace, or provide a substitute for, any other site/project safety or training requirements. The intent of this procedure is to complement all other site and safety requirements and training.

3.0 DEFINITIONS

3.1 See Section 8.0 for definition of underlined terms.

3.2 See RES-ADMIN-02 for additional RES program definitions and acronyms.

4.0 REQUIREMENTS

4.1 Authorities / Responsibilities

4.1.1 The *Honeywell Design and Construction Manager, or Remediation Manager* is responsible for determining the need for distribution of the Contractor Safety Booklet for any given RES construction project.

4.1.2 The *Construction Manager* is responsible for distributing the Contractor Safety Booklet to the onsite project team and the appropriate site Contractors.

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4.2 Procedure

4.2.1 Prior to mobilizing to any RES construction jobsite, all Contractor personnel shall attend the relevant site safety orientation consistent with the site Health and Safety Plan (HASP) which communicates Honeywell's commitment to safety through:

4.2.1.1 Hazard communication and continuous safety awareness.

4.2.1.2 Ongoing communication of safety expectations.

4.2.1.3 Following work processes and practices that reduce at-risk behaviors.

4.2.1.4 Ensuring the proper management and communication of incidents.

4.2.2 All Contractor personnel working on Honeywell RES sites subject to this Standard shall be given the Honeywell RES Safety Booklet. Contractor employees must read the Safety Booklet and sign the Acknowledgement Page of the Booklet. The Acknowledgement Page must be submitted prior to his/her working no more than 16 hours onsite. The Construction Manager shall maintain a log of the safety orientation and Safety Booklet distribution.

4.2.3 Re-orientation and the distribution of the Safety Booklet shall occur annually on extended construction projects.

5.0 REFERENCES

5.1 RES Contractor Safety Booklet

6.0 ATTACHMENTS

6.1 Acknowledgement Page - RES Contractor Safety Booklet

7.0 REVISION LOG

Revision Number	Section Number	Revised By	Revision Date	Description of Change
0	All	S. Visnic	05/28/2013	Initial Issue

8.0 DEFINITIONS

None	

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RES CONTRACTOR SAFETY BOOKLET ACKNOWLEDGEMENT PAGE

Acknowledgement Page
Read Carefully Before Signing Below

This is to acknowledge that I have received my copy of the Honeywell Project Contractor Safety Handbook and an orientation on its contents as well as other project rules and policies. I have read, understand and will abide by all rules and regulations in the handbook and any additional rules and regulations of my job. I understand that working safely, complying with and obeying any and all of my Company and Honeywell project safety rules, regulations or standards is a condition of employment at this Honeywell project site location. Should I not comply with my Company and/or Honeywell project safety rules, regulations or standards, I am subject to disciplinary action including removal from the site and possible termination of employment. I understand further that this handbook and the rules and regulations it contains do not in any way constitute a contract (either expressed or implied) of employment between the Company as my employer and me for any indefinite or specified period of time.

_____

Print Full Name Signature

_____

Contractor Company Name

_____

Honeywell Project Contact/Representative

_____

Date

Note: After properly endorsed, the perforated page is to be removed and given to the Honeywell Project Contact and/or Representative.

March 2013

Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-02
RES-HS-02
Line Breaking

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1.0 APPLICABILITY

1.1 This procedure is applicable to all Honeywell organizations and majority owned subsidiaries worldwide. It establishes minimum requirements that must be met by all organizations.

1.2 In addition to complying with this procedure, organizations must ensure that they are in compliance with all applicable national, state, and local regulations.

1.3 Each Honeywell Strategic Business Group (SBG) must either adopt this procedure or develop its equivalent SBG procedure. The SBG equivalent procedure must be reviewed and approved by the corporate owner of this standard for equivalency.

1.4 Each Honeywell site or organization must customize either this procedure or its SBG's equivalent procedure.

1.5 Each Honeywell site or organization must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate organization's procedure.

1.6 Whenever a Honeywell Procedure is more stringent than the applicable national, state, and local regulations, the Honeywell Procedure shall apply.

1.7 Honeywell organizations that have determined that this procedure is not applicable to them do not need a site procedure on this topic. The organization must document in its SAT the rationale for determining that this procedure is not applicable.

2.0 OVERVIEW

2.1 To protect personnel from potential thermal, chemical, physical and other hazards associated with breaking or opening pipelines or other closed systems.

2.2 Applies whenever a closed system previously containing chemicals or any other material under pressure (e.g., steam line) is breached or opened.

2.3 Performance Materials and Technologies requirements are covered in PMTHSE311

3.0 DEFINITIONS

3.1 Definitions for underlined text are found at the end of this document.

4.0 REQUIREMENTS

4.1 Line Breaking Procedures

4.1.1 Line breaking procedures may be incorporated into location zero energy procedures. Low hazard exceptions shall be documented in the SBG and site procedure (see Definition of Hazardous Linebreaking Activities for example low hazard exceptions).

4.2 Personal Protective Equipment (PPE) and Clothing Requirements

4.2.1 All employees performing line breaking activities shall be required to wear appropriate personal protective equipment (e.g., respirators, chemical-resistant gloves, hearing

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protection, protective full faceshields over safety glasses and/or chemical safety goggles, etc.)

4.3 Line Breaking Preparation Activities

4.3.1 Affected persons shall be notified prior to initiating line breaking activities pertinent in their work areas. Notifications shall include a description of the potential hazards associated with the line breaking activity.

4.3.2 All associated pumps and electrical equipment shall be placed in a zero energy state prior to the initiation of line breaking activities.

4.3.3 The portion of the line being worked on shall be effectively isolated by blanking, shutting and isolating valves preceding and following the affected area of the line.

4.3.4 Line isolating devices (e.g., valves, disconnects, blanks) shall be physically locked in the closed position by the authorized person performing the line break.

4.3.5 Lines shall be drained and purged with vents open to prevent the possibility of an air lock.

4.3.6 The authorized person shall ensure that systems are in a zero energy state prior to initiation of line breaking work.

4.4 Line breaking activities

4.4.1 A line breaking checklist and permit shall be completed and signed by the authorized person performing the work, except when breaking into a compressed air line less than 100 psi (6.9 bar) when a risk assessment is completed and zero energy procedures are applied.

4.4.2 Each checklist/permit must be displayed at the job site and issued for only a single shift.

4.5 Closure of Line breaking activities

4.5.1 Any guards or safety devices removed prior to or during line breaking activities shall be reinstalled and made fully operational prior to the startup of the associated lines.

4.5.2 All affected employees shall be notified of the completion of line breaking activities.

4.6 Training

4.6.1 Authorized persons shall be trained in line breaking procedures.

4.6.2 Training shall include the requirement that authorized persons successfully demonstrate the application of line breaking procedures.

4.6.3 Training shall be conducted annually and documented.

4.6.4 Affected persons shall be trained on the existence and purpose of line breaking procedures.

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4.6.5 Retraining shall be provided as necessary based on personnel, facility and/or procedural changes**.**

4.7 Annual Audit

4.7.1 An authorized person shall conduct an annual, documented audit of site line breaking procedures.

4.7.2 The audit shall include direct observation of line breaking steps by authorized persons and verification that associated procedures are appropriate, understood and implemented.

5.0 Reference Documents

5.1 Lock / Tag / Try, HSEMS 301

6.0 Attachments

6.1 Example Line Breaking Checklist Permit

7.0 Revision Log

Revision Number	Section Number	Revised By	Revision Date	Description of Change
00	All	Abhi Joshi		Converted standard to new format. No change in content or requirement number
01	4.1.1; 4.4.1; 8.0	Al Shaw CSSC	2/15/2012	Removed requirement for specific equipment procedures, clarified high pressure as 100 psi (6.9 bar) or greater, and clarified the definition of hazardous line breaking activities.

8.0 Definitions

Affected person	An individual who works or has occasion to work in the vicinity of machinery or equipment systems covered by line breaking procedures.
Authorized person	An individual qualified to perform line breaking by virtue of training and demonstrated competency.
Hazardous Linebreaking activities	Hazardous linebreaking includes activities such as opening lines and/or clearing line blockages during which exposure may occur to high pressure compressed air (100 psi (6.9 bar) or greater), pressurized materials, corrosive liquids and gases, hot (150F/66C or above) liquids and gases including steam and condensate, cryogenic gases, toxic liquids and gases, or flammable or explosive liquids or gases or other hazards. Low hazard exceptions shall be approved by the site HSE Representative and documented in the site Linebreaking procedure.

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	Examples of low hazard exceptions may include: • Disconnecting forklift propane tanks • Breaking sanitary sewer lines provided that appropriate PPE is utilized. • Connecting or disconnecting portable compressed gas/air cylinders • Hose connections related to bulk shipments/deliveries. • Breaking water or inert material lines 1 ½" / 3.8 cm in diameter or less which are at a pressure no greater than normal municipal water pressure and under 130 ^{0} F/ 54 C. • Replacing twist on/off filters or filters in twist on/off housings. These example exceptions are not considered an exhaustive list, and the requirements of HSEMS 301 Lock Tag Try shall be followed as applicable.
Line Breaking	A procedure in which a closed system is breached or opened.
Linebreaking checklist and permit	A written document completed and signed by an Authorized person prior to initiating line breaking activities that verifies appropriate safety precautions have been completed.
Zero Energy Procedure (ZEP)	A procedure for eliminating energy from equipment and machinery prior to maintenance, repair, servicing or modification that contains the following sequence of steps: • Identification of all energy sources • De-energization • Lockout • Tagout • Relief of stored energy • Testing and verification
Zero Energy State	The physical state of equipment and machinery following complete de-energization and verification through implementation of ZEP.

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Honeywell Level 2 Checklist	**Line Breaking (Safe-32)**

Only the key elements of this program are listed below. The location is expected to conform to all the requirements in the standard.

Requirements:

1. Customized written procedure (may be part of local Zero Energy Procedure). (4.1)

2. PPE/Clothing requirements have been identified. (4.2)

3. A line breaking checklist and permit system is in place. (4.4)

Training:

4. Authorized and affected employees have received training. (4.6)

5. Refresher training provided when personnel, facility or procedure changes occur. (4.6)

Self-Audit:

6. Annual assessment of the program. (4.7)

7. Periodic audits conducted of line breaking work conducted and reviewed. (4.7)

Discussions (List title and role of personnel):

Observations:

Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-03
RES-HS-11
Event Notification / Communication

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1.0 APPLICABILITY

1.1 This procedure is applicable to all Honeywell organizations and majority owned subsidiaries worldwide. It establishes minimum requirements that must be met by all organizations.

1.2 In addition to complying with this procedure, organizations must ensure that they are in compliance with all applicable national, state, and local regulations.

1.3 Each Honeywell Strategic Business Group (SBG) must either adopt this procedure or develop its equivalent SBG procedure. The SBG equivalent procedure must be reviewed and approved by the corporate owner of this standard for equivalency.

1.4 Each Honeywell site or organization must customize either this procedure by using Attachment 6.1 or its SBG's equivalent procedure.

1.5 Each Honeywell site or organization must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate organization's procedure.

1.6 Whenever a Honeywell Procedure is more stringent than the applicable national, state, and local regulations, the Honeywell Procedure shall apply.

2.0 OVERVIEW

2.1 Conformance to this procedure will ensure all required Health, Safety, Environmental and Security related events are reported to the appropriate contacts and systems in an established period of time.

2.2 This procedure establishes the requirements for completing and posting an annual summary of the prior years' recordable safety events from February 1 thru April 30.

3.0 DEFINITIONS

3.1 Definitions for underlined text are found at the end of this document.

4.0 REQUIREMENTS

4.1 Responsibilities

4.1.1 Corporate HSES – Responsible for informing corporate leadership concerning HSE events, coordinating level of response, conference calls, and meetings. Responsible for the organization and activities of the Corporate Recordkeeping Committee.

4.1.2 Site Leader – Accountable for ensuring events (Tier 1, 2 or 3) are reported as described within the procedure. Responsible for signing the annual summary of recordable safety events and accountable for the information on this summary being true, accurate, and complete.

4.1.3 Site Health, Safety & Environmental (HSE) – Responsible for reporting HSE events as described within this procedure, utilizing designated reporting systems to enter information, assuring the truth, accuracy, and completeness of information entered,

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and ensuring the annual summary is visibly posted throughout the required time period.

4.2 Events shall be investigated according to the requirements in HSEMS 701, Incident Investigation.

4.2.1 All Corrective Actions arising out of incident investigations for Tier 1, Tier 2, and Tier 3 Events must be entered in the Event Tracking System so they may be tracked to completion.

4.3 Event Reporting System

4.3.1 Reporting shall be accomplished using the secure HSES intranet Event Tracking System (http://hser.honeywell.com/hser/index.jsp). Prior to first use of the intranet system, users shall register for access by completing the Event Tracking Registration Form.

4.3.2 If user experiences technical difficulties, inquiries can be made by contacting the system administrator for assistance.

4.4 Injury and Illness Classification

4.4.1 All employee and contractor employee work-related injuries and illnesses shall be classified for recordability using the Honeywell Global Recordkeeping Requirements.

4.4.2 If an employee or contractor employee injury or illness is initially assessed as “Not Recordable”, the Recordkeeping Coach shall be used to evaluate the classification.

4.4.3 If the Recordkeeping Coach indicates that the injury or illness is likely “Recordable”, the site must enter the case as a Recordable Tier 1 or Tier 2 Event.

4.4.3.1 If the site wishes to pursue a recordability exemption, site HSE personnel should complete the Recordability Exemption form and forward it to the SBG HSE leader.

4.4.3.2 If the SBG HSE leader agrees with the request for recordability exemption, the SBG HSE leader forwards the form to the Chair of the Recordkeeping Review Committee.

4.4.3.3 The three members of the Recordkeeping Review Committee will each review the case and provide their assessment of recordability.

4.4.3.4 If the Recordkeeping Review Committee agrees that the case is not recordable, the SBG leader and site HSE leader will be notified, and the Event Tracking System entry can be updated to reflect the proper classification.

4.4.3.5 If the Recordkeeping Review Committee determines that the case is recordable, the SBG leader and site HSE leader will be notified. If the SBG leader and site HSE leader request further review, the case will be sent to Honeywell’s External Recordkeeping Consultant for review.

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4.4.3.6 The opinion of Honeywell's External Recordkeeping Consultant will be communicated to the SBG and site HSE leader and is binding.

4.5 Reporting of Events with Multiple Components

4.5.1 If a single incident results in multiple items that qualify as reportable events under this procedure, each reportable event must be entered into the Event Tracking System as a unique entry.

4.5.1.1 After the initial entry, subsequent entries should reference the event number of the initial entry.

4.6 Event Reporting – Tier 1 Event

4.6.1 A Tier 1 event requires locations/organizations to immediately (within two hours) contact Corporate HSES via the Corporate Call List and the SBE/SBU/SBG HSE leader by telephone at any time including weekends and holidays.

4.6.1.1 The SBG Leader or designee can make the corporate notification.

4.6.1.2 A voicemail message or e-mail notification is not an acceptable means of notification.

4.6.2 The corporate HSES leader receiving the call shall contact additional members of the Corporate Call List **,** including the Corporate VP HSES.

4.6.3 If there is any doubt as to the potential significance of an event, the SBE/SBU/SBG HSE leader should be contacted to help determine the appropriate reporting Tier.

4.6.4 Tier 1 events shall be reported into the Honeywell Event Tracking System within one business day of the event even if information about the event is incomplete.

4.6.4.1 The initial event report is a preliminary report due within one business day and should include the pertinent factual details (with no guesses, assumptions or speculation) known at the time the report is entered into the Event Tracking System.

4.6.4.2 Event reports shall be updated as the situation evolves and additional information is determined. Updates shall continue until the event is considered closed with all corrective actions completed.

4.6.5 Tier 1 safety injury and illness events will automatically populate the electronic version of the HON Form 300. A current list of all of an organization's Tier 1 and Tier 2 safety events can be printed from the Event Tracking System at any time.

4.6.6 The location may create and print the optional HON Form 301.

4.7 Event Reporting – Tier 2 Event

4.7.1 Tier 2 events shall be reported into the Honeywell Event Tracking System within one business day.

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4.7.1.1 The initial event report is a preliminary report due within one business day and should include the pertinent factual details (with no guesses, assumptions or speculation) known at the time the report is entered into the system.

4.7.1.2 Event reports shall be updated as the situation evolves and additional information is determined. Updates shall continue until the event is considered closed with all corrective actions completed.

4.7.1.3 Tier 2 safety injury and illness events will automatically populate the electronic version of the Honeywell Form 300. A current list of all of an organization's Tier 1 and Tier 2 safety events can be printed from the Event Tracking System at any time.

4.7.1.4 The location may create and print the optional HON Form 301.

4.8 Event Reporting – Tier 3 Event

4.8.1 The following Tier 3 events **shall** be entered into the event tracking system within seven (7) calendar days.

4.8.1.1 Employee, contractor or visitor injuries/illnesses where first-aid treatment or evaluation is provided by a Medical or Para-Medical Professional.

4.8.1.2 A regulatory agency inspection that does not otherwise qualify as a Tier 1 or Tier 2 event, (and may still be ongoing) with no notice of fine, penalty or corrective action.

4.8.1.3 A notification required to be sent to an agency based on an excursion from a permit condition that does not result in any notice of fine, penalty or agency corrective action.

4.8.1.4 As defined in HSEMS 711 Emergency Response, all Emergency Response Plan drills shall be entered into the Event Tracking System as Tier 3 events with identified action plans and timelines, as needed and developed by the critique.

4.8.2 The following Tier 3 events **may** be entered into the event tracking system as directed by the SBG for reporting.

4.8.2.1 Employee, contractor or visitor injuries/illnesses injury/illness where first-aid treatment or evaluation is provided by someone other than a Medical or Para-Medical Professional.

4.8.2.2 Significant Near misses

4.8.2.3 Operations successes at facilities (i.e., ISO Certification, VPP, OHSAS, local or state recognition, etc.)

4.8.3 Tier 3 first-aid events that have been entered into the Event Tracking System will be automatically entered on the HON First Aid Form (300B). Additional first-aid events

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can be added to the form by hand, which would provide the site with a complete first-aid log.

4.9 Annual Posting of Honeywell Forms

4.9.1 The HON Form 300 is the site log of work-related injuries and illnesses. This log shall be available upon request, but is not posted.

4.9.2 The HON Form 300A is the summary of work-related injuries and illnesses. The data from the HON Form 300 will be automatically summarized on the HON Form 300A.

4.9.2.1 In January of each year, the Site Leader shall sign the completed HON Form 300A for the previous year certifying that all entries are true, accurate, and complete.

4.9.3 The HON Form 300A shall be posted in a conspicuous location from February 1 to April 30 documenting the information from the prior year. This must be posted even if the site had no Tier 1 or Tier 2 Safety events the previous year.

4.9.4 After the annual posting period, the HON Form 300A shall be placed in a secure file with the HON Form 300.

4.10 Data Privacy

4.10.1 In countries with applicable data privacy laws:

4.10.1.1 Appropriate notice shall be given to individuals from whom or about whom information is collected. The Data Privacy Function should be contacted to assist with providing appropriate notice.

4.10.1.2 A process shall be put in place for individuals whose information is contained in these records to review information pertaining to them and to request correction if the information is not accurate.

4.10.1.3 Steps shall be taken to notify the records collection/database to the national data protection authority, where required. The data privacy function should be contacted to determine whether such notification is required and, if so, what steps need to be taken to notify the records collection/database.

4.10.2 Records shall be stored in a location (physical or virtual) that is secure and not accessible except to those who have a legitimate reason to see the records. Appropriate access controls shall be put in place to ensure that records can be and are accessed only by those who have been authorized to see them.

4.10.3 If an employee experiences one of the following types of injuries or illnesses, the employee's name shall not be printed on a hard copy printout of the Form 300. Within the event tracking system, click the box corresponding to the event(s) that meet these criteria. This action will prevent the employee's name from being printed on the Form 300; instead, it will print "Privacy Case #__"

4.10.3.1 An injury or illness to an intimate body part or the reproductive system

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4.10.3.2 An injury or illness resulting from a sexual assault

4.10.3.3 Mental Illness

4.10.3.4 HIV infection, hepatitis, or tuberculosis

4.10.3.5 Needle stick injuries and cuts from sharp objects that are contaminated with another person's blood or other potentially infectious material

4.10.3.6 Other illnesses, if the employee voluntarily requests that his or her name not be entered on the log.

4.10.4 A separate, confidential list of the case number and employee names for privacy concern cases can be printed through the event tracking system.

4.11 Attorney Client Privilege

4.11.1 Only Tier 1 events may be entered into the ETS under Attorney-Client Privilege.

4.11.2 For cases designated as Attorney-Client Privilege, the SBG HSE leader is responsible for entering the Event Description and Root Cause Category under the direction of counsel.

4.11.3 Once the Attorney-Client Privilege status of an event is deemed no longer applicable, the SBG HSE leader shall contact the ETS Administrator and the Event Reporting standard owner so that the event entry can be correctly classified and updated as needed.

4.11.4 The status of all Attorney-Client Privilege Cases will be reviewed at each SBG Quarterly Call until the status is no longer deemed applicable.

4.12 Records

4.12.1 Records required by the Event Reporting Procedure shall be retained for (the greater of) either six years or the applicable national regulatory requirement. Refer to the Honeywell Records and Information Management website. This includes the following:

4.12.1.1 Honeywell Form 300 log

4.12.1.2 Honeywell Form 300A (annual summary)

4.12.1.3 Honeywell First Aid Form (300B)

4.12.1.4 Honeywell Form 301 (Injuries and Illnesses Incident Report)

4.12.1.5 Privacy Case Concerns

4.12.1.6 Incident Investigation Reports

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4.13 Audit and Program Review

4.13.1 The Organization shall perform a documented annual evaluation of the entire Event Reporting Process. This evaluation can be done as part of the annual HSE Self-Assessment (SAT).

4.13.2 The annual evaluation shall include a thorough review of the following:

4.13.2.1 The Organization's Event Reporting Procedure to determine if it meets all Corporate and SBG requirements.

4.13.2.2 Consistent with any applicable data privacy requirements, a comparison between national or insurance reporting requirements, such as worker's compensation, and cases in the Event Tracking System. The reasons for any variance shall be investigated and documented.

4.13.2.3 Appropriate accident reports, HON and regulatory required accident logs (HON Form 300), and first-aid logs (HON Form 300B).

4.13.2.4 Verification the summary (HON Form 300A) was posted.

4.13.2.5 The availability of all records required to be maintained by this procedure.

4.13.2.6 The accuracy of classification and Event Tracking System entry of Recordable injuries and illnesses.

4.13.3 The results of the evaluation shall be included as part of the SBG HSEMS Management Review. All actions that are necessary to improve the process shall be documented and completed.

5.0 Reference Documents

5.1 Incident Investigation HSEMS 701

5.2 Honeywell Global Recordkeeping Requirements

5.3 Allegations of Adverse Health Effects and Substantial Risk Reporting, HLTH-19

5.4 TRAC - The Risk Assessment Committee, HSEMS 605

6.0 Attachments

6.1 Sample Site Level Event Reporting Procedure

6.2 Honeywell Corporate Call List

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7.0 REVISION LOG

Revision Number	Section Number	Revised By	Revision Date	Description of Change
01	4.2.1	E. Jennison	July 6, 2009	Added requirement to codify current practice
01	All	Abhi Joshi		Converted standard to new format. No change in content or requirement number
02	4.11	E. Jennison	Sept. 14, 2009	Added section 4.11 relating to Attorney Client Privilege.
03	4.8.1.3	E. Jennison	Nov. 4, 2009	Clarified that environmental excursions that must be reported to an agency that do not result in notice of a fine, penalty or agency corrective action are Tier 3 events. Excursions that do result in notice of a fine, penalty, or agency corrective action remain Tier 2 events.
04	9.0	E. Jennison	September 2012	Consolidated definitions in Tier 1 relating to security events and clarified that these include off site events that require Honeywell personnel to take action. Modified definition of Tier 1 Fires. Consolidated Tier 1 definitions relating to serious injuries or illnesses or fatalities in the general public that are related to Honeywell incidents. Removed phrase “which includes a release that triggers a regulatory inquiry” from Tier 1 definition of releases that have an Adverse Environmental Impact. Removed phrase “or any act triggering a subsequent inquiry or response by an agency or other governmental entity” from definition of Adverse Environmental Impact. Eliminated Tier 1 definition of “Events generating community activism or adverse media coverage not associated with an episodic event at the national/international level.” Added item 5.8.1.4, requirement to document Emergency Response Drills, critiques, and corrective actions as Tier 3 events (effective January 1, 2013). Eliminated 5.3.3 referencing obsolete flow chart.

8.0 DEFINITIONS

Accident	An unplanned event resulting in personal injury or illness, equipment or property damage, or an environmental excursion.
Adverse	Any incident that results in a significant and negative effect to the

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Environmental Impact	environment OR Involves community, property owners, regulatory agencies, governmental officials or other non-Honeywell parties and presents a situation that results in interactions with these parties beyond those that are routine or expected as part of permitted activities. Examples of significant and negative effects that meet this criteria include, but are not limited, to the following: the upset or shutdown of a community wastewater treatment facility, contamination of a drinking water supply, wildlife fatalities (such as a fish kill), unplanned closure or restriction of public transportation routes, property damage or impairment (such as distress of vegetation, compromise to the ongoing use), aesthetic degradation (such as color, odor, noise) that draws community interest, neighborhood evacuations or a call to shelter-in-place..
Contractor	An organization that provides services to Honeywell for maintenance, repair, capital improvement, minor renovations, new installations, specialty work, etc.
Contractor Employee	A non-Honeywell individual that provides services to Honeywell and works under the direct day-to-day supervision of a member of the Contractor organization.
Due Diligence Finding	HSE recommendations arising out of due diligence activities must be entered in the Event Tracking system within 2 weeks of a site being assigned a Site ID number in the system.
Employee	An individual employed by Honeywell, a subsidiary of Honeywell or anyone that is working for Honeywell and who is directly supervised on a day-to-day basis by a Honeywell employee.
Excursion	A release to air, water or soil which exceeds a numerical limit imposed by law, regulation, permit, ordinance, agency order or agreement, or which requires notification to a government agency.
HON Form 300	This is the site's annual log of recordable work-related injuries and illnesses. Tier 1 and Tier 2 employee work-related injuries and illnesses are tracked on this electronic form.
HON Form 300A	This is the site's annual summary of recordable work-related injuries and illnesses. It summarizes the detailed data from the HON Form 300.
HON First Aid Form (300B)	This is the site's annual log of first-aid injuries. Tier 3 work-related injuries and illnesses are tracked on this electronic form.
HON Form 301	Optional outside the US. This form can be used to document a recordable

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	work-related injury/illness event. Note: In the US, some state workers' compensation, insurance, or other reports may be acceptable substitutes.
Incident	An Accident or Near Miss occurrence that either did or could have resulted in personal injury or illness, equipment or property damage, or an environmental excursion.
Medical and Para-Medical Professionals	Personnel with licensure or certification that authorizes them to perform medical treatment independently as defined by the scope of practice for their profession or to perform medical treatment under the direction of a physician. (i.e., Doctor, Nurse, LPN, Physicians Assistant, Emergency Medical Technician, Paramedic, etc.)
Near Miss	An unplanned event that could have reasonably resulted in personal injury or illness, equipment or property damage, or an environmental excursion.
Notice of Violation (NOV)	A written notice from a government entity which alleges that a Honeywell entity is not in compliance with law, permit, order, or agreement.
Operations Success	Cost reductions, location or business certifications or awards, staffing changes or other activities or accomplishments that document the beneficial role of HSES.
Privacy Case	An injury or illness that is of a sensitive nature. Examples include injury or illness to an intimate body part, sexual assault, mental illness, etc.
Recordable	An injury or illness that is classified as Recordable using Honeywell Global Recordkeeping Requirements.
Significant	An occurrence that is anything other than routine in the setting in which is occurs, which is important to people, property or the environment. An occurrence that may contribute to additional events in the future if left uncontrolled.
Site Leader	The operating manager who has responsibility for a particular facility or organization. The Site Leader could also be called the General Manager, Plant Manager, Facility Manager, Area Manager, etc., depending on the particular business entity.
Spill	A release of material from a primary containment. Spills that are not also excursions are generally small in nature, do not violate government requirements, and do not require reporting to a government agency.
Tier 1	A Tier 1 event requires locations/organizations to immediately (**within two hours**) contact Corporate HSES and the SBE/SBU/SBG HSE leader by telephone at any time including weekends and holiday and enter a report into the Honeywell Event Tracking System within **one business day**.

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	One or more on-site or off-site fatalities involving an employee, contractor employee or visitor that are or may be work-related. A single work-related on-site or off-site incident resulting in three or more employees, contractors or visitors being admitted to a hospital. Fires that resulted in a significant interruption of business operations or an estimated damages in excess of $5 million US Dollars. Any on-site security incident that may be immediately dangerous to life or property, such as bomb threats, receipt of suspicious materials, packages or letters for which outside authorities were called in to investigate. Other examples include proximity to external incidents, such as chemical or radiation releases, and releases of biological agents that require Honeywell personnel to respond in any way. Fatalities, serious injuries or illnesses in the general public allegedly associated with a company-related incident, event or release to air, water or soil. A release to air, water or soil that has an Adverse Environmental Impact. Government representatives alleging or suggesting criminal non-compliance of any kind. A regulatory agency inspection with notice of fine, penalty or corrective action that has a directive or other type of injunctive device designed or likely to halt, curtail, or restrict operations.
Tier 2	Tier 2 events shall be reported into the Honeywell Event Tracking System within **one business day**. Employee or contract employee lost workday injuries/illnesses. Any on-site or off-site injuries/illnesses involving an employee, contractor employee or visitor that are or may be work-related and are significant enough to be recordable. Minor injuries or illnesses in the general public that allegedly are associated with a company-related incident, event or release to air, water or soil. Suspicious activities in or around Honeywell facilities or processes that may present a potential security risk. Fires that do not meet the Tier 1 definition, including fires extinguished using handheld fire extinguisher(s) or an integrated fire suppression system internal to a piece of equipment that did minimal property damage, and did not halt operations. Allegations of previously unknown health or environmental effects caused by products, processes, emissions or discharges Allegations of Adverse

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	Health Effects, Hlth-19. An environmental excursion that does not also trigger Tier 1 reporting. Discovery of potential or actual evidence of contaminated soil or groundwater from current or former operations that does not otherwise meet the definition of an adverse environmental impact. Written notification from a governmental agency alleging non-compliance of any kind. Proposal or imposition of an HSES fine, penalty or corrective action. Receipt of a non-routine request for information from a governmental agency. A regulatory agency inspection (excluding those that are Tier 1 Events) with notice of fine, penalty or corrective action. An excursion from a permit condition which requires a notification to be sent to an agency that results in any notice of fine, penalty or agency corrective action. All HSE audits, including Corporate audits, Peer review, the annual SAT (Self assessment tool), audits for external HSE certification processes, and SBU audits or special initiatives. Any evaluations made by third parties such as HSE consultants or contracted HSE services. Recommendations from such evaluations must be entered as recommendations in the Event Tracking System. Significant community activism or adverse media coverage resulting from HSE events. Notice of an allegation from a third party or regulatory agency of environmental impacts from operations on current or formerly operated Honeywell facilities. Demands, including voluntary agreements, to conduct a site investigation or remedial measures to respond to environmental impacts from operations on current or formerly operated Honeywell facilities. Receipt of an information request or special notice letter associated with the disposal, transportation or storage of hazardous substances by Honeywell or its predecessors. Identification of any condition or circumstance which falls under the criteria of “Issues requiring TRAC approval” for which TRAC approval was NOT obtained. The Risk Assessment Committee (TRAC) - HSEMS 605

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Tier 3	The following Tier 3 events **shall** be entered into the event tracking system within **seven (7) calendar days**: On-site or off-site employee, contractor employee or visitor injuries/illnesses where first-aid treatment or evaluation is provided by a Medical or Para-Medical Professional. A regulatory agency inspection (which is not a Tier 1 or Tier 2 Event, and may still be underway) with no notice of fine, penalty or corrective action. A notification required to be sent to an agency based on an excursion from a permit condition that does not result in any notice of fine, penalty or agency corrective action. As defined in HSEMS 711 Emergency Response, all Emergency Response Plan drills shall be entered into the Event Tracking System as Tier 3 events with identified action plans and timelines, as needed and developed by the critique. (effective date January 1, 2013). The following Tier 3 events **may** be entered into the event tracking system as directed by the SBG for reporting: Employee, contractor or visitor injuries/illnesses injury/illness where first-aid treatment or evaluation is provided by someone other than a Medical or Para-Medical professional. Significant near misses Stewardship outreach events with customers, suppliers and/or communities, Operations successes at facilities (i.e., ISO Certification, VPP, OHSAS, local or state recognition, etc.)
Vendor/Supplier	A non-Honeywell individual involved in the sale or supply of items for a particular use by the site. Individual may have multiple Honeywell Points of Contact and does not physically reside within the confines of the site.
Visitor	Any individual entering a Honeywell facility for business or personal reasons and not fitting the definition of: contractor, contract employee, or sub-contractor; vendor/supplier; and/or delivery/pickup personnel.

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Honeywell Level 2 Checklist	**Events Reporting Procedure (HSEMS 703)**

Only the key elements of this program are listed below. The location is expected to conform to all the requirements in the standard.

Requirements:

1. TIER I events are reported within 2 hours to SBG Leader/Corporate Leader via telephone – live contact required. (4.3.3)

2. TIER I and TIER II events are inputted into the Event Reporting System within one business day of the event and updated until all corrective actions are completed. (4.6 & 4.7)

3. TIER III required events are inputted into the Event Reporting System within seven (7) calendar days of the event and updated until all corrective actions are completed. (4.8)

4. Review injury and illness data (HON Form 300, HON Form 300A, HON Form 300B, HON Form 301, national or insurance reporting requirements such as worker's compensation, etc.) to ensure appropriate decision criteria has been applied and is consistent with what is contained in the Event Reporting System. NOTE: If site disagrees with auditor decision, recommend the submission of the case to the corporate accident recordkeeping committee. (4.9)

5. If auditing between February 1 to April 30 verify the HON Form 300A is posted in a conspicuous area. Verify the site leader has signed this document. (4.9.2)

6. Review environmental incidents (spills, permit exceedence, use of non-approved waste vendor) and compare with entries in the event tracking system. (4.8.1.3)

Training:

Self-Audit:

1. Review injury and illness data (HON Form 300, HON Form 300A, HON Form 300B, HON Form 301, national or insurance reporting requirements such as worker's compensation, etc.) and compare with information contained within the Event Reporting System. (4.13)

Discussions (List title and role of personnel):

Observations:

Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-04
RES-HS-05
Incident Investigation

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1.0 APPLICABILITY

1.1 This procedure is applicable to all Honeywell organizations and majority owned subsidiaries worldwide. It establishes minimum requirements that must be met by all organizations

1.2 In addition to complying with this procedure, organizations must ensure that they are in compliance with all applicable national, state, and local regulations.

1.3 Each Honeywell Strategic Business Group (SBG) must either adopt this procedure or develop its equivalent SBG procedure. The SBG equivalent procedure must be reviewed and approved by the corporate owner of this standard for equivalency.

1.4 Each Honeywell site or organization must customize either this procedure by using Attachment 6.1 or its SBG's equivalent procedure.

1.5 Each Honeywell site or organization must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate organization's procedure.

1.6 Whenever a Honeywell Procedure is more stringent than the applicable national, state, and local regulations, the Honeywell Procedure shall apply.

2.0 OVERVIEW

2.1 Conformance to this procedure will aid the organization in preventing or mitigating future similar incidents through the use of a structured incident investigation process. This approach requires the identification of the causes of HSE incidents and the development of corrective actions that address those causes.

3.0 DEFINITIONS

3.1 Definitions for underlined text are found at the end of this document.

4.0 REQUIREMENTS

4.1 Responsibilities

4.1.1 Site Leader – Responsible for ensuring the Incident Investigation procedure is implemented and followed. The site leader shall participate in all Tier 1 incident investigations and reviews and signs-off on all Tier 1, Tier 2 and Tier 3 reports.

4.1.2 Line Supervision – Responsible to lead all Tier 2 and 3 incident investigations and participate in Tier 1 investigations, as appropriate.

4.1.3 Employees – Responsible to comply with the organization's Incident Investigation procedure and participate in incident investigations, as appropriate.

4.1.4 Health, Safety & Environmental (HSE) – Responsible for coordinating the entire Incident Investigation Program and providing technical expertise, as necessary.

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4.2 General Requirements of Incident Investigation

4.2.1 Incident investigations shall be conducted on all Safety, Health, Environmental, Property Damage, Security, and Transportation Accidents or Near Misses that are required to be entered in the Event Tracking System (ETS) as per the Corporate Event Reporting Procedure (HSEMS 703).

4.2.2 Incident investigations shall be initiated immediately following an Incident or upon receiving knowledge that an event has occurred. Preliminary reports shall be entered into the Event Reporting and Tracking System for all Tier 1, 2 and 3 events required to be entered in ETS as per the Corporate Event Reporting Procedure (HSEMS 703).

4.2.3 Incident investigations for all Tier 1 and Tier 2 events shall utilize a formal and documented analysis approach that identifies root causes. The approach shall be similar to one of the following and must be included in the site specific Incident Investigation Procedure: Causal Tree, Event Tree, Fault Tree, Why Tree, Apollo®, REASONS®, ABS®, or TapRoot®.

4.3 Incident Investigation Team

4.3.1 A team approach shall be used when conducting incident investigations.

4.3.1.1 At a minimum, two employees shall be members of the incident investigation team.

4.3.1.2 The team shall include: (a) someone that has knowledge of the process involved, and (b) someone with specific training and experience in leading investigations, fact-finding, and interviewing. (This may be the same individual.)

4.3.2 Either an SBG/SBU HSE manager or a member of Corporate HSES shall lead all Tier 1 incident investigations. These investigations shall be conducted under the guidance of the Corporate HSES group.

4.3.3 Legal and Communications must be immediately notified and involved in any Honeywell Tier I incident. See Event Reporting (HSEMS 703).

4.4 Fact Finding

4.4.1 The Incident Investigation must be conducted as a fact-finding exercise and not as a fault-finding mission.

4.4.2 The scene of the incident must be visited as quickly as possible.

4.4.3 Access to the area of the incident must be carefully controlled. In some cases, it may be necessary to isolate the area pending investigations by Honeywell personnel or outside authorities.

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4.4.4 In some cases, pictures and other means should be taken to record the evidence.

4.4.5 Interviews must be conducted with all relevant persons involved in or with knowledge of the incident, as soon as possible. These interviews shall be clearly documented.

4.4.6 If a person to be interviewed is not immediately available due to an injury or other reasons, he must be interviewed as soon as possible.

4.5 Corrective Actions

4.5.1 Specific corrective actions shall be developed to address the causes of the incident so that similar events are prevented in the future.

4.5.2 All corrective actions shall be assigned to a responsible person and have a target date set for completion.

4.5.3 For Tier 1, Tier 2, and Tier 3 events required to be entered into ETS, the event entry and associated corrective actions must be in English.

4.5.4 All Incidents requiring an Incident Investigation (as defined in Section 4.2) must have at least one corrective action entered into the Event Tracking System.

4.5.5 Corrective actions may not be closed until the entire action has been completed. (See “Guidance Document for Closing Corrective actions”)

4.5.6 Cascading corrective actions may be utilized to track plans for corrective actions provided;

4.5.6.1 The anticipated duration of the entire project exceeds 6 months

4.5.6.2 There are at least 2 sub-actions to complete the project

4.5.6.3 The action plan must be approved by the organization’s SAT approver.

4.5.6.4 The entire action plan must be completed before the Cascading Corrective action plan can be closed and sent for verification.

4.5.6.5 All Cascading Corrective Action plans must be verified using the Corrective Action Verification process.

4.5.6.6 Each corrective action under a plan has to be verified by the organization’s SAT approve.

4.5.6.7 The entire plan has to be verified once completed.

4.5.7 All One Honeywell sites, and sites designated by their SBG’s as subject to Corrective Action verification shall follow the following process;

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4.5.7.1 The corrective action closer utilizes the Attachment #1 function in ETS to provide evidence that the corrective action has been completed and enters the event closure date in ETS .

4.5.7.2 The corrective action verifier is automatically (weekly) notified that there are closed corrective actions that need review.

4.5.7.3 The corrective action verifier either approves the action closure, and indicates this in ETS OR indicates that the action is not approved, and the corrective action re-opens with the original starting date

4.5.7.4 If a corrective action verifier takes no action on verification within 30 days, the corrective action automatically is escalated to the next level SAT approver.

4.5.8 Where feasible, corrective actions shall be developed using the following Hierarchy of Effectiveness;

4.5.8.1 Elimination of Process or Activity

4.5.8.2 Engineering Controls (e.g. redesign, guarding) or Substitution

4.5.8.3 Operational or Administrative Controls (e.g. procedures, training, job rotation)

4.5.8.4 Personal Protective Equipment (e.g. hearing protection, gloves).

4.6 Written Report

4.6.1 A documented Incident Investigation Report must be generated for all Tier 1, Tier 2 and any Tier 3 events that are required to be entered in ETS per HSEMS 703, or there is a Near Miss that could have resulted in a Tier 1 or Tier 2 event.

4.6.1.1 As a minimum, the report shall contain the following details: facility or organization name, the time & date of the incident, date the investigation began, a description of the incident, a listing of all causes of the incident, all factors that contributed to the incident, all corrective actions, and the names of the incident investigation team members. (See Attachment 6.2 for a sample Incident Investigation Report Form.)

4.7 Communication

4.7.1 Each organization must implement a process that effectively communicates the causes and lessons learned to affected personnel for all appropriate Tier 1, 2 and 3 incidents.

4.7.2 Organizations must create a brief Incident Alert for all Tier 1 and 2 HSE related events.

4.7.2.1 At a minimum, the HSE Incident Alert should include the content outlined in Attachment 6.3.

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4.7.2.2 HSE Incident Alerts should be forwarded to the SBG/SBU HSE leaders, the Environmental Council for the business, and to the Corporate HSE Direct Editor. The Corporate HSE Direct Editor will utilize the HSE Direct publication to communicate HSE Incident Alerts throughout the Honeywell HSE community.

4.7.2.3 HSE Incident Alerts for all Tier 1 events shall receive Corporate Legal review prior to distribution.

4.8 Contractors and Visitors

4.8.1 Contractors

4.8.1.1 Honeywell must insure that contractors immediately notify Honeywell management of all contractor-related Tier 1 and 2 events.

4.8.1.2 Honeywell must insure that a representative from the contractor's company conducts an investigation of all contractor-related Tier 1 and 2 events and forwards a copy of the report to the Honeywell Incident Investigation Program Coordinator for review, within five (5) working days of the Incident.

4.8.1.3 Where appropriate, Honeywell may conduct its own incident investigation for a Tier 1 event involving contractors. However, Honeywell Legal must be consulted prior to beginning this additional investigation.

4.8.1.4 All Tier 1 and 2 incidents involving contractors shall be entered into the Corporate Event Reporting and Tracking System.

4.8.2 Visitors

4.8.2.1 For all incidents involving visitors, Honeywell will conduct investigations as per this procedure.

4.8.2.2 All Tier 1, 2 and required Tier 3 incidents involving visitors shall be entered into the Corporate Event Reporting and Tracking System.

4.9 Training

4.9.1 Initial training shall be provided to the Incident Investigation Team Leaders on the root cause analysis methodology and investigation techniques that are being used by the organization. Refresher training shall be provided at least once every three years.

4.9.2 Investigation team members shall be provided training that covers general information on the root cause analysis methodology being used.

4.9.3 All affected personnel shall receive awareness training on the organization's Incident Investigation Procedure during new employee orientation. Employees

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shall receive Rapid Problem Solving training during Phase III of HOS Deployment as described in HSEMS 715 and HOS 14.

4.10 Data Privacy

4.10.1 In countries with applicable data privacy laws;

4.10.1.1 Appropriate notice must be given to individuals from whom or about whom information is collected. The Data Privacy Function should be contacted to assist with providing appropriate notice.

4.10.1.2 A process must be put in place for individuals whose information is contained in these records to review information pertaining to them and to request correction if the information is not accurate.

4.10.1.3 Steps must be taken to notify the records collection/database to the national data protection authority, where required. The data privacy function should be contacted to determine whether such notification is required and, if so, what steps need to be taken to notify the records collection/database.

4.10.2 Records must be stored in a location (physical or virtual) that is secure and not accessible except to those who have a legitimate reason to see the records. Appropriate access controls must be put in place to ensure that records can be and are accessed only by those who have been authorized to see them.

4.11 Audit and Program Review

4.11.1 The Organization shall perform a documented annual evaluation of the entire Incident Investigation Process. This evaluation can be done as part of the annual HSE Self-Assessment (SAT).

4.11.2 The annual evaluation shall include a thorough review of the following:

4.11.2.1 The Organization's Incident Investigation Procedure to determine if it is complete and up to date.

4.11.2.2 Appropriate accident reports, insurance records, regulatory required accident logs, and first-aid logs to determine if Incident Investigation Reports were completed for all required cases.

4.11.2.3 All Incident Investigation Reports to insure their accuracy, including: (a) use of proper investigation techniques, (b) use of root-cause analysis methodology, (c) complete root-cause identification, and (d) identification and completion of all corrective actions.

4.11.2.4 Training records to determine if all required training was appropriately conducted and attended.

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4.11.2.5 The availability of all the records required to be maintained by this procedure.

4.11.3 The results of the evaluation shall be communicated to all appropriate levels of management. All actions that are necessary to improve the process must be documented and completed.

4.12 Records

4.12.1 Records required by the Incident Investigation Procedure shall be retained for (the greater of) either six years or the applicable national regulatory requirement. (Refer to the Records and Information Management website for records retention requirements.) This includes the following:

4.12.1.1 Any documentation gathered throughout the investigation process, such as: (a) data gathered during fact finding, (b) the documented Root Cause Analysis for any Tier 1 or Tier 2 event, or (c) the Incident Investigation Report for all Tier 1, 2, and required Tier 3 events, as specified in section 4.7.

4.12.1.2 All Training documentation including: (a) initial and refresher training for incident investigation team leaders, (b) training for incident team members, and (c) initial and refresher training for all affected personnel on the facility's Incident Investigation Procedure.

4.12.1.3 The Audit and Program Review Documentation.

5.0 Reference Documents

5.1 Event Reporting (HSEMS 703)

5.2 Integrating HSE into HOS (HSEMS 715 & HOS 14)

6.0 Attachments

6.1 Sample Site Level Incident Investigation Procedure

6.2 Sample Incident Investigation Report Form

6.3 Sample HSE Incident Alert

6.4 Guidance Document for Closing Corrective Actions

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7.0 REVISION LOG

Revision Number	Section Number	Revised By	Revision Date	Description of Change
01	4.5.3	E. Jennison	July 6, 2009	Changed document owner. Updated requirement to codify current practice. Updates references to other Corporate procedures
01	All	Abhi Joshi		Converted standard to new format. No change in content or requirement number
02	4.9.3	E. Jennison	December 21, 2010	Changed "initial training" for all new employees at time of hire to "awareness training". Replaced requirement for refresher training for all employees to completing Rapid Problem Solving training during Phase III of HOS deployment. Removed links to procedures not referenced by this standard, added link to HSEMS 715. Updated Tier event definitions to be consistent with HSEMS 703.
03	4.2.1, 4.2.2, 4.5.3, 4.6.1 4.6.2 4.5.3 4.5.6 and 4.5.7 4.7 5.0 8.0	E. Jennison	October 1, 2012	Clarified that actions relating to Tier 3 events only refer to Tier 3 events required to be in ETS as defined in HSEMS 703. Removed requirement to include name of injured persons in the investigation report. Added requirement that all Tier 1, 2, and Tier 3 events required to be in ETS and their associated corrective actions must be in English. New sections describing Corrective Action Cascading process and Corrective Action Verification Process. Revised process for sending Incident Bulletins to Corporate and distribution throughout the corporation to reflect the current practice of utilizing HSE Direct for this purpose. Revised list of references to include only those referred to in this procedure. Removed Tier 1, Tier 2 and Tier 3 definitions to avoid duplication and potential inconsistency with definitions in HSEMS 701.

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DEFINITIONS

Accident	An unplanned event resulting in personal injury or illness, equipment or property damage, or an environmental excursion.
Excursion	A release to air, water or soil which exceeds a numerical limit imposed by law, regulation, permit, ordinance, agency order, or agreement.
Incident	An Accident or Near Miss occurrence that either did or could have resulted in personal injury or illness, equipment or property damage, or an environmental excursion.
Medical and Para-Medical Professionals	Personnel with licensure or certification that authorizes them to perform medical treatment independently as defined by the scope of practice for their profession or to perform medical treatment under the direction of a physician. (i.e., Doctor, Nurse, LPN, Physicians Assistant, Emergency Medical Technician, Paramedic, etc.)
Near Miss	An unplanned event that could have reasonably resulted in personal injury or illness, equipment or property damage, or an environmental excursion.
Root Cause(s)	Personal Factors or Job Factors that allow unsafe behaviors to occur or unsafe conditions to exist.
Site Leader	The operating manager who has responsibility for a particular facility or organization. The Site Leader could also be called the General Manager, Plant Manager, Facility Manager, Area Manager, etc., depending on the particular business entity.

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Honeywell Level 2 Checklist	**Incident Investigation Procedure (HSEMS 701)**

Requirements:

1. Event investigations are promptly conducted for TIER 1, 2 and 3 Events. Note: TIER 3 is evaluation or treatment by either a licensed medical practitioner or a near miss that could have resulted in a TIER 1 or 2 event (4.2)

2. Event investigations include management representatives and indicate they have responsibility for the process. Site Leader signs-off on all TIER 1, TIER 2 and 3 reports. (4.3)

3. Event investigations utilize a documented root cause analysis approach (5 Why, Apollo, etc.) and identify root and contributory causes, and have corrective actions associated. (4.4 & 4.5)

4. Results from event investigations are communicated, corrective actions are developed to prevent recurrence, and HSE bulletins are created for TIER 1 and 2 events. (4.6 & 4.7)

5. TIER 1 and 2 events (for employees and contractors) are inputted into the Event Reporting System within one business day of the event.

Training:

1. Employees who conduct event investigations are trained in procedures, techniques and tools. (4.9)

Self-Audit:

1. Training is conducted every three (3) years for incident investigation team leaders. (4.9)

2. Records are retained for (the greater of) six (6) years or applicable national regulatory requirement. (4.12)

Discussions (List title and role of personnel):

Observations:

Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-05
RES-HS-04
Fall Protection

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Honeywell	HSE Management System Level 2 Standard	Document Owner	Al Shaw	
		Approved By	Mike Csedrik	
		Issue Date	03/09/2007	
Safety **Fall Protection Procedure**		Effective Date	07/01/2009	
		Rev. # & Date	**04**	**12/15/2011**
		Standard #	**HSEMS 343**	

1.0 APPLICABILITY

1.1 This procedure is applicable to all Honeywell organizations and majority owned subsidiaries worldwide. It establishes minimum requirements that must be met by all organizations

1.2 In addition to complying with this procedure, organizations must ensure that they are in compliance with all applicable national, state, and local regulations.

1.3 Each Honeywell Strategic Business Group (SBG) must either adopt this procedure or develop its equivalent SBG procedure. The SBG equivalent procedure must be reviewed and approved by the corporate owner of this standard for equivalency.

1.4 Each Honeywell site or organization must customize either this procedure by using Attachment 6.1 or its SBG's equivalent procedure.

1.5 Each Honeywell site or organization must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate organization's procedure.

1.6 Whenever a Honeywell Procedure supersedes the applicable national, state, and local regulations, the Honeywell Procedure shall apply.

2.0 OVERVIEW

2.1 Conformance to this Procedure will aid Organizations in preventing falls by avoiding work at heights where possible; use work equipment or other controls to prevent falls; and minimize the consequences if a fall should occur. Although work at heights may be covered by other regulations or procedures such as ladders, scaffolds or other elevated work platforms, this procedure will apply to all work performed above 4 feet or 1.2 meters, or 6 feet or 1.8 meters for construction related activities.

3.0 DEFINITIONS

3.1 Definitions for underlined text are found at the end of this document.

4.0 REQUIREMENTS

4.1 Responsibilities

4.1.1 Site Leader - Responsible for assuring the organization's Fall Protection Procedure is implemented and followed.

4.1.2 Program Administrator – Responsible for the development and implementation of the site-specific Fall Protection Procedure. The Program Administrator, (a) measures and evaluates the effectiveness of the organization's Fall Protection program, (b) assists in approving the selection and use of Work Positioning and Fall Arrest Systems, and (c) identifies the level of Risk Management applied to specific fall hazards.

4.1.3 Supervisor – Responsible for ensuring employees adhere to the organization's Fall Protection Procedure.

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4.1.4 Qualified Person – Approves the selection and use of Work Positioning and Fall Arrest Systems. Verifies that fall protection equipment chosen by the competent person for specific tasks is adequate for the abatement of the fall hazard.

4.1.5 Competent Person – Conducts the risk assessment for fall hazards. Knowledgeable on applicable Fall Protection regulations and requirements. Assists Program Administrator as required. Selects appropriate Fall Protection equipment for specific tasks.

4.1.6 Authorized Person – Responsible for adhering to all requirements in the organization's Fall Protection program. Responsible to cease work and take appropriate action to include communicating to the appropriate management level when new or previously unknown hazards are identified.

4.1.7 Contractors shall:

4.1.7.1 Be aware of the requirements outlined in this procedure,

4.1.7.2 Provide all personal fall arrest systems to their employees,

4.1.7.3 Submit site specific fall protection plan for review by persons with authorized oversight (i.e. contractor control manager, site HSE Lead, etc),

4.1.7.4 Wear fall protection consistent with the requirements outlined in this document and all other applicable regulations.

4.2 General Requirements of Fall Protection

4.2.1 Minimum Fall Protection Requirements

4.2.1.1 All work above 4 feet (1.2 meters), or 6 feet (1.8 meters) for construction related activities must follow this Fall Protection Procedure or provide adequate fixed guarding systems (i.e. guardrails).

4.2.1.2 Warning systems must be in place on a roof 15 feet or 5 meters from the edge to warn employees that they are approaching an unprotected opening (including skylights), roof side or edge of the roof. The warning system also designates an area on the roof where work may **not** take place without the use of guardrails, fall arrest, or safety net systems to protect employees in the area.

4.2.1.3 Anchorage points must be rated or engineered. Guardrails are not considered an acceptable fixed anchor point on mobile elevated work platforms or similar equipment.

4.2.2 Mobile Elevated Work Platforms

4.2.2.1 Employees working from a mobile elevated work platform (MEWP), such as a scissor lift, boom, cherry picker etc. must wear a harness and lanyard whenever the lift is designed with proper anchor points installed by the manufacturer for use with fall protection harnesses.

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4.2.2.2 If the lift does not have proper anchor points installed by the manufacturer, then the employee must wear fall protection if the guardrail system is inadequate (including an appropriate top rail and mid rail) or the worker leaves the safety of the work platform and guardrail system. If work is performed outside the guardrails of any MEWP, the employee must have fall protection anchored on a fixed anchor point outside of the MEWP that meets the anchor point requirements for fall protection.

4.2.2.3 No MEWP or anchor points can be modified or removed by anyone other than the original manufacturer.

4.3 Risk Assessment

4.3.1 All work at height tasks being performed shall be assessed initially and upon any task changes by a Competent Person prior to the work (using attachment 6.2) commencing to identify if there is a risk of a fall and the control measures to be implemented.

4.3.2 This risk assessment can be done as part of a site-wide risk assessment for all routine tasks. For non-routine or modified tasks, the risk assessment shall be done prior to the task being undertaken. (see attachment 6.2)

4.3.3 Based on the risk assessment, the following shall be documented as applicable:

4.3.3.1 An inventory of all work at height tasks and risks identified (attachment 6.4)

4.3.3.2 A determination that the structure(s) are safe to climb and fixed anchor points are safe to use must be done by a competent person.

4.3.3.3 Required training as identified in 4.5.

4.3.4 The risk assessment should be reviewed and updated on a periodic basis, as defined by regulatory requirements, not to exceed every 3 years.

4.4 Risk Management : Where the risk of a fall from work at height is identified, a hazard identification and risk assessment shall be documented for the intended task(s) and the following hierarchy of risk control measures MUST be applied (in descending order) to either eliminate the risk or reduce the chance of a fall to as low as reasonably practicable. Only where it is not reasonably practical to use a higher order control may you then use a control at the next lower level:

4.4.1 Elimination: Eliminate the risk of a fall completely, e.g. relocate the work to a safe working height, to the ground or existing solid construction with guardrail/walls, etc.

4.4.2 Passive Fall Protection: If it is not reasonably practical to eliminate the risk of a fall, reduce the risk by the use of passive fall protection equipment e.g. guard-railing, scissor lifts, elevated work platforms, scaffolds, etc. Work from any mobile elevated work structure, shall require the additional use of a Personal Fall Arrest System.

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4.4.3 Work Positioning System: If it is not reasonably practical to eliminate the risk or use passive fall protection, use work positioning systems to physically prevent a fall from occurring.

4.4.4 Personal Fall Arrest System: If it is not reasonably practical to use the above options, the use of Personal Fall Arrest Systems to arrest a fall after it occurs shall be used. Body belts are not permitted for use as part of a Personal Fall Arrest System.

4.4.5 Administrative Controls: If none of the above measures are reasonably practical, or the risk of a fall still remains, the risk shall be reduced by the use of documented administrative controls that specify the procedures to be used to mitigate the risk, such as Warning Line System, Fall Protection Plan, Work at Heights Permit, Job Safety Analysis, etc.

NOTE: The selection and use of either a Work Positioning System, Personal Fall Arrest System or Administrative Controls must be approved by the relevant local manager (e.g. Site Leader or HSE Manager) in consultation with a Qualified Person or Program Administrator

4.5 Fall Protection & Rescue Plan

4.5.1 The organization must ensure that appropriate emergency procedures (to include a formal rescue plan, if applicable) are established, documented, and communicated to all affected employees, before any work at height is undertaken. This information is to be included in the organization's emergency response plan.

4.5.2 The organization must ensure that emergency procedures:

4.5.2.1 enable the rescue of an employee in the event of a fall, and

4.5.2.2 provide for first aid to an employee who has fallen

4.5.3 The organization must ensure that emergency response shall commence within 15 minutes. The following are examples of emergency response that can be used:

4.5.3.1 self-rescue

4.5.3.2 assisted rescue

4.5.3.3 self-descent device

4.5.3.4 high-angle rescue

4.6 Maintenance and Inspection

4.6.1 Personal Fall Arrest Systems and associated devices/equipment shall be visually inspected by the user prior to each use for excessive wear, damage and other sign of deterioration. In addition equipment shall be periodically inspected per manufacturers' specifications at intervals of no more than one year by a person other than the user.

4.6.2 Periodic inspections (attachment 6.3) shall be documented.

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4.6.3 Defective or out of date equipment shall be immediately removed from service and tagged.

4.6.4 Personal Fall Arrest Systems that are involved in a fall arrest incident must be taken out of service immediately and permanently. Retractable lifelines must be sent back to the manufacturer for repair and re-certification or destroyed.

4.6.5 Harnesses, lanyards, and retractable devices must have a legible tag or data plate attached to the device or it must be taken out of service.

4.6.6 Fall protection equipment must be replaced as required per the manufacturer's instructions or after 5 years from the date of manufacture if the manufacturer's documentation is not available. The manufacturing date is located on the equipment tags.

4.6.7 Fall protection equipment must be used in accordance with the manufacturer's instructions. This includes weight and size limitations, and must not be altered in any way without the manufacturer's written authorization.

4.6.8 Identification markings should follow the manufacturer's recommendations and should be made using an attached tag.

4.6.9 Markings on harnesses and lanyard webbing with either ink or paint and cleaning with solvents or corrosive materials should be avoided. Harnesses and lanyards with marked webbing should be replaced if: 1) there are signs of deterioration, 2) as recommended by the manufacturer or 3) after 5 years from the date of manufacture if the manufacturer's documentation is not available.

4.6.10 Anchor points shall be rated by the manufacturer or capable of supporting at least 5,000 pounds or 2,273 kgs per employee attached. Anchor points shall be certified by a qualified and competent person prior to its initial use.

4.7 Qualifications and Training

4.7.1 Personnel performing work at height shall be trained in site-specific fall protection procedures, and any task specific procedures that are established, prior to performing any work at height.

4.7.2 Employees shall demonstrate an understanding of the training and use of the equipment. This shall be accomplished through a documented exam and documented practical demonstration.

4.7.3 Refresher training, similar to the training stated in 4.7.1 and 4.7.2, shall be provided when;

4.7.3.1 Changes in the workplace render previous training obsolete,

4.7.3.2 Changes in the types of Fall Protection equipment to be used render previous training obsolete,

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4.7.3.3 Workplace observations indicate that employees have not retained an understanding of the skills acquired through their initial training,

4.7.3.4 Changes are made to the Fall Protection Program, or

4.7.3.5 Qualified or competent personnel identify the need.

4.7.4 At a minimum, refresher training must be completed every 3 years.

4.7.5 Personnel who maintain and inspect Personal Fall Arrest Systems must receive formal training on how to properly maintain and inspect Personal Fall Arrest Systems per the manufacturer's recommendations. The training shall be conducted by a Program Administrator, a Qualified person, a Competent person, or outside resource.

4.8 Records

4.8.1 Records required by the Fall Protection Procedure shall be retained for either three years or the applicable national regulatory requirements, whichever is greater. (Refer to the Corporate HSE Document and Records Management Procedure – HSEMS 210.) This includes the following:

4.8.1.1 Completed Fall Protection Risk Assessments (attachment 6.2)

4.8.1.2 All training documentation.

4.8.1.3 All Audit and Program Review Documentation.

4.9 Audit and Program Review

4.9.1 The Organization shall perform a documented annual evaluation of the entire Fall Protection Procedure. This evaluation can be done as part of the annual HSE Self-Assessment Tool (SAT).

4.9.2 The annual evaluation shall include at least a thorough review of the following:

4.9.2.1 The Organization's Fall Protection Procedure to determine if it is complete and up to date.

4.9.2.2 Fall protection risk assessments to evaluate the thoroughness and completeness of the assessment.

4.9.2.3 Equipment inspection checklists to evaluate the thoroughness and completeness.

4.9.2.4 Training records to determine if all required training was appropriately conducted and attended.

4.9.2.5 The availability of all the records required to be maintained by this procedure.

4.9.3 The results of the evaluation shall be communicated to all appropriate levels of management. All actions that are necessary to improve the process must be documented and completed.

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5.0 Reference Documents

5.1 HSE Aspects & Impacts (HSEMS 202)
5.2 HSE Legal & Other Requirements (HSEMS 203)
5.3 HSE Training (HSEMS 208)
5.4 HSE Documents & Records Management
5.5 Operational Controls (HSEMS 211)
5.6 Emergency Response (HSEMS 317)
5.7 Personal Protective Equipment (HSEMS 319)
5.8 Contractors & Visitors on Premises (HSEMS 323)
5.9 Ladders & Scaffolds (HSEMS 333)

6.0 Attachments

6.1 Fall Protection Program Template
6.2 Fall Protection Risk Assessment Form
6.3 Fall Protection Equipment Inspection Checklist
6.4 Fall Protection Inventory

7.0 Revision Log

Revision Number	Section Number	Revised By	Revision Date	Description of Change
00	All	Abhi Joshi		Converted standard to new format. No change in content or requirement number
0.1	4.2.1.3, 4.2.1.4, 4.6.9	EG & CSSC	July 2009	Added "…from proper anchor points installed by the manufacturer or rated by a structural engineer." to 4.2.1.3; added 4.2.1.4; changed language related to capacity ratings of anchor points in 4.6.9.
02	4.2.2	AS & CSSC	March 2010	Clarification of when fall protection is required when using a mobile elevated work platform.
03	4.6	AS & CSSC	August 4, 2010	Added to Inspection and Maintenance: Formal inspections of fall protection equipment at intervals of no more than one year by a person other than the user. Replacement of fall protection equipment per manufacturer's recommendations or after 5 years from the date of manufacture if the manufacturer's documentation is not available. Updated identification markings on lanyards and harness webbing and replacement practice.

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04	4.2.1.2	AS & CSSC	December 15, 2011	Clarified wording regarding 15 ft (5m) warning systems designates an area on the roof where work may **not** take place without the use of guardrails, fall arrest, or safety net systems to protect employees in the area.

8.0 DEFINITIONS

Authorized Person	A person authorized by the organization to perform work at height. May be a Honeywell employee, contractor, or sub-contractor.
Body belt (safety belt)	A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.
Competent Person	A person who is capable of identifying existing and predictable hazards in the surroundings or working conditions associated with the work at height which are hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to solve work at height problems.
Construction Related Activities	Activities that involve building, erecting new structures or processes, relocation of equipment or processes, installation of new processes, etc. This does not include typical maintenance activities such as painting, changing of light bulbs or related fixtures, electrical work, preventive maintenance activities, etc.
Deceleration Device	Any mechanism such as a rope grab, rip-stitch lanyard, tearing lanyard, deforming lanyard, or automatic self-retracting lifeline/lanyard that serves to dissipate a substantial amount of energy during a fall arrest.
Double Lanyard	Two independent lanyards, each with its own individual shock absorbing device.
Fall Prevention	Fall prevention is any means used to reasonably prevent employee exposure to fall hazards, either by eliminating work at elevation, using aerial lifts, scaffolds, work platforms with guardrails, or similar protection.
Fall Protection	Fall protection involves using personal fall arrest equipment to prevent the completion of a fall and to reduce the possibility of resulting injuries.
Fall Arrest System	A fall arrest system includes the proper anchorage, body support (harness), and connecting means (lanyards/lifelines) interconnected and rigged to arrest a free fall. The primary function of a fall arrest system is to minimize the consequences of a fall rather than preventing its occurrence. The use of fall arrest equipment should be recognized as a

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	means of minimizing injuries sustained from a fall. It does not prevent the fall.
Full Body Harness	An engineered design of straps which are secured about the employee in a manner that will distribute the fall arrest forces over the thighs, pelvis, waist, chest and shoulders with means of attaching it to other components of a personal fall arrest system.
Guard Rail System	A barrier erected to prevent employees from falling to lower levels. Design requirements must meet local engineering codes or Honeywell Corporate HSE Level 2 Standards - Walking/Working Surfaces- HSEMS 345
High Angle Rescue	A situation where a victim is elevated above ground greater than 10 feet or below ground and must be moved and/or rescued by the use of rope and/or mechanical advantage systems and rigging.
Leading Edge	Means the edge of a floor or roof.
Mobile Elevated Work Platforms	Vehicle mounted aerial devices, elevating rolling work platform, boom-type elevating work platform, or self-propelled elevating work platform.
Personal Fall Arrest System	An approved system used to arrest an employee in a fall from a working level. It consists of an anchor point, anchorage devices, connectors, full body harness, and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.
Personal Fall Restraint System	System that prevents a worker from reaching an unprotected leading edge on a horizontal surface, such as a roof. May include guard rails, cable systems, and fixed anchor points.
Positioning Device System (Horizontal)	A restraining device positioned in such a way that a person is able to work at the edge of a non-procedure walking / working surface but cannot physically fall over the edge. Positioning Device Systems cannot be used for fall arrest.
Positioning Device System (Vertical)	A body harness system rigged to allow a person to work on a horizontal surface while wearing a harness secured to a lanyard no longer than twenty-four inches, on a vertical surface such as a wall or fixed ladder. The positioning device system allows a person to work with both hands free while leaning. Positioning Device Systems cannot be used for fall arrest.
Program	Those individuals that are tasked with the development, implementation and management of the Fall Protection Program. (for example – HSE or

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Administrator	Facilities Manager) The Program Administrator has the responsibility to assure qualified certification of any fall protection/fall arrest systems to be used by Honeywell personnel.
Qualified Person	A person who, by extensive knowledge, training and experience, has successfully demonstrated to the organization or the organization's designate the ability to resolve problems relating to work at height or the project. (for example - HSE professional, Engineer, Subject Matter Expert, 3rd Party)
Rope Grab	An approved deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee.
Shock Absorbing Lanyard	A flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body harness to a lifeline or anchor point and has deceleration capabilities as part of the entire unit (i.e., rip-stitching, tearing or deforming lanyards).
Self Descent Device	A manual or automatic rescue device that is used to lower a climber to a lower level or the ground.
Self Rescue	Reach the fallen worker from the structure and pull the victim back to the safety of the structure.
Self-Retracting Lifeline/Lanyard	A deceleration device containing a drum-wound line that can be slowly Extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.
Snaphook	All snaphooks used are to be of the locking type with a self-closing, self-locking keeper that remains closed and locked until unlocked and pressed open for connection or disconnection.
Unprotected Sides and Edges	Any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp or runway where there is no wall or guardrail system at least 42 inches (105 cm) high**.**
Warning Line System	A visual or physical warning on a roof 15 feet or 5 meters from the edge to warn employees that they are approaching an unprotected opening (including skylights), roof side or edge, and which designates an area in where roofing work may take place without the use of guardrails, fall arrest, or safety net systems to protect employees in the area.
Work At Heights	Work performed at a height equal to or greater than 4 feet (1.2 meters)

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	or 6 feet (1.8 meters) for construction related activities in terms of risk assessment and risk management.
"Y" Lanyard	Two lanyards sharing a common shock-absorbing device.

NOTE: Multiple roles identified in the definitions may be performed by a single person. If the Organization does not possess the skill sets necessary to fill these roles, outside assistance is required (consultant, contractor or other Honeywell resources).

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Honeywell Level 2 Checklist	**Fall Protection (HSEMS-343)**

Only the key elements of this program are listed below. The location is expected to conform to all the requirements in the standard.

Requirements:

1. A written Fall Protection Program is in place. (1.4)

2. The minimum Corporate Fall Protection requirements are in place. (4.2)

3. A fall protection risk assessment has been completed. (4.3)

4. The local fall protection procedure includes a rescue plan. (4.5)

5. Maintenance and documented Inspections of personal fall protection (visual inspection prior to each use, periodical checks per manufacturer specifications) (4.6)

Training:

6. Personnel performing elevated work shall be trained in site-specific fall protection measures with refresher training every 3 years. (4.7)

Self-Audit:

7. An annual evaluation of the fall protection procedure is completed. (4.9)

Discussions (List title and role of personnel):

Observations:

Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-06
RES-HS-07
Confined Space Entry

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1. REQUIREMENTS

- This Standard will ensure that proper precautions are taken when company employees or contractor personnel must enter a confined space to perform work, including but not limited to: inspecting, cleaning, testing and repairing.
- By following this standard, potential confined space hazards such as oxygen deficiency, hazardous materials, engulfment, power-driven equipment, electrical shock and difficulty in escaping will be eliminated or properly controlled.

1.1 DETERMINE PERSONNEL ENTRY OF PERMIT REQUIRED CONFINED SPACES

- Honeywell locations must determine if employees shall enter any permit-required confined spaces.
- If Honeywell locations prohibit entry into permit-required confined spaces for their employees, the location must take effective measures to prevent their employees from entering the permit required confined spaces.
- All Contractors performing confined space entry activities shall follow the applicable Country Requirements; and follow either the requirements outlined below or follow their own Confined Space Entry Procedures, as long as it is equivalent to and consistent with the Honeywell requirements.
- ***To customize this element for a site or organization, please describe how the site or organization will manage confined space entry and whether Honeywell employees, Contractors or both will be permitted to enter and work inside confined spaces.***

1.2 IDENTIFICATION, HAZARD ASSESSMENT AND INVENTORY

Confined Space Inventory and Evaluation Form

Each location shall evaluate its workplace and create a complete confined space inventory using the Confined Space Inventory and Evaluation form in Appendix D, or equivalent, as follows:

- Determine if there are any potential confined spaces, using columns (a), (b) and (c), which identify the three characteristics of a confined space: i) bodily entry possible, ii) limited or restricted means of access or egress, and iii) not designed for continuous employee occupancy.
- Evaluate each confined space for one or more of the characteristic confined space hazards that make it a permit-required confined space, using columns (d), (e), (f) and (g).

In evaluating each confined space for the presence of one or more of the characteristic confined space hazards, the analysis must take into account chemicals and physical agents that:

- will be in the space prior to emptying, draining or cleaning the space; or
- are reasonably expected to be introduced into the space during emptying, draining or cleaning of the space; or
- are reasonably expected to be introduced into the space in connection with any subsequent activities in or around the space.

- The Confined Space Inventory and Evaluation Form shall classify each confined space as either permit-required or non-permit required in the “Type of Space” column.
- The Confined Space Inventory and Evaluation shall be communicated to all affected personnel and reviewed annually for accuracy.

- While this detailed Confined Space Inventory and Evaluation form should be extremely helpful in identifying the potential hazards and control measures for a particular confined space, it does not eliminate the need to follow our standard procedures for entry into permit-required spaces.
- ***To customize this element for a site or organization, please describe where the Confined Space Inventory and Evaluation Form will be stored.***

Permit-Required Confined Space Hazard Assessment and Control Form

- Each permit-required confined space must be evaluated for potential hazards prior to entry. The Permit-Required Confined Space Hazard Assessment and Control Form must be used for this evaluation.
- Complete the Permit-Required Confined Space Hazard Assessment and Control Form in Appendix D. The characteristic hazards are: i) a potential/actual hazardous atmosphere, ii) a potential for engulfment, iii) an internal configuration that may trap or asphyxiate an entrant, or iv) and other recognized serious safety or health hazard. This form provides guidance in identifying these characteristic confined space hazards.
- ***To customize this element for a site or organization, please describe where the Permit-Required Confined Space Hazard Assessment and Control Form will be stored.***

1.3 Entry Procedures

- Written entry procedures must be developed for each confined space identified in the confined space inventory.
- Written entry procedures include both Permit-Required and Non-Permit Confined Spaces. For a sample of a Permit and Non-Permit Confined Spaced Entry Procedure, see Appendix D.
- If a confined space is identified in the inventory as a non-permit space, or one that can be readily reclassified to a Non-Permit Confine Space by applying lockout to mechanical hazards, and an activity to be performed in or around the space has the potential to create a serious safety or health hazard in the space, then the written entry procedures for entry into a permit-required space must be followed.
- ***To customize this element for a site or organization, please state where the written confined space entry procedures are located.***

1.4 Confined Space Warnings

Permanent confined space warnings shall be conspicuously displayed at each entrance to a confined space as follows:

- Permit-Required Confined Spaces must read: “DANGER – PERMIT-REQUIRED CONFINED SPACE. AUTHORIZED PERSONNEL ONLY” or equivalent.
- Non-Permit Required Confined Spaces must read: “CAUTION – NON-PERMIT CONFINED SPACE. AUTHORIZED PERSONNEL ONLY” or equivalent.
- For storm sewer manhole covers, such as in parking lots and high traffic areas, an alternative identification strategy may be used such as ensuring that these spaces are included in the site inventory and applicable employees have received training to recognize these as confined spaces.
- Confined space warnings must be posted at each entrance regardless of whether the space is being entered or not.

1.5 Performing the Permit-Requied Confined Space Entry

Prior to Entry

- The following local documents specific to the space must be completed, available and reviewed prior to entry:
    - Permit-Required Confined Space Entry Procedure

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  - Permit-Required Confined Space Hazard Assessment and Control Form
  - Confined Space Entry Permit, including the Attendant Training Checklist, see Appendix D.
- The entry supervisor must ensure that the authorized entrants and attendants are fully informed of potentially hazardous materials or conditions they are likely to encounter by conducting a safety preparation briefing.

Permit System

- Ensure that the Permit-Required Confined Space is safe for entry by implementing the permit system.
- A detailed Confined Space Entry Permit, including the Attendant's Checklist, see Appendix D, must be completed, signed by the appropriate entry supervisor, test equipment operator, attendant and posted at all entry points being used to enter the space.
- The initial Confined Space Entry Permit including the Attendant's Checklist will be valid for the specified duration of the job. The entry permit shall be reviewed and revalidated upon change of entry supervisor.
- ***To customize this element for a site or organization, please state where the completed permits will be stored.***

Control Internal Hazards

- Place the confined space in a zero energy state and isolate the space from unexpected ingress of materials in accordance with the Honeywell HSEMS 301 Lock/Tag/Try Standard.

Control Introduced or External Hazards

- Steps shall be taken to ensure that all precautions necessary to protect authorized entrants from external hazards are provided.
- These steps include: placing appropriate signs and barriers outside the space; protecting the space against releases from adjacent processes, exhaust from vehicles and other sources of hazardous gases or mists; and protecting entrants from releases or any other hazards posed by materials brought into the confined space for required work or created in the space by the work (e.g., tile adhesives, welding products and by-products, paint solvents).

Cleaning and Purging

- All confined spaces shall be emptied, flushed or otherwise purges of hazardous materials.
- Cleaning may be done by flushing with water, steaming or any other acceptable practice, depending on the nature of the material contained in the confined space. If steam is used for cleaning, the space must be cooled before entering.

Ventilation

- In order to eliminate or control atmospheric hazards, the confined space shall be thoroughly and continuously ventilated by use of fans, blowers or any other method that will ensure an adequate continuous movement of uncontaminated air through the confined space.
- Care should be taken to ensure that there is sufficient air circulation to eliminate pockets of contaminated air. The only exception to this would be where the local HSE Leader has documentation proving continuous ventilation is not required by the certifying that there is no actual or potential atmospheric hazard posed by the space during the entry, including heat stress.

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Atmospheric Testing for Acceptable Entry Conditions

- Test equipment accuracy shall be field tested prior to each use and calibrated either prior to each use or on a monthly basis.
- Manufacturer required inspections and calibrations shall be completed by a qualified technician.
- All inspections and calibrations shall be performed and documented in accordance with the manufacturer's specifications.
- ***To customize this element for a site or organization, please indicate where the atmospheric test equipment inspection and calibration records will be stored.***
- The test equipment operator will test the atmosphere in the confined space to determine if acceptable entry conditions exist before entry is authorized to begin.
- This may be performed from a manhole, provided a remote sensor can reach the potential work areas and entry point(s). Otherwise, the test equipment operator must enter the space using an atmosphere-supplying respirator with retrieval system to conduct testing in all potential work areas of the space.
- An entry by the test equipment operator for this purpose must comply with all other requirements of a permit-required entry (e.g., attendant, rescue service).
- ***To customize this element for a site or organization, please indicate that a trained qualified person will be designated as the test equipment operator.***
- Permit-Required Confined Spaces shall be tested for the following atmospheric conditions in the order specified below to determine whether they meet the specified acceptable entry conditions:
    - Oxygen concentration, which must be between 19.5% and 23.5%. Continuous monitoring must be done where there is potential for oxygen concentrations outside this range.
    - Flammable vapor, gas or mist which must be at or below 5% of its lower flammable limit (LFL). In situations where gases or vapors are liberated after initial zero readings; evacuation must take place if any flammable vapor, gas or mist is detected. Continuous monitoring is required where there is a potential for liberation of flammable materials.
    - Toxic air contaminant concentrations must be below the established Occupational Exposure Limits (OELs) for acute health effects (see HSEMS 375 Exposure Assessment), in other words, an atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury or acute illness due to its health effects is not covered by this provision. Continuous monitoring is required where there is potential for liberation of toxic materials.
    - Airborne combustible dust (e.g., plastic, metal, wood, coal) concentration, which must be less than its LFL (generally, this is a concentration that obscures vision at a distance of five feet or less).
    - Note: Appropriate respiratory protection is required for entry if test results indicate airborne concentration outside of the limits as listed above. Except in extraordinary circumstances, approved by the site HSE Leader or person responsible for managing the local Confined Space Entry Program, no entry should be made into a permit-required confined space under any of the following conditions: an IDLH atmosphere; an atmosphere at or above 5% of the LFL for a flammable vapor, gas or mist; or an atmosphere at or above the lFL for a combustible dust.
- Continuous monitoring must be performed whenever the space contains or has the potential to contain a hazardous atmosphere.
- Where there is an extended entry and the scope of the continuous monitoring is not as extensive as that of the initial entry testing, additional follow up tests in the confined space should be made as often as deemed necessary by the entry supervisor. At a minimum, the confined space must be reevaluated at shift changes. The retesting shall be documented on the entry permit.
- If the confined space remains unattended for at least one hour, re-entry is not permitted until atmospheric re-testing of the space is performed.

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Entry

- The entry supervisor shall verify the completion of actions required by this standard by signing the confined space entry permit. Authorized entrants, with the required PPE and the retrieval systems in place, can now enter the space.
- When authorized entrants are inside a confined space, they must maintain communications with the attendant through the following two methods. The entrants must be within sight of the attendant stationed outside the space where line sight can be maintained.
- If line of sight cannot be maintained, two-way radio or voice communications between the attendant and the entrants in the confined space, as well as the use of a personal alert safety system (PASS), will be required. One radio and one PASS per group of employees inside the space is acceptable as long as the entrants can maintain line of sight with each other.

Entry Completion

- Once the work has been completed and all authorized entrants are known to be out of the confined space, the permits shall be removed and canceled by the entry supervisor in charge of the space and forwarded to the site HSE Leader or person responsible for managing the local Confined Space Entry Program for review.
- The entry supervisor shall ensure that the confined space is returned to a safe condition prior to cancellation of the entry permit.
- Canceled entry permits shall be filed and retained for 3 years to facilitate both the annual SAT audit and Corporate HSE audit of the confined space entry program.

1.6 Safe Work Practices Inside a Confined Space

Electrical Equipment

- Except as provided in the following sentence, portable electric equipment and lighting used in confined spaces shall be operated at 55 volts or less. 120-240 volt equipment and lights may be used if protected by a ground-fault circuit interrupter (GFCI) that is positioned outside the confined space.
- Portable lights outfitted with protective guards over the bulbs shall be provided.
- When a step-down transformer is used, the transformer must be left outside the space.
- Electrical equipment to be used inside the confined space must be explosion proof if the potential for a combustible atmosphere is present.
- All portable electrical equipment and lighting should be approved for type and operation by Underwriters Laboratory (UL), Factory Mutual (FM) or other appropriate certifying agencies.

Hot Work

- Before beginning any hot work, obtain a hot work permit and comply with the other requirements of HSEMS 389 Hot Work.
- Welding and burning equipment, other than torches, hoses and electrical welding leads, must not be taken into the confined space. The gas cylinders or welding machines must be left outside of the space and chocked, if on wheels.
- When gas cutting or welding is no longer needed on the job, or if the job is to be left unattended for an extended period of time (such as during lunch or overnight), the gas supply must be shut off at the cylinders and the torch valves must be closed. Where practicable, the torch and house shall also be removed from the confined space. If hoses are left running into the confined space, they must be disconnected from the gauges and properly stored, to prevent tripping hazards and hose damage.
- When arc welding is to be suspended for any substantial period of time, such as during lunch or overnight, all electrodes shall be removed from the holders and the holders carefully located so

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that accidental contact cannot occur, and the machine shall be disconnected from the power source.
- The attendant shall be instructed on how to quickly secure arc and oxygen acetylene welding equipment in case this equipment is involved in an accident inside the space.

Tools and Equipment
- Only tools and equipment appropriate for the work being performed and the potential hazards may be used inside a confined space, e.g. explosion proof, air operated, non-sparking.

Personal Protective Equipment
- Personal protective equipment such as goggles, respirators, boots, hardhats, gloves and protective clothing must be worn when the entry supervisor determines them necessary.
- If tests indicate that the confined space contains a hazardous atmosphere (due to the presence of a toxic chemical or an oxygen-deficient or oxygen-rich atmosphere), employees must not enter unless authorized by their entry supervisor and then only if wearing appropriate respiratory protection in accordance with the HSEMS 373 Respiratory Protection.

Retrieval System
Each authorized entrant shall wear a full body harness with a retrieval line attached except as modified below:
- The retrieval line does not have to be attached to the entrant if it would increase the overall risk of entry or would not contribute to the rescue of the entrant. However, precautions must be taken so that the task can be performed as safely as with the retrieval line. These exceptions must be approved by the Site Manager and the site HSE Leader and documented.
- Wristlets can be used if the location determines the use of a harness is infeasible or creates a greater hazard.
- A mechanical device shall be readily available to retrieve personnel from vertical-type confined spaces more than 5 feet (1.52 meters) deep.
- The end of the retrieval line which is outside the confined space shall be attached to a mechanical device or fixed point in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary.
- NOTE: A retrieval line must always be used and attached to the safety harness of each authorized person entering the confined space where a hazardous atmosphere or a potential for engulfment is determined to exist. If a retrieval line is infeasible or creates a greater hazard when either of these two hazardous conditions exists, the entry may not be performed.

1.7 Advance Rescue Preparation for Entries Under a Permit
- There must be an established emergency response procedure whereby both the rescue personnel and all necessary rescue equipment are available at the incident scene in a timely manner.
- ***To customize this element for a site or organization, please state where the emergency response procedure is located or add a link for the document.***
- Rescue shall commence within 5 minutes of an emergency. This means that, within 5 minutes after the attendant identifies an emergency situation, a qualified rescuer should be attending to the entrant, and the designated internal emergency rescue team or outside emergency service should be at the space preparing to extract the entrant.
- For entry into an IDLH atmosphere or a space that could quickly develop into an IDLH atmosphere, the rescue team or service must be standing by outside the permitted space.

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- For entries performed by Honeywell personnel, the emergency rescue service may be provided by on-site Honeywell personnel, the on-site personnel of a contract rescue service, or a combination of the two.
- For entries performed by outside contractors, the emergency rescue service may be provided by the contractor's on-site personnel, the on-site personnel of a contract rescue service or a Honeywell emergency rescue team with appropriate training and certification.
- In the event Honeywell and the outside contractors decide to rely on a Honeywell emergency rescue team for responding to a confined space emergency, that agreement shall be documented in writing, between Honeywell and the outside contractor, in the contracting documents prior to the start of work or as an amendment to the Confined Space Entry Permit, Addendum A, Appendix D.
- Given the 5 minute response target, neither Honeywell nor an outside contractor performing a confined space entry may rely on the local fire department or an off-site service to provide this emergency rescue service.
- All appropriate rescue equipment such as: harnesses, retrieval lines, stretchers, a mechanical means for removing an injured person from a confined space, etc must be readily available for emergency use by the rescue team. It is recommended that a Confined Space Rescue cart be established to contain all of the equipment within a portable means.
- The attendant must have a communications device immediately available, such as a two-way radio, telephone or cell phone, which could be used to call for rescue personnel.
- When entrants inside a confined space might be potentially exposed to a hazardous atmosphere (due to the present of a toxic chemical or an oxygen-deficient or oxygen-rich atmosphere), an atmosphere-supplying respirator must be readily available for emergency use by the rescue team.
- A documented review of the site rescue equipment shall be conducted prior to any permit-required confined space entry to ensure that all required rescue equipment is in usable condition and readily available (e.g., has not been removed for other purposes), Confined Space Rescue Cart Pre-Use Checklist, Appendix D.
- ***To customize this element for a site or organization, please include a customized inventory of confined space equipment used and rescue equipment available and state where the equipment is stored.***
- A documented practice rescue drill must be conducted annually. If the site uses a contracted service for rescue, documentation of the contracted service practice drill should be obtained and kept on file.
- ***To customize this element for a site or organization, please state where documentation of practice drills are located.***

1.8 Actual Rescue

- An entry rescue into a Permit-Required Confined Space shall be subject to all requirements for entry into a Permit-Required Confined Space. For purposes of entry rescue, a space that was originally classified as a Permit-Required Confined Space and then re-classified as a Non-Permit Confined Space shall be subject to all requirements for entry into a Permit-Required Confined Space.

1.9 Performing the Non-Permit Confined Space Entry

- The following local documents specific to the space must be completed, available and reviewed prior to entry:
    - Non-Permit Confined Space Entry Procedure or;
    - Non-Permit Confined Space Entry Procedure (After Reclassification)

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- Safe work practices shall be applied when entering any Non-Permit Confined Space. These practices include those mentioned in Safe Work Practices inside a Confined Space, Personnel Protective Equipment and HSEMS 301 Lock/Tag/Try.
- For entries by Honeywell employees, the entrant must receive authorization from the immediate Honeywell supervisor prior to entry for each Non-Permit Confined Space to be entered. The Honeywell supervisor shall assign a Honeywell employee to act as an attendant or periodic monitor (as appropriate). A monitor would be expected to check on the entrant's progress at least every 15 minutes until the entry is completed.
- For entries by contractor employees, the entrant must receive authorization from the contractor's on-site supervisor and notify the Honeywell supervisor prior to entry for each Non-Permit Confined Space to be entered. The Contractor's supervisor shall assign a contractor employee to act as an attendant or periodic monitor. A monitor would be expected to check on the entrant's progress at least every 15 minutes until the entry is completed.
- Care should be taken to ensure that there is sufficient air circulation within the Non-Permit Confined Space to prevent an exposure to heat stress. Fans, blowers or any other method that will ensure an adequate movement of uncontaminated air through the Non-Permit Confined Space should be used. Natural ventilation may satisfy this requirement if the airflow is adequate.

1.10 Confined Space Entry Field Audit

- Ongoing field audits must be conducted for both company and contractor entries.
- Field audits must be conducted by personnel with a detailed understanding of the local procedures and its application.
- If confined space entries are less frequent than once every 3 months, then every confined space entry must be audited using the Confined Space Entry Field Audit Form, Appendix D.
- ***To customize this element for a site or organization, please state where field audit forms are stored.***

2. Training

2.1 Confined Space Entry Training

- Honeywell is responsible for providing and documenting training to Honeywell employees and to any other workers whose means and methods of performance are directed by Honeywell personnel.
- Each contractor is responsible for providing and documenting the training to its personnel (and the personnel of their Honeywell-approved subcontractors) who perform confined space entry work at Honeywell locations.
- Contractor personnel shall be able to prove that they have received effective training on either this Standard or a substantially equivalent Standard.
- Locations shall provide training so that all personnel whose work is regulated by this standard will acquire the understanding, knowledge and skills necessary for the safe performance of their assigned duties.
- The training shall establish employee proficiency in the duties required by this Standard and will introduce new or revised standards, as necessary, for compliance with this Standard. This training should include hands-on training for each identified role.

Initial and annual refresher training shall be documented and minimally include the following:

- Safe Work Practices
- The Confined Space Entry Standard and Permit
- Personal Protective Equipment and Tools
- Use and calibration of devices used to monitor the atmosphere in a confined space

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- Duties of all people involved in the entry
- Rescue planning
- Emergency action and communication
- Chemical and physical hazards
- Ventilation techniques
- Isolation and hazardous energy control
- Use of safety harnesses and lifelines

Locations shall certify that the required training has been accomplished through documentation including the following information:

- Date of the training
- Name and signature of the instructor
- Detailed outline of the training
- Name of any video or computer based training programs that are used
- Signatures and identification numbers of the employees to whom the training was given

3. Inspections and Recordkeeping Requirements

3.1 Determination for Personnel Entry

- A site or organization shall describe how to manage confined space entry and whether Honeywell employees, Contractors or both will be permitted to enter and work inside confined spaces.

3.2 Confined Space Inventory and Evaluation

- A site or organization shall maintain current Confined Space Inventory and Evaluation Forms.

3.3 Permit-Required Confined Space Hazard Assessment and Control Forms

- A site or organization shall maintain current Permit-Required Hazard Assessment and Control Forms.

3.4 Confined Space Entry Procedures

- A site or organization shall maintain current written Confined Space Entry Procedures.

3.5 Confined Space Entry Permits

- Completed Confined Space Entry Permits shall be retained for 3 years.

3.6 Atmospheric Test Equipment Inspection and Calibration

- Atmospheric test equipment inspection and calibration records shall be retained for 3 years.

3.7 Emergency Response Procedure

- An Emergency Response Procedure specifying all necessary confined space rescue equipment are available at the incident scene in a timely manner.

3.8 Confined Space Equipment Inventory

- Maintain a current customized inventory of confined space equipment used and where the equipment is stored.

3.9 Annual Practice Drills

- A documented practice rescue drill must be conducted annually. If the site uses a contracted service for rescue, documentation of the contracted service practice drill should be obtained and kept on file.

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3.10 Field Audits

- Ongoing field audits must be conducted for both company and contractor entries and shall be retained for 3 years.

4. Responsibilities

The local procedure must include who is responsible for the development, implementation and ownership of this Standard.

4.1 Authorized Entrant

An employee who is authorizes by the employee to enter a confined space.
Entrants shall:

- Have received training on the location's confined space entry standard within the last year.
- Know the hazards or potential hazards faced during entry and the symptoms and consequences of any related exposures.
- Properly use equipment required by the entry.
- For Permit-Required Confined Spaces, keep entry sign-in and sign-out log current regarding entry status.
- Alert the attendant to hazardous conditions in the space.
- Exit from the confined space when an evacuation alarm or order is given or when a hazardous condition is detected in the space.

4.2 Contractor Coordinator

When Honeywell locations arrange to have a Contractor perform work that involves confined space entry, the site shall:

- Designate a Honeywell employee as a Contractor Coordinator and assign that individual the responsibility for performing the coordination and informational functions required by this section.
- Provide the contractor with a copy of this Standard, ensure the contractor understands this Standard and understands that the contractor's confined space requirements of this Standard, and verify that the contractor has a qualified confined space program per HSEMS 323 Contractor HSE.
- Communicate to contractor employees entering confined spaces known hazards of the confined spaces that will be entered.
- Inform contractor employees entering confined spaces of precautions that have been implemented for the protection of employees in or near the specified confined spaces.
- Coordinate entry operations with the Contractor when:
    - Both the Contractors employees and Honeywell employees are working simultaneously as authorized entrants in or near a confined space, so that employees of one employee do not endanger the employees of another employer or
    - The Contractors work will affect Honeywell operations of the Contractor will require the assistance of Honeywell personnel to, for example, shutdown or lock out a process, system or piece of equipment.
- Debrief the Contractor at the conclusion of the entry operations to discuss the entry activity.

When Honeywell locations arrange to have contractors perform work that involves confined space entry, the Contractor shall:

- Ensure Contractor employees understand this Standard and that the Contractors confined space entry program (including emergency rescue) is equivalent to and consistent with the requirements of the Honeywell Standard.
- Demonstrate to the Honeywell Representative that the Contractor has a qualified confined space program that meets regulatory and Honeywell requirements.

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- Assist the Honeywell Representative to prevent endangering employees, affecting operations, or as needed when:
    - Both the Contractor's employees and Honeywell employees are working simultaneously as authorized entrants in or near a confined space or
    - The Contractors work will affect Honeywell operations.
- Participate in a debriefing at the conclusion of the entry operations to discuss the entry activity.
- Ensure that the entry permit is completed and approved in writing by the Contractor's entry supervisor before entering tanks, vessels, manholes or similar confined spaces, and presented to and acknowledged in writing on the permit, in the space provided by the Honeywell Representative prior to entry.
- Note: In presenting an entry permit to the Honeywell Representative for signature, the contractor shall be deemed to have made a representation to Honeywell that all requirements of the permit have been satisfied by the Contractor's personnel, who are responsible for planning, performing, authorizing, supervising and supporting the entry and associated work in the confined space.
- The signature of the Honeywell Representative on an entry permit for work to be performed by the Contractor is simply an acknowledgement that the permit was presented to the Honeywell Representative for signature and Honeywell is aware of the work (as described in the permit) that is to be performed under that permit and nothing more. The signature of the Honeywell Representative does not constitute any type of representation, agreement, or warranty by Honeywell of anything beyond that acknowledgement, and neither the Contractor nor its employees or Subcontractors may rely on that signature for anything more.
- Notwithstanding any such signature by a Honeywell Representative, the Contractor is solely responsible for ensuring the permitted activity is performed in a safe manner and in compliance with the Standard, the site's other HSE Requirements, and all applicable legal requirements, and Honeywell is relying on the Contractor to comply with these obligations.

4.3 Entry Supervisor

The person (only for Permit-Required Confined Spaces, such as a supervisor, team leader, or authorized employee) responsible for:

- Determining if acceptable entry conditions are present at a Permit-Required Confined Space where entry is planned, authorizing entry and overseeing entry operations and terminating entry as required by this Standard.
- The duties of the entry supervisor may be passed to another qualified person during the course of an entry operation.

Entry supervisors shall:

- Know the hazards faced during entry and the symptoms and consequences of exposures.
- Verify by checking or completing the entry permit that all required tests have been conducted and all procedures and equipment are in place before endorsing the permit and allowing entry to begin.
- Verify that rescue services are available and that the means for summoning them are operable before authorizing entry into a Permit-Required Confined Space.
- Ensure the attendant is aware of which rescue service will be sued and how to contact it.
- Terminate the entry and cancel the permit when the entry operations covered by the entry permit have been completed or when a condition not allowed under the entry permit arises in or near the confined space.
- Remove unauthorized individuals who enter or attempt to enter the permit space during operations.
- Determine that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

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- Ensure that an attendant is posted outside the space prior to entry of rescue personnel.
- If an entry is being made by one or more contractors, each contractor shall provide a qualified entry supervisor who will be responsible for carrying out the entry supervisor functions for that contractor's employee(s).

4.4 ATTENDANT

An individual who is stationed outside a Permit-Required Confined Space to monitor and communicate with the authorized entrants on a continuous basis (only for Permit-Required Confined Spaces).

Attendants shall:

- Know the hazards faced during entry and the symptoms and consequences of exposures to authorized entrants.
- Understand all requirements of Section I of the entry permit titled, Attendant Training Checklist, and verify their understanding by signing that section.
- Ensure that all individuals who enter or leave a Permit-Required Confined Space are continually accounted for and have signed in or out.
- Remain outside the Permit-Required Confined Space during entry operations until relieved by another qualified attendant.
- Continuously monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space.
- Order authorized entrants to evacuate the Permit-Required Confined Space immediately when a hazard arises.
- Summon rescue services when authorized entrants may need assistance to escape from a Permit-Required Confined Space.
- Keep unauthorized entrants from entering the Permit-Required Confined Space.
- Perform non-entry or entry rescues (if required by location rescue procedure and properly trained). However, entry rescues cannot be performed until another attendant is posted and the procedures for entry into a Permit-Required Confined Space have been completed.
- Perform no other duties that might interfere with the primary duty of monitoring and protecting the authorized entrants.

4.5 MONITOR

An individual who, as directed by the immediate supervisor, is either stationed outside or assigned to periodically check on entrants in a Non-Permit Confined Space during the entry, until relieved by another qualified monitor (only for Non-Permit Confined Spaces).

Monitors shall:

- Order authorized entrants to evacuate the Non-Permit Confined Space immediately when a hazard arises.
- Summon rescue services when authorized entrants may need assistance to escape from a Non-Permit Confined Space.
- Perform no other duties that might interfere with the duty of monitoring (either continuously or periodically, as directed by the supervisor) the authorized entrants in a Non-Permit Confined Space. Once the assignment is made, it can only be changed by a supervisor and not an informal agreement between the entrant and the monitor.

4.6 RESCUE AND EMERGENCY SERVICE

The personnel designated to rescue employees from confined spaces.

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The members of the rescue team or service shall:

- Be provided with and trained in the use of personal protective equipment and rescue equipment necessary for making rescues from confined spaces, which may include respiratory protection.
- Be trained to perform the assigned rescue duties.
- Receive the same training required of authorized entrants under this section.
- Practice simulated rescue operations annually from actual or representative confined spaces.
- Be trained and currently certified in basic first aid and cardiopulmonary resuscitation (CPR), and be incorporated in the local Blood Borne Pathogens Procedure.

4.7 Test Equipment Operator

An individual who performs atmospheric testing to evaluate potential atmospheric hazards in a Permit-Required Confined Space.

Test equipment operators shall:

- Know the operation and limitations of the monitoring instruments, including the required field checks (checking the instrument for proper response in the field) specified by the instrument manufacturer.
- Know the actual testing practices and testing requirements specified by this Standard.
- Enter the test results on the Confined Space Entry Permit, Appendix D, along with their signature.
- Require all entrants to evacuate the space when atmospheric testing indicates a hazardous atmosphere.
- Inform the entry supervisor whenever atmospheric testing indicates a hazardous atmosphere.
- May also fill the role of attendant as long as attendant training has been provided and signs the Attendant's Training Checklist Section of the Confined Space Entry Permit, Appendix D.

5. Audit Requirements

- Each site shall audit compliance to this Standard annually by using the Self Assessment Tool (SAT).
- Locations shall annually perform a self-audit of the entire Confined Space Entry Standard including a review of the canceled permit and field audits. Based on the results of this audit, appropriate program changes must be initiated and documented. This evaluation can be completed as part of the annual HSE SAT **or** by completing the Annual Confined Space Entry Procedure Audit Form, see Appendix D.

6. Enforcement

- Where an employee, manager, contractor or visitor willfully violates this Standard, appropriate action will be taken.
- Any action taken must be in accordance with local disciplinary procedures and documented.

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7. REVISION HISTORY

Revision Number	Section Number	Revised By	Revision Date	Description of Change
0			Jul 1, 2001	Initial Release
1		Ernie Garcia	Jun 30, 2008	Updated Initial Release
1	All	Abhi Joshi	Jun 30, 2008	Converted Standard to new format. No change in content or requirement number.
2	4.1.1 & 4.1.5	CSSC	Jul 1, 2009	Added the words “or equivalent” for flexibility.
3	4.1.5	Al Shaw & CSSC	Apr 27, 2011	Revised confined space warning for storm sewer manhole covers, such as in parking lots and high traffic areas, to allow an alternative identification strategy such as ensuring that spaces are included in the site inventory and applicable employees have received training to recognize these as confined spaces, in lieu of posting warning signs.
4	Definitions	Al Shaw & CSSC	Dec 13, 2012	Added “such as elevator/lift and loading dock pits to the definition of a permit-required confined space.
5	All	Al Shaw & CSSC	Jan 1, 2014	Converted standard to new format. Added contractor related changes from legal review of HSEMS 323 Contractor HSE Standard. Added provisions for use of Honeywell Rescue Team for Contractors.

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Appendix A – Purpose and Applicability

This Standard is designed to improve the HSE Management System at all Honeywell locations and is applicable to all organizations and majority owned subsidiaries worldwide. It establishes minimum requirements that must be met by all organizations. In addition to complying with this Standard:

- All locations must ensure they are in compliance with all applicable national, state and local regulations.
- Honeywell Strategic Business Groups (SBG) must either adopt this Standard or develop its equivalent SBG Standard. The SBG equivalent Standard must be reviewed and approved by the corporate owner of this Standard for equivalency.
- Honeywell sites or their organizations must customize either this Standard or its SBG's equivalent Standard and identify how they will meet the requirements. To customize this Standard, the site must add the specific information that is highlighted in green bold font with italics in the elements that needs to be customized.
- Honeywell sites or their organizations must review this Standard for any conflicts and/or additions with country requirements and add additional country requirements to the appropriate organization's Standard.
- Whenever a Honeywell Standard is more stringent than the applicable national, state and local regulations, the Honeywell Standard shall apply.
- Honeywell organizations that have determined that this Standard is not applicable to them do not need a site procedure on this topic. The organization must document in its SAT the rationale for determining that this Standard is not applicable and the SAT element must be scored as N/A.
- Honeywell Safety Products for employee and contractor use are readily available globally from numerous safety, welding and general industrial suppliers. Information on Honeywell Safety Products and how to place an order for safety equipment may be obtained locally at a Honeywell site or by searching online (http://www.honeywellsafety.com).

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Appendix B – Definitions

Acceptable Entry Conditions	The conditions that must exist in a confined space to allow entry and to ensure that personnel involved with an entry can safely enter into and work within the space.
Atmosphere Supplying Respirator	Either a full face piece self-contained breathing apparatus (SCBA) or airline full face piece respirator connected to a Grade D or equivalent breathable compressed air source. Airline respirators must be connected to a 5 minute escape bottle.
Attendant (Permit-Required Confined Space)	An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space system.
Attendant (Non-Permit Confined Space)	An individual who is stationed outside, or required to periodically check on the entrants in one or more Non-Permit Confined Spaces.
Confined Space	A space that: is large enough and so configured that an employee can bodily enter and perform assigned work; and has limited or restricted means for entry, exit or rescue (e.g., tanks, vessels, silos, storage bins, hoppers, utility vaults and pits are spaces that may have limited means of entry, exit or rescue); and is not designed for continuous employee occupancy.
Engulfment	The surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction or crushing.
Entry	The action by which a person passes through an opening into a confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any of the entrant's body breaks the plane of an opening into the space.
Ground Fault Circuit Interrupter (GFCI)	A fast-acting circuit breaker that is sensitive to very low levels of current leakage to ground. The GFCI will trip and prevent serious injury.
Hazardous Atmosphere	An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a confined space), injury, or acute illness from one or more of the following causes: • Flammable gas, vapor, or mist in excess of 5 percent of its lower flammable limit (LFL). • Airborne combustible dust at a concentration that equals or exceeds its LFL (this concentration may be approximated as a condition in which dust obscures vision at a distance of 5 feet (1.52 m) or less). • Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent. • Atmospheric concentration of any substance that could result in employee exposure in excess of its occupational exposure limit (e.g., Threshold Limit Value (TLV), Permissible Exposure Limit (PEL)). Note: An

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	atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury or acute illness due to its health effects is not covered by this provision. • Any other atmospheric conditions that is immediately dangerous to life or health (IDLH).
Hot Work	Any work involving electric or gas welding, cutting, brazing, burning or similar flame or spark producing operations. This includes, but not limited to: acetylene torches, arc welding equipment, portable grinders, propane torches, explosion actuated tools, etc.
IDLH (Immediately Dangerous to Life and Health	Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects of that would interfere with an individual's ability to escape unaided from a confined space.
Isolation of Permit-Required Confined Space	"isolation" means the process by which a permit space is removed from service and completely protected against: 1) the release of energy into the space by such means as lockout or tagout of all sources of energy, or blocking or disconnecting all mechanical linkages; and 2) the release of material into the space by such means as a. blanking or blinding b. misaligning or removing sections of lines, pipes or ducts or c. a double block and bleed system. Pipelines containing low pressure water at 120° F (49° C) or less do not require the additional isolation provided they would pose no serious hazard if a leak into the space were to occur.
Non-Permit Confined Space	A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm. Typical examples of Non-Permit Confined Spaces could include shallow pits and air-handling ducts with no actual or potential hazardous atmosphere and no mechanical hazard that would need to be locked out.
Permit-Required Confined Space	A confined space that has one or more of the following characteristics: • Contains or has a potential to contain a hazardous atmosphere; • Contains a material that has the potential for engulfing an entrant; • Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or • Contains any other recognized serious safety and health hazard. Typical examples of Permit-Required Confined Spaces include: silos, storage tanks, boilers, fuel storage tanks, sewers, wastewater treatment tanks, and some pits such as elevator / lift and loading dock pits.
Personal Alert Safety System (PASS)	A safety device that will detect lack of motion of a worker and automatically emit an audible warning signal.

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Rescue	An established emergency response procedure whereby both the rescue personnel and all necessary rescue equipment are available at the incident scene in a timely manner so that it should be possible to commence rescue within 5 minutes of the start of an emergency.
Retrieval System	The equipment, including a retrieval line, full body harness, wristlets (if appropriate) and a lifting device or anchor used for non-entry rescue of persons from confined spaces.
Zero Energy State (ZES)	A condition in which all potentially hazardous energy in equipment is neutralized to provide maximum protection against the unexpected release of energy. Putting equipment into ZES typically involves securing all electrical power sources, lowering or blocking suspended parts, bleeding or venting pneumatic or hydraulic pressure, isolating hazardous materials, releasing or blocking springs and securing hazardous moving parts of machines, HSEMS 301 Lock/Tag/ Try for details.

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Appendix C – References

- Corporate Standards Webpage
- Corporate HSEMS 301 – Lock/Tag/Try
- Corporate HSEMS 305 – Machinery and Equipment Safe Guarding
- Corporate HSEMS 311 – Line Breaking
- Corporate HSEMS 323 – Contractor HSE
- Corporate HSEMS 373 – Respiratory Protection
- Corporate HSEMS 375 – Exposure Assessment
- Corporate HSEMS 389 – Hot Work
- Corporate HSEMS 511 – Blood Borne Pathogen

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Appendix D – Attachments

- Confined Space Inventory and Evaluation Form
- Permit-Required Confined Space Hazard Assessment and Control Form
- Non-Permit Confined Space Entry Procedure Example
- Permit-Required Confined Space Entry Procedure Example
- Confined Space Rescue Cart Pre-Use Checklist
- Confined Space Entry Permit and Checklist
- Annual Confined Space Entry Procedure Audit
- Confined Space Entry Field Audit

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Honeywell Level 2 Checklist	**Confined Space Entry (HSEMS 303)**

Only the key elements of this program are listed below. The location is expected to conform to all the requirements in the standard.

Requirements:

1. Customized written Level 3 CSE Procedure is on file & up to date (1.4)

2. Written Hazard Assessment and Control form used (4.1)

3. Written site inventory and classification of all PRCSs and NPRCSs is on file (4.1.1)

4. All entrances to CSs are clearly labeled and posted with standard signs (4.1.5)

5. A Non-Permit Required CS Entry procedure exists & all NPRCS entries documented (4.1.4)

6. CSE Permit System in place and used for all PRCSs entries (4.3.6)

7. CS-specific written entry procedures developed for all PRCSs and NPRCs on site (4.3)

8. Continuous Forced Ventilation used in all hazardous atmosphere PRCS entries (4.3.6)

9. Rescue capabilities (Rescue Cart / equipment immediately available, training, annual drills and capable to begin within 5 minutes of an emergency) (4.5)

Training:

10. Annual training of Supervisor, Sampler, Permit authorizer, Lookout (attendant), Entrant and Rescue team (including designated Rescue contractors) (4.7)

11. Affected employees and other site personnel have received appropriate training (for their level of participation in the procedure) (4.7)

Self-Audits:

12. Post-Entry field audits conducted & documented at least quarterly (or 100% of entries if less than 4 entries conducted per year) (4.8)

13. Annual review & documentation of completed CSE permits and field audits (4.8)

14. Annual assessment of the CSE Program (may be part of the SAT process) (4.8)

Discussions (List title and role of personnel):

Observations:

Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-07
RES-HS-08
Lock Out / Tag Out

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1.0 APPLICABILITY

1.1 This procedure is applicable to all Honeywell organizations and majority owned subsidiaries worldwide. It establishes minimum requirements that must be met by all organizations

1.2 In addition to complying with this procedure, organizations must ensure that they are in compliance with all applicable national, state, and local regulations.

1.3 Each Honeywell Strategic Business Group (SBG) must either adopt this procedure or develop its equivalent SBG procedure. The SBG equivalent procedure must be reviewed and approved by the corporate owner of this standard for equivalency.

1.4 Each Honeywell site or organization must customize either this procedure by using Attachment 6.4 or its SBG's equivalent procedure.

1.5 Each Honeywell site or organization must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate organization's procedure.

1.6 Whenever a Honeywell Procedure is more stringent than the applicable national, state, and local regulations, the Honeywell Procedure shall apply.

1.7 Honeywell organizations that have determined that this procedure is not applicable to them do not need a site procedure on this topic. The organization must document in its SAT the rationale for determining that this procedure is not applicable

2.0 OVERVIEW

2.1 The Lock/Tag/Try Procedure is designed to protect Honeywell employees and contractors from hazards associated with the unexpected startup or release of stored energy in machines or equipment.

2.2 Lock/Tag/Try is the means by which operations, maintenance, or other personnel may be assured that a potentially dangerous system is properly shut down, isolated, and verified prior to starting service or maintenance activities.

2.3 The procedure applies to the control of energy, including electrical, mechanical, hydraulic, pneumatic, chemical, thermal, potential, kinetic, and any other form of energy, during servicing or maintenance of machines and equipment.

2.4 The Lock/Tag/Try aspects of this procedure do not apply to minor adjustments and other minor servicing activities that take place during normal production operations if these activities are routine, repetitive and integral to the use of the equipment for production. However, if these activities place the individual in a potentially hazardous position, then the Lock, Tag, and Try Procedure must be used.

3.0 DEFINITIONS

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3.1 Definitions for underlined text are found at the end of this document.

4.0 REQUIREMENTS

4.1 Responsibilities

4.1.1 Site Leader – Responsible for ensuring that the Lock/Tag/Try Procedure is fully implemented, properly managed, and uniformly enforced. Where possible, responsibilities shall be assigned to the individuals that have authority and accountability for the department and/or employees performing Lock/Tag/Try.

4.1.2 Line Supervision – Responsible to ensure that their employees are properly trained and comply with the Lock/Tag/Try Procedure.

4.1.3 Employees – Responsible to comply with the organization's Lock/Tag/Try Procedure.

4.1.4 Health, Safety & Environmental (HSE) – Responsible for providing technical and regulatory expertise and assisting in program development, implementation and assessment.

4.1.5 Contractors - Responsible for following either the requirements outlined in this procedure or their own lockout procedure, as long as it provides protection that is as stringent as the Honeywell Procedure.

4.2 Implementing Lock/Tag/Try

4.2.1 Prepare for lockout by identifying all energy sources and locating the energy isolating device(s) (electrical disconnects, valves, etc.) to which the lockout devices will be attached. For some operations, more than one energy source (electrical, mechanical, hydraulic, pneumatic, chemical, thermal, potential, kinetic, and any other form of energy) may be involved. The machine specific lockout procedure, which lists all energy sources and isolation points, shall be used during this step. (See Attachment 6.1 for a sample machine specific lockout procedure.)

4.2.2 Notify all affected people that a lockout procedure is going to be performed.

4.2.3 Secure the equipment using established shutdown procedures. If the equipment was shut down due to a power failure, emergency stop procedures, or for unknown reasons, all operating controls must be placed in the off or normal shutdown position.

4.2.4 Lockout the energy isolating devices and attach identification tags. Each authorized person must attach their own personal lock, to the switches, valves, etc. In situations where more than one authorized person might be involved in the lockout procedure, the first person to lockout the equipment shall use a Multiple Lockout Device on each isolation point. The last hole in the Multiple Lockout Device shall be reserved for an additional Multiple Lockout Device.

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4.2.5 Release any and all potentially hazardous stored or residual energy from the equipment being serviced or maintained. Stored energy, even after lockout procedures, may still be present in pneumatic accumulators, capacitors, springs, burners, flywheels, hydraulic pistons, tanks and hoses, or just as gravity, among other energy-storing devices. Positive methods must be utilized to relieve, disconnect, restrain or otherwise safe-render any stored energy systems present.

4.2.6 After ensuring that no one is exposed, test the correct installation of all lockout devices and proper release of stored energies by attempting to start the equipment using the normal operating controls.

4.2.7 Return operating controls to the neutral, off, or safe position. This step will help prevent an unexpected start-up when power is restored.

4.2.8 The equipment is now ready for servicing or maintenance.

4.2.9 If an authorized person leaves the lockout process for more than four hours, then the returning authorized employee must re-check that all isolation devices are still in place.

4.3 Acceptable Lockout Methods

4.3.1 Electrical

4.3.1.1 Lock and tag either the main or local electrical disconnect switch in the power circuit in the off position.

4.3.1.2 Never use a control circuit to lockout equipment. Locking start-stop or on-off switches, control buttons, control switches, or key controls, is not an acceptable means of securing equipment.

4.3.2 Piping

4.3.2.1 When isolating manually operated valves, the valves shall be locked out, generally with a chain and lock or a clamshell type device, and tagged.

4.3.2.2 Remote actuated valves are not an acceptable means of isolation unless:

4.3.2.2.1 They can be de-energized and mechanically locked closed and tagged.

4.3.2.2.2 A blank is installed at the nearest flange and tagged, or

4.3.2.2.3 Some other positive means is used to assure protection.

4.3.2.3 All work on piping systems containing hazardous materials must be performed in accordance with one of the following methods:

4.3.2.3.1 A valve arrangement allowing double block and bleed, with the bleed valve open. If double block and bleed is used, the authorized person must verify

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that the bleed valve is not clogged or obstructed by allowing a small amount of the material to flow safety to an appropriate drain or containment.

4.3.2.3.2 Physical separation of the lines.

4.3.2.3.3 Insertion of a blank in the line and tagged.

4.4 Group Lockout

4.4.1 When complex pieces of equipment or processes with multiple energy sources are being worked on by a number of authorized people, the following Group Lockout Procedure may be used:

4.4.1.1 The supervisor or other authorized person, can lockout the equipment for the crew by following the machine specific lockout procedure and placing a lockout device and tag on each isolation point.

4.4.1.2 All keys to the locks used to isolate the equipment are then placed into a group lockout device (lockbox).

4.4.1.3 Each authorized person working on the equipment then places a personal lock on the lockbox to secure the keys. Note: Any authorized person working under a group lockout system has the right to review that the application of the lockout devices was done in accordance with the machine specific lockout procedure.

4.4.1.4 When the lockout activity is completed or at the end of the shift, each authorized person shall remove his own personal lock from the group lockbox.

4.4.1.5 Once all personal locks have been removed, the supervisor, or other authorized person, can then remove the keys from the lockbox, unlock the equipment, assure that the area is clear, and restart the equipment.

4.5 Shift Change

4.5.1 If the servicing or maintenance on a piece of equipment needs to extend beyond one shift, then all authorized people leaving the facility must remove their personal locks from the equipment at the end of the shift. To insure that the lockout process remains in-effect, an authorized person's lock(s) from the outgoing shift must remain on the equipment or lockbox until an authorized person's lock(s) from the incoming shift is attached.

4.5.2 All authorized people coming in to start a new shift must apply their own personal locks to the equipment, using the process outlined in section 4.3. If a group lockout situation exists, section 4.5 must also be followed.

4.6 Restoring Equipment To Normal Operation

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4.6.1 After the servicing or maintenance is complete, remove all tools, parts, and excess materials and reinstall all guards.

4.6.2 Check the area around the equipment to ensure that no one is exposed.

4.6.3 Notify all affected people that lockout devices are being removed.

4.6.4 Remove the lockout devices.

4.6.5 Operate the energy isolating devices to restore power to the equipment.

4.6.6 Restart the equipment following normal operating procedures to test and determine the effectiveness of the service, maintenance, or repair conducted.

4.6.7 If the service, maintenance, or repair is successful, notify all affected personnel that the equipment may resume normal operations.

4.6.8 If further service, maintenance, or repair is needed, then the authorized person shall reapply the lockout procedure, as per section 4.3.

4.7 Equipment Set-Up or Clean-Up

4.7.1 Minor Set-Up or Clean-Up

4.7.1.1 Where people are required to perform minor equipment set-up or clean-up activities during normal production operations, these tasks may be accomplished by simply shutting off the equipment using the control circuit, provided that the control circuit is equipped with a two-step restart, which is under the control of the individual performing the task.

4.7.2 Potentially Hazardous Set-Up or Clean-Up

4.7.2.1 Where set-up or clean-up procedures require power and people are placed in potentially hazardous positions, only those specific sections of equipment that require power can be energized. All other sections, such as main drive motors and equipment closing motors, must be isolated to ZES and locked out. During this type of set-up, the equipment is in an Intermediate Energy State (IES).

4.7.2.2 When IES power is required, a start/jog button, which is under the control of the person performing the activity, must govern the set-up function. This button must be designed so that it cannot be accidentally activated.

4.7.2.3 Whenever this IES set-up exception to a full lockout is used, a written standard operating sheet must be developed for that particular task.

4.7.2.4 Those set-up or clean-up tasks where IES power is not required, and the individual is exposed to injury from the unexpected start-up or energization of the equipment, shall be performed with all sections of the equipment isolated to ZES and locked out.

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4.8 Jam Clearing

4.8.1 Minor Jam Clearing

4.8.1.1 Where people are required to clear minor jams during normal production operations, these tasks may be accomplished by simply shutting off the equipment using the control circuit, provided that the control circuit is equipped with a two-step restart which is under the control of the individual performing the task.

4.8.2 Potentially Hazardous Jam Clearing

4.8.2.1 If the jam clearing activity places an individual in a potentially hazardous position, then either:

4.8.2.1.1 An IES procedure must be used, whereby the hazardous sections of the machine are isolated to ZES and only those specific sections of the equipment that require power are energized, or

4.8.2.1.2 The equipment must be completely shut down and isolated to ZES.

4.8.2.1.3 Whenever this IES jam clearing exception to a full lockout is used, a written standard operating sheet must be developed for that particular task.

4.9 Labeling of Energy Isolating Devices

4.9.1 All energy isolating devices that might be used during the implementation of the Lock/Tag/Try Standard must be permanently and legibly labeled. This includes main and local electrical disconnects, circuit breakers, stop-start buttons and other control switches, valves, etc.

4.9.2 The label must clearly identify the function of the energy isolating device, using names familiar to the affected employees.

4.10 Removal of Another Person's Lock

4.10.1 Personal locks shall be individually keyed. If a master key is available, it shall be maintained by one member of management, such as the department head, and may only be used in an emergency.

4.10.2 When an employee is finished working on a particular system, he must remove his own personal lock.

4.10.3 If a piece of equipment is ready to be started and the employee cannot be located, the supervisor is allowed to remove the employee's personal lock by taking the following steps:

4.10.3.1 Attempt to contact the person to have them remove their personal lock.

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4.10.3.2 Check the area to ensure it is clear and safe.

4.10.3.3 Remove the personal lock.

4.10.3.4 Follow up the removal of the lock by completing the "Personal Lock Removal Report" and sending copies to the Site Leader and HSE Leader within 24 hours, explaining the action taken. (See Attachment 6.2 for the Personal Lock Removal Report.)

4.10.3.5 Take appropriate corrective action with the employee immediately upon his return to the facility and document the action.

4.11 Equipment Isolation Using Site Locks

4.11.1 If a facility wishes to keep a piece of equipment locked out of service for a long period of time for reasons other than employee protection as outlined in this procedure, then a site lock should be used for this purpose.

4.11.2 A site lock must be clearly distinguishable from the personal locks used by authorized employees for their own protection, as outlined in this procedure.

4.11.3 Whenever a site lock is used to isolate a piece of equipment, a tag different than the one used for Lock/Tag/Try should also be used. This tag should identify who took the equipment out of service, why it is out of service, and the date that it was taken out of service.

4.12 Contractors

4.12.1 All contractors working at a Honeywell site must follow either the requirements outlined in this procedure or their own Lock/Tag/Try Procedure, as long as it meets the requirements included in this procedure.

4.12.2 It is the responsibility of the Honeywell Contractor Coordinator to inform contractor management of this procedure during either the annual contractor meeting or pre-work safety meeting.

4.12.3 It is the responsibility of the Honeywell Contractor Coordinator to verify that the contractor's employees are following the approved procedure.

4.12.4 Any contractor employee who violates the approved Lock/Tag/Try Procedure will not be allowed to continue working at the site.

4.13 Training

4.13.1 All authorized employees shall receive documented initial and annual refresher training on all aspects of the Lock/Tag/Try Procedure.

4.13.1.1 This training will include:

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4.13.1.1.1 Instruction in the recognition of applicable hazardous energy sources, the type and magnitude of energy available in the workplace, and the methods and means necessary for energy isolation and control.

4.13.1.1.2 The location and use of the machine specific lockout procedures.

4.13.1.1.3 A demonstration of competency and a certification of proficiency.

4.13.1.2 This training will occur prior to the employee beginning any work that requires the use of the Lock/Tag/Try Procedure.

4.13.2 All affected employees shall receive documented initial and annual refresher training on the purpose, general requirements and use of the Lock/Tag/Try Procedure. This must include the specific instructions that they are not to attempt to restart or reenergize any equipment that is locked out, unless they are the authorized employee who performed the lockout.

4.13.3 Machine specific retraining will be provided to both authorized and affected employees when equipment modifications change a machine specific lockout procedure or a new hazard is presented.

4.13.4 All training documentation (dates, content, trainer, signatures, etc.) will be maintained on file and be available for review.

4.14 Enforcement

4.14.1 Where either an employee or supervisor willfully violates the Lock/Tag/Try Procedure, appropriate disciplinary action will be taken. Appropriate disciplinary action will be considered when an employee:

4.14.1.1 Does not follow proper lock/tag/try procedures.

4.14.1.2 Does not properly shut down equipment when setting-up, cleaning-up, or clearing a jam.

4.14.1.3 Forgets to remove his personal lock prior to leaving the facility.

4.14.1.4 Removes another person's personal lock without authorization.

4.14.2 Any action taken should be in accordance with local disciplinary procedures and must be documented.

4.15 Audit and Program Review

4.15.1 To assure that the Lock/Tag/Try Procedure is being followed, its application shall be frequently reviewed during Lock/Tag/Try observations. These observations must occur on a regular basis and cover approximately 25% of the total number of authorized employees at the site each year. (Note: At a minimum, at least 25 lock/tag/try

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observations must be done annually.) (See Attachment 6.3 for a sample Lock/Tag/Try Observation Report.)

4.15.2 The organization shall perform a documented annual evaluation of the entire Lock/Tag/Try Procedure. This evaluation can be done as part of the annual HSE Self-Assessment (SAT).

4.15.2.1 The annual evaluation shall include a thorough review of the following:

4.15.2.1.1 The Organization's Lock/Tag/Try Procedure to determine if it is complete and up to date.

4.15.2.1.2 Samples of Machine Specific Lock/Tag/Try Procedures.

4.15.2.1.3 Lock/Tag/Try Observation Reports.

4.15.2.1.4 Training records to determine if all required training was conducted and properly attended.

4.15.2.1.5 The availability of all the documents and records required to be maintained by this procedure.

4.15.2.2 Deficiencies that are identified during the annual evaluation must be corrected, with appropriate documentation maintained.

4.15.2.3 The results of the annual evaluation shall be communicated to all appropriate levels of management. All actions that are necessary to improve the process must be documented and completed.

5.0 Reference Documents

5.1 HSEMS 303 – Confined Space Entry

5.2 HSEMS 307 – Electrical Safety

5.3 HSEMS 311 – Line breaking

5.4 HSEMS 323 – Contractors & Visitors on Premises

6.0 Attachments

6.1 Sample - Machine Specific Lockout Procedure

6.2 Sample – Personal Lock Removal Report

6.3 Sample – Lock/Tag/Try Observation Report

6.4 Sample – Site Specific Lock/Tag/Try Procedure

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7.0 Revision Log

Revision Number	Section Number	Revised By	Revision Date	Description of Change
0		JG	March 19, 2007	Initial Release
1	4.2.5	EG	October 12, 2007	Added Section 4.2.5 on release of stored energy
1	All	Abhi Joshi		Converted standard to new format. No change in content or requirement number

8.0 Definitions

Authorized Person	An individual qualified to perform a lockout procedure by virtue of training and demonstrated competency.
Affected Person	Anyone who either works or may work in an area where a lockout procedure is performed.
Control Circuit	The control circuit carries electrical signals that direct the performance of the equipment, but does not carry the main power current.
Energy Isolating Device	A mechanical device that physically prevents the transmission or release of energy. Examples of energy isolating devices include: a manually operated electrical circuit breaker; a manually operated primary electrical disconnect switch; a line valve, blank, or blind; or any similar device used to block or isolate energy. The term does not include a push button, selector switch, and other electrical control circuit type devices. All energy isolating devices must be permanently and clearly labeled to identify the specific name, or section, of the equipment or process that it isolates.
Exclusive Control	A cord and plug set that is both visible to and within arm's reach of the exposed individual, and is the only power source to the equipment.
Delayed Restart and Warning Alarm	A system whereby the start button must be pushed and an audible and/or visual warning alarm must actuate for a minimum of five seconds before the equipment will begin to run. The purpose of the audible warning alarm is to adequately warn employees in the vicinity that the equipment is about to start.
Intermediate Energy State (IES)	A state of energy in a piece of equipment or process in which designated hazardous energy sources are at Zero Energy State (ZES), while maintaining other designated energies to perform specific non-hazardous tasks or functions. For example, a setup on a piece of equipment in which the main drive motors and equipment closing motors are at ZES and locked out, yet the non-hazardous crawl motors are operational so that the

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	equipment can be set, adjusted and prepared for operation.
Lockout	The placement of a lockout device on an energy isolating device ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.
Lockout Device	A device that uses a positive means, such as a lock, chain and lock combination, etc., to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Lockout devices must be identified, standardized, durable, substantial, and may not be used for any other purpose.
Machine Specific Lockout Procedure	A document that lists all sources of energy and the associated energy isolation points for a specific piece of equipment or process, as well as the steps to effectively de-energize and reenergize the system. These procedures shall be readily available for all equipment, except small hand-held portable devices and appliances, such as drills, coffee pots, microwave ovens, radios, laptop computers, fans, etc. Where appropriate, a common Machine Specific Lockout Procedure can be developed for a group of similar pieces of equipment. As a minimum, these procedures must include: the name of either the individual equipment or group of equipment covered by the procedure, the types of energy involved, the specific steps to be followed to isolate the equipment, the name (on the permanent label) and location of all isolation points, the method to verify that the equipment has been properly isolated, and the last revision date. (See Attachment 6.1)
Main or Local Disconnect Switch	the main or local switch that controls power to a piece of equipment. By opening either the main or local disconnect switch, the equipment is positively isolated from the power source. While main disconnect switches may be located almost anywhere, they are usually located in a motor control center. Local disconnects are normally adjacent to the piece of equipment being locked out.
Minor Jam Clearing	Whenever a minor jam in a piece of equipment can be cleared without defeating a guard or exposing personnel to potentially serious hazards.
Minor Set-Up	Whenever a piece of equipment can be set-up without defeating a guard or exposing personnel to potentially serious hazards.
Multiple Lockout Device	A device that allows more than one lock to be attached to an energy isolating device, thus assuring that each authorized employee has individual lockout and control capability.

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Pipe Blank	A solid disc that is placed between two flanges in a pipeline to positively interrupt the flow of material inside the pipe. Once placed into position, a tag must be attached to the blank to provide a means of identification.
Safe/Run Switch	A control switch, which has a key and puts the equipment in either a "run" or "safe" mode. Minor set-up, clean-up, and jam clearing activities can be accomplished while the equipment is in the safe mode, as long as the employee performing the activity has the key under their exclusive control (i.e. in his pocket). However, since the safe/run switch is wired into the equipment's control circuitry, it cannot be used as a lockout device to protect employees who are potentially exposed to hazardous energy.
Servicing or Maintenance	Workplace activities such as constructing, installing, setting-up, adjusting, inspecting, lubricating, modifying, servicing, and maintaining machines or equipment.
Tag	A means of providing identification concerning a lockout device. Tags are not to be used in lieu of a positive means to isolate energy, such as, a lock, blank, chain and lock combination, and other similar devices. Tags must be standardized throughout the facility, substantial enough to prevent inadvertent or accidental removal, and constructed so that exposure to weather or environmental conditions will not cause the tag to deteriorate or the message on the tag to become illegible.
Two-Step Restart	A system whereby two unique steps must be completed in order to start a piece of equipment. For example, to start a piece of equipment a person must: (a) press the "start" button, wait a few seconds, then press it again within a few second window of opportunity, or (b) pull out a mushroom headed "stop" button and then push a "start" button. The purpose of the two-step restart is to force a person to think about what they are doing before starting a piece of equipment.
Zero Energy State (ZES)	Where all the energy sources (electrical, mechanical, hydraulic, pneumatic, chemical, thermal, kinetic, and any other form of energy) are properly removed or protected by use of the Lock/Tag/Try Procedure. ZES is a condition in which all energy in a piece of equipment is neutralized to provide maximum protection against unexpected energy release. Putting equipment into ZES typically involves securing all electrical power sources, lowering or blocking suspended parts, venting pneumatic or hydraulic pressure, releasing or blocking springs, and securing hazardous moving parts or machine products.

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Honeywell Level 2 Checklist	**Lock/Tag/Try (HSEMS 301)**

Only the key elements of this program are listed below. The location is expected to conform to all the requirements in the standard.

Requirements:

1. Customized written procedure. (1.4)

2. Written machine specific procedures exist and are available at the machine centers. (4.2)

3. Approved locks and tags provided to all authorized employees. (4.3)

4. Multi-employee/group lockout procedures exist. (4.4)

5. Contractors/non-Honeywell personnel briefed on local zero energy procedures prior to work. (4.12)

6. A procedure to handle shift changes exists. (4.5)

7. Set-up, clean-up and jam clearing procedures exist. (4.7)

8. Energy isolating devices are properly labeled. (4.9)

9. A procedure for removal of another's lock exists. (4.10)

10. There is a separate procedure for isolating equipment out of service. (4.11)

Training:

11. Authorized and affected employees have received training. Authorized employee training shall include the demonstration of zero energy procedures. (4.13)

Self-Audit:

12. Annual assessment of the program. (4.15.2)

13. Periodic audits conducted during the year observing the application of Lock/Tag/Try. (4.15.2)

Discussions (List title and role of personnel):

Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-08
RES-HS-03
Excavations

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1.0 APPLICABILITY

1.1 This procedure is applicable to all Honeywell organizations and majority owned subsidiaries worldwide. It establishes minimum requirements that must be met by all organizations

1.2 In addition to complying with this procedure, organizations must ensure that they are in compliance with all applicable national, state, and local regulations.

1.3 Each Honeywell Strategic Business Group (SBG) must either adopt this procedure or develop its equivalent SBG procedure. The SBG equivalent procedure must be reviewed and approved by the corporate owner of this standard for equivalency.

1.4 Each Honeywell site or organization must customize either this procedure or its SBG's equivalent procedure.

1.5 Each Honeywell site or organization must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate organization's procedure.

1.6 Whenever a Honeywell Procedure supersedes the applicable national, state, and local regulations, the Honeywell Procedure shall apply.

2.0 OVERVIEW

2.1 To protect personnel from the hazards associated with excavation work, including cave-ins, exposures to energy sources, falls and other hazards

2.2 Applies to any site conducting excavation work.

3.0 DEFINITIONS

3.1 Definitions for underlined text are found at the end of this document.

4.0 REQUIREMENTS

4.1 Excavation Procedures

4.1.1 A pre-excavation review shall be conducted to identify and develop control measures for potential hazards such as underground utilities, surface encumbrances, access/egress impediments, vehicular and pedestrian traffic, and falling loads/loose materials.

4.1.2 Excavations shall be provided with shoring or other cave-in protection, as required.

4.1.3 Excavations shall be tested for safe atmosphere and adequate ventilation, in accordance with confined spaces entry requirements (Confined Space Entry (Safe-33)).

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4.1.4 Depending on the nature of the work performed in the excavation, zero energy, line breaking and hot work procedures shall be implemented, as necessary.

4.1.5 A means of emergency access and egress shall be provided for excavations.

4.1.6 Barricades, warning signs and other appropriate measures shall be provided around excavations to prevent personnel falls and dropping of materials and equipment into excavations.

4.2 Periodic Inspections

4.2.1 Excavations, adjacent areas and associated equipment shall be periodically inspected for potential hazards, and any identified hazards shall be promptly corrected.

4.3 Training

4.3.1 Personnel working in excavations shall be trained on the associated hazards and protective equipment requirements, as appropriate.

5.0 Reference Documents

5.1 Zero Energy (Safe-31)

5.2 Line Breaking (Safe-32)

5.3 Confined Space Entry (Safe-33)

5.4 Hot Work (Safe-**34)**

6.0 Attachments

6.1 None.

7.0 Revision Log

Revision Number	Section Number	Revised By	Revision Date	Description of Change
00	All	Abhi Joshi		Converted standard to new format. No change in content or requirement number

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8.0 DEFINITIONS

Confined Space	Any space not intended for continuous occupancy that has limited means of access and egress and that is large enough and so configured that an employee can bodily enter and perform assigned work.
Hot Work	Burning, welding, cutting or other operations that may generate arcs, sparks, open flames or other fire hazards.
Line Breaking	A procedure in which (a part of) a closed system (e.g., chemical supply lines, connection fittings, valves, etc.) that contains/has contained pressure, hot or corrosive materials or other energy that could create a hazard if not properly controlled is breached or opened.
Zero Energy	A state where equipment or machinery systems have had (1) all potential energy sources isolated (i.e., turned off); (2) all potential energy sources secured from reactivation (e.g. locked out); (3) all residual energy relieved from the system; and (4) all system controls activated, with safety verified.

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Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-09
RES-HS-09
Contractor Substance Abuse and Prevention Compliance Program

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1.0 APPLICABILITY

1.1 This standard applies, unless prohibited by local laws, to all RES projects involving remedial action, remedial construction activities, or operations/maintenance at treatment system facilities.

1.2 This standard is applicable to all Contractors and Subcontractors and those individuals that provide direct supervision (means and methods), of the following work activities.

1.2.1 The use of heavy, construction-type equipment including, but not be limited to, excavators, dozers, dump trucks, cranes of any type, compactors, drilling equipment, including geoprobes, etc.

1.2.2 Operations and/or maintenance activities at treatment plants or treatment facilities.

1.2.3 Safety sensitive/at-risk work such as, but not be limited to, confined space entry, LOTO (lockout/tag out), dredging operations, hot work activities, etc.

1.2.4 Other work activities not listed can be assessed on a case-specific basis by the Project Manager (PM) and/or the certified safety and health professional approving the Health and Safety Plan (HASP) for such activity to determine applicability to the standard.

1.3 In addition to complying with this standard, RES sites must comply with all applicable national, state, and local regulations.

1.4 RES sites or project teams must review this standard for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate site's standard.

1.5 Whenever a Honeywell RES standard is more stringent than the applicable national, state, and local regulations, the Honeywell RES standard shall apply.

2.0 OVERVIEW

2.1 This standard requires all Contractors and Subcontractors performing work at Honeywell RES sites to understand and comply with Honeywell's Substance Abuse and Prevention Requirements as documented in the RES Health and Safety Manual (See Attachment 6.1), and to submit a signed Certificate of Compliance (Attachment 6.2) no later than two weeks prior to starting any work and annually thereafter in the case of long-term ongoing work.

3.0 DEFINITIONS

3.1 See Section 8.0 for definition of underlined terms.

3.2 See RES-ADMIN-02 for additional RES program definitions and acronyms.

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4.0 REQUIREMENTS

4.1 Authorities / Responsibilities

4.1.1 *Design and Construction Manager and/or Remediation Manager* – Accountable for:

4.1.1.1 Ensuring all Contractors and Subcontractors have, read, understand, and are in compliance with the Substance Abuse and Prevention Requirements.

4.1.1.2 Ensuring that Construction Manager (CM) has received signed Compliance Certification forms from all Contractors and Subcontractors no later than two weeks prior to starting any work for Honeywell or on a Honeywell site, and ensuring annual renewals are received thereafter for projects with a duration greater than one year.

4.1.2 *Honeywell Construction Representative or Alliance Partner Construction Manager* - Responsible for:

4.1.2.1 Receiving a signed Certificate of Compliance two weeks prior to starting any work for Honeywell.

4.1.2.2 Receiving annual renewals of the Certificate of Compliance when the work activities extend beyond one year.

4.2 Substance Abuse and Prevention Requirements

4.2.1 All Contractors and Subcontractors performing work for Honeywell must understand and comply with Honeywell's Substance Abuse and Prevention Requirements (See Attachment 6.1).

4.2.2 The complete Substance Abuse and Prevention Requirements are included in the Honeywell Safety Manual. This document contains specific details regarding the requirements of the Substance Abuse and Prevention Requirements. An overview of the requirements includes the following elements:

4.2.2.1 Honeywell prohibits the use, manufacture, sale, possession, or transfer of illegal drugs, alcohol, and controlled substances on Honeywell RES sites.

4.2.2.2 Contractor's (and Subcontractor's) drug screening program and reporting shall comply with, and be in accordance with, Parts 382 and 40 of the Federal Motor Carrier Safety Regulations, Department of Transportation.

4.2.2.3 Pre-assignment screening for illegal/unauthorized substances (alcohol, marijuana, cocaine, opiates, amphetamines and phencyclidine) must occur not more than two (2) weeks prior to their initial assignment for work at Honeywell's site. Contractor personnel who are in a continuous random drug testing program are not required to be screened for subsequent work activities at the same site. If contractor does

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not have a random monthly screen rate of 10 percent, contractor is required to be drug and alcohol screened on a monthly basis for long-term projects (projects greater than 30 days) and be retested each time they begin work at any site.

4.2.2.4 In addition to pre-assignment testing, contractors shall establish procedures in the HASP for post-accident and reasonable suspicion testing for illegal/unauthorized substances.

4.2.3 Certification of Compliance

4.2.3.1 The PM or certified safety and health professional identifies applicable Contractors and Subcontractors or project activities that will require compliance with the Substance Abuse and Prevention Requirements.

4.2.3.2 The CM, and procurement professionals include the requirements for certification in the bidding documents.

4.2.3.3 The procurement professional (Honeywell Supply Manager or Alliance Partner Procurement) issue the Certification of Compliance with the contract or subcontract.

4.2.3.4 All Contractors and Subcontractors for applicable projects/activities as identified in the bidding documents must complete the Certification of Compliance form, indicating that the Contractor or Subcontractor understands and certifies that it is in compliance with the Substance Abuse and Prevention Requirements. All lower-tiered subcontractors conducting applicable work are also required to complete and submit the Certification of Compliance form.

4.2.3.5 The completed and signed Certification of Compliance form must be submitted to the Construction Representative or CM no later than two weeks prior to starting any work for Honeywell or on a Honeywell Site.

4.2.3.6 A copy of the completed and signed Certification of Compliance must be maintained in the Alliance Partner project files and at the job site or otherwise made available upon request during an audit.

4.2.3.7 If the provisions of the RES Substance Abuse and Prevention Requirements are prohibited by local laws, the Contractor shall provide Honeywell with evidence of such legal prohibition and shall maintain file copies of this evidence in lieu of the signed Certification of Compliance.

5.0 REFERENCE DOCUMENTS

5.1 RES-ADMIN-02 - Definitions and Acronyms Summary

5.2 RES Health & Safety Manual

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6.0 ATTACHMENTS

6.1 Honeywell Substance Abuse and Prevention Requirements (excerpt from RES Health and Safety Manual)

6.2 Certificate of Compliance

6.3 Operating Procedure Flowchart

7.0 REVISION LOG

Revision Number	Section Number	Revised By	Revision Date	Description of Change
0	All	L.M. Somer	04/22/2011	Initial Issue
1	4.2.2.3	S. Visnic	10/16/2012	Removed alcohol testing requirement for subsequent work activities for those in continuous testing program.

8.0 DEFINITIONS

None	

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SUBSTANCE ABUSE AND PREVENTION REQUIREMENTS (EXCERPT FROM RES HEALTH AND SAFETY MANUAL)

Contractors performing, and those individuals that provide direct supervision (means and methods) of the following work activities shall comply with Honeywell's Substance Abuse and Prevention Requirements:

- The use of heavy, construction-type equipment including, but may not be limited to, excavator, cranes of any type, drilling equipment, including geoprobe, compactor, etc.;
- Operations and maintenance at treatment plant-treatment systems facilities;
- Safety sensitive/at-risk work such as, but may not be limited to, confined space entry, lockout/tagout, dredging operations, hot work activities, etc.;
- Other work activities not listed can be assessed on a case-specific basis by the PM of the Alliance/Non-Alliance Firm and/or the certified safety and health professional approving the HASP for such activity to determine applicability to the requirements.

The requirements prohibit the use, manufacture, sale, possession, or transfer of illegal drugs, alcohol, and controlled substances on Honeywell sites. The Substance Abuse and Prevention Requirements are included in Honeywell contracts. Specification 01620 and contract documents contain specific details regarding the Substance Abuse and Prevention Requirements. As an overview the requirements includes the following elements:

- Contractor's drug screening program and reporting shall comply with and be in accordance with Parts 382 and 40 of the Federal Motor Carrier Safety Regulations, Department of Transportation;
- Pre-assignment screening for illegal/unauthorized substances (alcohol, marijuana, cocaine, opiates, amphetamines and phencyclidine) must occur not more than two (2) weeks prior to their initial assignment for work at Honeywell's site. Contractor personnel who are in a continuous random drug testing program are not required to be screened for subsequent work activities at the same site, except for alcohol testing. If contractor does not have a random monthly screen rate of 10 percent, contractor is required to be drug and alcohol screened on a monthly basis for long-term projects (projects greater than 30 days) and be retested each time they begin a work at any site; and,
- In addition, to pre-assignment testing, contractors shall establish procedures in the HASP for post-accident and reasonable suspicion testing for illegal/unauthorized substances.

CERTIFICATION OF COMPLIANCE

Contractor/Subcontractor **(Company):** _____

Contractor/Subcontractor
(Point-of-Contact): _____ Phone Number: _____

Address: _____

Project Site: _____

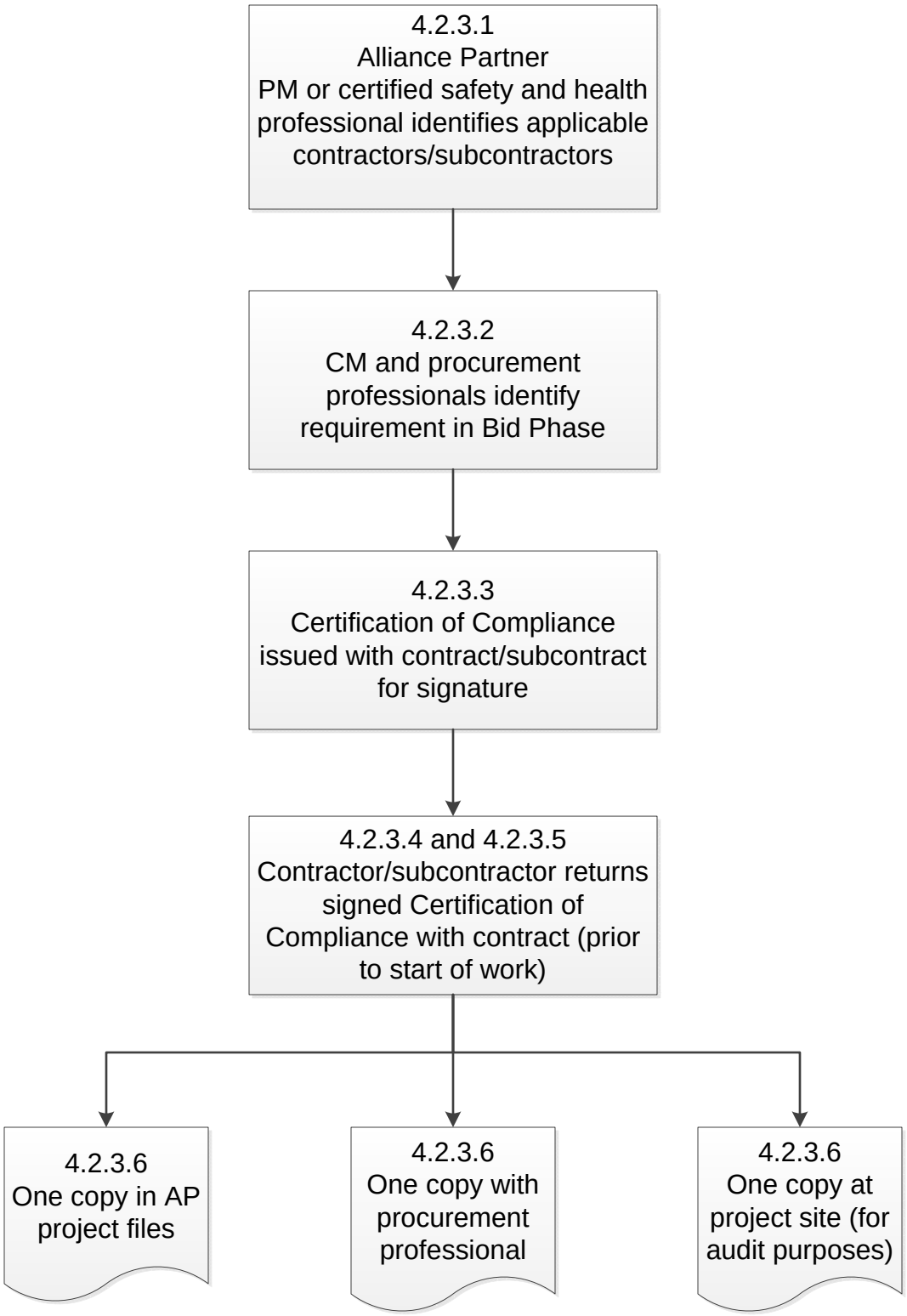
Work Activities to Be Performed by the Contractor/Subcontractor **(check any and all that apply):**

- ☐ Use of heavy, construction-type equipment including, but may not be limited to, excavator, cranes of any type, drilling equipment, including Geoprobe, compactor, etc.
- ☐ Operations and maintenance at treatment plant-treatment systems facilities
- ☐ Safety sensitive/at-risk work such as, but not be limited to, confined space entry, lockout/tagout, dredging operations, hot work activities, etc.
- ☐ Other work activities determined to trigger applicability of the requirements (please list work activities below)

I, **(print name of Contractor/Subcontractor's representative),** a duly authorized representative of **(print name of Contractor/Subcontractor)**, certify that **(Company's name)** is in full compliance with Substance Abuse and Prevention Requirements, including the prohibition on the use, manufacture, sale, possession, or transfer of illegal drugs, alcohol, and controlled substances on Honeywell sites. I further certify that **(Company's name)** is in full compliance with the drug screening, pre-assignment testing, and drug testing requirements also described in the Substance Abuse and Prevention Requirements. I understand that compliance with this certification and with all applicable Health and Safety requirements may be subject to review, audit, and verification at any time prior to or during execution of our work.

_____ _____

Contractor's Representative **Date**


4.2.3.1
Alliance Partner
PM or certified safety and health professional identifies applicable contractors/subcontractors
4.2.3.2
CM and procurement professionals identify requirement in Bid Phase
4.2.3.3
Certification of Compliance issued with contract/subcontract for signature
4.2.3.4 and 4.2.3.5
Contractor/subcontractor returns signed Certification of Compliance with contract (prior to start of work)
4.2.3.6
One copy in AP project files
4.2.3.6
One copy with procurement professional
4.2.3.6
One copy at project site (for audit purposes)

Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-10
CD-13-1
Safety & Occupational Health; Compliance

NOTICE : This document is the property of **Honeywell** and is subject to return on demand. Its contents are disclosed in confidence to authorized persons only. Disclosure of information herein embodied is prohibited except as is expressly authorized by **Honeywell**. Not intended for publication.

ATTACHMENT 01620-10

CD-13-1
SAFETY & OCCUPATIONAL HEALTH
COMPLIANCE

TO: Honeywell Site Superintendent _____.

FROM: Contractor _____.

The employees listed below:

	Name	If Employed by Sub-Contractor List Sub's Name		Name	If Employed by Sub-Contractor List Sub's. Name
1.			11.		
2.			12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

have started to work at the _____ site of Honeywell.

All the Safety rules presented in 01620, and all special safety and occupational health matters pertaining to this project site and its operations have been explained to those contractor employees listed above.

We believe that these employees understand the rules and risks of work at this site and that they fully intend to work safely within the spirit and letter of the documents mentioned above. If we observe any deviations, we will call it to their attention immediately and take any other corrective action, including dismissal, to comply with Honeywell's intention of safe, productive work with minimal occupational risk.

For Contractor:_____

Date:_____

Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-11
CD-13-2
Contractor's Safety Declaration

NOTICE : This document is the property of **Honeywell** and is subject to return on demand. Its contents are disclosed in confidence to authorized persons only. Disclosure of information herein embodied is prohibited except as is expressly authorized by **Honeywell**. Not intended for publication.

ATTACHMENT 01620-11

CD-13-2
CONTRACTOR'S SAFETY DECLARATION

TO: Honeywell Site Superintendent _____.

FROM: Contractor's Safety Officer _____.

As the duly authorized and designated representative and agent of _____ , hereinafter called "Contractor", I hereby certify and agree for myself and for and on behalf of Contractor that:

(1) I have been advised and instructed by the Honeywell Site Superintendent concerning working conditions including hazards, if any, involved in the job and/or job location in which Contractor and Contractor's agents and employees will be working or present;

(2) I have already instructed or will immediately instruct all such agents and employees with respect to such conditions and/or hazards and the proper safety precautions to be observed in regard thereto. I will also see to it that each Contractor employee signs form CD-13-3 and will submit these weekly for all new employees;

(3) All necessary, adequate and operative protective clothing and equipment have been or will be immediately issued to all such agents and employees, together with full instructions and training for their use;

(4) Procedures including employee clothing and equipment requirements will be put into effect; that all such agents and employees will be properly supervised to insure compliance in the use of protective clothing and equipment and in the strict observance of safety rules and regulations; and

(5) The following items among other items, were specifically covered:

a.) General safety rules and regulations

b.) Special safety and occupational health matters pertaining to this site and its environs.

c.) Compliance with 29 CFR 1910.120.

Date: _____ _____

Signature of Contractor's Representative for himself and for and on behalf of Contractor

_____

Signature of Honeywell employee giving instructions

Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-12
CD-13-3
Contractor's Employee Safety Declaration

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ATTACHMENT 01620-12

CD-13-3
CONTRACTOR'S EMPLOYEE SAFETY DECLARATION

TO: Honeywell Site Superintendent_____.

FROM: Contractor_____.

I have been instructed in detail on and understand the following:

1. The existence and requirements of the OSHA Hazard Communications Standard.

2. The chemical hazards present in the areas where I will be working.

3. The hazards associated with these chemicals.

4. Where the Project Site maintains the written Health and Safety Plan.

5. The list of Material Safety Data Sheets and the location of these sheets.

6. Site Specific Health and Safety Plan

_____
Employee Signature

_____
Employee Name Printed

_____
Contractor Name Printed

Specification Section 01620
General Requirements Safety, Health, and Emergency Response

ATTACHMENT 01620-13

Monthly Exposure Hours Report

NOTICE : This document is the property of **Honeywell** and is subject to return on demand. Its contents are disclosed in confidence to authorized persons only. Disclosure of information herein embodied is prohibited except as is expressly authorized by **Honeywell**. Not intended for publication.

Honeywell

ATTACHMENT 01620-13
Monthly Exposure Hours Report

Instructions: This form is used to report monthly contractor exposure hours that are worked at a Honeywell location. Definitions and the different types of contractor activities that should or should not be reported are discussed below. Unless alternate arrangements are made (e.g., Allinace Partner with access to event reporting system enters directly), Email completed form by the 10th day of each month to report exposure hours for the previous month to merry.abbott@honeywell.com.

Definitions:

Contractor = non-Honeywell individual(s) that provide independent contract labor services, either by direct purchase order, blanket purchase order, contract or other agreement. This labor service typically includes, but is not limited to, capital improvement projects, minor renovations, equipment installation, service, maintenance or repair activities.

Independent Contract Labor = individual(s) working on-site that have the means, methods and processes by which the work objective is accomplished, directly supervised by the contractor company.

Categories of "Contractor Hours and Injuries" that should be reported

Capital **= individuals associated with a specific construction or remediation project [work requiring an Appropriation Request (AR)] that has a dedicated Honeywell Project Manager or Engineer.**

General *= individuals working on an as-needed basis, usually more than four (4) hours/day and a couple of times per month (e.g. fire or security alarm personnel, office or equipment repairs, etc.)*

Resident = individuals working on a regular or temporary permanent basis (e.g. outsourcing) related to site/plant operations including, but not limited to; administration/clerical, cleaning services, consultants, food service, mail delivery, maintenance and repair activities, security guards, technical/laboratory, etc.

Work hours and injuries that are NOT considered a "Contractor"

Temps = agency personnel working under the direct supervision of Honeywell. These individuals are not considered independent contractors and should have their work-related hours and injuries reported as "Honeywell", for the purpose of calculating Honeywell incident rates.

Delivery = individuals briefly coming onto Honeywell property for the drop-off of materials (e.g. FedEx, UPS, common carriers, vending machines, etc.). **NOTE:** Although work hours are not captured, procedures should be in place to address the potential hazard of chemical deliveries by tanker trucks (e.g. nitrogen, oxygen, etc.)

Visitors = individuals coming onto Honeywell property for non-labor related activities, usually on an one-time basis (e.g. meetings, inspections, plant tours)

Contractor Classification	Contractor/Subcontractor Name	Work Hours

Reporting Month		Total Hours	1t

Reporting Location	Honeywell Project # Other Project # (if any)	Contact	

Safety Performance

Were there any incidents during the month (e.g. near misses, property damage, first aid or medical treatment cases, lost time injuries, fatalities)? No Yes If "Yes", the contractor must complete a Contractor Incident Investigation Report (see RES-HS-05).

REMEDIAL ACTION
LUMP SUM/UNIT RATE PROPOSAL

SECTION IV
TECHNICAL SPECIFICATIONS

This document may contain trade secrets or other confidential information of **Honeywell**. It is furnished in confidence to authorized persons only and remains the property of **Honeywell** and is subject to return upon demand. Copying in whole or part, publication or disclosure of this information is prohibited except as is expressly authorized by **Honeywell**.

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SECTION 01 10 00
SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work by Owner or Others.
4. Site Access and Work restrictions.
5. Project Permits.

1.02 DEFINITIONS

A. Buffalo River AOC: Buffalo River Area of Concern, which was established by the U.S.-Canada Great Lakes Water Quality Agreement (Annex 2 of the 1987 Protocol) as having experienced environmental degradation.

B. Debris: Debris is defined as any solid waste materials encountered within the capping and habitat restoration area limits, shown on the Contract Drawings, such as logs, wire, cable, steel bands, anchors, lumber, boulders, trash, concrete, etc. Debris that needs to be removed to facilitate the work shall be disposed of at an approved, off-site landfill facility. Disposal of debris shall be in accordance with all applicable local, state, and/or federal regulations..

C. Owner: Honeywell International is the owner of the Work.

D. Owner’s Representative: The entity responsible for oversight of all phases of the Project on behalf of Honeywell.

E. USACE: United States Army Corps of Engineers.

F. USEPA: United States Environmental Protection Agency.

G. GLLA: Great Lakes Legacy Act.

H. GLNPO: Great Lakes National Program Office.

I. NYSDEC: New York State Department of Environmental Conservation.

J. PCBs: Polychlorinated Biphenyls.

K. Contractor: The successful Bidder of the Work will become the Contractor and will be directly contracted to the Honeywell to perform the Work.

L. Non-TSCA-level Sediment (or Non-TSCA-level Material): Sediment and debris containing total PCBs less than 50 mg/kg that are not regulated by USEPA as TSCA sediment and is not RCRA hazardous in New York.

M. Work: Remedial activities described herein which the Contractor will perform.

1.03 PROJECT INFORMATION

A. Project Identification: Capping and Habitat Restoration for the Buffalo River AOC under the GLLA.

B. Project Location: The Buffalo River AOC is located in the city of Buffalo in western New York State. The river flows from the east and discharges into Lake Erie near the head of the Niagara River. A portion of the Buffalo River is designated as the federal navigation channel and is maintained by the USACE. The AOC includes the entire 1.4-mile (2.3-kilometer [km]) stretch of the City Ship Canal (Ship Canal) and extends in the Buffalo River upstream approximately 6.2 miles (10 km), as shown on the Project Drawings.

C. Description of Habitat Restoration Sites:

1. The following are general descriptions of the Project work areas. Further details are provided in the Final Habitat Basis of Design Report (CH2MHill, 2013).
2. City Ship Canal:
   a. The City Ship Canal is a man-made, dead-end canal. The restoration site is the portion at the head (south end) of the Ship Canal and includes approximately 4,000 feet of shoreline on both sides of the canal, as shown on the Project Drawings
   b. The head of the City Ship Canal is bordered by naturally sloped shoreline with, scattered concrete, debris, rubble, scrap material, pilings, sheet piling walls, deteriorating concrete bulkhead and culvert pipes.
3. Riverbend Site:
   a. The Riverbend Site encompasses approximately 5,400 feet of shoreline and adjacent near-shore area on the left bank facing downstream and the site is bisected by the South Park Bridge , as shown on the Project Drawings.
   b. The shoreline within the Riverbend restoration project area is variable. Along the upstream half of the Project area, it contains stone, concrete cap, and natural sloped shorelines. Riparian vegetation is present along portions of this area. The shoreline

along the downstream half consists of naturally sloped shoreline, old timber pilings, a concrete cap, and a retaining structure along the most downstream portion of the site.

4. Buffalo Color Peninsula:
   a. The Buffalo Color Peninsula site is located on the right bank facing downstream across from the lower portion of the Riverbend Site, as shown on the Project Drawings. The site is the location of previous environmental remediation efforts, including the construction of a subsurface slurry wall around the perimeter of the site. During previous remedy construction, additional wastefill material was identified along the shoreline and outside of the slurry wall on the downstream portion of the site. In order to preserve the stability of the constructed slurry wall, approximately 4,000 CY of wastefill immediately adjacent to the slurry wall was left in place along a 500-foot length of the southwestern shoreline. This material may be the subject of subsequent pending remediation. Based on the “as-built” cross sections from the previous remediation, up to 10 feet of wastefill was excavated to within 30 feet of the slurry wall. The wastefill material remaining in the river was capped with a base layer of sand to stabilize side slopes, followed by a geotextile layer and then a surface layer of shot rock and/or riprap.
   b. The upland portion of the site is currently mowed grass with riprap banks that contain a mix of native vegetation and invasive plant species. The site extends for approximately 2,900 feet between the abandoned Niagara Frontier Transportation Authority half bridge and the Eastern CSX railroad bridge.
5. Katherine Street Peninsula:
   a. The Katherine Street Peninsula Site includes approximately 1,600 feet of shoreline on the right bank facing downstream along the southeastern corner of the Katherine Street Peninsula. The river bank is steeper at the northern portion of the shoreline, where the navigation channel is approximately 50 feet from the shore. The shoreline becomes considerably shallower at the southeastern corner of the peninsula, where the navigation channel is almost 150 feet from shoreline. The majority of the restoration area is comprised of vegetated river bank that is generally abandoned industrial property, with the exception of the most upstream portion, where a metal fabricating facility has a small boat ramp and dock, as shown on the Project Drawings.
6. Ohio Street Shoreline:
   a. The Ohio Street Shoreline Site is located on the right bank facing downstream shorelinethat includes a NYSDEC Park with a small boat launch, an inlet area that contains a combined sewer outfall (CSO), and a downstream portion that is currently occupied by a

local rowing club. The majority of the park portion of the restoration area includes naturally sloped shorelines as shown on the Project Drawings.

b. The boundaries of the restoration site include approximately 1,200 feet of shoreline.

D. Owner: Honeywell International.

1. Owner Contact: William Hague.
   a. Address: 101 Columbia Road, Morristown, NJ 07962.
   b. Work Phone: 973-455-2175.
   c. Email: william.hague@honeywell.com.

E. Engineer of Record: Anchor QEA Engineering, PLLC.

1. Anchor QEA Engineering, PLLC Contact: John Paul Doody.
   a. Address: 290 Elwood Davis Road; Liverpool, NY 13088.
   b. Work Phone: 315-453-9009.
   c. Email: pdoody@anchorqea.com.

F. Owner's Representative: Anchor QEA Engineering, PLLC.

1. Anchor QEA Engineering, PLLC Contact: Mark Reemts.
   a. Address: 10400 Little Patuxent Parkway, Suite 220, Columbia, MD 21044.
   b. Work Phone: 410-715-0824.
   c. Email: mreemts@anchorqea.com.

1.04 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work is defined by the Contract Documents and is subdivided into Base Work and Optional Work. The Optional Work will be undertaken at the Owner's discretion. The Work is subdivided as follows:

1. Base Work:
   a. Construction of all necessary temporary facilities to support the work, including but not limited to project trailers, employee and visitor parking areas, equipment and materials staging, haul roads, water access and mooring locations, equipment decontamination areas, and other access structures (if necessary).
   b. Placement of a cap at the south end of the City Ship Canal.
   c. Placement of an armored cap adjacent to the ADM/Pillsbury property.
   d. Installation of in-water habitat restoration features at two sites within the Buffalo River.
      1) City Ship Canal

2) Katherine Street Peninsula

2. Option 1: Installation of in-water habitat restoration features at Riverbend.
3. Option 2: Installation of in-water habitat restoration features at Buffalo Color Peninsula.
4. Option 3: Installation of in-water habitat restoration features at Ohio Street Shoreline.

B. Tasks Associated With Placement of a Cap At the South End of the City Ship Canal (Base Work):

1. Mobilizing equipment and personnel necessary to perform Base Work
2. Performing sampling and analytical testing of imported material sources to confirm compliance with Specifications
3. Performing a bathymetric survey to document the pre-construction sediment conditions.
4. Removing, staging, and properly characterizing and disposing miscellaneous scrap metal, concrete, wood, and other solid debris located within the in-water portion of the Project area and identified by the Owner's Representative for removal during capping.
5. Locating in the field all utilities that could be affected by the Work.
6. Installing equipment and performing water quality monitoring in the river if required as part of permit conditions.
7. Placement of cap material and in-water fill to design elevations and to meet Specifications over approximately 290,000 ft^2 of contaminated sediment at the end of the Ship Canal.
8. Performing bathymetric surveys and quality control checks to document capping placement and payment quantities.
9. Continued performance of water quality monitoring in the river.
10. Dismantling and removal of the temporary facilities not needed for future Work followed by the site restoration, if necessary.
11. Demobilization of personnel and equipment not needed for Base or Optional Work yet to be completed.

C. Tasks Associated With Placement of an Armored Cap Adjacent to the ADM/Pillsbury Property (Base Work):

1. Mobilizing equipment and personnel necessary to perform Base Work.
2. Performing sampling and analytical testing of imported material sources to confirm compliance with Specifications.
3. Performing a bathymetric survey to document the pre-construction sediment conditions.
4. Removing, staging, and properly characterizing and disposing miscellaneous scrap metal, concrete, wood, and other solid debris

located within the in-water portion of the Project area and identified by the Owner's Representative for removal during capping.

5. Locating in the field utilities that could be affected by the Work.
6. Installing equipment and performing water quality monitoring in the river.
7. Placement of cap materials within the river to meet specifications.
8. Performing bathymetric surveys and quality control checks to document capping placement.
9. Decontamination, dismantling and removal of temporary facilities not needed for future Work followed by site restoration, if necessary.
10. Demobilization of personnel and equipment not needed for Base or Optional Work yet to be completed.

D. Tasks Associated with Installation of In-water Habitat Restoration Features at Two Sites within the Buffalo River (Base Work):

1. Mobilizing equipment and personnel necessary to perform Base Work.
2. Performing sampling and analytical testing of imported material sources to confirm compliance with Specifications.
3. Performing a bathymetric survey to document the post-dredge/pre-habitat sediment conditions.
4. Removing, staging, and properly characterizing and disposing miscellaneous scrap metal, concrete, wood, and other solid debris located within the in-water portion of the Project area and identified by the Owner's Representative for removal during habitat restoration.
5. Providing, placing, and grading backfill to restore the site to the proposed grades as shown on the Drawings to promote a proper platform for planting.
6. Locating in the field all utilities that could be affected by the Work.
7. Installing in-water restoration features shown on the Drawings.
8. Providing monitoring of in-water restoration features.
9. Replace dead or diseased plants in order to meet minimum coverage requirements for 1 year after approval of installation.
10. Demobilization of personnel and equipment not needed for Base or Optional Work yet to be completed.

E. Tasks Associated with Installation of In-water Habitat Restoration Features at Riverbend (Option 1 Work):

1. Mobilizing equipment and personnel necessary to perform Option 1 Work.
2. Performing sampling and analytical testing of imported material sources to confirm compliance with Specifications.
3. Performing a bathymetric survey to document the post-dredge/pre-habitat sediment conditions.

4. Removing, staging, and properly characterizing and disposing miscellaneous scrap metal, concrete, wood, and other solid debris located within the in-water portion of the Project area and identified by the Owner's Representative for removal during habitat restoration.
5. Providing, placing, and grading backfill to restore the site to the proposed grades as shown on the Drawings to promote a proper platform for planting.
6. Locating in the field all utilities within work areas.
7. Installing in-water restoration features shown on the Drawings.
8. Providing monitoring of in-water restoration features.
9. Providing a 1 year guarantee of survival for plants after approval of installation, replace dead or diseased plants in order to meet minimum coverage requirements.
10. Demobilization of personnel and equipment not needed for Base or Optional Work yet to be completed.

F. Tasks Associated with Installation of In-water Habitat Restoration Features at Buffalo Color Peninsula (Option 2 Work):

1. Mobilizing equipment and personnel necessary to perform Option 2 Work.
2. Performing sampling and analytical testing of imported material sources to confirm compliance with Specifications.
3. Performing a bathymetric survey to document the post-dredge/pre-habitat sediment conditions.
4. Removing, staging, and properly characterizing and disposing miscellaneous scrap metal, concrete, wood, and other solid debris located within the in-water portion of the Project area and identified by the Owner's Representative for removal during habitat restoration.
5. Providing, placing, and grading backfill to restore the site to the proposed grades as shown on the Drawings to promote a proper platform for planting.
6. Locating in the field all utilities within work areas.
7. Installing in-water restoration features shown on the Drawings.
8. Providing monitoring of in-water restoration features.
9. Providing a 1 year guarantee of survival for plants after approval of installation, replace dead or diseased plants in order to meet minimum coverage requirements.
10. Demobilization of personnel and equipment not needed for Base or Optional Work yet to be completed.

G. Tasks Associated with Installation of In-water Habitat Restoration Features at Ohio Street Shoreline (Option 3 Work):

1. Mobilizing equipment and personnel necessary to perform Option 3 Work.
2. Performing sampling and analytical testing of imported material sources to confirm compliance with Specifications.
3. Performing a bathymetric survey to document the post-dredge/pre-habitat sediment conditions.
4. Removing, staging, and properly characterizing and disposing miscellaneous scrap metal, concrete, wood, and other solid debris located within the in-water portion of the Project area and identified by the Owner's Representative for removal during habitat restoration.
5. Providing, placing, and grading backfill to restore the site to the proposed grades as shown on the Drawings to promote a proper platform for planting.
6. Locating in the field all utilities within work areas.
7. Installing in-water restoration features shown on the Drawings.
8. Providing monitoring of in-water restoration features.
9. Providing a 1 year guarantee of survival for plants after approval of installation, replace dead or diseased plants in order to meet minimum coverage requirements.
10. Demobilization of personnel and equipment not needed for Base or Optional Work yet to be completed.

H. Type of Contract: Project will be constructed under a single prime contract.

1.05 WORK BY OWNER OR OTHERS

A. Concurrent Work:

1. Ongoing remedial dredging activities will be performed in the Buffalo River during 2014. Contractor shall coordinate all necessary access and river traffic with the ongoing work to prevent disruption of other remedial activities during the work.
2. Owner or Owner's Representative will perform observation of remedial dredging activities simultaneously with Work under this Contract.

1.06 SITE ACCESS AND WORK RESTRICTIONS

A. Project Area: Contractor shall have use of Project area (Buffalo River and Ship Canal) for remediation operations during construction period, subject to the fish spawning restrictions (no dredging or capping between December 31 and June 14 in the Buffalo River, and December 31 through June 30 in the ship canal). Contractor's use of Project area is limited by any permit restrictions and Owner's right to perform work or to retain other contractors on portions of Project. Contractor shall coordinate all necessary activities with existing river traffic and the ongoing remediation dredging activities being

performed on the Buffalo River. Contractor shall obtain from the NYSDEC a variance to the fish spawning restrictions for planting work of the habitat restoration work if spring conditions warrant an earlier start to the planting season.

B. Work Restrictions, General: Comply with restrictions on construction operations, limitations on use of public streets, and with other requirements of authorities having jurisdiction.

C. For Work performed within the Buffalo River and Ship Canal, do not disrupt commercial boat traffic in the navigation channel.

D. For Project staging sites or other areas used for Project work that do not have site security, the Contractor is responsible for posting instructions to visitors and have sign-in sheets available and control visitor access to designated areas.

E. Maintain access to properties for property owners and emergency vehicles at all times.

F. All habitat restoration work shall be completed under reasonably dry conditions, except for planting of SAV beds which may be installed by divers working below the water surface.

G. Onsite Work Hours: Work may be conducted 24 hours per day, Monday through Saturday, unless otherwise indicated. Sundays are to be reserved for maintenance work or to be used to compensate for downtime incurred during the work week.

H. Existing Utility Interruptions: Do not interrupt utilities unless permitted under the following conditions and then only after obtaining approval for proposed interruption from Utility owner:

1. Notify Owner’s Representative not less than 2 days in advance of proposed utility interruptions.
2.
3. Obtain Owner’s Representative’s written permission before obtaining clearance and before proceeding with utility interruptions.

I. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to display identification tags at all times.

J. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site. Maintain list of approved screened personnel with Owner's Site Representative.

1.07 PROJECT PERMITS

A. Permits and Planning for the Project shall be obtained and conducted as indicated below and in Section 01 57 20, Environmental Protection.

1. Joint Permit Application which incorporates requirements of Section 10 of the Rivers and Harbor Act of 1899, Section 404 of the Clean Water Act (CWA), Section 401 of the CWA (including NYSDEC Water Quality Certification (WQC) and an Article 15-Protection of Waters Permit), Nationwide Permit 27 for Aquatic Habitat Restoration, Establishment, and Enhancement Activities (NWP 27) and Nationwide Permit 38 for Cleanup of Hazardous and Toxic Waste (NWP 38), both of which are issued by the USACE Buffalo District. (prepared by others).
2. Full Environmental Assessment Form and an Environmental Assessment of the capping and habitat restoration in accordance with 6 NYCRR Part 617 State Environmental Quality Review (SEQR) (prepared by others).
3. Coordination with the U.S. Coast Guard regarding a Notice to Mariners (to be performed by Contractor).
4. Preparation of a Stormwater Pollution Prevention Plan in accordance with the SPDES General Permit for Construction Activity (obtained by Contractor) and in accordance with Section 01 57 23, Stormwater Pollution Control.
5. Characterization and suitability determination of maintenance dredge material for beneficial reuse for capping or habitat purposes (if elected for use by Contractor). If material is suitable, additional permitting will be required (by others).
6. A temporary building permit will be required for any support structures. The City of Buffalo will require a survey, a site plan, and a description of the type and configuration of any structures that will be erected as part of the application (to be obtained by the Contractor).

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 11 01
HEALTH, SAFETY, ENVIRONMENT, AND EMERGENCY RESPONSE

PART 1 GENERAL

1.01 WORK INCLUDED

A. Contractor is responsible for implementation and enforcement of health and safety requirements along with emergency response requirements, and shall take necessary precautions and provide protection for following:

1. Personnel working in or visiting Project area for the purpose of conducting Project-related activities, irrespective of employer.
2. Work and materials or equipment to be incorporated in Work areas
3. Property within the Project area.
4. Public exposed to Project-related operations.

B. Contractor is responsible for initiating, maintaining, and supervising safety precautions and programs in connection with Work.

C. Contractor shall be directly responsible for health and safety of their employees and their subcontractors. In event of an issue/emergency, Contractor shall address the issue/emergency with their personnel and support systems and provide appropriate notification to Owner's Representative and Owner.

D. Contractor's duties and responsibilities for safety in connection with Work shall continue until such time as Work is complete and Owner's Representative has issued notice to Contractor that Work is complete.

E. Contractor shall develop and implement a written Health, Safety, and Emergency Response Plan (HSERP) which, at minimum, meets requirements of this Section and complies with applicable federal, state, local and site regulations. HSERP shall be the agreed upon method for implementation and enforcement of Site safety, health, and emergency response requirements.

F. HSERP shall be submitted and reviewed by Owner's Representative before any work on jobsite can begin.

G. Payment: Work specified in this Section is considered incidental and cost shall be included as part of appropriate lump sum and unit prices specified in Compensation Schedule.

1.02 SUBMITTALS

A. Submit copies of HSERP to Owner's Representative in accordance with provisions in Section 01 33 00, Submittal Procedures.

B. Submit copy of Contractor Corporate Safety Manual.

C. Submit copies of safety training records of all staff working in the Project area.

D. Submit employee drug testing compliance verification prior to beginning site work.

E. Submit activity hazards analysis (AHA) for all tasks or definable features of the work.

F. Submit formatted SDS sheets in alphabetized binder, with table of contents, for all chemicals to be used onsite.

G. Submit equipment inspection sheets weekly.

H. Submit a minimum of one safe behavior observation (SBO) daily.

I. Contractor shall certify to Owner's Representative by weekly health and safety summary submittal from Contractor Health and Safety Officer that Contractor is in compliance with HSERP. Weekly personnel hours shall be incorporated.

J. Contractor shall be responsible for submitting name, qualifications, training records, and experience of personnel required above in accordance with following:

1. Health and Safety Coordinator (HSC) information shall be submitted to Owner's Representative at preconstruction conference and before any changes are made.
2. Health and Safety Officer (HSO) information shall be submitted to Owner's Representative at preconstruction conference and before any changes are made.
3. Safety Technician (ST) information shall be submitted to Owner's Representative at preconstruction conference and before any changes are made.

1.03 REGULATORY REQUIREMENTS

A. HSERP shall meet requirements of this Section and applicable requirements including but not limited to those contained in publications listed below.

1. Code of Federal Regulations (CFR):
   a. 29 CFR 1920, Occupational Safety and Health Administration (OSHA) Standards for General Industry
   b. 29 CFR 1910.120, OSHA Standards, "Hazardous Waste Operations and Emergency Response"
   c. 29 CFR 1910.134, OSHA Standards, "Respiratory Protection"
   d. 29 CFR 1910.1000 through 1910.1048, OSHA Standards, "Air Contaminants - Permissible Exposure Limits".
   e. 29 CFR 1910.1200, OSHA Standards, "Hazard Communication"
   f. 29 CFR 1926, OSHA Standards, "Construction Industry".
   g. 29 CFR 1926.59, OSHA Standards, "Hazard Communication Standard for Construction Industry"
2. New York Codes, Rules and Regulations (NYCRR)
   a. 6 NYCRR 370, Hazardous Waste Management System: General.
   b. 6 NYCRR 371, Identification and Listing of Hazardous Wastes
   c. 6 NYCRR 372 Hazardous Waste Management System and Related Standards for Generators, Transporters and Facilities
   d. 6 NYCRR 376 Land Disposal Restrictions
3. Miscellaneous Regulations
   a. New York Oil Spill Prevention, Control, and Compensation Act; Navigation Law, Article 12; 17 NYCRR 32.3 and 32.4; New York Environmental Conservation Law (ECL) 17-1743, 40 CFR 110.10 and 117.21 and 33 CFR 126.29 and 153.203 regarding spills.
   b. 49 CFR 171, Hazardous Materials Regulations: General Information, Regulations, and Definitions.
   c. 49 CFR 172, Hazardous Materials Tables and Hazardous Materials Communications Regulations.
   d. 49 CFR 173, Shippers - General Requirements for Shipments and Packaging.
   e. 49 CFR 178, Shipping Container Specifications.
4. Other Agencies Minimum Requirements:
   1) National Institute for Occupational Safety and Health (NIOSH).
   2) OSHA.
   3) U.S. Coast Guard.
   4) U.S. Environmental Protection Agency (EPA).
   5) US Army Corps of Engineers.
   6) New York State Department of Environmental Conservation (NYSDEC).

7) Erie County.
8) City of Buffalo.

b. American National Standards Institute (ANSI):
1) ANSI Z358.1, Emergency Eye Wash and Shower Equipment.
2) ANSI Z88.2, Practices for Respiratory Protection.
3) ANSI G-7.11, Commodity Specification for Air.

c. Comply with applicable laws and regulations of any public body having jurisdiction for safety of persons or property.

B. Other Publications:

1. American Conference of Governmental Industrial Hygienists(ACGIH) - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, current issue.
2. (1985) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.
3. New York State Department of Health's (NYSDOH) guidance document titled 'New York State Department of Health Generic Community Air Monitoring Plan' dated May 2010.
4. NYSDEC Division of Environmental Remediation guidance policy contained in Appendix 1b of Guidance Document DER-10 titled ‘Fugitive Dust and Particulate Monitoring’.

1.04 RESPONSIBILITIES

A. Contractor shall provide services of Health and Safety Coordinator, Health and Safety Officer and Safety Technicians.

1. Health and Safety Coordinator: Designated Health and Safety Coordinator (HSC) shall have minimum of 10 years’ experience in field of hazardous waste or related chemical industries. HSC must have working knowledge of state and federal occupational safety and health regulations and shall be Certified Industrial Hygienist (CIH) or Certified Safety Professional (CSP).
a. HSC shall be responsible for development and implementation of HSERP. All site-specific health and safety training shall be approved by HSC, and initial site-specific training shall be conducted by HSC. HSC will not be required to be present at site for entire duration of Project, but must be available for consultation and/or assistance at all times throughout remedial activities.
2. Health and Safety Officer: Designated Health and Safety Officer (HSO) must have, as minimum, 5 years of onsite remedial action experience on hazardous waste sites, working knowledge of state and federal

occupational safety and health regulations, and formal training in health and safety. HSO also shall have experience in maintenance, calibration, and use of various air monitoring and other instruments required in this Section of these Specifications. HSO shall have demonstrable experience in implementation of personal protective equipment programs, basic knowledge of dilution ventilation systems, and be certified in First-Aid and CPR by American Red Cross or equivalent. HSO shall be assigned to site on full-time basis and report directly to HSC on matters pertaining to site health and safety, air monitoring and public protection. The HSO will be 100 percent dedicated to the project in this capacity. HSC will be responsible for day-to-day on site implementation of HSERP.

3. Safety Technician: Safety Technician (ST) must have 3 years of related experience and basic understanding of current health and safety regulations. In addition to site-specific training given by HSC, ST shall have had additional training in personal protective equipment and air monitoring instruments. ST also must have current certification in First-Aid and CPR (American Red Cross or equivalent). ST will be responsible for on site compliance with HSERP. ST shall report directly to HSO on all matters relating to onsite health and safety matters, including noncompliance with HSERP.

1.05 HSERP REQUIREMENTS

A. Contractor shall develop and implement comprehensive HSERP to ensure adequate protection for all onsite personnel, visitors and surrounding community.

B. Formal statement of qualifications and responsibilities of Contractor’s health and safety personnel shall be included in HSERP. Requirements described herein shall be used as minimum outline description of HSERP. HSERP shall be site-specific and incorporate assessment of hazards associated with work. HSERP shall address not only potential chemical hazards but also potential physical and biological hazards associated with performance of work.

C. HSERP shall address following minimum subject areas in accordance with 29 CFR 1910.120(b)(4)(ii) and commensurate with project scope and hazards:

1. Site Description/History/Evaluation.
2. Health and Safety Organization (responsibilities, qualifications and chain of command).
3. Work Zones.
4. Site Control.
5. Hazard Assessment.
6. Training.

7. Medical Surveillance.
8. Atmospheric/Air Monitoring (if required).
9. Standard Operating Safety Procedures, Engineering Controls and Work Practices.
10. Personal Protective Equipment.
11. Personnel Hygiene and Decontamination.
12. Equipment and Material Decontamination.
13. Emergency Equipment and First-Aid Requirements.
14. Emergency Response/Contingency Plans and Procedures.
15. Heat/Cold Stress Monitoring.
16. Hazard Communication Program, including (SDSs).
17. Accident Prevention Plan.
18. Cutting and Welding Procedures (including hot work permits).
19. Spill Control Provisions.
20. Water/Boat Safety.
21. Drinking Water and Supplies.

1.06 HSERP ELEMENTS AND EXECUTION

A. Site Description History/Evaluation: Contractor shall briefly describe site, history, any evaluations completed with dates and type of contamination. This Section should not be more than 1 page.

B. Health and Safety Organization: Contractor shall describe health and safety organization for Project including identification of key personnel, their resumes/professional profiles, their responsibilities, and administrative flowchart or procedures for identifying problems and taking corrective actions.

C. Work Zones:

1. Contractor shall be responsible for establishing work zones if necessary in Project areas. Work zones may be fixed locations throughout duration of job or may be adjusted as area of work activity changes. Work zones shall be defined as follows:
   a. Exclusion Zone: Initially, Exclusion Zone (EZ) will include all potentially contaminated areas of site where work is to be performed. Contractor may change Exclusion Zone with approval of Owner’s Representative during progress of work; requests for such change shall be in writing and include justification.
   b. Contamination Reduction Zone: Contamination Reduction Zone (CRZ) is transition area between contaminated work area and "clean area". Distance between Exclusion Zone and Support Zone provided by CRZ, together with decontamination of works and equipment should limit transfer of potential contaminants into

"clean areas". Contractor shall require personnel entering CRZ to wear personal protective equipment prescribed for working in EZ as specified in Contractor's HSERP.

c. Support Zone: Support Zone shall be utilized by Contractor for administrative and other support functions. Examples of equipment and facilities that will be located in this area include, but are not limited to, lunch and break areas, supplies and equipment storage, parking, Contractor offices and maintenance facilities. Personnel may wear normal work clothing in this zone. Potentially contaminated clothing, equipment and materials shall not be allowed in this area prior to proper decontamination in CRZ.

2. Contractor shall mark outer limits of Exclusion Zone with high visibility markers or flagging.
3. Contractor shall be responsible for establishing means of communication between work zones, and for workers within same zone. This means of communication shall be documented in HSERP.
4. Contractor shall be responsible for security within each established work zone.

D. Site Control:

1. Contractor shall establish system to control access to Work areas where appropriate. This system shall be incorporated into layout of work zones and shall ensure that only authorized persons enter site.
2. Contractor shall keep daily sign in/out logs for all "work zones". Daily sign in/out logs shall be submitted to Owner's Representative weekly.

E. Hazard Assessment: Purpose of hazard assessment is to provide information necessary for selecting personal protective equipment, establishing air monitoring requirements and determining health and safety procedures necessary to protect all onsite personnel, environment and public.

1. Qualitative evaluation of chemical hazards shall be based upon following:
   a. Nature of potential contaminants.
   b. Locations of potential contaminants Project site.
   c. Concentrations of contaminants.
   d. Potential for personnel/public exposure during various site activities.
   e. Effects of potential contaminants on human health.
   f. Physical work area (water and railroad).
2. Biological Hazards: Contractor shall assess potential biological hazards this site may pose to personnel.

3. Physical Hazards: Contractor shall assess potential for physical hazards present at site and those that may develop as result of remedial activities (e.g. water and railroad).

F. Training:

1. General: Contractor shall certify that all personnel assigned to work on jobsite have received required level of training. Those individuals who enter the site shall have received appropriate training in accordance with 29 CFR 1910.120 and other appropriate training as required by law. HSERP shall describe training required for each identified job task.
2. Site-Specific Training: All personnel assigned to or entering the site shall complete site-specific training. Purpose of this training is to ensure personnel are familiar with content of HSERP and general site procedures. This training shall be conducted by HSC and HSO. Contractor shall notify Owner's Representative at least 2 working days prior to initial site-specific training session so that Owner's Representative's and other contracted personnel may attend. Follow-up site-specific training sessions for new personnel or visitors shall be conducted by HSC and HSO.
3. Follow-Up Training: "Tail Gate" safety meetings shall be held daily prior to start of work to discuss safety practices related to ongoing work. Should operational change affecting onsite field work be made, or prior to commencement of new tasks, meeting prior to implementation of change or new task shall be convened to explain health and safety procedures and requirements. Prior to initiating nonroutine or new task in any restricted area, HSO shall present health and safety practices and training for operation(s) to persons responsible for accomplishing activity.
4. Refresher Training: All personnel working at this site shall receive refresher training as required by 29 CFR 1910.l20(e)(4).
5. General Records: Contractor shall keep copies onsite of records for all training periods, documenting date, attendance and topics covered. Additionally, Contractor shall be responsible for ensuring that only personnel successfully completing required training are permitted to work on jobsite. Training records shall be submitted to Owner's Representative minimum of 1 week in advance of personnel working on jobsite. Training record updates shall be submitted to Owner's Representative monthly.
6. Emergency Medical Care: Contractor shall establish emergency routes and communications with health and emergency services.
7. Medical records: Contractor shall maintain and preserve medical records in accordance with requirements of 29 CFR 1910.1020. Access to employee medical records shall also be in accordance with 29 CFR 1910.1020 and 1926.33.

G. Personal Air Monitoring: Personal Air Monitoring procedures and action levels will be identified in Contractor's HSERP.

H. Standard Operating Safety Procedures, Engineering Controls and Work Practices: Contractor shall develop, implement and enforce safe work practices and Engineering safeguards for work covered under these Specifications. General health and safety directives for conducting onsite work which shall be included in HSERP and enforced during site activities include, but are not limited to:

1. Eating and smoking shall be restricted to designated areas.
2. Wearing contaminated protective apparel in any area other than CRZ or EZ shall be prohibited.
3. Buddy system shall be implemented for all work in Exclusion Zone.
4. Contractor shall provide emergency showers and emergency eye washes which conform to requirements of ANSI Z358.l-2004.
5. Contractor shall develop procedures which addresses potential of equipment coming into contact with overhead hazards such power transmission lines or cables.
6. Contractor shall implement protocols for unloading and loading materials. These protocols shall include DOT requirements covering such items as grounding, placarding, driver qualifications and use of wheel locks/chocks. Operation of heavy equipment at site shall be in accordance with OSHA 29 CFR 1926.
7. Illumination in areas accessible by employees shall meet requirements of OSHA 29 CFR1910.120(m).

I. Personal Protective Equipment: Contractor shall provide Project personnel with safety equipment and protective clothing as specified in HSERP, at no cost to the employee, compliant with 29 CFR 1910.120.

1. Skin Protection: Contractor shall provide and maintain all required protective clothing, including but not limited to hard hats, coveralls, boots, gloves, and other necessary items which are protective against and resistant to chemicals at site.
2. General Exclusion Zone Requirements: Employees who have been working with contaminated materials or in contaminated environment shall remove all protective and work clothing and shower before changing into street clothes and leaving site. Prior to eating lunch and taking breaks, personnel leaving Contamination Reduction Zone shall wash their hands, face and exposed skin areas. All protective equipment shall be selected by Contractor's HSC and shall be resistant to degradation and permeation of site chemicals. Openings (wrists and ankles) shall be taped.

HSC shall evaluate work conditions and determine effectiveness of protective equipment and when upgrades/downgrades in levels of protection are appropriate. Any deviations from personal protective equipment levels listed in HSERP shall be provided in writing to Owner's Representative for approval.

3. Task-Specific Levels of Protection: Contractor shall indicate in HSERP levels of protection required to perform specific tasks. Contractor also shall describe in HSERP methods and protocols that will be utilized to upgrade/downgrade levels of protection for each task.
4. Working On or Near Water: When work is performed adjacent to or on water, personnel will wear United States Coast Guard approved life vests.

J. Personnel Hygiene and Decontamination:

1. Personnel Decontamination Area: Contractor shall provide Personnel Decontamination Area in Contamination Reduction Zone where surface contamination and outer protective clothing can be removed. Area shall provide workers protection from weather. This area shall include provisions for washing contamination and mud from boots and protective clothing.
2. Work Area Change Rooms: Contractor shall provide Work Area Change Rooms in accordance with 29 CFR 1910.120(n)(7)(i-iv) which meets requirements of 29 CFR 1910.141. This shall include change areas separated by shower facilities. These areas shall include benches and tables needed for changing clothes. One change room, with exit leading off site, shall provide clean area where employees can remove, store and put on street clothing. This area shall have lockers for each employee to securely store personal items.
3. Shower Room: Contractor shall provide, supply and maintain shower room which meets requirements of 29 CFR 1910.141(d)(3)(4). Soap, washcloths and towels shall be provided to all personnel required to shower.
4. Lunch Room: Contractor shall provide lunch room for all site personnel. This area shall be furnished with benches and tables. This area will be free of contamination and be kept in clean and sanitary condition. Area shall be cooled/ heated dependent on season.
5. All areas described above shall be lighted in accordance with minimum requirements defined in 29 CFR 1910.120(m), Table H-120.1.

K. Equipment and Material Decontamination:

1. Contractor shall build an Equipment Decontamination Area in Contamination Reduction Zone. Purpose of Equipment Decontamination Area is to capture and prevent spread of site

contaminated material, invasive species, and viruses from leaving Contamination Reduction Zone and Exclusion Zones.

2. Contaminated solids and solids collected in decontamination area shall be disposed of properly.
3. Contractor shall include design details for Equipment Decontamination Area in this Section of HSERP.
4. Information required should include, but not necessarily be limited to following:
    a. Scaled map showing location of decontamination area.
    b. Materials of construction data.
    c. Liner specifications.
    d. Method of rinsate collection.
    e. Decommissioning procedures.
5. Contractor shall address their plans for dealing with these issues in this Section of HSERP.
    a. Contractor shall develop set of protocols and procedures for equipment decontamination that will be utilized to prevent spread of contamination into Support Zone and offsite area.
    b. Contractor shall decontaminate all equipment used for the Project including, but not limited to, trucks, barges, boats, silt or turbidity curtains, hoses, sheet pile and pumps, prior to bringing equipment onsite.
    c. Designated clean area shall be established in Contamination Reduction Zone for performing equipment maintenance. This area shall be used when Contractor personnel are required to perform maintenance on equipment. All equipment within Exclusion Zone or Contamination Reduction Zone shall be decontaminated before maintenance.
    d. All items taken into Exclusion Zone must be assumed to be contaminated and shall be decontaminated and inspected before leaving Contamination Reduction Zone. All contaminated vehicles, equipment and materials shall be cleaned and decontaminated to satisfaction of Owner’s Representative prior to leaving site.
    e. The following steps shall be taken every time equipment is relocated to a new water body to avoid transporting invasive species and viruses. To the extent practicable, equipment and gear used on infested waters should not be used on other noninfested waters.
        1) Inspect and remove aquatic plants, animals, and mud from equipment.
        2) Drain water from equipment including, but not limited to, tracked vehicles, barges, boats, silt or turbidity curtains, hoses, sheet pile and pumps.

3) Dispose of aquatic plants, animals in the trash. Do not release or transfer aquatic plants, animals or water from one water-body to another.
4) Wash equipment with hot (> 104 degrees F) and/or high pressure water OR allow equipment to dry thoroughly for 5 days.

f. Tools and items for which decontamination is difficult or impossible to verify shall remain onsite, until completion of work, for subsequent packaging and disposal by Contractor at secure landfill with current permit to accept wastes generated at site. Examples of such wastes include, but are not limited to, wire, rope and lumber.

L. First-Aid Provisions and Emergency Equipment:

1. Fire Extinguishers: Type and number of fire extinguishers shall be determined by Contractor and submitted as part of HSERP. Inspection and maintenance shall be responsibility of Contractor. As minimum, two 20-pound A, B, C fire extinguishers shall be located at entrance to Exclusion Zone, at entrance of each enclosure in work zone, and in Support Zone. Other fire stations equipped with appropriate type and size of fire extinguishers shall be established by Contractor as needed. These stations shall be clearly marked and identified in HSERP. All combustible or flammable materials used onsite shall be stored in Underwriter's Laboratory (UL) listed and/or Factory Mutual (PM) approved containers. Each vehicle will have approved, inspected portable fire extinguisher.
2. Emergency Eye Wash: At a minimum, Contractor shall provide and maintain I5-minute free-flow capacity Contractor emergency eye wash unit. This unit may be part of emergency shower specified above and shall be located in Contamination Reduction Zone. Contractor shall establish additional eye wash stations at any area where potential eye-irritating materials will be used. Locations of stations shall be identified in HSERP and identified to onsite personnel during site health and safety training. Emergency eye wash units shall meet requirements specified in ANSI Z358.1-1981. Each vehicle will have portable eye wash.
3. First-Aid Kits: Contractor shall provide and equip first-aid kits with supplies applicable to scope of work. HSERP shall list contents of First-Aid Kits. At minimum, Contractor shall provide first-aid kits at clearly designated locations in Contractor’s offices and at entrance to Contamination Reduction Zone. Location of first-aid stations shall be identified in HSERP. Each vehicle will have first-aid kit.

M. Emergency Response/Contingency Plans and Procedures:

1. Contractor shall develop emergency response and contingency plan for onsite and offsite emergencies in accordance with 29 CFR 1910.120(1) which meets requirements of 29 CFR 1910.120(p)(8). This plan shall, at a minimum, address the following:
   a. Pre-emergency planning.
   b. Personnel roles, lines of authority, training and communication.
   c. Emergency recognition and prevention.
   d. Safe distances and places of refuge.
   e. Evacuation routes and procedures.
   f. Emergency decontamination.
   g. Emergency medical treatment and first-aid.
   h. Emergency alerting and response procedures.
   i. PPE and emergency equipment.
   j. Critique of response and follow-up.
2. In event of any emergency associated with remedial activities, Contractor shall without delay: take diligent action to mitigate cause of emergency, alert Owner's Representative, and institute whatever measures might be necessary to prevent any recurrence of conditions or actions leading to or resulting in emergency.
3. Emergency medical care services shall be prearranged at a medical facility in Buffalo. Staff at facility shall be advised of potential emergencies that might result.
4. Contractor shall establish emergency communications with health and emergency services. Name of these facilities, points of contact, emergency routes and communications arrangements shall be included in Contractor's HSERP. Contractor shall post list of all phone numbers that may be used for emergency communications. As minimum, this list shall include following information and telephone numbers:
   a. Procedure for prompt notification of New York State Department of Environmental Conservation, EPA, National Response Center and Owner's Representative.
   b. Any other telephone numbers that may be needed in emergency.
   c. Location of emergency showers and eye washes.
   d. Location of first-aid stations.
5. In event of accident or some other incident, Owner's Representative shall be notified immediately and receive written notification within 24 hours. Report shall include following items:
   a. Name, organization, telephone number and location of Contractor.
   b. Name and tile(s) of person(s) reporting.
   c. Date and time of accident/incident.
   d. Location of accident/incident (i.e., site location, facility name).
   e. Brief summary of accident/incident giving pertinent details including type of operation ongoing at time of accident/incident.
   f. Cause of accident/incident, if known.
   g. Injuries.

h. Details of any chemical hazard or contamination resulting from accident/incident.
i. Estimated property damage, if applicable.
j. Nature of damage; effect on Project schedule.
k. Action taken by Contractor to ensure safety and security.
l. Other damage or injuries sustained (public or private).

6. Fires: As part of HSERP, Contractor shall describe procedures, equipment and personnel for responding to fires and potential explosion at site. Contractor will provide training records for personnel who are designated to fight fires.
   a. Small Fires: Small is defined as fire that can be extinguished with available fire extinguishers required under other paragraphs of this Section. In event of small fire at site, Contractor and his designated fire control personnel shall take following action:
      1) Evacuate all unnecessary personnel from area to a safe upwind location.
      2) Attempt to extinguish fire using portable fire extinguishers or by smothering.
      3) Fire control personnel shall wear appropriate personal protective equipment when responding to fire.
      4) Request emergency response assistance as needed for any injuries or exposures to hazardous chemicals
      5) Notify Owner’s Representative and Owner of incident.
   b. Large Fires: In event of large fire or fire which cannot be extinguished with onsite personnel and equipment, Contractor shall take following minimum actions:
      1) Evacuate all unnecessary personnel from site to a safe upwind location.
      2) Take any appropriate actions to ensure safety of onsite personnel and public.
      3) Notify Owner’s Representative and Owner.
7. First-Aid:
   a. Physical Injury:
      1) For minor injuries, routine first-aid procedures shall be administered by individual(s) certified in first-aid.
      2) For major injuries, onsite personnel shall attempt to stabilize victim and perform any decontamination possible that does not compromise condition of injured person or others. Onsite personnel shall be prepared to provide paramedics with information about accident and/or chemical exposure if applicable.
      3) Notify Owner’s Representative and Owner.
   b. Chemical Injury:
      1) Appropriate personal protective equipment shall be worn when treating victim(s).

2) Victim's vital signs and severity of exposure shall be assessed. Ambulance should be called and hospital should be notified of type of injury that is being brought to them for emergency treatment.
3) Victim shall be removed to fresh air and resuscitated if necessary.
4) If clothing is chemically contaminated and injuries permit, clothing shall be removed and skin flooded with copious amounts of water.
5) If eyes are contaminated, they shall be irrigated immediately with copious amounts of water for at least 15 minutes and preferably until victim can be transported to hospital.
6) If appropriate, Poison Control Center should be contacted for technical advice and assistance.
7) Notify Owner’s Representative and Owner.

N. Heat/Cold Stress Monitoring:

1. Heat Stress Monitoring: Nature of work combined with use of protective equipment may create heat stress. To prevent heat stress and to monitor body's recuperative abilities to excess heat, one or more of following techniques shall be used. Monitoring of personnel wearing impervious clothing shall commence when ambient temperature reaches 70 degrees F. Monitoring frequencies shall increase as temperatures increase or when employees show slow recovery rates. Monitoring shall be performed by person with current first-aid certification and specific training in recognition of symptoms of heat stress. Heat stress physiological monitoring shall include, but not be limited to following:
   a. Heart rates.
   b. Body temperature.
   c. Body water loss.
2. Contractor’s Health and Safety Coordinator (HSC) shall specify work cycle period and rest period based upon ambient temperatures and heat stress monitoring. Work/rest schedules and action levels at which corrective action shall be taken shall be addressed in Contractor’s HSERP.
3. Cold Stress Monitoring: To protect against cold-related injuries, Contractor shall provide appropriate clothing, shelter for rest periods and written procedures which protect employees from potential cold-related injuries and stress. As minimum, Contractor shall follow recommendations in American Conference of Governmental Industrial Hygienists Threshold Limit Values for Physical Agents in Work Environment.

O. Hazard Communication Program: Hazard Communication Program: Contractor's HSERP shall include hazard communication program compliant with 29 CFR 1910.1200 and 29 CFR 1910.1200 (d) for all chemicals brought onto site by Contractor and any contracted personnel. All chemicals which are considered hazardous shall be correctly labeled, and workers shall be trained on hazard of chemical before using it. Contractor shall maintain copy of all Safety Data Sheets in Support Zone for all such chemicals; these documents shall be readily available to Owner's Representative and other site personnel upon request. All MSDSs will be provided to Owner's Representative for approval minimum of 1 week before material is brought onsite.

P. Accident Prevention Plan: Contractor shall submit as part of HSERP an Accident Prevention Plan (APP). APP shall include accident prevention policy to be followed by Contractor and contracted personnel during construction and remedial action activities. Contractor shall be responsible for implementation of APP by all Contractor and contracted personnel. Accident Prevention Plan shall address, at minimum following items:

1. Safety hazards associated with work activities and preventive measures to be implemented.
2. Personnel responsibilities.
3. Safety procedures.
4. Contractor supervision.
5. Safety meetings.
6. Fire prevention and protection.

Q. Cutting Brazing and Welding Procedures: Cutting, brazing and welding operations shall not be conducted without hot work authorization permit from HSO per OSHA requirements. Contractor shall list requirements for obtaining hot work permit. HSO shall notify Owner's Representative of all hot work and provide copy to Owner's Representative to obtain Owner's Representative's authorization before commencing any such activity. As minimum, requirements shall be in compliance with regulations specified in 29 CFR 1910.252 and these Specifications. This requirement applies to welding, grinding, sawing or other similar operation which could be expected to potentially generate combustion-producing temperatures or sparks, or which could evolve potentially hazardous fumes or vapors. Contractor shall designate individual as fire watch during and after all hot work activities. This person's sole responsibility shall be to monitor hot work and have immediate access to fire extinguishers.

R. Spill Control Provisions:

1. Contractor shall have available provisions for dealing with spills. As part of HSERP Contractor shall provide their procedures for dealing with spills, including upland spills or marine spills.
2. Contractor must comply with New York Spill Prevention, Control, and Compensation rules if greater than 1320 gallons of oil storage capacity (total) is provided by Contractor,
3. Contractor to ensure compliance with any and all applicable US Coast Guard, Federal , and state marine spill containment and collection provisions.
4. Provide for unexpected spills through provision of following minimum equipment to be kept onsite and/or on barge if part of installation is performed from marine-based equipment at all times during site work activities.
    a. One front end loader, if used for other work such as drum moving (not required on barge).
    b. Hand shovels.
    c. Sorbant pads, containment booms, and other cleanup materials.
    d. Other decontamination supplies and equipment for decontamination of tools and equipment.
    e. Skiff/boat with life vests and marine spill equipment if materials discharge to sewer or river, or if spill occurs from barge, boat, or marine-based equipment.
    f. Other appropriate materials for use in river with commercial boat traffic.
5. Spills: If spill occurs, take following actions:
    a. Immediate action to stop spill and protect/decontaminate affected personnel.
    b. Implement appropriate action as called for in Safety Health and Emergency Response Plan (HSERP) and any other applicable site specific plans such as SPCC Plan.
    c. Take measures to control, confine, and clean up spill.
    d. Notify Owner’s Representative.
6. Spill cleanup plans and remedies shall be developed and implemented by Contractor as approved by Owner’s Representative.
    a. Recovered liquids may be handled and disposed of offsite in accordance with all applicable regulations.
    b. Remove contaminated soils onsite to depth of up to 1 foot or to depth to remove spilled materials, drum, and handle as specified in HSERP. Excavation to less than 1 foot shall be at Owner’s Representative discretion and will require sampling and analysis of residual samples. Excavation shall be restored to approximately original grade with clean fill material.
    c. Spilled flowing fluids will be stopped immediately and shall be drummed or placed in tankage and handled as specified for liquid wastes in HSERP.

d. Decontaminate onsite structures to remove traces of spilled material.
e. Spilled solids shall be completely recovered, drummed, and handled as specified in HSERP.
f. If spill or other emergency event occurred for reasons beyond control and responsibility of Contractor as determined by Owner's Representative, adjustment in price will be considered.

S. Water/Boat Safety: Personnel associated with Water/Boat safety will be required to wear personal floatation devices (PFDs). Life vests must be Coast Guard approved and marked for its appropriate use as life vest. Also pay particular attention to structural integrity of docks, piers, and working surfaces. All walking and working surfaces shall be maintained in good repair. Additionally, employees should have appropriate work boots with cleated soles for greater traction.

T. Drinking Water and Supplies:

1. Contractor shall provide bottled water (individual size bottles) for their employees working onsite.
2. Water shall be provided and placed in locations readily accessible to all employees. Water shall be suitable cool and in sufficient amounts, taking into account air temperature, humidity, and nature of work performed, to meet needs of all employees.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Submittals.
2. Coordination.
3. Progress of Work.
4. Contractor's Construction Schedule.
5. Overall Progress Schedule.
6. Daily construction reports.
7. Material location reports.
8. Site condition reports.
9. Special reports.

B. Related Requirements:

1. Section 01 33 00, Submittal Procedures, for submitting schedules and reports.
2. Section 01 40 00, Contractor Quality Control, for submitting a schedule of tests and inspections.

1.02 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early-start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest connected chain of interdependent activities through the schedule that establishes the minimum overall Project duration and contains no float.

D. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.03 INFORMATIONAL SUBMITTALS

A. Overall Progress Schedule: Submit adjusted schedule with each monthly Application for Payment in accordance with the General Terms and Conditions, and at such other times as necessary to reflect: (i) progress of Work to within 5 working days prior to submission; (ii) changes in Work scope and activities modified since submission; (iii) delays in Submittals or resubmittals, deliveries, or Work; (iv) adjusted or modified sequences of Work; (v) other identifiable changes; and (vi) revised projections of progress and completion.

B. Format for Progress Schedule Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF electronic file.

C. Contractor's Construction Schedule: Initial schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early-start date, early-finish date, late-start date, late-finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early-start date, or actual-start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early-start date, or actual-start date if known.

E. Construction Schedule Updating Reports: Submit an updated schedule weekly and with Applications for Payment. Include an upcoming work summary.

F. Daily and Weekly Reports: Submit daily and weekly reports that include operations overview, daily area covered, and estimated daily work to be completed.

1.04 COORDINATION

A. Coordinate Contractor's construction schedule with the Schedule of Values submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.05 PROGRESS OF WORK

A. If the Contractor fails to complete activity by its latest scheduled completion date and this failure may extend Contract Times (or Milestones), Contractor shall, within 3 days of such failure, submit a written statement as to how Contractor intends to correct nonperformance and return to the acceptable current progress schedule. Actions by Contractor to complete Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.

B. The Owner may order Contractor to increase plant, equipment, labor force or working hours if Contractor fails to: (i) complete a critical scheduled activity by its latest Milestone completion date, or (ii) satisfactorily execute Work as necessary to prevent delay to the overall completion of the Project.

PART 2 PRODUCTS

2.01 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for Contract execution to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Owner’s Representative.
2. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00, Submittal Procedures, in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
3. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Owner’s Representative’s administrative procedures necessary for certification of Substantial Completion.
4. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and Final Completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion**.**

E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

F. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance and the date by which recovery will be accomplished.

G. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.02 OVERALL PROGRESS SCHEDULE

A. General

1. Notice to Proceed will be issued only after the Overall Progress Schedule has been reviewed as acceptable by the Owner in accordance with Section 01 33 00, Submittal Procedures. Owner will review the initial submittal and subsequent resubmittals of the Overall Progress Schedule within 10 calendar days of receipt.
2. Schedule(s) shall reflect Work logic sequences, restraints, delivery windows, review times, Contract Times, and Milestones set forth in the Agreement and shall begin with the date of Notice to Proceed and conclude with the date of Final Completion.
3. The schedule requirement herein is the minimum required. Contractor may prepare a more sophisticated schedule if such will aid Contractor in execution and timely completion of Work.
4. Float time is a Project resource available to both parties to meet contract Milestones and Contract Times.
5. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times are prohibited, and use of float time disclosed or implied by use of alternate float-suppression techniques shall be shared to proportionate benefit of the Owner and Contractor.
6. Pursuant to above float-sharing requirement, no time extensions will be granted nor delay damages paid until a delay occurs which (i) impacts Project’s critical path, (ii) consumes available float or contingency time, and (iii) extends Work beyond Contract completion date.
7. If the Contractor provides an accepted schedule with an early completion date, the Owner reserves the right to reduce Contract Times to match the early completion date by issuing a deductive Change Order at no change in Contract Price.

2.03 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 15 days of date established for the Notice of Award.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

2.04 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. Safety toolbox meeting topic.
2. List of subcontractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. Quantity of fill and/or stone material placed.
7. Summary of habitat restoration elements installed (e.g., plant quantities, rootwad quantities, etc.)
8. High and low temperatures and general weather conditions, including presence of rain or snow.
9. Accidents.
10. Meetings and significant decisions.
11. Unusual events (see special reports).
12. Stoppages, delays, shortages, and losses.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Work Change Directives received and implemented.
17. Sampling events performed.

B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.05 FORMAT

A. Computer generated Gantt (Bar) chart or Network Analysis Diagram schedule using Critical Path Method (CPM), generally as outlined in Associated General Contractors of America (AGC) publication "The Use of CPM in Construction-A Manual for General Contractor's and the Construction Industry," latest edition, prepared on reproducible paper, not larger than 30 inches by 42 inches. Computer software used to generate the schedule shall be Microsoft Project 2003 or a later version.

1. Show complete interdependence and sequence of construction and Project-related activities reasonably required to complete the Work, identifying Work of separate stages and other logically grouped activities, and clearly identify critical path of activities.
   a. Include at a Minimum: Contract Work; major and other equipment and critical product design, fabrication, testing, delivery and installation times including required lead time for Contractor-furnished products, move-in and other preliminary activities, Project closeout and cleanup, Substantial Completion dates, Submittals that may impact critical path, and system/ subsystem/component testing, facility startup, and training activities that may impact critical path.
   b. Develop sub-schedules to further define critical portions of the Work.
   c. Indicate dates for early- and late-start, early- and late-finish, float and duration.
   d. No activity duration, exclusive of those for Submittals review and product fabrication/delivery, shall be less than 1 day, unless otherwise approved by the Owner.
   e. Activity duration for Submittals review shall not be less than review time specified unless clearly identified and prior written acceptance has been obtained from the Owner.
   f. Weekly Schedule Submissions: Include overall percent complete, projected and actual; and percent completion progress for each listed activity.

2.06 SPECIAL REPORTS

A. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report within 1 day of an occurrence. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Distribute copies of report to parties affected by the occurrence. Advise Owner in advance when these events are known or predictable.

PART 3 EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue an updated schedule before the next regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Final Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Owner’s Representative, Owner, inspecting firms or agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.02 CLAIMS FOR ADJUSTMENT OF CONTRACT TIMES

A. Where the Owner has not yet rendered formal decision on Contractor's claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in progress schedule, Contractor shall reflect that amount of time adjustment in progress schedule as Owner may accept as appropriate for the interim. It is understood and agreed that such interim acceptance by the Owner will not be binding and will be made only for purpose of continuing to schedule Work, until such time as formal decision as to an adjustment, if any, of the Contract Times acceptable to the Owner has been rendered. Contractor shall revise progress schedule prepared thereafter in accordance with Owner's formal decision

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 01 29 00, Payment Procedures, for submitting Applications for Payment and the Schedule of Values.
2. Section 01 32 00, Construction Progress Documentation, for submitting schedules and reports, including Contractor's Construction Schedule.
3. Section 01 40 00, Contractor Quality Control, for requirements related to test and inspection reports, schedules of tests, and inspections submittals.
4. Section 01 77 00, Closeout Procedures, for closeout submittals and maintenance material submittals.

1.02 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Owner’s Representative’s responsive action. Action submittals are those submittals indicated in individual Specification Sections as “action submittals.”

B. Informational Submittals: Written and graphic information and physical samples that do not require Owner’s Representative’s responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.03 SUBMISSION

A. Provide submittals to Owner’s Representative or Owner onsite. If directed by Owner’s Representative or Owner, send copies to the Owner or Owner’s Representative at the addresses provided in Section 01 10 00, Summary of Work.

1.04 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by Construction Schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Owner's Representative and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
2. Submit concurrently with the first complete submittal of Contractor's Construction Schedule.
   a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

B. Format:

1. Do not base Shop Drawings on reproductions of Contract Documents.
2. Package submittal information by individual Specification Section. Do not combine different Specification Sections together in submittal package, unless otherwise directed in Specification.
3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
4. Index with labeled tab dividers in an orderly manner.
5. When feasible, provide an electronic copy (via email, FTP site, or memory stick/flash drive) to the Owner's Representative in addition to hardcopy submittal.

1.05 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Owner's Representative's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Owner's Representative for Contractor's use in preparing submittals.

1. Owner's Representative will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
   a. Owner's Representative makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
   b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD Civil 3D 2014.
   c. Contractor shall execute an Electronic Media Release Form.
   d. Digital data files for the plans and sections will be furnished.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    a. Owner's Representative reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owner's Representative's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 weekdays for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Owner's Representative will advise Contractor when a submittal being processed must be delayed for coordination.
2. Resubmittal Review: Allow 5 weekdays for review of each resubmittal.
3. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Owner's Representative and to another third party, allow 15 weekdays for review of each submittal. Submittal will be returned to Owner's Representative before being returned to Contractor.

D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., BRASR-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., BRASR-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Owner’s Representative.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner**,** containing the following information:
   a. Project name.
   b. Date.
   c. Name and address of Owner's Representative.
   d. Name of Construction Manager.
   e. Name of Contractor.
   f. Name of firm or entity that prepared submittal.
   g. Names of subcontractor, manufacturer, and supplier.
   h. Category and type of submittal.
   i. Submittal purpose and description.
   j. Specification Section number and title.
   k. Specification paragraph number or drawing designation and generic name for each of multiple items.
   l. Drawing number and detail references, as appropriate.
   m. Location(s) where product is to be installed, as appropriate.
   n. Related physical samples submitted directly.
   o. Indication of full or partial submittal.
   p. Transmittal number, numbered consecutively.
   q. Submittal and transmittal distribution record.
   r. Other necessary identification.
   s. Remarks.
5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
   a. Project name.
   b. Number and title of appropriate Specification Section.
   c. Manufacturer name.
   d. Product name.

E. Options: Identify options requiring selection by Owner’s Representative.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Owner’s Representative on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision. Utilize redline strike out, revision clouds, or other forms of identifying changes in resubmittals.
3. Resubmit submittals until they are marked with approval notation from Owner's Representative's action stamp.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Owner's Representative's action stamp.

PART 2 PRODUCTS

2.01 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submit electronic submittals via email as PDF electronic files.
   a. Owner's Representative will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

B. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

C. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's catalog cuts.
b. Manufacturer's product specifications.
c. Standard color charts.
d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:
   a. Wiring diagrams showing factory-installed wiring.
   b. Printed performance curves.
   c. Operational range diagrams.
   d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:
   a. PDF electronic file if legible when printed on 11x17 paper, otherwise provide paper copy.

D. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data**,** unless submittal based on Owner’s Representative's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
   f. Relationship and attachment to adjoining construction clearly indicated.
   g. Seal and signature of a professional engineer licensed in the state of New York if specified.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42.
3. Submit Shop Drawings in the following format:
   a. PDF electronic file if legible when printed on 11x17 paper, otherwise provide paper copy.

E. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of

these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable Specification Section.
   e. Specification paragraph number and generic name of each item.
3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set. Samples may be incorporated into the Work. Such Samples must be in an undamaged condition at time of use.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
   a. Number of Samples: Submit two sets of Samples. Owner’s Representative will retain one Sample set; remainder will be returned.
      1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least two sets of paired units that show approximate limits of variations.

F. Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 00, Construction Progress Documentation.

G. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 29 00, Payment Procedures.

H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 40 00, Contractor Quality Control.

I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 77 00, Closeout Procedures.

J. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

PART 3 EXECUTION

3.01 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Owner’s Representative.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.02 OWNER’S REPRESENTATIVE’S ACTION

A. Action Submittals:

1. Prepare and submit Action Submittals required by individual Specification Sections.
2. Copies: Submit four paper copies only for those submittals that are not electronic.
3. Action Submittal Dispositions: Owner’s Representative will review submittal for general conformance with contract documents, mark, and stamp as appropriate, and distribute marked-up copies as noted:
   a. Approved:
      1) Contractor may incorporate product(s) or implement Work covered by submittal.
      2) Distribution:
         a) One copy furnished to Owner’s Representative.
         b) One copy retained in Owner’s file.
         c) Remaining copies returned to Contractor appropriately annotated.

d) For electronic submittal scanned version of marked-up copy will be distributed to Owner and Contractor and Owner's Representative will retain the one hard copy.

b. Approved as Noted:
1) Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Owner's Representative's notations.
2) Distribution:
a) One copy furnished to Owner's Representative.
b) One copy retained in Owner's file.
c) Remaining copies returned to Contractor appropriately annotated.
d) For electronic submittal scanned version of marked-up copy will be distributed to Owner and Contractor and Owner's Representative will retain the one hard copy.

c. Partial Approval, Resubmit as Noted:
1) Make corrections or obtain missing portions, and resubmit.
2) Except for portions indicated, Contractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with Owner's Representative's notations.
3) Distribution
a) One copy furnished to Owner's Representative.
b) One copy retained in Owner's file.
c) Remaining copies returned to Contractor appropriately annotated.
d) For electronic submittal scanned version of marked-up copy will be distributed to Owner and Contractor and Owner's Representative will retain the one hard copy.

d. Revise and Resubmit:
1) Contractor may not incorporate product(s) or implement Work covered by submittal.
2) Distribution:
a) One copy furnished to Owner's Representative.
b) One copy retained in Owner's file.
c) Remaining copies returned to Contractor appropriately annotated.
d) For electronic submittal scanned version of marked-up copy will be distributed to Owner and Contractor and Owner's Representative will retain the one hard copy.

3.03 INFORMATIONAL SUBMITTALS

A. General:

1. Copies: Only submit paper copies if submittal is not submitted electronically. Submit three copies, unless otherwise indicated in individual Specification Section.
2. Refer to individual Specification Sections for specific submittal requirements.
3. The Owner's Representative will review each submittal. If submittal meets conditions of the Contract, Owner's Representative will forward copies to appropriate parties. If Owner's Representative determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Owner's Representative will retain one copy and return remaining copies with review comments to Contractor, and require that submittal be corrected and resubmitted.

B. Certificates:

1. General:
   a. Provide notarized statement that includes signature of entity responsible for preparing certification.
   b. Signed by officer or other individual authorized to sign documents on behalf of that entity.
2. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
3. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual Specification Sections.

C. Contract Closeout Submittals: In accordance with Section 01 77 00, Closeout Procedures.

D. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty Contractor, trade, Specialist, consultant, installer, and other professionals.

E. Submittals Required by Laws, Regulations, and Governing Agencies:

1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
2. Transmit to Owner's Representative for Owner's Representative's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.

F. Test and Inspection Reports:

1. General: Shall contain signature of person responsible for test or report.
2. Field: As a minimum, include the following:
   a. Project title and number.
   b. Date and time.
   c. Record of temperature and weather conditions.
   d. Identification of product and Specification Section.
   e. Type and location of test, Sample, or inspection, including referenced standard or code.
   f. Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
   g. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
   h. Provide interpretation of test results, when requested by Owner's Representative.
   i. Other items as identified in individual Specification Sections.

G. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Owner's Representative.

H. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

1. Owner's Representative will return entire submittal for Contractor's revision if preliminary review deems it incomplete.
2. When the following are missing, submittal will be deemed incomplete:
   a. Contractor's review stamp, completed and signed.
   b. Transmittal of Contractor's Submittal, completed and signed.
   c. Insufficient number of copies.

I. Submittals not required by the Contract Documents may be returned by the Owner's Representative without action. The submittals will not be reviewed and will be returned stamped "Not Subject to Review". The Owner will keep one copy and return remaining copies to Contractor.

3.04 BASIS FOR COMPENSATION

A. The Contractor's cost for complying with the requirements of this Section of the Specifications shall be considered incidental and no additional compensation will be provided.

3.05 SUPPLEMENTS

A. The supplement listed below, following "End of Section," are part of this Specification.

1. Transmittal of Contractor's Submittal Form.

END OF SECTION

BUFFALO RIVER AOC CAPPING AND HABITAT RESTORATION
HONEYWELL

TRANSMITTAL OF CONTRACTOR'S SUBMITTAL

(ATTACH TO EACH SUBMITTAL)

DATE: _____

TO: _____

_____

_____

_____

_____

FROM: _____
Contractor

_____

_____

_____

Submittal No.:_____

☐ New Submittal ☐ Resubmittal

Project:_____

Project No.:_____

Specification Section No.:_____
(Cover only one section with each transmittal)

Schedule Date of Submittal:

_____

SUBMITTAL TYPE: ☐ Shop Drawing ☐ Sample ☐ Informational

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By:_____
Contractor (Authorized Signature)

SECTION 01 35 91
PROTECTION OF HISTORIC ARTIFACTS

1.01 SUMMARY

A. Section includes general protection and operational procedures for potentially historic discoveries during the Project.

1.02 DEFINITIONS

A. Potentially Historic: Materials removed during restoration operations that are so designated by the Owner’s Representative.

B. Designated Historic: Potentially historic items so designated by the SHPO representative.

C. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

D. SHPO: New York State Historic Preservation Office.

1.03 MATERIALS OWNERSHIP

A. Potentially historic items, relics, and similar objects that may be encountered during habitat restoration work remain Owner's property or property of New York State or others as determined under admiralty and salvage laws; such objects will not become the property of the Contractor. Carefully salvage each item or object.

1.04 STORAGE AND PROTECTION OF HISTORIC MATERIALS

A. Salvaged Potentially Historic Materials:

1. Store items in a secure area until inspected by the SHPO representative
2. Protect items from damage during storage.

1.05 PROJECT CONDITIONS

A. The cultural resource survey of the side scan sonar study results in the river have identified a potential area of significance just outside the boundary of DMU-11 as shown on Project Drawings.

1. Two weeks prior to restoration operations beginning at Buffalo Color Peninsula or Riverbend, the Owner must be notified so arrangements can be made with SHPO to have, at their discretion, a representative present during work near the area of potential significance.

2. Contractor shall not place anchors or spuds within 25 feet of the designated location as shown on Project Drawings.

B. The northwest tip of Kelly Island is the location of the former Richmond elevator and archaeological remains may extend into the river which is part of DMU-45c. The area has been deemed potentially significant and shall be avoided by Contractor equipment.

PART 2 PRODUCTS - (NOT USED)

PART 3 EXECUTION

3.01 PROTECTION, GENERAL

A. Ensure that SHPO personnel are onsite and on duty when restoration near the area of potential historic significance begins and during its progress.

3.02 GENERAL HISTORIC REMOVAL

A. When performing work in areas other than adjacent to DMU-11 or DMU-45c:

1. Allow the Owner's Representative monitoring personnel to review objects removed from the sediment as debris to identify them as potentially historic
2. Notify the Owner's Representative monitoring personnel if the Contractor suspects an object removed may be potentially historic.
3. If designated as potentially historic work with the Owner's Representative monitoring personnel to carefully place the object in the secure storage area for review by a SHPO representative.

B. Halt restoration in the immediate area of such a discovery and only proceed when so notified by the Owner's Representative and in the manner dictated by the Owner's Representative.

C. Notify Owner's Representative of visible changes in the integrity of material stored for SHPO review whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.

END OF SECTION

SECTION 01 40 00
CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality assurance and control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality assurance and control services required by Owner’s Representative or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Requirements: Divisions 02 through 35 Sections for specific test and inspection requirements.

1.02 DEFINITIONS

A. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include Contract enforcement activities performed by Owner’s Representative.

C. Source Quality Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

D. Field Quality Control Testing: Tests and inspections that are performed onsite for installation of the Work and for completed Work.

E. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

F. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, removal, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

G. Experienced: When used with an entity or individual, “experienced” means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.03 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Owner’s Representative for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Owner’s Representative for a decision before proceeding.

1.04 ACTION SUBMITTALS

A. Contractor's Quality Control Plan: For quality assurance and quality control activities and responsibilities.

B. Contractor shall submit for review, specifications and quality assurance/quality control criteria for capping and habitat restoration survey.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Contractor's quality control personnel.

B. Testing Agency Qualifications: For testing agencies specified in Article Quality Assurance within this Specification to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

C. Submit results of laboratory tests and field tests performed.

D. Submit documentation of appropriate licensure or training of persons performing Work.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality control service.

1.06 CONTRACTOR'S QUALITY CONTROL PLAN

A. Quality Control Plan, General: Submit quality control plan within 10 days of Notice to Proceed, and not less than 15 days prior to preconstruction conference. Submit in format acceptable to Owner’s Representative. Coordinate with Contractor's construction schedule.

1. Contractor’s Project Specific Quality Control Plan shall include, at a minimum:
   a. A description of Contractor’s quality control organization, including a chart showing lines of authority, and acknowledgement that the Contractor’s quality control staff shall conduct inspections for all aspects of the work specified.
   b. The name, qualifications, responsibilities, and authority of each person assigned to Contractor’s quality control function.
   c. A copy of a letter to Contractor’s Quality Control Manager signed by an authorized official of the firm, which describes the responsibility and delegates authority to Contractor’s Quality Control Manager.
   d. Procedures for scheduling and managing submittals including those of contractors, fabricators, suppliers, and purchasing agents.
   e. Control procedures to be promulgated.
   f. Reporting procedures, including proposed reporting formats.

g. Equipment used and other details regarding bathymetric data obtained to guide capping and habitat restoration operations.

B. Quality Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality assurance and quality control procedures similar in nature and extent to those required for Project. Project quality control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
3. Owner-performed tests and inspections indicated in the Contract Documents.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Owner’s Representative has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.07 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.

6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.08 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Installer Qualifications: A firm or individual experienced in installing, erecting, assembling, or performing in-water capping and habitat restoration work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance or successful and complete removal of specified dredge material.

C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product similar in material, design, and extent to those indicated for this Project.

D. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329 and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

1.09 QUALITY CONTROL

A. Owner Responsibilities: Where quality control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality control services specified and those required by authorities having jurisdiction. Perform quality control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality control services.
   a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Owner’s Representative and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Owner's Representative and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

G. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality control services required by the Contract Documents as a component of Contractor's quality control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Owner’s Representative, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 LABORATORY TESTS

A. Laboratory tests shall be conducted, and test results, certificates, and/or affidavits shall be submitted, as required in the individual Sections of these Specifications. Laboratory tests refer to those tests made by manufacturers, fabricators, suppliers, or Contractor specifically for this Project and conducted by an independent testing laboratory.

B. All laboratory tests shall be made by an independent testing laboratory approved by the Owner’s Representative. These tests shall be performed in accordance with the specified procedures or in accordance with ASTM procedures if no reference is included.

C. Laboratory tests may be witnessed by the Owner’s Representative. Contractor shall notify the Owner’s Representative in advance of testing to allow Owner’s Representative opportunity to witness. Failure of Contractor to notify will be grounds for rejection of the test results and may require Contractor to repeat testing and/or replace affected work.

D. Contractor shall conduct routine testing of materials used in the Work to satisfy itself that the quality of the Work meets the requirements of the Contract Documents. Owner’s Representative may also conduct routine sampling and analysis to ascertain same. Where laboratory testing, material specifications, or quality control requirements are specified in the individual Sections of these Specifications, Contractor shall not proceed with phases of the Work until Owner’s Representative has had opportunity to collect samples or conduct testing necessary to establish the specified quality of the Work.

Such instances may include, but are not limited to, soil/sediment contaminant testing, soil/sediment gradation testing, moisture content testing, testing of finishes, soil/sediment organic content, or other specified tests. This requirement shall apply even where Contractor is responsible for performing and documenting the performance and results of specific testing requirements by the individual Sections of these Specifications. Owner's Representative shall still be provided the opportunity to collect additional samples or conduct such additional testing as in their opinion may be needed.

E. Contractor shall pay for laboratory testing the Contractor desires. Owner shall pay for initial testing the Owner desires. If testing by the Owner or Owner's Representative identifies defective Work, Contractor shall pay for subsequent sample collection and testing costs required to convince the Owner's Representative that the defective Work has been repaired or replaced.

F. Contractor shall coordinate with the Owner's Representative during construction material testing, in order to provide the Owner's Representative sufficient notice to observe said testing and/or perform confirmatory testing.

1.11 FIELD TESTS

A. Field tests shall be conducted and test results, certificates and/or affidavits shall be submitted as required in the individual Sections of these Specifications. Submit in the quantity and in accordance with the requirements of Section 01 33 00, Submittal Procedures.

B. Field tests shall be conducted in accordance with the individual Sections to establish the quality and final locations of complete systems or individual components of the Work.

C. Field tests shall be set up and conducted by Contractor, who shall provide tools, equipment, instruments, personnel and other facilities required for the satisfactory completion of each test.

D. Field tests shall be witnessed by Owner or Owner's Representative. Contractor shall notify the Owner's Representative in advance of testing to allow the Owner's Representative to witness. Failure of Contractor to notify will be grounds for rejection of test results and Contractor may be required to repeat testing and/or replace affected Work, at Contractor's expense.

1.12 SURVEY BY CONTRACTOR

A. Refer to requirements in Section 02 21 00, Surveys.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Owner's Representative.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Owner's Representative's reference during normal working hours.

3.02 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

B. Protect construction exposed by or for quality control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

END OF SECTION

SECTION 01 42 13
ABBREVIATIONS AND ACRONYMS

PART 1 GENERAL

1.01 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES

A. Work specified by reference to published standard or specification of government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall meet requirements or surpass minimum standards of quality for materials and workmanship established by designated standard or specification.

B. Where so specified, products or workmanship shall also meet or exceed additional prescriptive or performance requirements included within Contract Documents to establish a higher or more stringent standard of quality than required by referenced standard.

C. Where two or more standards are specified to establish quality, product and workmanship shall meet or exceed requirements of most stringent.

D. Where both a standard and a brand name are specified for a product in Contract Documents, proprietary product named shall meet or exceed requirements of specified reference standard.

E. Copies of standards and specifications of technical societies:

1. Copies of applicable referenced standards have not been bound in these Contract Documents.
2. Where copies of standards are needed by Contractor, obtain a copy or copies directly from publication source and maintain in an orderly manner at the Site as Work Site records, available to Contractor personnel and Owner's Representative.

1.02 ABBREVIATIONS

A. Abbreviations for trade organizations and government agencies: Following is a list of construction industry organizations and government agencies to which references may be made in the Contract Documents, with abbreviations used.

1.	AA	Aluminum Association
2.	AAMA	American Architectural Manufacturers Association

3.	AASHTO	American Association of State Highway and Transportation Officials
4.	ABMA	American Bearing Manufacturers' Association
5.	ACI	American Concrete Institute
6.	AEIC	Association of Edison Illuminating Companies
7.	AGA	American Gas Association
8.	AGMA	American Gear Manufacturers' Association
9.	AHRI	Air-Conditioning, Heating, and Refrigeration Institute
10.	AI	Asphalt Institute
11.	AISC	American Institute of Steel Construction
12.	AISI	American Iron and Steel Institute
13.	AITC	American Institute of Timber Construction
14.	ALS	American Lumber Standards
15.	AMCA	Air Movement and Control Association
16.	ANSI	American National Standards Institute
17.	AOC	Area of concern
18.	APA	APA – The Engineered Wood Association
19.	API	American Petroleum Institute
20.	APWA	American Public Works Association
21.	ASA	Acoustical Society of America
22.	ASABE	American Society of Agricultural and Biological Engineers
23.	ASCE	American Society of Civil Engineers
24.	ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
25.	ASME	American Society of Mechanical Engineers
26.	ASNT	American Society for Nondestructive Testing
27.	ASSE	American Society of Sanitary Engineering
28.	ASTM	ASTM International
29.	AWI	Architectural Woodwork Institute
30.	AWPA	American Wood Preservers' Association
31.	AWPI	American Wood Preservers' Institute
32.	AWS	American Welding Society
33.	AWWA	American Water Works Association
34.	BHMA	Builders Hardware Manufacturers' Association
35.	BMP	Best management practice
36.	BSA	Buffalo Sewer Authority
37.	BUI	Beneficial use impairment
38.	CAA	Clean Air Act
39.	CBM	Certified Ballast Manufacturer
40.	CDA	Copper Development Association
41.	CDF	Confined disposal facility
42.	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act

43.	CFR	Code of Federal Regulations
44.	CGA	Compressed Gas Association
45.	CISPI	Cast Iron Soil Pipe Institute
46.	CMAA	Crane Manufacturers' Association of America
47.	CRSI	Concrete Reinforcing Steel Institute
48.	CS	Commercial Standard
49.	CSA	Canadian Standards Association
50.	CSI	Construction Specifications Institute
51.	CWA	Clean Water Act
52.	DIPRA	Ductile Iron Pipe Research Association
53.	EIA	Electronic Industries Alliance
54.	EJCDC	Engineers Joint Contract Documents' Committee
55.	ETL	Electrical Test Laboratories
56.	EVS	Environmental Visualization System
57.	FAA	Federal Aviation Administration
58.	FCC	Federal Communications Commission
59.	FDA	Food and Drug Administration
60.	Fed. Spec.	Federal Specifications (FAA Specifications)
61.	FEMA	Federal Emergency Management Agency
62.	FIPS	Federal Information Processing Standards
63.	FM	FM Global
64.	Ford	Ford Motor Company
65.	FS	Federal Specifications and Standards (Technical Specifications)
66.	ft2	Square feet
67.	GA	Gypsum Association
68.	GAC	Granular activated carbon
69.	GANA	Glass Association of North America
70.	GLNPO	Great Lakes National Program Office
71.	GLWQA	Great Lakes Water Quality Agreement
72.	gpm	Gallons per minute
73.	GPS	Global positioning system
74.	HI	Hydraulic Institute
75.	HMI	Hoist Manufacturers' Institute
76.	IBC	International Building Code
77.	ICBO	International Conference of Building Officials
78.	ICC	International Code Council
79.	ICEA	Insulated Cable Engineers' Association
80.	IEEE	Institute of Electrical and Electronics Engineers
81.	IESNA	Illuminating Engineering Society of North America
82.	IFC	International Fire Code
83.	IFI	Industrial Fasteners Institute
84.	IGMA	Insulating Glass Manufacturer's Alliance

85.	IMC	International Mechanical Code
86.	INDA	Association of the Nonwoven Fabrics Industry
87.	IPC	International Plumbing Code
88.	ISA	Instrumentation, Systems, and Automation Society
89.	ISO	International Organization for Standardization
90.	ITL	Independent Testing Laboratory
91.	JIC	Joint Industry Conferences of Hydraulic Manufacturers
92.	LWD	Low water datum
93.	NYSDEC	New York State Department of Environmental Conservation
94.	NYSDOT	New York State Department of Transportation
95.	mg/kg	Milligrams per kilogram
96.	MIA	Marble Institute of America
97.	MIL	Military Specifications
98.	MMA	Monorail Manufacturers' Association
99.	MSS	Manufacturer's Standardization Society
100.	NAAMM	National Association of Architectural Metal Manufacturers
101.	NACE	NACE International
102.	NBGQA	National Building Granite Quarries Association
103.	NEBB	National Environmental Balancing Bureau
104.	NEC	National Electrical Code
105.	NECA	National Electrical Contractors Association
106.	NEMA	National Electrical Manufacturers' Association
107.	NESC	National Electrical Safety Code
108.	NETA	InterNational Electrical Testing Association
109.	NFPA	National Fire Protection Association
110.	NHLA	National Hardwood Lumber Association
111.	NICET	National Institute for Certification in Engineering Technologies
112.	NIST	National Institute of Standards and Technology
113.	NRCA	National Roofing Contractors Association
114.	NRTL	Nationally Recognized Testing Laboratories
115.	NSF	NSF International
116.	NSPE	National Society of Professional Engineers
117.	NTMA	National Terrazzo and Mosaic Association
118.	NTU	Nephelometric turbidity unit
119.	NWWDA	National Wood Window and Door Association
120.	O&M	Operations and maintenance
121.	OSHA	Occupational Safety and Health Administration
122.	OSHA	Occupational Safety and Health Act (both Federal and State)
123.	PAC	Public Advisory Council

124. PAH	Polynuclear aromatic hydrocarbon
125. PCB	Polychlorinated biphenyl
126. PCI	Precast/Prestressed Concrete Institute
127. PEI	Porcelain Enamel Institute
128. PM10	Particulate matter finer than 10 micrometers in diameter and smaller
129. PPI	Plastic Pipe Institute
130. ppm	Parts per million [ppm]
131. PS	Product Standards Section-U.S. Department of Commerce
132. RAO	Remedial action objective
133. RAP	Remedial action plan
134. RCRA	Resource Conservation and Recovery Act
135. RMA	Rubber Manufacturers' Association
136. RTK	Real-time kinematic positioning system
137. RUS	Rural Utilities Service
138. SAE	SAE International
139. SDI	Steel Deck Institute
140. SDI	Steel Door Institute
141. SESC	Soil erosion and sediment control
142. SJI	Steel Joist Institute
143. SMACNA	Sheet Metal and Air Conditioning Contractors National Association
144. SOW	Statement of Work
145. SPI	Society of the Plastics Industry
146. SSPC	The Society for Protective Coatings
147. STI/SPFA	Steel Tank Institute/Steel Plate Fabricators Association
148. SWI	Steel Window Institute
149. TCA	Tile Council of North America
150. TEMA	Tubular Exchanger Manufacturers' Association
151. TIA	Telecommunications Industry Association
152. TSCA	Toxic Substance Control Act
153. UBC	Uniform Building Code
154. UFC	Uniform Fire Code
155. UL	Underwriters Laboratories Inc.
156. UMC	Uniform Mechanical Code
157. USACE	United States Army Corps of Engineers
158. USBR	U.S. Bureau of Reclamation
159. USEPA	United States Environmental Protection Agency
160. WCLIB	West Coast Lumber Inspection Bureau
161. WI	Wood Institute
162. WWPA	Western Wood Products Association
163. yd3	Cubic yards

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes requirements for staging area, temporary utilities, support facilities, and security and protection facilities.

1.02 RELATED SECTIONS

A. Section 01 10 00, Summary of Work.

B. Section 01 57 20, Environmental Protection.

C. Section 01 57 23, Storm Water Pollution Control.

D. Section 01 74 00, Waste Management and Disposal.

E. Section 01 77 00, Closeout Procedures.

1.03 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner, Owner's Representative, testing agencies, and authorities having jurisdiction.

B. Water Service: Pay water-service use charges for water used by all entities for construction operations.

C. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

1.04 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, and parking areas for construction personnel at all Project staging areas.

B. Specifications and user's manual for all equipment provided by the Contractor. Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

1.05 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

PART 2 PRODUCTS

2.01 MATERIALS

A. Portable Chain-Link Fencing: Minimum 0.148-inch thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Provide galvanized steel bases for supporting posts.

2.02 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading. Alternatively, Contractor can provide temporary office space for Owner and Owner’s Representative’s use within an existing permanent building if approved by Owner’s Representative.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner and Owner’s Representative field personnel and, office activities and to accommodate Project meetings. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings for 10 individuals. Provide electrical power service and 120V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot square tack and marker boards.
3. OSHA-compliant railed stairways and landings at entrances.
4. Drinking water and private toilet.

5. Coffee machine and supplies.
6. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 degrees F.
7. Lighting fixtures capable of maintaining average illumination of 20 foot-candle at desk height.

C. Contractor's Field Office: Provision of a field office for the Contractor is at the option of the Contractor.

D. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment that require indoor storage. Store combustible materials apart from the building and in locations designed for such purpose.

2.03 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. Office Equipment- General:

1. Paper Towel Dispenser with Towels: One.
2. Refrigerator, Small: One, between 3 and 4 cubic feet.
3. Computer Chair: Six with the following characteristics.
   a. Five castor base.
   b. Adjustable height.
   c. Swivels.
   d. Locking back.
   e. Adjustable seat back for height and angle.
   f. Adjustable arms
4. Folding Table: Two, 36 inches by 96 inches.
5. Steel Folding Chairs: Ten.
6. Drafting Table: One, 3 feet by 6 feet.
7. Drafting Stool: One, swivel, with back support.
8. Four-Drawer Steel File Cabinet with Lock: Two.
9. Bookcase: Two, 36 inches wide by 48 inches high.
10. Wastepaper Basket: Three.
11. Standing Coat Rack: Three.
12. Dry Erase Whiteboard: One, 48 inches wide by 72 inches long.
13. Dry Erase Markers: Twelve, various colors, including two dry erase marker erasers.
14. First Aid Kit: One.
15. Carbon Dioxide (10-Pound) Fire Extinguisher: Three.

16. Telephone: Two, with one intercom line and two incoming/outgoing lines, Touch-Tone, with conference speaker, and 12-foot coiled handset cord.
17. Mop and bucket, broom with dustpan.
18. Water Cooler and Service: One cooler and replacement 5-gallon water bottle service for duration of Contract.
19. Toilet Facilities

C. Computer Accessories/Internet Access:

1. Broadband Internet Service Provider.
2. Wireless Router, One: Linksys 2.4 GHz Wireless-G Access Point, Model WAP54G.
3. Power supply surge protector, one; rated at 15 amps minimum.
4. Printer/scanner/fax: Provide one, HP Office Jet 5610 or equal, with postscript and additional memory.
5. Ensure that equipment is set up, connected properly and is functional to the satisfaction of the Owner's Representative.
6. Provide user IDs and passwords required to access and change settings of computer equipment to the Owner and Owner's Representative.
7. Provide at minimum one radio per Owner's Representative on site capable of accessing full range of Contractor's communications (UHF, VHF, etc.). Include all necessary charging base stations necessary for operation.

PART 3 EXECUTION

3.01 STAGING AREA SELECTION

A. Prior to capping and habitat restoration activities, the Contractor will perform site preparation activities at the selected staging area(s). Six possible staging locations have been identified in the design drawings. All listed sites will require the Contractor to coordinate access and usage agreements with the property owner. The Owner and/or the Owner's Representative may approve the use of additional locations pending Contractor submittal of negotiated staging agreements.

3.02 MOBILIZATION

A. Mobilization shall include, but not be limited to, these principal items:

1. Obtaining required permits.
2. Moving Contractor's field office and equipment onto Site.
3. Providing and setting up Owner's Representative's field office.
4. Installing temporary construction power, wiring, and lighting facilities.
5. Providing onsite communication facilities, including telephones.

6. Providing Owner's Representative's high speed internet service.
7. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
8. Arranging for, setup, and securement of Contractor's work and storage yard.
9. Posting OSHA required notices and establishing safety programs and procedures.
10. Having Contractor's Superintendent at Site full time.

3.03 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed.

3.04 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Water Service: Install water service and distribution piping in sizes and pressures adequate for the intended use.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

D. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for Project operations. Install electric power service overhead unless otherwise indicated.

E. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. Install lighting for Project identification sign.

F. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line for each field office.

1. Provide additional telephone lines for the following:
   a. Provide a dedicated telephone line for each facsimile machine in each field office.
   b. Provide one telephone line for Owner's Representative’s use.
2. At each telephone, post a list of important telephone numbers.
   a. Police and fire departments.
   b. Ambulance service.
   c. Contractor's home office.
   d. Contractor's emergency after-hours telephone number.
   e. Owner’s Representative's office.
   f. Owner's office.
   g. Principal subcontractors' field and home offices, if applicable
3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

G. Telecommunications Service:

1. Computer Accessories: Provide required connecting cables and plugs.
2. Provide broadband internet connection with minimum of three live portable computer (PC) ports.
3. Provide appropriate jacks, CAT-5 patch cords, wiring, and equipment required for a complete telecommunications system.
4. Arrange and provide for telecommunication service for use during construction. Pay costs of installation, maintenance, and monthly service of internet connection until Contract closeout.
5. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall, providing minimum 384 Kbps upload and 1 Mbps download speeds at each computer.
6. Backup: External hard drive, minimum 80 gigabyte, with automated backup software for providing daily backups.
7. Site Radios: provide one per each Owner’s Representative on site, for any and all used frequencies for communication (VHF, UHF, etc.). Provide all associated charging stations, spare batteries or other necessary equipment.

H. Cleaning During Construction:

1. In accordance with General Terms and Conditions, as may be specified in other Specification Sections, and as required herein.

2. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.

3.05 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Owner's Representative schedules Substantial Completion inspection. Remove before Substantial Completion.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved and/or roofed areas adequate for habitat restoration operations. Locate temporary roads and paved areas within construction limits indicated on the Drawings.

1. At a minimum, temporary roads shall be constructed with a geotextile fabric placed over the existing ground surface, 4 inches of a naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve as a base, and 2 inches of a surface course consisting of narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve on top.
2. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.
3. Conduct the Work to interfere as little as possible with public travel, whether vehicular or pedestrian.
4. Conduct operations with the least interference to fire equipment access, and at no time prevent such access. Furnish night emergency telephone numbers to police and fire departments.
5. Coordinate traffic routing with that of others working in same or adjacent areas.

D. Parking: Provide temporary parking areas for construction personnel, Owner, Owner's Representative personnel, and visitors.

E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Temporary Signs: Provide other signs as indicated and as required to inform the public and individuals seeking entrance to Project.
   a. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touch up signs so they are legible at all times. When directed, at the completion of the Project, remove and properly dispose of the signs offsite.

F. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 00, Waste Management and Disposal.

G. Waste Disposal Facilities: Provide waste collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.

3.06 SECURITY AND PROTECTION OF FACILITIES AND PROPERTY

A. General:

1. Perform Work in a systematic manner that minimizes inconvenience to the adjacent property owners and the public.
2. No residence or business shall be cut off from vehicular traffic, unless special arrangements have been made.
3. Where completion of the Work requires temporary or permanent removal or relocation of an existing utility, coordinate work with owner of said utility as necessary.
4. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
5. In areas where Contractor's operations are adjacent to or near a utility that will remain in service, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.

B. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project support facilities site, in the Buffalo River and Ship Canal and along the shorelines and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

C. Environmental Protection: Provide protection, operate temporary facilities, and conduct dredging and construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Comply with work restrictions specified in Section 01 10 00, Summary of Work, 01 57 20 Environmental Protection, and 01 74 00 Waste Management and Disposal.

D. Erosion and Sedimentation Control: Comply with Section 01 57 23, Storm Water Pollution Control.

E. Stormwater Control: Comply with Section 01 57 23, Storm Water Pollution Control.

F. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project support site or portion determined sufficient to accommodate project support operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner and one set to Owner's Representative**.**
3. Contractor will be responsible for security of its equipment and materials at the Site during the Work. The Owner assumes no liability for theft of Contractor-supplied equipment or materials.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

1. Provide as required by applicable federal, state, and local regulations and in sufficient quantity to safeguard public and the Work.
2. Provide to protect existing facilities and adjacent properties from potential damage.
3. Locate barricades at the nearest intersecting public thoroughfare on each side of the blocked section.
4. Illuminate barricades and obstructions with warning lights from sunset to sunrise.

H. Waterways: Keep waterways continuously free of construction materials and debris.

3.07 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Operate Project-identification-sign lighting daily from dusk until dawn.

D. Termination and Removal: Remove each temporary facility when need for its service has ended or no later than Substantial Completion. Restore site or service to original condition.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves the right to take possession of Project identification signs.
2. Remove temporary roads and paved areas. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. Perform confirmatory sampling as specified and as described in site specific plans.
4. At Substantial Completion, comply with final cleaning requirements specified in Section 01 77 00, Closeout Procedures.

END OF SECTION

SECTION 01 57 20
ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.01 SUMMARY OF GENERAL REQUIREMENTS

A. This section covers environmental protection measures to control pollution that develops during normal construction practice.

B. Adhere to the measures specified herein, and take additional measures, as may be required by federal, state, and local regulations to minimize any adverse impacts to the environment during the performance of the work. Any delays resulting from failure to comply with environmental laws and regulations will be the Contractor's responsibility.

C. Environmental protection activities shall be limited to the boundaries of the restoration areas, Contractor's access area and public rights-of-way as shown on the Drawings or as modified by the Owner's Representative in writing.

D. This section provides requirements for dealing with solid and non-hazardous waste, hazardous materials, and associated water dust control, silt and sediment resuspension control, and river water monitoring.

1.02 DEFINITIONS

A. Sediment: Can refer to soil that has eroded and has been transported by runoff water or wind, or soil-like materials removed from the river or Ship Canal by dredging. Note that in New York, per 6 NYCRR 360-1.2(a)4(ix), sediment is exempt from being a solid waste when it is dredged or excavated from the waters of the state and placed or disposed in accordance with a permit(s) issued under Articles 15, 24, 25 or 34 of the Environmental Conservation Law or a Water Quality Certification issued under Section 401 of the Federal Water Pollution Control Act to the extent that both the excavation and disposal of the material is regulated by such permit(s) or certification.

B. Hazardous Waste: Any discarded material, liquid, solid, or gas, which meets the definition of hazardous material or is designated hazardous waste by the Environmental Protection Agency or State Hazardous Control Authority as defined or regulated in NYCRR Parts 360 through Part 376.

C. Hazardous Materials:

1. Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.
2. Hazardous material is any material that:
   a. Is regulated as a hazardous material per 49 CFR 173, or

b. Requires a Material Safety Data Sheet (MSDS) per 29 CFR 1910.120, or

c. During end use, treatment, handling, packaging, storage, transpiration, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261, Subparts A, B, C, or D.

3. Designation of a material by this definition, when separately regulated or controlled by other instructions or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this instruction for “control” purposes. Such material include ammunition, weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs). Nonetheless, the exposure may occur incident to manufacture, storage, use and demilitarization of these items.

D. MSDS: Material Safety Data Sheet.

E. RCRA: Resource Conservation and Recovery Act.

F. Trigger Value: Action Level for turbidity readings at which the automated sampling buoy sends an email notification. Action level shall be set at the values stated in paragraph 3.18 below.

G. TSCA: Toxic Substance Control Act.

H. Waste Hazardous Material: Any waste material which because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose a substantial hazard to human health or the environment and which has been so designated. Used oil not containing any hazardous waste, as defined above, falls under this definition.

I. Oily Waste:

1. Those materials which are, or were, mixed with used oil and have become separated from that used oil. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, used oil and may be appropriately tested and discarded in a manner which is in compliance with other State and local requirements.

2. This definition includes materials such as oily rags, “kitty litter” sorbent clay and organic sorbent material. These materials may be land filled provided that:

a. It is not prohibited in other State regulations or local ordinances.

b. The amount generated is “de minimus” (a small amount).
c. It is the result of minor leaks or spills resulting from normal process operations.
d. All free-flowing oil has been removed to the practical extent possible.

3. Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, a hazardous waste determination must be performed prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

J. Regulated Waste: Those solid wastes that have specific additional Federal, state, or local controls for handling, storage, or disposal.

1.03 RELATED SECTIONS

A. Section 01 11 01, Health, Safety, Environment and Emergency Response.

B. Section 01 35 91, Protection of Historic Artifacts.

C. Section 01 57 23, Storm Water Pollution Control.

D. Section 01 74 00, Waste Management and Disposal.

E. Section 31 11 00, Clearing and Grubbing.

F. Section 31 23 23, Fill for Habitat Restoration.

1.04 SUBMITTALS

A. Informational Submittals:

1. Current Conditions Documentation.
2. Post-remedial Conditions Documentation.

B. Action Submittals:

1. Solid Waste Management Plan.
2. Regulatory Notifications.
3. Environmental Management Plan.
4. Contractor Hazardous Material Inventory Log.
5. Temporary Water Treatment System Information.
6. SWPPP for access/staging area and temporary office location

C. Test Reports (Informational Submittals):

1. Laboratory Analysis.

2. Disposal Profile and Acceptance.
3. Erosion and Sediment Control Inspection Reports.
4. Solid Waste Management Report.

D. Closeout Submittals (Informational Submittals): Some of the records listed below are also required as part of other submittals. For the "Records" submittal, maintain onsite a separate three-ring Environmental Records binder and submit at the completion of the Project. Make separate parts to the binder corresponding to each of the applicable sub-items listed below.

1. Storm Water Pollution Prevention Plan compliance notebook.
2. Waste Determination Documentation.
3. Disposal Documentation for Hazardous and Regulated Waste.
4. Solid Waste Management Permit.
5. Solid Waste Management Report.
6. Contractor Hazardous Material Inventory Log.
7. Hazardous Waste/Debris Management Report.
8. Regulatory Notifications.

1.05 ENVIRONMENTAL PROTECTION REQUIREMENTS

A. Provide and maintain, during the life of the Contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the Project. Comply with Federal, State, and local regulations pertaining to the environment including water, air, solid waste, hazardous waste and substances, toxic wastes and substances, oily substances, and noise pollution.

B. The Contractor may be required to promptly conduct tests and procedures for the purpose of assessing whether construction operations are in compliance with Applicable Environmental Laws. Analytical work shall be done by qualified laboratories; and where required by law, the laboratories shall be certified.

C. Comply with all permit water quality requirements.

1.06 QUALITY ASSURANCE

A. Current Conditions Documentation: Photograph or video record all preconstruction conditions at each of the habitat restoration areas prior to commencement of work including adjacent properties, foliage, sewer grates, access roads, boat ramps, sheet pile walls along stream banks, bridge or culverts, surface and above grade utilities, appurtenances, guardrails, and trees. Additional areas include soil staging areas and all restoration areas adjacent to dredged management units (DMUs).

B. Post-Remedial Conditions Documentation:

1. Photograph or video record all post-remedial conditions at the locations documented prior to construction activities.
2. If work in a location has been started but a delay of 3 months or longer will transpire before work resumes, including for winter demobilization/ remobilization, then photograph and document conditions at the location within 1 week of the initial shutdown.

C. Regulatory Notifications:

1. The Contractor is responsible for all regulatory notification requirements in accordance with Federal, State and local regulations. The Contractor shall submit copies of all regulatory notifications to the Owner's Representative prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all inclusive): demolition, renovation, State Pollution Discharge Elimination System (SPDES) defined site work, remediation of controlled substances (asbestos, hazardous waste, lead paint).

D. Environmental Brief:

1. Attend an environmental briefing as part of the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the Project site and the activity; types and quantities of wastes/wastewater that may be generated during the contract. Discuss proper storage and management of these materials and the results of the documentation of existing conditions at this time.
2. Prior to initiating any work onsite, meet with the Owner and Owner's Representative to discuss the proposed Environmental Management Plan. Develop a mutual understanding relative to the details of environmental protection including measures for protecting natural resources, required reports, required permits, permit requirements, and other measures to be taken.

E. Environmental Manager: Appoint in writing an Environmental Manager for the Project. The Environmental Manager will be directly responsible for coordinating Contractor compliance with Federal, State, and local requirements. The Environmental Manager will implement the Environmental Management Plan; assure that all environmental permits are obtained, maintained, and closed out; ensure compliance with Storm Water Program Management requirements; and ensure compliance with Spill Prevention, Control and Countermeasure requirements if applicable. This can be a collateral position; however the person in this position must be trained to adequately accomplish all necessary duties for the tasks listed.

1.07 PROTECTION OF WATER QUALITY

A. It is imperative that the Buffalo River does not become further contaminated with sediment or other contaminants that may result from the work. The Contractor shall not discharge wastewater, sediments, or contaminants into the Buffalo River. The remedial restoration work boundaries are also restricted to the stream banks and beds as indicated on the Drawings and the navigational channel shall not be modified as part of this work.

B. The Contractor shall be fully responsible for any and all damages to life, property, and animal life that occur as a result of his activities. Damages resulting from polluting the adjacent surface water bodies shall be repaired, restored, or compensated for by the Contractor.

C. Observe rules and regulations of the State of New York and other federal and local authorities that prohibit polluting of any stream, river or wetland by dumping of refuse, wastewater, rubbish, or debris.

D. Best Management practices (BMPs) as described in the Stormwater Pollution Prevention Plan required under Section 01 57 23, Storm Water Pollution Control shall be employed to prevent stormwater from contaminating surface water bodies.

1.08 PROTECTION OF LAND RESOURCES

A. Confine all activities to areas defined by the Drawings and Specifications. Identify any land resources to be preserved within the work area prior to the beginning of construction, including selected trees and shrubs. Do not remove, cut, deface, injure or destroy native land resources without approval, except in areas indicated on Drawings or specified to be cleared.

B. Mark the areas that need not be disturbed under this Contract prior to commencing construction activities. The Contractor’s personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

C. Implement the Erosion and Sediment Controls outlined in Section 01 57 23, Storm Water Pollution Control.

D. Contractor Facilities and Work Areas, including field offices, staging areas, stockpile storage and temporary buildings shall be installed in areas designated on Drawings or as coordinated with the Owner’s Representative. Temporary movement or relocation of Contractor facilities will be made only when approved.

1.09 PROTECTION OF AIR QUALITY

A. Air Quality Objectives are:

1. Compliance with State and Federal Ambient Air Quality Standards for all parameters throughout the community surrounding the work areas as applicable.
2. All practical methods for suppression of fugitive dust are to be used as normal practice.

B. Minimize potential for air pollution by wetting down bare and disturbed soils from backfill areas or cleared or grubbed areas; properly operate combustion emission control devices on all construction vehicles and equipment; and do not allow motorized equipment to idle more than 5 minutes.

C. Refuse burning (including organic waste material) is prohibited.

1.10 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

A. Characterization, storage, transport and disposal of all waste (both hazardous and non-hazardous) shall be in accordance with all applicable local, state, and federal regulations.

1.11 BIOLOGICAL RESOURCES

A. Minimize interference with, disturbance to, and damage to wildlife and plants including their habitat. The protection of threatened and endangered animal and plant species, including their habitat, is the Contractor's responsibility in accordance with federal, state, and local laws and regulations.

1.12 CONTAMINATED MEDIA MANAGEMENT

A. No contaminated soil or sediment shall be removed from the site during Habitat Restoration Remedial Activities, without the written consent of the Owner's Representative.

1.13 CONSTRUCTION EQUIPMENT

A. Equipment that is left onsite shall be maintained in such a manner as to prevent leaks and spills of oil, gasoline, lubricants, and other materials used for maintenance or refueling activities.

B. Cleanup and properly dispose of any materials spilled onto a work area or surrounding areas, as well as materials contaminated as a result of the spill. Cleanup and disposal shall be at the Contractor's expense.

1.14 POST CONSTRUCTION CLEANUP

A. Restore all areas used during construction upon completion of the habitat restoration activities. Unless otherwise instructed in writing by the Owner's Representative, remove all signs of temporary construction facilities such as work areas,

temporary structures, foundations of temporary structures, stockpiles, waste materials, and other vestiges of construction prior to final acceptance of the work.

PART 2 PRODUCTS

2.01 SILT CURTAIN SYSTEM

A. The Contractor may elect to utlize silt curtains for containment of turbidity generated during backfilling and capping operations. Silt curtain shall be a containment system consisting of floating boom with flotation media, filtration curtain, load bearing members, mooring lines and anchoring system. Silt curtain shall be designed to be effective and stable in the flow velocities of the Buffalo River.

1. Flotation shall be an integral part of the curtain. Flotation media shall be buoyant units attached to the filtration media. Buoyancy provided shall be sufficient to support the weight of the curtain under load and maintain a freeboard of at least 6 inches above the water.
2. Filter media shall consist of oleophilic materials that are UV-stabilized, biofouling-resistant, nontoxic and performance tested in aquatic environments. Impermeable material used in the hood shall be Polyester based, copolymer strengthened, nontoxic and performance tested in aquatic environment.
3. The bottom of the silt curtain shall be ballasted with chain at the outer edge to maintain the filter barrier.
4. Load bearing members must be fabricated into the top and bottom of the filter barrier. The top and bottom load member shall consist of woven webbing that shall have sufficient break strength as recommended by the manufacture based on expected conditions in the Buffalo River.. Additional load bearing members shall be located at the base of the curtain and at the end of the curtain, these shall consist of a chain of sufficient weight to serve as ballast and to hold the curtain in a vertical position during river flow and throughout seiche cycles. Connections of the load bearing members shall be of equal or greater breaking strength of the load bearing members.
5. An anchoring system shall be designed to keep the silt curtain in place during peak flows and seiche extremes. Type and size of anchors shall be site specific and installed by qualified personnel to fully support the loads as recommended by the manufacturer.

B. Performance Criteria:

1. Silt curtain shall control silt and turbidity such that the requirements of the Order of Conditions, Department of the Army Permit and 401 Water Quality Certificate are met.
2. Silt curtain shall be designed to remain in place for the duration of the Work in that location.

3. The silt curtain shall be installed and maintained in a manner that will contain silt and turbidity between the capping and habitat operations and the control system, and prevent turbidity, or impacts to water quality in the Buffalo River that violate the NYSDEC Surface Water Quality Regulations; Federal Clean Water Act Regulations; requirements of the Project-specific Permits, the 401 Water Quality Certificate or Order of Conditions; or result in degradation of water quality beyond conditions existing in the Buffalo River prior to construction.
4. Structure of system shall be designed to resist wind-drive wave loading, current loading, and be fully functional during storm events and/or seiche changes.

2.02 SILT CURTAIN MATERIALS

A. Nonwoven (interior) Curtain Fabric Material: Interior filter fabric shall be nonwoven comprised of 100 percent polypropylene filaments, needle punched and heat set.

B. Woven (exterior) Curtain Fabric Material: Exterior filter fabric shall be woven comprised of 100 percent polypropylene filaments, needle punched and heat set.

C. Impermeable Fabric Material: Impermeable material used for flotation hood or curtain components shall be Polyester based copolymer strengthened.

D. Anchoring System:

1. Bottom chain shall be incorporated into a chain pocket at the bottom of the curtain and at the bottom of both skirts. Chain shall be 1/2 inch, galvanized or as recommended by the manufacture based on site conditions.
2. System shall employ mooring attachment points of sufficient strength and quantity to properly anchor the system based on expected site conditions.

2.03 AUTOMATED SAMPLING BUOY FOR WATER QUALITY MONITORING

A. An automated sampling buoy will incorporate the use of a programmable sampling device that can obtain an aliquot subsample once an hour for 24-hour period in order to provide a 24-hour composite sample. Sampling tube attached to the sampling buoy shall be placed at the approximate mid-depth of the water column. Total 24-hour sample volume shall be minimum 3 liters, 4 liters is preferred.

B. An automated sampling buoy shall incorporate a water monitoring device mounted to the buoy to measure turbidity. The setup shall be capable of transferring turbidity readings by cellular modem telemetry. Data from the turbidity sensors also

will be stored in an integrated data logger that can be accessed in the event the telemetry system is inoperable.

C. The turbidity monitoring setup shall be equipped with the means of sending out an automated email notification to Owner's Representative and Contractor's field personnel based on recording turbidity readings at or above a trigger value.

D. A total of one upstream and one downstream automated sampling buoy shall be used for each active project area, not including any spare units or parts that might be necessary to have on hand for adequate backup.

E. Sampling data and recorded turbidity readings shall be submitted to Owner and Owner's Representative.

2.04 CURRENT METER

A. Current meter attached to nylon rope capable of being manually lowered into river to measure flow velocity.

PART 3 EXECUTION (NOT USED)

3.01 ENVIRONMENTAL MANAGEMENT PLAN

A. Prior to initiating any work onsite, the Contractor will meet with the Owner's Representative to discuss the proposed Environmental Management Plan and develop a mutual understanding relative to the details of environmental protection including measures for protecting natural resources, required reports, and other measures to be taken. The Environmental Management Plan will be submitted in the following format and shall include the elements specified below.

1. Description of the Environmental Management Plan:
   a. General Overview and Purpose:
      1) A brief description of each specific plan required by environmental permit or elsewhere in this Contract.
      2) The duties and level of authority assigned to the person(s) on the jobsite that oversee environmental compliance.
      3) A copy of any standard or Project-specific operating procedures that will be used to effectively manage and protect the environment on the Project site.
      4) Communication and training procedures that will be used to convey environmental management requirements to contractor employees and subcontractors.
      5) Emergency contact information (office phone number, cell phone number, and e-mail address).
   b. General site information.

c. A letter signed by an officer of the firm appointing the Environmental Manager and stating that he/she is responsible for managing and implementing the Environmental Program as described in the Contract. Include in this letter the Environmental Manager's authority to direct the removal and replacement of nonconforming work.

2. Management of Contaminated Materials:
   a. Objectives.
   b. Methods.
   c. Compliance with the required water quality restrictions.
3. Management of Natural Resources:
   a. Land resources.
   b. Tree protection.
   c. Replacement of damaged landscape features.
   d. Temporary construction.
   e. Stream crossings.
   f. Fish and wildlife resources.
   g. Wetland areas.
4. Protection of Historical and Archaeological Resources:
   a. Objectives.
   b. Methods.
   c. Coordination with State Historic Preservation Office.
5. Storm Water Management and Control: Refer to Section 01 57 23 Storm Water Pollution Control.
6. Soil Erosion and Sediment Control: Refer to Section 01 57 23, Storm Water Pollution Control.
7. Resuspension and Turbidity Control:
   a. Objectives.
   b. Methods.
   c. Reporting of Results.
8. Protection of the Environment from Waste Derived from Contractor:
   a. Control and disposal of solid and sanitary waste.
9. Prevention of Releases to the Environment:
   a. Procedures to prevent releases to the environment including during in-water fueling.
   b. Notifications in the event of a release to the environment.
10. Regulatory Notification and Permits: List what notifications and permit applications must be made. Demonstrate that those permits have been obtained by including copies of all applicable, environmental permits.

B. Environmental Management Plan: Review: Within 30 days after the Contract award date, submit the proposed Environmental Management Plan for further discussion, review, and approval. Commencement of Work will not begin until the Environmental Management Plan has been approved.

C. Licenses and Permits: The following planning or permitting will be completed by Contractor or Others as indicated:

1. Joint Permit Application which incorporates requirements of Section 10 of the Rivers and Harbor Act of 1899, Section 404 of the Clean Water Act (CWA), Section 401 of the CWA (including NYSDEC Water Quality Certification (WQC) and an Article 15-Protection of Waters Permit), Nationwide Permit 27 for Aquatic Habitat Restoration, Establishment, and Enhancement Activities (NWP 27) and Nationwide Permit 38 for Cleanup of Hazardous and Toxic Waste (NWP 38), both of which are issued by the USACE Buffalo District. (prepared by others).
2. Full Environmental Assessment Form and an Environmental Assessment of the capping and habitat restoration in accordance with 6 NYCRR Part 617 State Environmental Quality Review (SEQR) (prepared by others).
3. Coordination with the U.S. Coast Guard regarding a Notice to Mariners (to be performed by Contractor).
4. Preparation of a Stormwater Pollution Prevention Plan in accordance with the SPDES General Permit for Construction Activity (obtained by Contractor) and in accordance with Section 01 57 23, Stormwater Pollution Control.
5. Characterization and suitability determination of maintenance dredge material for beneficial reuse for capping or habitat purposes. If material is suitable, additional permitting will be required (by others).
6. A temporary building permit will be required for any support structures. The City of Buffalo will require a survey, a site plan, and a description of the type and configuration of any structures that will be erected as part of the application (to be obtained by the Contractor).

D. According to the USACE, there are no wetlands found in the proposed Project Area and hence no wetland permits are needed.

3.02 PROTECTION OF NATURAL RESOURCES

A. Preserve the natural resources within the Project boundaries and outside the limits of Work. Restore to an equivalent or improved condition upon completion of Work. Confine construction activities to within the limits of Work indicated or specified. Conform to the national permitting requirements of the Clean Water Act.

B. Do not disturb fish and wildlife. Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the Project and critical to the survival of fish and wildlife, except as indicated or specified.

C. Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Owner’s Representative's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless author-

ized by the Owner’s Representative. Where such use of attached ropes, cables, or guys is authorized, the Contractor will be responsible for any resultant damage.

D. Protect existing trees which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. By approved excavation, remove trees with 30 percent or more of their root systems destroyed. Remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features. Obtain Owner’s Representative's approval before replacement.

E. Erosion and Sediment Control Measures: Comply with Section 01 57 23, Storm Water Pollution Control.

3.03 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

A. Comply with Section 01 35 91 Protection of Historic Artifacts.

3.04 SOLID WASTE MANAGEMENT PLAN AND PERMIT

A. Comply with Section 01 74 00, Waste Management and Disposal.

3.05 WASTE DETERMINATION DOCUMENTATION

A. Complete a Waste Determination form (provided at the preconstruction conference) for all Contractor-derived wastes to be generated. Base the waste determination upon either a constituent listing from the manufacturer used in conjunction with consideration of the process by which the waste was generated, EPA approved analytical data, or laboratory analysis (Material Safety Data Sheets [MSDSs] by themselves are not adequate). Attach all support documentation to the Waste Determination form. As a minimum, a Waste Determination form must be provided for the following wastes (this listing is not all inclusive): oil and latex based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and all containers of the original materials.

3.06 CONTRACTOR HAZARDOUS MATERIAL INVENTORY LOG

A. Submit the "Contractor Hazardous Material Inventory Log, which provides information required by EPCRA Sections 312 and 313 along with corresponding MSDSs to the Owner’s Representative at the start and at the end of construction (30 days from final acceptance), and update no later than January 31 of each calendar year during the life of the Contract. Documentation for any spills/releases, environmental reports or offsite transfers may be requested by the Owner’s Representative.

1. Disposal Documentation for Hazardous and Regulated Waste:
   a. Manifest, pack, ship and dispose of hazardous or toxic waste and universal waste that is generated as a result of construction in accordance with the generating facilities generator status under the Resource Conservation and Recovery Act (RCRA). Contact the Owner's Representative for the facility RCRA identification number that is to be used on each manifest.
   b. Submit a copy of the applicable EPA and or State permit(s), manifest(s), or license(s) for transportation, treatment, storage, and disposal of hazardous and regulated waste by permitted facilities. Hazardous or toxic waste manifest must be reviewed, signed, and approved by the Owner's Representative before the Contractor may ship waste.

3.07 POLLUTION PREVENTION/HAZARDOUS WASTE MINIMIZATION

A. Minimize the use of hazardous materials and the generation of hazardous waste. Include procedures for pollution prevention/hazardous waste minimization in the Hazardous Waste Management Section of the Environmental Management Plan. Describe the types of the hazardous materials expected to be used during the Work.

3.08 HAZARDOUS MATERIAL MANAGEMENT

A. No hazardous material shall be brought onto Project site that does not directly relate to requirements for the performance of this Contract.

B. Include hazardous material control procedures in the Safety Plan. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Submit an MSDS and estimated quantities to be used for each hazardous material to the Owner's Representative prior to bringing the material on base. At the end of the Project, provide the Owner's Representative with the maximum quantity of each material that was present at the site at any one time, the dates the material was present, the amount of each material that was used during the Project, and how the material was used. Ensure that hazardous materials are utilized in a manner that will minimize the amount of hazardous waste that is generated. Ensure that all containers of hazardous materials have NFPA labels or their equivalent. Keep copies of the MSDS for hazardous materials onsite at all times and provide them to the Owner's Representative at the end of the Project. Certify that all hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste per 40 CFR 261.

3.09 PETROLEUM PRODUCTS AND REFUELING

A. Conduct the fueling and lubricating of equipment and motor vehicles in a manner that protects against spills and evaporation. Manage all used oil generated onsite

in accordance with 6 NYCRR 360-14. Determine if any used oil generated while onsite exhibits a characteristic of hazardous waste. Used oil containing 1,000 parts per million or greater of solvents will be considered a hazardous waste and disposed of at Contractor's expense. Used oil mixed with a hazardous waste will also be considered a hazardous waste.

1. Oily and Hazardous Substances: Prevent oil or hazardous substances from entering the ground, drainage areas, or navigable waters. In accordance with 40 CFR 112, surround all temporary fuel oil or petroleum storage tanks with a temporary berm or containment of sufficient size and strength to contain the contents of the tanks, plus 10 percent freeboard for precipitation . Any containment berm will be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs.
2. Inadvertent Discovery of Petroleum Contaminated Soil or Hazardous Wastes: If petroleum contaminated soil or suspected hazardous waste is found during the Project that was not identified in the Contract Documents, the Contractor shall immediately notify the Owner’s Representative. The Contractor shall not disturb this material until authorized by the Owner’s Representative.

3.10 FUEL TANKS

A. Petroleum products and lubricants required to sustain up to 30 days of construction activity may be kept onsite in accordance with applicable regulations including 6 NYCRR 596. If greater than 1,320 gallons of total capacity are provided, New York Spill Prevention, Control, and Countermeasure regulations will be followed. Storage and refilling practices shall comply with 6 NYCRR 613. Secondary containment shall be provided and be no less than 110 percent of the tank volume plus 5 inches of free-board. If a secondary berm is used for containment then the berm shall be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Drip pans are required and the tanks must be covered during inclement weather.

3.11 RELEASES/SPILLS OF OIL AND HAZARDOUS SUBSTANCES

A. Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated by environmental law. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Owner’s Representative.

B. The Contractor is responsible for verbal and written notifications as required by the Federal 40 CFR 355, State 6 NYCRR 595, and local authorities. Spill response will be in accordance with 40 CFR 300 and applicable State and local regulations. Contain and clean up these spills without additional cost to the Owner. If Owner assistance is requested or required, the Contractor will reimburse the Owner for such assistance. Provide copies of the written notification and documentation that a verbal notification was made within 20 days.

C. Maintain spill cleanup equipment and materials at the work site. Contractor is responsible for clean up all hazardous and nonhazardous waste spills and oil sheens that occur as a result of the dredging and capping operations. The Contractor shall bear the cost for all material, equipment, and clothing generated during any spill cleanup. The Contractor shall pay for all costs incurred including sample analysis materials, equipment, and labor if the Owner must initiate its own spill cleanup procedures, for Contractor responsible spills, when:

1. The Contractor has not begun spill cleanup procedure within 1 hour of spill discovery/occurrence, or
2. If, in the Owner's judgment, the Contractor's spill cleanup is not adequately abating life threatening situation and/or is a threat to any body of water or environmentally sensitive areas.

3.12 CONTROL AND MANAGEMENT OF HAZARDOUS WASTES

A. Facility Hazardous Waste Generator Status: The Buffalo River AOC Environmental Dredging Project is designated as a Large Quantity Generator. All work conducted within the boundaries of this activity must meet the regulatory requirements of this generator designation. The Contractor will comply with all provisions of Federal, State and local regulatory requirements applicable to this generator status regarding training and storage, handling, recordkeeping and reporting disposal of all construction derived wastes.

3.13 AIR POLLUTION CONTROL

A. Dust Control: Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the staging/processing site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Strictly adhere to applicable environmental regulations for dust prevention.

B. Minimize air pollution from the construction activities. Burning of waste materials, rubbish, or other debris will not be permitted on or adjacent to site.

3.14 SILT AND SEDIMENT CONTROL (IN WATER)

A. The Contractor will be required to meet all applicable water quality restrictions during the course of the work. Contractor shall meet turbidity limits as stated in this specification. Contractor may elect to utilize best management practices to reduce the generation of turbidity during capping and habitat restoration activities. Should the Contractor elect to utilize silt curtains for turbidity management, the Contractor shall supply additional information as outlined in the following sections.

B. Shop Drawings:

1. Provide Project-specific information as required and as necessary to clearly show calculations, dimensions, logic and assumptions, and referenced standards and codes on which design is based.
2. Provide manufacturer's literature, illustrations, specifications and identification of materials of construction, rated capacities, dimensions of individual components, profiles and finishes.
3. Make model and weight of each component.
4. Detailed structural drawings showing the component fabrications and the interfaces with other components. Include dimensions, size, and location of connections to Work under other Sections.
5. Setting drawings, templates and directions for installation of anchor bolts and other anchorages.

C. Examination:

1. Inspect and verify that structures or surfaces on which equipment will be installed have no defects which will adversely affect installation.
2. Inspect all equipment prior to installation.
3. Promptly report defects which may affect the Work to the Owner's Representative.
4. Visually inspect surface water and silt curtain a minimum of three times per day and maintain a log documenting the observations. If such inspection reveals that additional measures are needed to prevent movement of silt, promptly notify the Owner's Representative and install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly.

D. Preparation:

1. All bulkheads onsite are to be considered non-structural and must not be damaged or punctured due to silt curtain installation.
2. There may be existing concrete debris on the river bed that may need to be removed prior to silt curtain installation. Contractor to coordinate with

Manufacturer to determine the extent of debris removal necessary for installation.

E. Assembly and Installation: Assembly and installation shall be according to the manufacturer's specifications.

F. Sequencing:

1. Silt curtain shall be installed prior to the start of Work in the area to be capped or backfilled.
2. Silt curtain shall remain in place throughout debris removal and capping or habitat operations until removal is approved by Owner or Owner's Representative.

G. Maintenance:

1. Perform the following maintenance of the silt curtain and also perform all other work necessary to keep the barrier operating efficiently during all construction activities:
   a. Provide additional pile anchors or other suitable means to secure the barrier against wind, waves, ice, boat activity, dredging and other forces acting on the barrier as required to maintain the intended function.
   b. Keep all anchor lines secure and properly positioned to maintain efficient operation and positioning of the barrier.
   c. Immediately contain, collect or otherwise mitigate the migration of sediments that are released from within the area protected by the silt curtain.
   d. Immediately replace any portions of the silt curtain that are damaged while the silt curtain is deployed. Damaged sections must be replaced by new sections of silt curtains. Use of patched sections is prohibited.
2. Protect and maintain silt curtain throughout work up-gradient and down-gradient of areas designated to require silt curtains.

H. Removal and Disposal:

1. The silt curtain shall be removed following approval of Owner or Owner's Representative.
2. Allow sufficient time from completion of construction activities to allow suspended sediments within the area contained by the silt curtain to settle to the river bottom before removing the system. Maintain all turbidity control equipment surrounding work areas until all suspended sediment within the work areas has settled and water quality is equal to the background sample levels for the contained area. Data indicating this criteria has been met shall be submitted and approved by Owner or Owner's Representative before the turbidity control equipment is removed.

3. Prevent release of sediments to the water body during removal of the system.
4. Dispose of the silt curtain offsite. If temporary storage is necessary, temporarily store the silt curtain by encapsulating with polyethylene or containerizing.

I. When to Use:

1. Silt curtain usage shall comply with NYSDEC TOGs 5.1.9.

3.15 WATER QUALITY MONITORING (TURBIDITY)

A. Turbidity Threshold Value:

1. A value of 100 NTUs over background (nephelometric turbidity units) will be the threshold value. If a downcurrent turbidity reading is more than 100 NTUs above an upcurrent reading, this will be a trigger to evaluate activities.
2. Contractor will perform turbidity monitoring shortly after capping and habitat restoration begin.

B. River Water Flow Monitoring:

1. Use a flow meter to obtain flow velocity and direction in the Buffalo River (“towards the lake” or “away from the lake”).
2. Obtain measurement from mid-channel and approximately 10 feet below the water surface. Suggested location is from the Ohio Street Bridge.
3. Obtain readings once every 6 hours on a 24-hour basis while dredging and cap placement activities are ongoing. Provide readings in the Daily Report.
4. Results of river flow monitoring will be used to determine “upstream” and “downstream” relative to turbidity monitoring during dredging operations.

C. Sampling Buoy Positioning:

1. Utilize a single upcurrent and a single downcurrent sampling buoy when working in two locations that are sufficiently close to one another (within 800 feet) such that the individual operations can be evaluated as a group.
2. Utilize a single upcurrent and a single downcurrent sampling buoy for each work area when working in two areas at a sufficient distance (greater than 800 feet) away from each other.
3. Locate the upcurrent and downcurrent sampling buoys no further than 800 feet from the operation(s).

D. Turbidity Readings:

1. Turbidity readings shall be recorded once every 15 minutes at the each buoy and automatically uploaded to a website within 5 minutes of obtaining each reading or similar method of data transfer.
2. The turbidity monitoring setup shall be equipped with the means of sending out an automated email notification based on readings. If either buoy associated with a work area has a reading above the threshold value, an email will be automatically sent out to the Contractor's field personnel and the Owner's Representative.
3. Should the threshold alert email be sent, Owner's Representative will calculate the increase in turbidity reading between the upstream and downstream buoys as outlined below. Contractor shall provide the latest flow direction information to the Owner's Representative to enable this calculation.
    a. A rolling average of 16 consecutive readings (4-hour) will be used as the basis of comparison. The rolling average value of the upcurrent(background) location will be compared to the rolling average value of the downcurrent location.
    b. If an obvious outlier appears, it will be eliminated from the rolling average calculation. An outlier is defined as a reading that is outside the range of 50 to 200 percent of the average of the three previous readings. In addition, to be considered an outlier, the following reading must return to a range of 75 to 133 percent of the average of the three readings preceding the outlier. In practice, it is common to get occasional one-time spikes that cannot be tied to activities in the water. If this happens regularly (that is, more frequently than twice per day), the Contractor shall inspect and clean, repair, or replace the sensor.

E. Mitigation Measures:

1. If, after employing the best management practices, an exceedance of the turbidity criteria above ambient background conditions is reported, mitigation measures shall be employed if it is determined that the cause for the exceedance is related to remedial activities. Mitigation measure shall be employed within 4 hours of such a determination. Contractor shall notify Owner and Owner's Representative of the mitigation measure or measures to be employed. Possible mitigation measures are:
    a. Reducing the backfilling rate or temporarily suspending backfilling operations.
    b. Implement the use of silt curtains to limit the dispersion of suspended materials.
    c. If silt curtains have already been established around the backfilling operation(s) where the confirmed exceedance was obtained, an additional silt curtain layer could be established around the operation in question.
2. Depending upon the situation in which the confirmed exceedance is reported, a single mitigation measure may be used to correct the issue or a combi-

nation of measures may be implemented. As more data are obtained as part of the real-time turbidity monitoring, additional mitigation measures may be developed and implemented, or the additional measures suspended if values are significantly lower.

3.16 NOISE

A. Provide acoustical barriers if noise emanating from tools or equipment will exceed legal noise levels.

END OF SECTION

SECTION 01 57 23
STORM WATER POLLUTION CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

A. The work consists of implementing the storm water pollution prevention measures to prevent sediment from entering streams or water bodies as specified in this Section, and the requirements of the State Pollution Discharge Elimination System (SPDES).

1.02 RELATED SECTIONS

A. Section 32 92 19, Seeding.

1.03 EROSION AND SEDIMENT CONTROLS

A. Stabilization Practices:

1. The stabilization practices to be implemented include geotextiles, erosion control mats, protection of trees, preservation of mature vegetation, etc. in accordance with the NYSDEC's *Standards and Specifications for Erosion and Sediment Control (August 2005)*. On the Daily Report, record the dates when the major grading activities occur, (e.g., clearing and grubbing, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in below in subparagraph Unsuitable Conditions, and subparagraph No Activity for Less Than 21 Days, initiate stabilization practices as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.
2. Unsuitable Conditions: Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceases or is precluded by unsuitable conditions caused by the weather, initiate stabilization practices as soon as practicable after conditions become suitable.
3. No Activity for Less Than 21 Days: When the total time period in which construction activity is temporarily ceased on a portion of the site is 21 days minimum, stabilization practices do not have to be initiated on that portion of the site until 14 days have elapsed after construction activity temporarily ceased.
4. Burnoff: Burnoff of the ground cover is not permitted.

5. Protection of Erodible Soils: Immediately finish the earthwork to a final grade, as indicated or specified, and protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

B. Erosion, Sediment and Storm Water Control:

1. Submit Erosion and Sediment Controls (E&S) and Storm Water Inspection Reports for General Permit to the Owner's Representative once every 7 calendar days and within 24 hours of a storm event that produces 0.5 inch or more of rain.
2. Submit a Storm Water Notice of Intent for SPDES coverage under the General Permit for Construction Activities (current version) and a Storm Water Pollution Prevention Plan (SWPPP) for the Project to the Owner's Representative prior to the commencement of work. The SWPPP shall meet the requirements of the State of New York general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Owner's Representative, to the appropriate State agency for approval, a minimum of 14 calendar days prior to the start of any land disturbing activities. Maintain an approved copy of the SWPPP at the construction onsite office, and continually update as regulations require, to reflect current site conditions. Include within the SWPPP:
   a. Identify potential sources of pollution which may be reasonably expected to affect the quality of storm water discharge from the site.
   b. Describe and ensure implementation of practices which will be used to reduce the pollutants in storm water discharge from the site.
   c. Ensure compliance with terms of the State of New York general permit for storm water discharge.
   d. Install, inspect, and maintain best management practices (BMPs) as required by the general permit. Prepare and submit to the Owner's Representative, BMP Inspection Reports as required by the general permit.
   e. Once construction is complete and the site has been stabilized with a final, sustainable cover, submit the Notice of Termination to the appropriate state Agency within 30 days after all land disturbing activities end.

C. Stormwater Drainage: Discharge of hazardous substances or stormwater that has been in contact with hazardous materials will not be permitted under any circumstances. Construction site runoff will be prevented from entering any storm drain or the river directly by the use of straw bales, retention berms or other method approved by the Owner's Representative. Provide erosion protection of the surrounding soils.

D. Structural Practices: Implement structural practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement structural practices in a timely manner, during the construction process, to minimize erosion and sediment runoff. Include the following devices:

1. Silt Fences: Provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Properly install silt fences to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading).
2. Straw Bales: Provide bales of straw as a temporary structural practice to minimize erosion and sediment runoff. If bales are used, properly place and secure the bales to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g., after clearing and grubbing in an area between a ridge and drain, place the bales as work progresses, remove/replace/relocate the bales as needed for work to progress in the drainage area). Show on Drawings areas where straw bales are to be used. Provide rows of bales of straw as follows:
   a. Along the downhill perimeter edge of all areas disturbed
   b. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.
   c. Along the toe of all cut slopes and fill slopes of the construction areas.
   d. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Space the rows such that they are no more than one foot of grade change from the next row
   e. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Space the rows such that they are no more than one foot of grade change from the next row.
   f. At the entrance to culverts that receive runoff from disturbed areas.

3. Diversion Dikes: Build diversion dikes with a maximum channel slope of 2 percent and adequately compacted to prevent failure. The minimum height measured from the top of the dike to the bottom of the channel shall be 18 inches. The minimum base width shall be 6 feet and the minimum top width shall be 2 feet. Ensure that the diversion dikes are not damaged by construction operations or traffic.

E. Vegetation and Mulch: Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

1.04 SUBMITTALS

A. Action Submittals: Storm Water Pollution Prevention Plan.

B. Informational Submittals:

1. Storm Water Notice of Intent.
2. Storm Water Inspection Reports for General Permit.
3. Product information for erosion and sediment controls.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Identify, store and handle filter fabric in accordance with ASTM D4873.

PART 2 PRODUCTS

2.01 COMPONENTS FOR SILT FENCES

A. Filter Fabric: Provide geotextile that complies with the requirements of ASTM D4439, and consists of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and contains stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure. Provide synthetic filter fabric that contains ultraviolet ray inhibitors and stabilizers to assure a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

Filter Fabric For Silt Screen Fence		
Physical Property	**Test Procedure**	**Strength Requirement**
Grab Tensile Elongation (percent)	ASTM D4632	445 N100 lbs. min. 30 percent max.
Trapezoid Tear	ASTM D4533	245 N min.55 lbs. min.
Permittivity	ASTM D4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D4751	20-100

B. Silt Fence Stakes and Posts: Use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction shall have a minimum cross section of 2 by 2 inches when oak is used and 4 by 4 inches when pine is used, and have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 5 feet.

2.02 STRAW BALES

A. The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, Bermuda, etc., furnished in air dry condition. Provide bales with a standard cross section of 14 by 18 inches. Wire-bound or string-tie all bales. Use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 2 by 2 inches in cross section and have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum weight of 1.33 pounds/linear foot and a minimum length of 3 feet.

2.03 EROSION CONTROL MATS

A. Rolled jute mesh to be used at the site for soil stabilization for all disturbed soil areas should be single net machine-produced mats that consist of 100 percent biodegradable jute. The mats shall be of consistent thickness, with jute evenly distributed over the entire area of the mat. The blanket shall have a mass per unit area of 0.50 lb/yd^2. The blanket shall be covered on the top side with a 100 percent biodegradable woven natural organic fiber net. The netting shall consist of machine direction strands formed from two intertwined biodegradable yarns with across directional strands interwoven through the twisted machine strands (commonly refer to as a Leno weave) to form approximately a 0.50 x 0.5 inch mesh. The thread pattern on these mats shall not be more than 2 inches transverse stitch spacing. The mat should meet Class II, Type C of the NYSDOT Standards Specifications (latest edition).

PART 3 EXECUTION

3.01 INSTALLATION OF SILT FENCES

A. Extend silt fences a minimum of 16 inches above the ground surface without exceeding 34 inches above the ground surface. Provide filter fabric from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, splice together filter fabric at a support post, with a minimum 6-inch overlap, and securely sealed. Excavate trench approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4- by 4-inch trench shall be backfilled and the soil compacted over the filter fabric.

3.02 INSTALLATION OF STRAW BALES

A. Place the straw bales in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Install straw bales so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. Entrench and backfill the barrier. Excavate a trench the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging with straw), backfill the excavated soil against the barrier. Conform the backfill soil with the ground level on the downhill side and build up to 4 inches against the uphill side of the barrier. Scatter loose straw over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Securely anchor each bale by at least two stakes driven through the bale. Drive the first stake or steel post in each bale toward the previously laid bale to force the bales together. Drive stakes or steel pickets a minimum 18 inches deep into the ground to securely anchor the bales.

3.03 SEEDING

A. See specifications for Seed Mix - Erosion Control as per Section 32 92 19, Seeding.

3.04 FIELD QUALITY CONTROL

A. Maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing daily inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. Use the following procedures to maintain the protective measures.

B. Silt Fence Maintenance: Inspect the silt fences in accordance with Article Inspections, of this Section. Any required repairs shall be made promptly (within 24 hours). Pay close attention to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, replace the fabric promptly. Remove sediment deposits when deposits reach one-third of the height of the barrier. Remove a silt fence when it is no longer required. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall receive erosion control.

C. Straw Bale Maintenance: Inspect straw bale barriers in accordance with Article Inspections. Pay close attention to the repair of damaged bales, end runs and undercutting beneath bales. Accomplish necessary repairs to barriers or replacement of bales in a prompt (within 24 hours) manner. Remove sediment deposits when deposits reach one-half of the height of the barrier. At the each end of each row turn bales uphill when used to retain sediment. Remove a straw bale barrier when it is no longer required. The immediate area occupied by the bales and any sediment deposits shall be shaped to an acceptable grade.

D. Diversion Dike Maintenance: Inspect diversion dikes in accordance with Article Inspections, of this Section. Pay close attention to the repair of damaged diversion dikes and accomplish necessary repairs promptly (within 24 hours). When diversion dikes are no longer required, shape to an acceptable grade.

3.05 INSPECTIONS

A. General: Inspect disturbed areas of the construction site, areas that have not been finally stabilized used for storage of materials exposed to precipitation, stabilization practices, structural practices, other controls, and area where vehicles exit the site on a daily basis and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site.

B. Inspections Details: Inspect disturbed areas and areas used for material storage that are exposed to precipitation for evidence of, or the potential for, pollutants entering the drainage system. Observe erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan to ensure that they are operating correctly. Inspect discharge locations or points to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Inspect locations where vehicles exit the site for evidence of offsite sediment tracking.

C. Inspection Reports: For each inspection conducted, prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. Furnish the report to the Owner’s Representative within 24 hours of the inspection as a part of the Contractor's Daily Report. A copy of the inspection report shall be maintained on the jobsite.

END OF SECTION

SECTION 01 71 00
EXAMINATION AND PREPARATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes general procedures governing the examination of habitat restoration sites to determine if conditions are acceptable for restoration feature installation and basic requirements for preparing to install restoration features and plantings.

B. Related Requirements:

1. Section 01 10 00, Summary of Work.
2. Section 02 21 00, Surveys, for surveying requirements.

1.02 INFORMATIONAL SUBMITTALS

A. Unsatisfactory Conditions Notifications: Submit as needed.

B. One-call system notification of utility markout.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities indicated on Drawings is based on available information. Before beginning site work, investigate and verify the existence and location of underground utilities and other subgrade structures that may affect the Work. Use the one-call system or other system(s) as applicable and provide a copy of the notification from the system that advises that the utilities have been field marked. This work should be coordinated with the current site conditions survey as specified in Section 02 21 00, Surveys.

1. Before construction, verify the location and conditions of outfalls, stream access areas (i.e., boat ramps), property boundaries, pilings to be kept in place, concrete and metal debris to be removed from site, and any utilities.
2. Arrange to have 3rd party specialist perform hard locate of utilities identified through one-call system or other system(s) as applicable or that appear on Drawings and are within dredging or habitat restoration footprints.

3. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions that may affect performance and record observations.

1. Notify Owner's Representative in writing of any unsatisfactory conditions.
2. Do not proceed until unsatisfactory conditions have been corrected.

C. Inspect all materials and equipment immediately upon delivery and again before installation. Reject damaged and defective items.

D. Written Report: Prepare a listing of conditions detrimental to performance of the Work, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

E. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly and stake locations of restoration features. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before installation. Coordinate measurements work with construction progress to avoid delaying the Work.

C. Identify and mark trees, shrubs, structures, and other site features, such as pilings, that have been selected to remain.

D. Identify and stake locations of soil erosion control measures that will be used onsite.

3.03 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property lines and existing benchmarks. If discrepancies are discovered, notify Owner's Representative promptly.

B. General: Coordinate layout work with initial topographic survey work as described in Section 02 21 00, Surveys.

1. Establish benchmarks and control points to set lines and levels at each layer of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated.
4. Notify Owner's Representative when deviations from required lines and levels exceed allowable tolerances.
5. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including in-water fill placement prior to beginning installation of restoration features and plants.

D. Record Log: Maintain a log of layout control work and record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Owner's Representative.

END OF SECTION

SECTION 01 72 20
DECONTAMINATION

PART 1 GENERAL

1.01 WORK INCLUDED

A. This Section covers the labor, materials, equipment necessary for decontaminating personnel, equipment and construction materials. The Contractor shall perform decontamination of equipment as specified in Part 3 (Execution). The contractor shall be responsible for submission of decontamination procedures and shall supply required equipment.

1.02 GENERAL

A. Potentially impacted debris may be encountered and require removal during construction of the capping areas or habitat restoration.

B. An onsite decontamination area large enough as part of the exclusion and decontamination reduction zones to accommodate any potentially impacted debris or materials removed from the capping or habitat areas shall be established by the Contractor in conformance with this Section and the Site Health, Safety, and Emergency Response Plan (HSERP). The Contractor will be responsible for providing the appropriate water supply, decontamination tools, equipment, solutions, liquids, containers, and supplies.

C. All personnel shall be decontaminated before leaving the site, as specified in the Site HSERP. “Leaving the site” is defined as leaving the exclusion zone and entering the contamination reduction area. Decontamination shall be required prior to breaks, when picking up tools, equipment, or materials in the support zone, or any other activities where the potential exists for contaminant transfer.

D. Equipment shall be cleaned and decontaminated prior to use onsite and prior to leaving the site.

E. All equipment shall be washed and cleaned prior to initiation of work at the site.

F. All decontamination operations shall be conducted by Contractor personnel wearing personal protective equipment as specified by in the HSERP.

1.03 RELATED SECTIONS

A. Section 01 11 01, Health, Safety, Environment and Emergency Response.

B. Section 01 33 00, Submittal Procedures.

C. Section 01 50 00, Temporary Facilities and Controls.

PART 2 PRODUCTS

2.01 DECONTAMINATION AREA

A. The Contractor shall provide or construct a decontamination area for decontamination of trucks and other heavy equipment. The area shall contain and collect decontamination fluids and sediments without release to the environment.

2.02 GENERAL

A. The Contractor shall furnish all equipment and supplies necessary for the decontamination process such as trisodium phosphate detergent, a mobile steam cleaner or hot water high pressure washer, buckets, brushes, etc, as specified in the HSERP or as required by applicable permits.

B. The Contractor shall furnish sealable United States Department of Transportation (U.S. DOT)-approved containers (55-gallon drums) having watertight lids as required. The Contractor shall also supply labeling materials.

PART 3 EXECUTION

3.01 EQUIPMENT DECONTAMINATION

A. For equipment used to handle Non-TSCA-level materials, the Contractor shall decontaminate the equipment after use in the following manner:

1. Scrape and remove all earthen materials from the equipment.
2. Hose down equipment with a portable high-pressure steam cleaner.
3. Collect rinsate and scrapings. Place rinsate in approved tanks, as required by USEPA, until it can be tested, treated and discharged.
4. Scrapings shall be stored on-site and covered until it can be disposed of at an approved offsite disposal facility.
5. Contractor is responsible for management of all rinsate and scrapings, any testing, treating (as appropriate) and discharge or disposal at an approved offsite disposal facility.

3.02 PERSONNEL DECONTAMINATION

A. Personnel decontamination procedures to be used shall be performed prior to leaving the exclusion zone. The Contractor shall provide all protective

clothing and the equipment necessary for its own personnel to comply with the decontamination procedures as specified in this Section and in the HSERP.

END OF SECTION

SECTION 01 74 00
CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT AND DISPOSAL

GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

1.02 DEFINITIONS

A. Construction Waste: Waste materials resulting from restoration feature installation and habitat planting. Construction waste includes packaging.

B. Demolition Waste: Waste materials resulting from selective demolition of existing stream-side structures and existing site improvements.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse in another facility.

E. Salvage: As defined in Section 01 35 91, Protection of Historic Artifacts.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.03 PERFORMANCE REQUIREMENTS

A. General: Salvage/recycle non-hazardous solid waste generated by the Work as much as possible. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials**,** including the following:

1. Demolition Waste:
2. Concrete Debris.
3. Concrete reinforcing steel.

4. Metal Debris.
5. Trees and Shrubs.
6. Construction Waste:
   a. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
      1) Paper.
      2) Cardboard.
      3) Boxes.
      4) Plastic sheet and film.
      5) Polystyrene packaging.
      6) Wood crates.
      7) Plastic pails.
   b. Planting and Grubbing Debris: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the native species materials generated by clearing and grubbing by disposing of material at an off-site composting facility. Invasive species shall be separated for disposal at a landfill to control the spread of such species.

1.04 ACTION SUBMITTALS

A. Waste Management Plan: Submit a waste management plan according to ASTM E 1609 within 14 days of the Notice to Proceed. The plan shall include the following:

1. Name of Contractor personnel responsible for waste prevention and management.
2. Actions that will be taken to reduce waste generation.
3. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas and equipment to be used for processing, sorting and temporary storage of wastes.
4. Characterization, including estimated types and quantities, of the waste to be generated during restoration activities. Note that there are several areas that have large amounts of concrete debris at several of the sites that will require disposal by Contractor. No chemical sampling is required for disposal. If, disposal facility requires chemical sampling that is the responsibility of the Contractor to determine and include in the price for the work.
5. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.
6. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials (removed trees and shrubs) such as materials exchange networks.

7. List of specific waste materials that can be salvaged and reused, or recycled. Recycling facilities that will be used shall also be identified.
8. Identification of materials that cannot be recycled/reused with an explanation or justification.

1.05 INFORMATIONAL SUBMITTALS

A. Provide to the Owner's Representative written notification of the quantity of solid waste/debris that is anticipated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance or as applicable, submit one copy of a State and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off property. The records shall be made available to the Owner's Representative during construction and a copy of the records shall be submitted to the Owner's Representative upon completion of the restoration construction.

B. Solid Waste Management Report:

1. Monthly, submit a solid waste disposal report to the Owner's Representative. For each waste, the report will state the classification (using the definitions provided in this Section), amount, location, and name of the business receiving the solid waste.
2. Include copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, the Contractor may submit a statement indicating the disposal location for the solid waste which is signed by an officer of the Contractor firm authorized to legally obligate or bind the firm. The sales documentation or Contractor certification shall include the receiver's tax identification number and business, EPA or State registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained by the Contractor for his own use, the Contractor shall submit on the solid waste disposal report the information previously described in this paragraph. Prices paid or received need not be reported unless required by other provisions or specifications of this Contract or public law.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 PLAN IMPLEMENTATION

A. General: Take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging ma-

terials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste, consideration shall be given to the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. Implement or take advantage of any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage or recycling shall accrue to the Contractor. Firms and facilities used for recycling, reuse, and disposal shall be appropriately permitted for the intended use to the extent required by federal, state and local regulations.

B. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

C. Comply with operation, termination, and removal requirements in Section 01 50 00 Temporary Facilities and Controls.

D. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

E. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas at the staging areas necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 01 50 00, Temporary Facilities and Controls for controlling dust and dirt, environmental protection, and noise control.

3.02 CONTROL AND MANAGEMENT OF SOLID WASTES

A. Pick up solid wastes, and place in covered containers which are regularly emptied. Do not prepare or cook food on the Project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At Project completion, leave the areas clean. Recycling is encouraged and can be coordinated with the Owner’s Representative. Remove all solid waste (including nonhazardous debris) from the property and dispose offsite at an approved landfill. Solid waste disposal

offsite must comply with most stringent local, State, and Federal requirements including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

B. Manage spent hazardous material used in construction including, but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, as per environmental law.

C. Dumpsters: Equip dumpsters with a secure cover. Keep cover closed at all times, except when being loaded. Locate dumpsters behind the construction fence or out of the public view. Empty site dumpsters at least once a week or as needed to keep the site free of debris and trash.

3.03 COLLECTION

A. The necessary containers, bins and storage areas to facilitate effective waste management shall be clearly and appropriately labeled. Recyclable materials shall be handled to prevent contamination of materials from incompatible products and materials and separated by the following method.

1. Source Separation Method: Waste products and materials that are recyclable shall be separated from trash and sorted into appropriately marked separate containers and then transported to the respective recycling facility for further processing.

3.04 SALVAGED WASTE

A. Salvaged Items for Reuse in the Work: As necessary, salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

3.05 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhe-

sives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
   a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.06 RECYCLING DEMOLITION WASTE

A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum 4-inch (100-mm) size.

B. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

C. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

3.07 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.

3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials: Dispose off-site at a facility subject to the approval of the Owner.

3.08 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Final cleaning.

1.02 ACTION SUBMITTALS

A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

B. Certified List of Incomplete Items: Final submittal at Final Completion.

C. Submit Prior to Final Application for Payment:

1. Record Documents.
2. Special Bonds, Special Guarantees, and Service Agreements.
3. Consent of Surety to Final Payment.
4. Releases or Waivers of Liens and Claims.
5. Releases from Agreements.

1.03 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01100 Remediation Construction Requirements, and the General Conditions of the Contract.

1.04 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other sections, including final bathymetric surveys and similar final record information.
3. Submit sampling results summary of all final samples.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Terminate and remove temporary facilities from Project site, along with construction tools and similar elements.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection. On receipt of request, Owner’s Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner’s Representative will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Owner’s Representative that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.05 RECORD DOCUMENTS

A. Quality Assurance:

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain Record Documents.
2. Accuracy of Records:
   a. Coordinate changes within Record Documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.

b. Purpose of Project Record Documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.

3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.
4. Prior to submitting each request for progress payment, request Owner's Representative's review and approval of current status of Record Documents. Failure to properly maintain, update, and submit Record Documents may result in a deferral by the Owner' Representative to recommend whole or part of Contractor's Application for Payment, either partial or final.

1.06 RELEASED FROM AGREEMENTS

A. Furnish the Owner's Representative written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within the property owner's construction right-of-way.

B. In the event Contractor is unable to secure written releases:

1. Inform the Owner and Owner's Representative of the reasons.
2. The Owner or Owner's Representative will examine the Site, and the Owner will direct the Contractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
3. Should the Contractor refuse to perform this Work, the owner reserves the right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory bond in a sum to cover legal Claims for damages.
4. When the Owner is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) Contractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon legitimate Claims that the Contractor has failed to fulfill terms of side agreement or special easement, or (ii) The Contractor is unable to contact or has had undue hardship in contacting grantor.

1.07 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 01 29 00, Payment Procedures.
2. Certified List of Incomplete Items: Submit certified copy of Owner's Representative's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Owner's Representative. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Owner's Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner's Representative will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.08 LIST OF INCOMPLETE ITEMS

A. Organization of List: Include name and identification of each area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of areas in sequential order.
2. Include the following information at the top of each page:
   a. Project name.
   b. Date.
   c. Name of Owner's Representative.
   d. Name of Contractor.
   e. Page number.
3. Submit list of incomplete items in the following format:
   a. MS Excel electronic file. Owner's Representative will return annotated file.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. General:

1. Promptly following commencement of Contract Times, secure from the Owner's Representative at no cost to the Owner's Representative, one complete set of Contract Documents.
2. Delete Engineer's title block and seal from documents.
3. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.
4. Record information concurrently with the construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use Record Documents for construction purposes.
2. Make documents and Samples available at all times for observation by the Owner's Representative.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
   a. Color Coding:
      1) Green when showing information deleted from Drawings.
      2) Red when showing information added to Drawings.
      3) Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by "cloud" drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including, but not limited to:
   a. Horizontal and vertical locations of existing Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
   b. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Contractor's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.

3.02 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations at all Project staging/storage/ processing areas.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
   a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
   b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
   c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
   d. Remove tools, construction equipment, machinery, and surplus material from Project site.

END OF SECTION

SECTION 02 21 00
SURVEYS

PART 1 GENERAL

1.01 SUMMARY

A. Contractor shall perform surveys to the extent specified herein to set equipment, place features, determine required lines and grades, and to document completion of Work.

1.02 ACTION SUBMITTALS

A. Contractor shall submit for review the point grid that Contractor intends to use to complete bathymetric and topographic surveys for the Project.

1.03 INFORMATIONAL SUBMITTALS

A. Qualification Data for Bathymetric and Land Surveyors: Provide the names, addresses, credentials, years of experience and telephone numbers of the surveyors performing the Project survey work.

B. Initial Topographic Map: Submit with the Current Conditions Documentation for each Project area:
   1. All capping and habitat restoration areas.

C. Final Topographic Map/Record Drawings: Submit for each Project Area after restoration work has been completed prior to Final Application for Payment.
   1. All capping and habitat restoration areas.

D. Bathymetric Surveys: As described in Article “Bathymetric Surveys” within this section.

1.04 QUALITY ASSURANCE

A. Bathymetric and Land Surveyor Qualifications: Survey work shall be performed by or under the review of a New York State Licensed Land Surveyor (LLS).

   1. Land Surveyor shall have a minimum of 5 years’ experience in construction surveying and layout and maintenance of record construction drawings, with a record of performing horizontal and vertical control requirements as stated in this Section.
   2. Bathymetric Surveyor shall have a minimum of 5 years’ experience in hydrographic surveying.

B. Plan for, and ensure that, all personnel comply with the basic provisions of the Occupational Safety and Health Administration (OSHA) Standards (29 Code of Federal Regulations CFR 1910) and General Construction Standards (29 CFR 1926), including OSHA Hazardous Waste Operations and Emergency Response, Interim Final Rule (29 CFR 1910.120). All personnel must also comply with other applicable federal, state, or local laws and regulations.

1.05 BATHYMETRIC SURVEY OVERSIGHT

A. Owner's Representative may conduct oversight of Contractor's bathymetric and topographic surveying activities. Contractor shall conduct bathymetric surveying with vessels capable of accommodating one representative of the Owner's Representative's bathymetric surveying specialist.

PART 2 PRODUCTS

2.01 DIGITAL DATA FILES PROVIDED BY OWNER'S REPRESENTATIVE

A. Owner's Representative will furnish Contractor one set of digital data files of Drawings for use in preparing Record Drawings.

B. Owner's Representative makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.

C. Digital Data Software Program: Drawings are available in AutoCAD 2014, and Civil 3D as appropriate.

D. Contractor shall execute a data licensing agreement in form of AIA Document C106 or similar form acceptable to the Owner's Representative.

2.02 RECORDS (FOR ALL SURVEYS)

A. Provide AutoCAD 2014, Civil 3D and LDD electronic files or xml files, as appropriate, for the project on CD and provide a data file of all the points surveyed using PNEZD format (point number, northing, easting, elevation and description).

B. For all surfaces installed, provide a list identifying the names of each surface with associated descriptions and names of point layers, point groups, breaklines, boundaries, and all other objects used to build each surface.

C. Submit a list of all layers added to the drawing with layer names and descriptions for each layer and other associated external references (xrefs) and/or third party files that support the Drawing:

1. The AutoCAD file shall be developed on a 1:1 basis, with actual distances equal to “AutoCAD” distances. The file shall be developed with the standard unit being decimal feet.
2. The AutoCAD file shall have a separate layer for a border and title block, which shall contain the Project name as well as the name of the surveying firm that performed the survey and prepared the drawing.
3. A “Notes” layer shall be included. The notes layer shall identify the dates of the survey, control points, and benchmarks used, and any other information that the Surveyor deems pertinent.
4. Each contour of a constant elevation shall be included as a separate polyline with the “z” coordinate set equal to that elevation. Major and minor contours shall be on separate layers.

D. The AutoCAD model space drawing shall be plotted in hardcopy on sheets size 22 inches by 34 inches, at an appropriate scale. Three copies shall be submitted and all copies shall bear the seal and signature of the professional Surveyor.

E. Also provide an Adobe Acrobat 9.0, or higher compatible electronic files of all surveys.

F. Field Data: Provide an electronic scanned copy of the survey book upon completion of each phase of survey work. Include all field notes, notations, and descriptions used and compiled during the field survey.

G. Quantity Calculations: Provide all calculations required supporting the requests for Application Payments and verifications of volumes, areas, and lengths involved.

2.03 RECORD DRAWINGS

A. Mapping shall conform to the National Map Accuracy Specifications.

B. Record Drawings shall include labeled contour lines, property line locations, horizontal grid systems, cross-sections and details modified to show variations in conditions, details and cross-sections from original drawings, and any authorized field changes of elevations, dimensions, and details. Indicate locations of physical features on the site including: utilities, roadways, culverts, manholes, utility poles, fences, gates, drainage ditches, monitoring wells, piezometers, leachate pipes, tanks, benchmarks, excavation limits, large trees, confirmation sampling points, and other significant items.

2.04 SURVEY NOTES

A. All data obtained during a survey shall be permanently recorded. A field notebook shall be maintained noting location, survey crew members, dates,

times, weather, field sketches, and other pertinent data (e.g. computer calculations or coordinates used to verify survey accuracy, closure notes, etc.).

B. Data recorded electronically shall be preserved on a CD. A hard copy of all electronically obtained data shall be maintained. Hard Copy and CD shall be retained for a minimum of seven years.

PART 3 EXECUTION

3.01 COORDINATE SYSTEM AND DATUMS

A. Compute the coordinates of each surveyed point on the New York State Plane Coordinate System, West Zone using the 1983 North American Datum (NAD83), units in US Feet.

B. The vertical datum for topographic elevations shall be on the International Great Lakes Datum (IGLD) 85, Units in US Feet.

3.02 HORIZONTAL AND VERTICAL CONTROL

A. Horizontal and vertical control points shall be referenced to the permanent site control monuments to an accuracy of one part in ten thousand.

3.03 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Owner’s Representative. Report the need to relocate permanent benchmarks or control points to Owner’s Representative before proceeding.
2. Report and replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of one permanent benchmark at each restoration Project site. The monument locations and elevations shall meet the Federal Geodetic Control Committee Standard for second order (horizontal and vertical). Final locations will be reviewed by the Owner’s Representative for acceptability. Comply with authorities having jurisdiction for type and size of benchmark. Provide permanent benchmark at each location of work using closed traverse and leveling loops.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore site of temporary reference point to original condition.

3.04 SURVEYS

A. Contractor shall employ an ACSM Certified Hydrographer to take the bathymetric surveys. In shallow water areas inaccessible by survey vessels, bathymetric surveys shall be supplemented as necessary with topographic surveys conducted by a qualified land surveyor. The following surveys shall be conducted:

1. For Katherine Street Peninsula restoration area:
   a. Pre- habitat subgrade placement survey.
   b. Survey in the fall immediately following placement of habitat subgrade material. This survey can serve as the pre- planting substrate placement survey in the fall.
   c. Post-planting substrate placement survey in the spring.
2. For Riverbend, Buffalo Color Peninsula, and Ohio Street Shoreline restoration areas:
   a. Pre-planting substrate placement survey in the fall.
   b. Post-planting substrate placement survey in the spring.

3. For the area at the south end of the City Ship Canal designated for capping:
   a. Pre-in-water fill placement survey.
   b. Survey following placement of the chemical isolation layer (5.5 foot thick in-water fill layer).
   c. Survey in the fall following placement of the in-water fill. This survey can serve as the pre- planting substrate placement survey in the fall.
   d. Post-planting substrate placement survey in the spring.
4. For the area adjacent to the ADM/Pillsbury property designated to receive an armored cap:
   a. Pre-capping survey.
   b. Survey following placement of the riprap toe berm.
   c. Survey following placement of filter layer.
   d. Survey following placement of armor layer.

B. Extend bathymetric surveys a minimum of 50 feet outside the extents of the area to be surveyed.

C. The USACE hydrographic surveying requirements referenced in EM 1110 2 1003 Engineering and Design-Hydrographic Surveying shall be mandatory unless otherwise specified. Bathymetric surveys in support of pay requests shall be performed with multi-beam survey equipment and others shall be performed with single beam survey equipment on lines spaced a maximum of 25 feet apart. The survey software must be capable of collecting XYZ data in real time. The surveys shall cover 100 percent of the targeted area. Horizontal positioning shall be by differential global positioning systems (DGPS), or an equivalent technology capable of achieving DGPS accuracy, and shall be referenced to the horizontal datum described in Article Coordinate System and Datums.

D. Horizontal (x, y) accuracy shall be 3 feet (or better) and the vertical (z) accuracy shall be +1, -3 inches (or better).

E. Provide to the Owner's Representative, for review, specifications and quality assurance/quality control criteria as to how Contractor's surveyor will collect bathymetric data and grid spacing.

F. Pre-placement bathymetric surveys shall be conducted within 7 days prior to starting backfill or capping work in a restoration area. If a significant precipitation event or propeller wash from a passing vessel has occurred before backfill or capping begins in the restoration area, conduct another pre-placement bathymetric survey.

G. Contractor shall perform post-backfill or cap layer placement bathymetric surveys within 7 days of completing the backfill or cap layer and, if an additional backfill or cap layer is to be placed, shall start the placement of the successive layer within 7 days of completion of the bathymetric survey.

H. Horizontal datum used for backfill and capping work in the river should be in New York State Plane Coordinates North American Datum 1983, Central Zone (US Feet). Vertical datum used for the backfill and capping work in the river should be in International Great Lakes Datum 1985 (Feet).

I. Contractor shall present the results of bathymetric surveys to the Owner's Representative. Plots of post-backfill or capping surveys, raw survey data and related quantities are required to be submitted within 3 days of completion of the surveys. For bathymetric surveys that are required to document progress of Work, Owner's Representative will evaluate the results and within 7 working days either:

1. Approve the Work represented by the survey or;
2. Document in writing why the Work is deficient.

J. Final Topographic Map/Record Drawings:

1. Provide upon completion of the final backfill of materials, removal of debris, installation of restoration features and restoration of all disturbed surfaces.
2. Submit quantity estimates and back-up survey data for review by Owner's Representative prior to payment for this item. Preliminary estimates are presented in the Contract Documents.
3. Show final location and elevation of all construction areas including backfill, riprap, and vegetation by planting types.
4. Show final position of porcupine cribs, anchored woody debris, stones and vegetative restoration elevations as installed on the stream bank within each restoration area.
5. Show final contours of the backfill areas.
6. Show location of all confirmation or documentation sample points as needed.
7. Show the final grading, amount of riprap, and amount of backfill and topsoil materials placed along river banks at each restoration site.
8. Show the final grading of the soil staging area.
9. This final survey/record drawing shall be certified by the licensed land surveyor.

3.05 PRE-CAPPING AND POST-CAPPING SURVEY OVERSIGHT

A. Owner's Representative will provide oversight of Contractor's bathymetric surveying subcontractor. Alternatively, Owner may contract with another bathymetric surveying specialist to perform the oversight.

B. Contractor shall conduct bathymetric surveying with vessels capable of accommodating the Owner's bathymetric surveying representative.

C. Contractor shall work with Owner's bathymetric surveying representative as necessary to ensure surveys are approved in a timely manner.

3.06 PAYMENT QUANTITIES DEPENDENT UPON SURVEYS

A. Quantities shall be calculated using industry standard techniques such as the average end-area method or digital terrain modeling.

B. Armored cap layer: Pre-capping and post-capping layer placement bathymetric surveys. Cap layer thickness measurements will be used in conjunction with weight tickets showing quantity of armored cap material placed to document the thickness of the armored cap layer meets specifications.

C. Lateral extent of cap layers placed: Pre-capping and post-capping layer placement bathymetric surveys will document the lateral extent of cap placement, which will be the basis for payment (square feet).

D. Habitat Restoration: Placement of backfill for in-water habitat restoration will be documented by pre-backfilling and post-backfilling bathymetric surveys.

END OF SECTION

SECTION 02 56 14
CAPPING

PART 1 GENERAL

1.01 DESCRIPTION

A. Section includes materials, handling, placement, and confirmation of layers for armored caps and the City Ship Canal Cap.

1.02 SUBMITTALS

A. Action:

1. Cap Layer Placement Plan for Armored Cap and City Ship Canal Cap.
2. Results of gradation analyses for supplied materials.
3. Results of chemical analyses for supplied materials.

B. Informational: Post placement testing results.

1.03 RELATED SECTIONS

A. Section 01 57 20, Environmental Protection.

B. Section 01 57 23, Storm Water Pollution Control.

C. Section 01 72 20, Decontamination.

D. Section 01 74 00 Waste Management and Disposal.

E. Section 02 21 00, Surveys.

F. Section 31 05 00 Common Work Results for Earthwork.

1.04 QUALITY CONTROL

A. Prepare Cap Placement Plan to include the following for both armored caps and the Ship Canal cap:

1. Procedures for placement of cap materials, including means of navigational positioning, sequence of work, and material placement methods, including BMPs and expected rates of placement.
2. Identification of potential methods and/or procedure modifications to be implemented to limit sediment resuspension, if determined to be necessary through water quality monitoring results (to be performed by

the Contractor; information on applicable water quality standards is provided in Section 01 57 20 Environmental Protection).

3. Details on how equipment will be anchored and maneuvered, particularly in areas where caps have been placed.
4. Materials source, gradation, testing methods and frequency, hauling route, stockpile area and management
5. Materials offloading and transport equipment and procedure.
6. Plan for debris removal from the capping areas including methods, procedures, and equipment to be used to complete debris removal operations. The plan shall also include methods, procedures, and equipment to be used to complete offloading, transportation, and disposal operations.
7. Materials placement equipment and procedure.
8. Methods to verify placement of cap within the designated capping limits, lift and total cap thicknesses, and tracking of total volume of placed cap material; include discussion on survey control and expected position accuracy of sample locations for underwater verification methods.
9. Procedures to control resuspension and turbidity during placement.

1.05 ENVIRONMENTAL PROTECTION REQUIREMENTS

A. As stated in Section 01 57 20, Environmental Protection and Section 01 57 23, Storm Water Pollution Control.

B. Contractor shall place cap materials in such a manner to minimize re-suspension of sediment in the water column or have such controls in place that if sediment is re-suspended it is captured and kept within the cap footprint. Turbidity monitoring shall be conducted upstream and downstream of the area being capped.

C. All removed debris shall be decontaminated in accordance with the procedures identified in Section 01 72 20 Decontamination.

D. All removed debris shall be disposed of in accordance with the Contractor Waste Management Plan identified in Section 01 74 00 Waste Management and Disposal.

PART 2 PRODUCTS

2.01 GRADATION OF MATERIALS FOR ARMORED CAP

A. Filter Layer Material: The Filter Layer material shall meet the material requirements of NYSDOT Standard Specifications 703.02 with the following specific gradation requirements:

U.S. Sieve	1 1/2"	1”	3/4"	1/2"	3/8"
Metric Sieve	38.1mm	25.4mm	19.1mm	12.7mm	9.5mm
Specification (Percent Passing by Weight)	100	70-90	20-70	10-20	Less than or equal to 10

B. Armor Layer: Armor Layer shall meet the requirements of NYSDOT Standard Specifications 733-21 with the following specific gradation requirements:

U.S. Sieve	10"	8”	6"	4"	3"
Metric Sieve	254mm	203.2mm	152.4mm	101.6 mm	76.2mm
Specification (Percent Passing by Weight)	100	70-90	20-70	10-20	Less than or equal to 10

2.02 MATERIALS FOR CITY SHIP CANAL CAP

A. The cap material shall be a material meeting gradation specifications for in-water fill identified in Section 31 05 00 Common Work Results for Earthwork.

2.03 SOURCE QUALITY ASSURANCE

A. Contractor shall provide the results of one representative gradation test (ASTM D422 [for soils and gravel] or ASTM D5519 [for Riprap]) for each type of proposed imported materials for capping and habitat restoration work prior to the delivery of materials to the site. Additional gradation tests shall be provided at a frequency as stated in Section 31 05 00 Common Work Results for Earthwork.

B. Contractor shall perform chemical analyses of proposed imported capping materials in accordance with Section 31 05 00, Common Work Results for Earthwork. .

C. The results of the required chemical analyses and associated QA data must be provided to Owner’s Representative at least 1 week prior to use of the material.

D. No capping material may be placed without approval of the material by Owner’s Representative.

PART 3 EXECUTION

3.01 INSPECTION

A. Inspect the work, keep records of work performed, and ensure that gauges, targets, ranges, and other markers are in place and usable for the intended purpose. Furnish, at the request of the Owner's Representative, boats, boatmen, laborers, and materials necessary for inspecting, supervising, and surveying the work. Inspection may include the deployment of cap thickness verification devices such as push cores, cap material collection pans or other measurement devices at a frequency to be determined by the Owner's Representative. When required, provide transportation for the Owner's Representative and Owner and inspectors to and from the material staging area and between the placement equipment and adjacent points on shore.

3.02 EXAMINATION AND PROTECTION

A. Contractor shall locate and protect overhead and underground utilities, and other facilities or structures that lie in or adjacent to Work areas. Known utility information is shown on the Drawings.

B. Armored Cap placement occurs adjacent to Critical Structures and therefore Contractor shall avoid disturbing or creating the potential to damage the existing structure.

C. Contractor shall maintain a minimum offset of five feet from the Critical Structure with all placement equipment to limit the potential to impact them with the equipment.

D. Contractor shall not place any capping materials outside the footprint of the cap and shall specifically avoid placing of any capping materials within the Federal Navigation Channel.

3.03 DECONTAMINATION OF EQUIPMENT

A. Any equipment that comes in contact with the existing sediment during the capping operations shall be subject to the requirements of Section 01 72 20, Decontamination.

3.04 INTERFERENCE BETWEEN NAVIGATION AND WORK PROGRESS

A. Minimize interference with the use of channels and passages. Contractor shall be responsible for working with shipping interests in the Buffalo River and Ship Canal and arranging the schedule of Work to minimize interference both with third party vessel movements and the progress of the Work.

B. Contractor shall be responsible for coordinating the schedule of Work with operators of marinas to minimize disruption to both the marina operations and the progress of Work.

C. No additional compensation, including payment of standby time, shall be due to the Contractor for impedance of Work from vessel traffic or marinas operating in the Buffalo River or Ship Canal, including loading and unloading operations.

3.05 NAVIGATION WARNINGS:

A. Furnish and maintain navigation warning signs as required near capping operations and material loading operations. Contractor shall coordinate with the U. S. Coast Guard's Navigation Center.

3.06 MATERIAL PLACEMENT TOLERANCES AND VERIFICATION

A. Riprap Toe Berm

1. Prior to placement of any cap materials, conduct a pre-capping bathymetric survey as specified in Section 02 21 00, Surveys over the entire area to receive the armored cap.
2. Dust control shall be implemented during the placement of the riprap toe berm to reduce the particulate emissions for above water operations.
3. Turbidity control shall be implemented during the placement of the riprap toe berm to reduce loss of toe berm materials downstream and to control resuspension of sediment materials being capped.
4. Place riprap toe berm to thicknesses no less than the thickness shown on the Drawings. The fall height of placed materials shall not exceed one foot above existing bathymetry during placement.
5. Following placement of the riprap toe berm, conduct a bathymetric survey as specified in Section 02 21 00, Surveys.
6. There will be no maximum thickness tolerance level constraints as long as the minimum thickness is met based on surveyed elevations.
7. Place riprap toe berm in such a manner to minimize re-suspension of sediments and to minimize turbidity.
8. Oversight shall be provided by Owner's Representative during the material placement.

B. Filter Layer:

1. Place filter layer following the completion of the riprap toe berm.
2. Place filter layer material from the base of the slope upward.
3. Dust control shall be implemented during the placement of filter layer to reduce the particulate emissions for above water operations.

4. Turbidity control shall be implemented during the placement of filter layer to reduce loss of layer materials downstream and to control resuspension of sediment materials being capped.
5. Place filter layer to thicknesses no less than the thickness shown on the Drawings. The fall height of placed materials shall not exceed one foot aboveexisting bathymetry during placement.
6. Following placement of the filter layer, conduct a bathymetric survey as specified in Section 02 21 00, Surveys.
7. There will be no maximum thickness tolerance level constraints as long as the minimum thickness is met based on surveyed elevations.
8. Place filter layer in such a manner to minimize re-suspension of sediments and to minimize turbidity.
9. Oversight shall be provided by Owner's Representative during the material placement.

C. Armor Layer:

1. Place armor layer material from the base of the slope upward. In no case shall the fall height exceed one foot above the previously installed filter layer during placement.
2. No mechanical compaction of armor layer material will be permitted.
3. Conduct a bathymetric survey following armor layer material placement.
4. Verification of thickness of armored cap material layer will be done by weight tickets and density estimates in addition to survey comparisons. The placement bathymetric survey will be used as a general guide to identify areas where the cap might be thin. An alternative verification method can be proposed by the Contractor, subject to approval by Owner's Representative. Contractor shall remove at own cost any misplaced material.
5. Oversight shall be provided by Owner's Representative during the placement of armor layer materials.

D. City Ship Canal Cap:

1. Prior to placement of any cap material, conduct a pre-capping layer placement bathymetric survey as specified in Section 02 21 00, Surveys over the entire area to receive the cap.
2. Dust control shall be implemented during the placement of cap and in-water backfill materials to reduce the particulate emissions for above water operations.
3. Turbidity control shall be implemented during the placement of cap and in-water backfill materials to reduce loss of material downstream and to control resuspension of sediment materials being capped.

4. Place the in-water backfill material to elevations shown on the Drawings. See Section 31 05 00, Common Work Results for Earthwork for fill material properties.
5. No mechanical compaction of the cap material will be permitted.
6. Material shall be placed in lifts no thicker than 12 inches maximum. The placement of multiple layers may occur during a single occupation of the area by the placement equipment. The fill material shall be installed in a manner that provides a continuous uniform surface over the area specified for fill. Contractor will take care to select placement methods and approach the work to minimize consolidation of underlying material, minimize bottom disturbance during placement, and reduce the chance of slope failures or mud wave generation as a result of selected installation methods.
7. Verification of final grade of in-water backfill layer will be done by bathymetric survey. Conduct additional bathymetric surveys related to City Ship Canal capping as indicated in Section 02 21 00, Surveys. Note that a post-capping layer placement survey shall be completed within 7 days following placement of the in-water backfill to verify design elevations have been achieved, and a bathymetric survey shall be performed in the spring prior to planting of EV and SAV.
8. Contractor shall remove at own cost if any material is placed within the navigational channel.
9. Oversight shall be provided by Owner's Representative during the placement of cap materials.

E. Contractor can suggest alternative material placement verification techniques to those specified. An alternative shall be used in lieu of the specified technique only if Owner approves the alternative technique in writing.

3.07 WATER QUALITY MONITORING

A. Perform water quality monitoring as specified in Section 01 57 20, Environmental Protection.

3.08 PLATFORM REMOVAL

A. Upon completion of the work, promptly remove platform, including ranges, buoys, piles, and other markers or obstructions.

END OF SECTION

SECTION 31 05 00
COMMON WORK RESULTS FOR EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

A. Earthwork: This section covers requirements for filling conducted as part of the following activities:

1. In-water fill placement at the City Ship Canal restoration area.
2. Habitat subgrade material placement at Katherine Street Peninsula restoration area.
3. Preparation and installation of planting substrate material associated with Submerged Aquatic Vegetation (SAV) and Emergent Vegetation (EV) beds.

B. Products shall consist of:

1. In-water fill material for City Ship Canal only;
2. Habitat subgrade material for Katherine Street Peninsula only;
3. Planting substrate for SAV and EV plantings.

C. On-site materials that conform to these specifications shall be used at the discretion of the Owner's Representative and shall meet all the requirements of the New York State Department of Transportation Standard Specifications (NYSDOT Spec), unless otherwise stated.

1.02 PROJECT CONDITIONS

A. No fill material shall be placed in the navigation channel during the restoration activities. Additionally, earthwork will not be permitted outside the Project boundaries as shown on the Drawings.

B. Material delivery and on site stockpiling must be coordinated with ongoing site operations, including the dredging operations.

C. Only stockpile fill materials at the staging area. Do not stockpile at individual restoration sites, or on adjacent land outside of the restoration site boundaries without written consent of the Owner's Representative and the Property Owner.

D. Protect all partially completed work; Buffalo River is known to rise rapidly during storm and seiche events.

E. Do not remove, change the location of, obstruct, willfully damage, make fast to or interfere with any Aid to Navigation except in accordance with approval of the New York State Canal Corporation (NYSCC).

1.03 RELATED WORK

A. Section 01 40 00, Contractor Quality Control

B. Section 01 57 20, Environmental Protection.

C. Section 01 72 20, Decontamination

D. Section 02 21 00, Surveys

E. Section 31 11 00, Clearing and Grubbing.

F. Section 31 25 00, Erosion and Sedimentation Controls.

G. Section 32 91 00, Planting Preparation

H. Section 35 44 00, Waterway Habitat Features

1.04 REFERENCE STANDARDS

A. New York State Department of Transportation Standard Specifications (US Customary Units) January 9, 2014.

B. ASTM C136 – 06 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

C. ASTM D422 – 63(2007)e1 - Standard Test Method for Particle-Size Analysis of Soils.

D. ASTM D2974 – 13 Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

1.05 INFORMATIONAL SUBMITTALS

A. Obtain and submit any required federal, state, and local permits for excavation and placement of fill within/near a waterway.

B. Analytical Results for supplied earthwork materials, including Capping materials specified in Section 02 56 14, Capping.

1.06 ACTION SUBMITTALS

A. At least two weeks prior to beginning site work, submit a Habitat Restoration Work Plan.

B. Within 30 days of final acceptance and as a condition of final payment, a Final Habitat Restoration Project Report.

C. Prior to beginning work, submit for review:

1. Thirty- (30-) pound (lb) samples sealed in airtight containers and analyses of borrow (fill, or aggregate) materials, including a contact name, address, and phone number for each source, shall be submitted to the Owner's Representative for approval fourteen (14) days prior to beginning any fill activities.
2. Qualifications and/or certifications of the Testing Laboratory(ies) shall be submitted to the Owner's Representative for approval twenty one (21) days prior to beginning any fill activities.
3. Schedule of delivery for all fill materials.
4. Certification from suppliers that capping and habitat restoration materials to be supplied for use on this project shall meet the requirements of this section, and that the materials are free from chemical contamination. The Owner's Representative will use 6 NYCRR Part 375 Soil Cleanup Objectives, for unrestricted residential use, as the basis for acceptance of the fill materials. Certification shall be received and approved by the Owner's Representative prior to delivery of fill and aggregate materials to the Site. The Owner's Representative will be present during the acquisition of these samples from each source.
5. Certified chemical laboratory analysis to verify that all fill materials meet New York State Department of Environmental Conservation specifications for placement of material in water, as detailed in "*In-Water and Riparian Management of Sediment and Dredged Material*", Technical and Operational Guidance Series 5.1.9, November 2004.
6. Certification that soil supplements meet the requirements of the New York State Agriculture and Marketing Law.
7. The Contractor shall submit planting substrate analysis results from soils testing laboratory to the Owner's Representative at least fourteen (14) calendar days prior to importation of the material to the Site. Indicate source and obtain the Owner's Representative's approval before hauling to site (an analysis test of a 5-pound bag sample is required). Acceptance of the material will be based upon the test results.
8. Contractor shall provide the results of one representative gradation test (ASTM D422 [for soils and gravel] or ASTM D5519 [for Riprap]) for each type of proposed imported materials for capping and habitat restoration work prior to the delivery of materials to the site. Additional gradation tests shall be provided at a frequency of one test per 1,000 cubic yards for the first 5,000 cubic yards of material delivered. Gradation testing will provided at a frequency of one test per 5,000 cubic yards thereafter.

1.07 QUALITY ASSURANCE

A. Areas selected as sources of borrow material shall provide access to the Owner's Representative for inspection and approval or another source shall be found.

B. Collect samples and conduct analytical testing as specified below. Sampling frequency, locations, and analyses are stated below. The Contractor is responsible for tracking material quantities and providing sample results on the specified frequency. The Owner's Representative reserves the right to request additional sampling should delivered materials appear to deviate substantially from previously approved materials.

1.08 ENVIRONMENTAL PROTECTION REQUIREMENTS

A. As stated in Section 01 57 20, Environmental Protection and Section 01 57 23, Storm Water Pollution Control.

B. Contractor shall place all habitat-restoration materials including in-water fill, habitat subgrade and planting substrate in such a manner to minimize re-suspension of sediment in the water column or have such controls in place that if sediment is re-suspended it is captured and kept within the restoration area footprint. Turbidity monitoring shall be conducted upstream and downstream of the placement areas.

C. All removed debris shall be decontaminated in accordance with the procedures identified in Section 01 72 20 Decontamination.

D. All removed debris shall be disposed of in accordance with the Contractor Waste Management Plan identified in Section 01 74 00 Waste Management and Disposal

PART 2 PRODUCTS

2.01 IN-WATER FILL MATERIAL

A. In-water fill will be used in the City Ship Canal capping and habitat restoration area. In-water fill shall meet the requirements of NYSDOT Specification 733.1101 – Select Granular Fill (Typical). In-water fill shall meet the following gradation verified per ASTM C136:

Sieve	**Percent by Weight Passing**
4-in	100
No. 40	0 - 70
No. 200	0 -15

2.02 HABITAT SUBGRADE MATERIAL

A. Habitat subgrade material will be used in the Katherine Street Peninsula restoration area. Habitat subgrade material shall consist of natural mineral soil substantially free of wood, trash, debris, frozen materials, and other objectionable materials. Habitat subgrade material shall have the following gradation verified per ASTM D422:

Sieve	**Percent by Weight Passing**
12-in	100
6-in	50-92
2-in	40-76
No. 4	10-33
No. 40	3-13
No. 200	Less than or equal to 7

2.03 PLANTING SUBSTRATE

A. Planting substrate will be used in the SAV and EV Planting Areas Planting substrate shall be run-of-bank or screened run-of-bank.

B. Planting substrate shall meet the following gradation verified per ASTM D422:

Sieve	**Percent by Weight Passing**
1 in	100
No. 4	90-100
No. 10	75-100
No. 40	35-67
No. 100	5-40
No. 200	0-15

C. Planting substrate shall contain trace organic content.

PART 3 EXECUTION

3.01 HABITAT RESTORATION WORK PLAN

A. The habitat restoration work plan shall be consistent with the requirements of the Contract Documents and must provide at a minimum sections on waste and existing in-water debris handling, site work controls, Quality Assurance/Quality Control (QA/QC) protocols, temporary soil erosion and sedimentation controls,

equipment description including safety devices to be utilized for the work, identification of required permits and copies of obtained permits, staging/site area layout, a detailed schedule of all tasks required to fulfill the Work of the project, and a work sequencing for each individual restoration site.

1. For the section on staging/site area layout, if applicable, include the following items at a minimum:
   a. Area to be cleared and grubbed and restored upon completion.
   b. Equipment and material staging areas.
   c. Equipment maintenance and fueling areas.
   d. Any site trailers.
   e. Access roads and haul routes, including any on river hauling, access points or any trans-load operations.
   f. Any temporary fencing or other security measures.
   g. Soils staging areas.
   h. Personal vehicle parking areas.
2. For the section on work sequencing, describe procedures to be utilized for the Work at each of the five restoration sites. Include procedures for completing all of the restoration features as shown on the Drawings and as described in Section 35 44 00 at each site.
3. Include procedures for debris removal from the habitat restoration areas including methods, procedures, and equipment to be used to complete debris removal operations. The plan shall also include methods, procedures, and equipment to be used to complete offloading, transportation, and disposal operations.
4. For the section on site work controls include provisions for fugitive emissions to the air and dust control, dewatering and water management, if necessary, and navigational controls or markings as needed.

3.02 ANALYTICAL TESTING LABORATORIES

A. The Contractor shall utilize subcontract laboratories to achieve required sample analyses. The Contractor shall propose the analytical laboratories to be used.

B. All laboratories must be certified by New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP). Analytical methods shall be implemented in accordance with most current version of the New York State Department of Environmental Conservation Analytical Services Protocol (NYSDEC-ASP) unless specifically stated otherwise.

C. Analytical data shall be reported in dry weight for soils and $\mu g/m^3$ for air and vapor samples in data reports. Results shall be reported to the correct number of significant figures. Calculations shall be performed on unrounded, raw results and not on the final instrument values.

D. Data packages shall meet the specifications of NYSDEC Analytical Services Protocol Category B. The laboratory also shall provide a summary data package that

includes a copy of the chain-of-custody, case narrative and Form I results. Electronic data shall be provided in accordance with the most recent version of New York State Department of Environmental Conservation standardized electronic data deliverable (EDD) format.

3.03 CHEMICAL SAMPLING AND ANALYSIS

A. Collect samples of proposed borrow material at the source.

B. Label and ship representative samples under chain of custody documentation to an accredited New York State approved ELAP lab for analysis.

C. Samples shall be analyzed for target compound list (TCL) organics and target analyte list (TAL) metals. All fill or aggregate materials shall meet the New York State [DEC DER 10] Subdivision 5.4(e) Appendix 5 for Ecological Resources Present for imported fill or soils for the project.

D. Contractor shall perform chemical analyses of proposed imported capping and habitat restoration materials. Collect and analyze one representative sample for each proposed material prior to delivery of the materials to the site. Additional chemical analysis tests shall be provided at a frequency of one test per 1,000 cubic yards for the first 5,000 cubic yards of material delivered. Analysis will provided at a frequency of one test per 5,000 cubic yards thereafter.

E. The results of the required chemical analyses and associated QA data must be provided to Owner’s Representative at least 1 week prior to use of the material.

3.04 PREPARATION

A. Deliver, handle and transport fill materials in a manner and with equipment that will prevent intermixing of soil types, segregation or contamination.

B. Fill material shall be stockpiled at locations approved by the Owner’s Representative in sufficient quantities to meet schedule requirements.

C. Stockpiles shall be constructed and maintained so they are well drained, free of foreign materials, and of adequate bearing capacity to support the weight of materials placed thereon.

D. Separate differing materials with substantial dividers or stockpile apart to prevent mixing.

E. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

F. Provide temporary erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties. Refer to Section 01 57 23, Storm Water Pollution Control and Section 01 57 20, Environmental Protection.

G. Establishing an accurate method of horizontal and vertical control before earthwork begins; the proposed method of control system shall be subject to approval by the Owner's Representative (see Section 02 21 00, Surveys). All fill areas shall be laid out from horizontal and vertical control points prior to placement of any material within the Restoration Sites. All measurements shall be taken from these points.

H. Prior to beginning placement of fill, site clearing and grubbing shall be conducted as specified in Section 31 11 00, Clearing and Grubbing.

3.05 GENERAL PLACEMENT OF FILL MATERIALS

A. Filling will be conducted once dredging activities (performed by others, if needed) have been completed at a particular restoration site. It is required that in-water fill, habitat subgrade material, and planting substrate be placed outside the fish spawning season (see Section 01 10 00, Summary of Work) and at least one season prior to planting to allow the material to consolidate prior to the planting season. Place in-water fill, habitat subgrade material, and planting substrate in areas as identified on the Drawings. Filling shall only begin upon Owner's Representative's approval.

B. Conduct Initial bathymetric survey and terrestrial survey over footprint of habitat restoration area prior to initiating the Work to verify the site elevations.

C. In the specified areas for SAV and EV planting, placement of fill shall begin at the site boundary identified on the Drawings. Spread the materials over the specified areas to the lines, grades, thicknesses, slopes, and tolerances as shown on the Drawings.

D. Placement of in-water fill, habitat subgrade material, and planting substrate material shall be accomplished such that final material grade forms a uniform layer of required thickness, as appropriate, and surfaces are leveled to the slopes and elevations indicated on the Drawings. Placement methods shall minimize the resuspension and mixing of bottom sediments and fill material and minimize the downstream loss of fill materials during placement.

E. The in-water fill (City Ship Canal) and habitat subgrade material (Katherine Street Peninsula restoration area) shall be placed in multiple layers (a minimum of two layers at each placement location) of comparable thicknesses, but no individual layer shall be greater than 12 inches. The placement of multiple layers may occur during a single occupation of the area by the placement equipment. The fill

material shall be installed in a manner that provides a continuous uniform surface over the area specified for fill. Placement must be conducted in a manner that does not disturb underlying sediment materials within the footprint of the active placement area or surrounding sediments. If evidence of disturbance of existing sediments is observed during in-water fill placement by the Contractor or the Owner's Representative, additional layer thickness restrictions and placement methodologies to prevent further existing sediment disturbance will be required. Adjustments to lift thicknesses or placement methodologies will be identified by the Contractor and approved by the Owner's Representative. Perform placement bathymetric surveys to confirm the slopes and elevations have been met.

F. Perform bathymetric and topographic surveys prior to spring planting of SAV and EV beds in accordance with Section 02 21 00, Surveys.

3.06 GRADING

A. Uniformly place materials to create required grades.

B. Provide a smooth transition between adjacent existing grades and new grades.

3.07 PROTECTION

A. Repair and reestablish grades where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions, before Project correction period elapses, as defined by the date of substantial completion.

B. The final in-water fill and habitat subgrade material grades within a tolerance of -6 to +3 inches can be made up with planting substrate and only elevation differences greater than -6 to +3 inches shall require additional fill or removal of fill.

3.08 HAULING AND STOCKPILING

A. Fill material shall be stockpiled at the staging area in an uncontaminated area as approved by the Owner's Representative. The stockpiled fill materials shall be adequately covered to prevent runoff as specified in Section 01 57 23, Storm Water Pollution Control and Section 01 57 20, Environmental Protection. Side slopes of stock piles shall not be steeper than 2H: 1V.

3.09 PREPARATION FOR PLACING SAV AND EV PLANTING SUBSTRATE

A. Ensure and obtain Owner's Representative's approval that in-water fill (at City Ship Canal) and habitat subgrade (at Katherine Street) filling activities are complete and ready to receive planting substrate.

3.10 GENERAL PLACEMENT OF PLANTING SUBSTRATE

A. Placement of planting substrate will be conducted once previous backfilling activities have been completed at a particular restoration site. It is required that planting substrate be placed outside the fish spawning season (see Section 01 10 00, Summary of Work) and at least one season prior to planting to allow the material to consolidate prior to the planting season.

B. Place the specified type of planting substrate, as indicated on Drawings, in designated areas to lines and grades shown on the plans.

C. A six (6) inch minimum thickness layer of planting substrate shall be placed in all SAV and EV Planting areas.

D. Outfall scour protection (Section 31 37 00) shall be installed prior to placing planting substrate

E. Rock vanes (Section 31 37 00) shall be placed prior to placing planting substrate.

F. Anchored Rootwads and Bank Rootwad Chains (Section 35 44 00) shall be placed prior to placing planting substrate.

G. Gravel Spawning Beds (Section 35 44 00) shall be placed prior to placing planting substrate.

H. Grade the planting substrate material, maintain levels, profiles, and contours of subgrade.

I. Remove weeds, debris, and foreign material while spreading the planting substrate materials.

J. Use equipment appropriate for spreading the material in a uniformly thick layer across the lift.

K. Remove surplus in-water fill and other materials from staging area upon completion of spreading the materials. Remove and dispose of all stockpiles and restore any areas adjacent thereto which have been disturbed by the Contractor to a condition that will be acceptable for seeding (Section 32 92 19).

L. After fill installation, install vegetation in accordance with Section 32 91 00, Planting Preparation.

3.11 FINAL HABITAT RESTORATION PROJECT REPORT

A. The final report shall summarize information included in the construction and maintenance records as submitted throughout the project. The report shall summarize the work that has been completed, the amount of each type of fill materials

used in restoration, the amount of materials planted and utilized, and the area each was installed on. The report shall include drawings that depict the date, location and type of Plantings installed, including methods, quantities and species. Drawings shall be submitted with the Initial and Final acceptance requests for the initial planting and for any maintenance re-planting.

END OF SECTION

SECTION 31 11 00
CLEARING AND GRUBBING

PART 1 GENERAL

1.01 DESCRIPTION

A. This section includes the requirements for site preparation, clearing and grubbing. This Work shall consist of clearing, grubbing, removing and disposing of select trees, invasive vegetation, rocks, brush, shrubs, and stumps within the staging areas and other areas as specified and shown on the Drawings.

1.02 RELATED SECTIONS

A. Section 01 57 20, Environmental Protection.

B. Section 01 57 23, Storm Water Pollution Control.

C. Section 02 41 19, Selective Demolition.

1.03 DEFINITIONS

A. Stripping: Stripping shall consist of removal and disposal of the uppermost layer of soil, which normally contains organic matter, grasses and small plants, and topsoil.

B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction.

C. Tree-Protection Zone: Individual trees or areas surrounding individual trees or groups of trees to be protected during construction.

D. Hazardous Waste: A hazardous waste is any material listed under NYSDEC rules and regulations in 6 NYCRR Part 371, http://www.dec.ny.gov/regs/14898.html. If materials in this category are encountered, stop work and consult with Owner's Representative on an appropriate course of action.

1.04 REQUIREMENTS

A. Materials generated by the Work shall not be disposed of by burning.

B. Cleared and grubbed materials shall be stored at the staging area only, with temporary staging (less than one week) allowed at the individual restoration sites.

C. Oversized clearing and grubbing materials, construction and demolition (C&D) materials such as concrete, asphalt, brick, etc. and other non-hazardous waste shall be removed from the individual restoration sites to the staging area.

D. Dumping of spoil material into any stream corridor, flood plain, or surface water is prohibited.

E. Boulders larger than 1.5 feet in diameter removed as part of clearing and grubbing shall be relocated for use onsite as part of the restoration. Coordinate relocation with Owner's Representative.

1.05 ACTION SUBMITTALS

A. Submit, prior to commencing Work, a Handling and Transport Plan for clearing and grubbing wastes as part of the Contractor's overall Work Plan. This plan should include the designated locations and details of the stockpiles and temporary storage areas at each of the restoration sites, as well as the plan for moving materials between the individual restoration sites and the staging area. This plan may be submitted as a part of the Habitat Restoration Work Plan as specified in Section 31 05 00, Common Work Results for Earthwork.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 PREPARATION

A. Prior to clearing and grubbing operations, prepare areas to the extent necessary to designate areas that are outside of the boundaries to be cleared and grubbed. The Owner's Representative will perform a site walk with the Contractor to establish the limits of the areas to be cleared and grubbed, to be cleared but not grubbed, or areas, objects, or features designated to remain undisturbed. In general the work areas shall include access roads, staging areas, and other areas as shown on the Drawings. The Owner's Representative may designate fences, structures, debris, trees and brush to be cleared where grubbing is not required. Clearing beyond the area of construction shall be done only where specified.

B. Prior to starting work, lay out and mark areas where plants including trees, shrubs, and stumps are to cleared, grubbed or stripped. Additionally, any Plant-Protection and Tree-Protection Zones as identified for the staging areas should be clearly marked in a separate and distinct manner. The Owner's Representative will then inspect the site and give authorization to proceed, prior to the Contractor beginning any clearing and grubbing at an individual restoration site. It is the responsibility of the Contractor to protect those features, trees and vegetation selected to remain onsite. If damaged or destroyed, repair or replace in kind at Contractor's expense.

C. The Contractor is responsible for protecting existing utility lines, existing structures to remain, select trees, fences, and poles that are to remain from damage. Notify the Owner's Representative immediately of damage to or an encounter with an unknown existing utility line and repair damage to existing utility lines at no additional cost to the Owner.

D. Collect samples of soil to be disturbed to identify any unacceptable chemical contamination. Samples shall be representative of the first 12 inches of soil and shall be taken at least once for every 500 square yards, with a minimum of one for every area less than 500 square yards. Samples shall be analyzed and compared to the NYSDEC standard for unrestricted residential use. If unacceptable soil is identified, notify the Owner's Representative for direction on how to proceed.

3.02 TEMPORARY SEDIMENT EROSION CONTROL

A. Provide temporary erosion and sedimentation control measures to control soil erosion and discharge of soil-bearing water runoff or airborne dust to the Buffalo River and its tributaries and adjacent properties, according to erosion and sedimentation control requirements of authorities having jurisdiction. Specific methods to be used will be in accordance with Section 01 57 23, Storm Water Pollution Control.

B. On a daily basis inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls once re-vegetation of cleared and grubbed areas has been completed.

D. Restore and stabilize areas disturbed during clearing and grubbing activities that were outside of the intended clearing and grubbing areas at no additional expense to the Owner.

3.03 RESUSE OF CLEARED AND GRUBBED MATERIALS

A. Materials cleared and grubbed shall be chipped only with the prior approval of the Owner's Representative. Chipped waste shall be spread in a thin layer onsite in a location identified by the Owner's Representative. With the Owner's Representative's approval wood may be reduced to chips of 1/2 inch maximum thickness by the use of an approved chipping machine or stump grinder. Chips can be stockpiled and used as mulch for planting or may be disposed of at an off-site location. Stumps, tree trunks, and limbs too large for chipping shall be disposed as specified above. Do not chip and spread any species considered an Invasive Species, particularly Japanese Knotweed (*Polygonum cuspidatum* syn. *Fallopia japonica*).

END OF SECTION

SECTION 31 37 00
RIP-RAP

PART 1 GENERAL

1.01 SUMMARY

A. Rip-rap installation includes placement of rock vanes where SAV and EV beds are to be created or enhanced, and in association with outfall protection, as identified on the Drawings.

1.02 RELATED SECTIONS

A. Section 31 05 00, Common Work Results for Earthwork.

B. Section 31 2 500, Erosion and Sedimentation Controls.

C. Section 32 91 00, Planting Preparation.

D. Section 35 44 00, Waterway Habitat Features

1.03 REFERENCE STANDARDS

A. ASTM D5519 – 07 Standard Test Methods for Particle Size Analysis of Natural and Man-Made Riprap Materials

B. ASTM C136 – 06 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

C. New York State Department of Transportation Standard Specifications (US Customary Units) January 9, 2014

1.04 ACTION SUBMITTALS

A. Prior to beginning work, submit as part of the Work Plan (see Section 31 05 00 - Common Work Results for Earthwork) a description of material and method details for performing installation of rip-rap. This plan shall include material sources, storage and handling methods, quality control measures, testing procedures (if necessary) and placement, spread, and grading procedures with a list of equipment proposed to complete the Work.

B. Two weeks prior to beginning installation of rip-rap, submit the following for each of the materials:

1. A statement from the material supplier indicating the materials meet the referenced standard New York State Department of Transportation, Standard Specifications.
2. Gradation results for each specified material from the chosen source and supplier.

1.05 QUALITY ASSURANCE

A. The services of a qualified testing laboratory and field testing firm shall be engaged by the Contractor to sample and test selected materials for compliance with these specifications.

PART 2 PRODUCTS

2.01 RIP-RAP

A. Rip-Rap for rock vanes and outfall scour protection shall be in accordance with NYSDOT Specification 733.2201, Dry Rip-rap, and shall be self-launching, well graded angular stone and have the following gradation verified per ASTM D5519:

Rip-Rap Gradation	
Stone Weight	**Gradation Spread**
Heavier than 300 lbs.	50-100 percent of total by weight
Heavier than 100 lbs, less than 300 lbs	Remainder of Stones

1. Material shall contain a sufficient amount of stones smaller than the average stone size to fill in the spaces between the larger stones. Consideration should be given to obtaining stone that is similar in color and texture to the native stone in the Project Area.
2. Stone for rip-rap shall consist of field stone or rough unhewn quarry stone. The stone shall be hard and angular and shall meet the soundness requirements under Section 733-22 of NYSDOT Standard Specifications. The specific gravity of the individual stones shall be at least 2.5.
3. Contractor is responsible for providing certification from the supplier/manufacturer that material provided meets requirements of soundness, gradation, and density.

B. Following initial material testing and approval material shall be tested to verify that it meets the requirements no less often than once per 5,000 cubic yards placed.

2.02 BEDDING MATERIAL

A. Bedding material for placement under outfall scour protection shall be in accordance with NYSDOT Specification 620-1.05, Bedding Material, and shall have the following gradation verified per ASTM C136:

Bedding Material Gradation	
Sieve Size Designation	**Percent Passing by Weight**
4 in.	100
1 in.	15-60
¼ in.	0-25
No. 40	0-10

B. Following initial material testing and approval material shall be tested to verify that it meets the requirements no less often than once per 5,000 cubic yards placed.

PART 3 EXECUTION

3.01 RIP-RAP PLACEMENT AT ROCK VANES

A. Material delivery and on-site stockpiling must be coordinated with ongoing site operations.

B. Rock vanes will be constructed out of rip-rap which will be stacked until it extends to a height of approximately 2 feet above the streambed. Each rock vane shall be placed at the location and angle shown on the Drawings.

C. Rocks shall be placed so as to produce a smooth finished grade and shall be installed to minimize void spaces between adjacent rocks. The spaces between vane rocks, and between the vane rocks and footer rocks, shall be filled with spalls of suitable size.

D. Chink all voids in rock vanes such that no voids greater than 4 inches will be present.

E. Any unsuitable or surplus rock materials will be removed from the site at the completion of the Work.

F. In locations where SAV and EV are to be planted, as specified on the Drawings, place Planting Substrate as specified in Section 31 05 00, Common Work Results for Earthwork, after the construction of rock vanes has been completed. This work shall be performed prior to planting SAV or EV, as specified in Section 32 91 00, Planting Preparation.

3.02 RIP-RAP PLACEMENT AT STORMWATER OUTFALL AREAS

A. Prior to placement of rip-rap a layer of bedding material shall be placed to cover the horizontal extents of the rip-rap.

B. Rip-rap shall be placed at the stormwater outfall areas within the restoration areas. The thickness of the rip-rap layer shall be at minimum 24-inches. Rip-rap shall be installed so it forms a dense, well graded mass of stone with a minimum amount of voids. Contractor shall install outfall scour protection materials in a manner such that the existing operation of the outfall is not impeded. This may require limited grading of subgrade materials to provide clearance from surrounding rip-rap. Rip-rap shall be placed to its full thickness in one operation. Do not place rip-rap by dumping through chutes or other methods that may cause segregation of stone sizes.

C. Prior to placement of bedding material and rip-rap the subgrade shall be prepared to the required elevation and grades. Any fill required in the subgrade shall be compacted to the density of approximately that of the surrounding undisturbed materials.

END OF SECTION

SECTION 32 01 90
OPERATION AND MAINTENANCE OF PLANTING

PART 1 GENERAL

1.01 DESCRIPTION

A. As part of the Contractor's guarantee of plant stock for one (1) year from the time of acceptance of the planting by the Owner's Representative, Contractor shall provide the warranty of Plantings for one (1) year after the acceptance of the plant installation in the boundaries of the restoration sites.

1.02 RELATED SECTIONS

A. Section 01 10 00, Summary of Work.

B. Section 31 11 00, Clearing and Grubbing.

C. Section 31 05 00, Common Work Results for Earthwork.

D. Section 31 25 00, Erosion and Sedimentation Controls.

E. Section 31 37 00, Rip-Rap.

F. Section 32 92 19, Seeding.

G. Section 32 91 00, Planting Preparation.

1.03 REFERENCES

A. Plant Nomenclature: Conform to the latest edition of "Standardized Plant Names" as adopted by the American Joint Committee of Horticultural Nomenclature.

B. Size and Grading Standards: Conform to the current edition of "American Standard for Nursery Stock" – Sponsor – the American Association of Nurserymen Inc., unless otherwise specified.

C. Planting and Care Standards: Conform to the current edition of "The American National Standard for Tree Care Operations" ANSI A300. Sponsor – International Society of Arboriculture, unless otherwise specified.

D. Thunhorst, Gwendolyn A., Wetland Planting Guide for the Northeastern United States, Environmental Concern, Inc. 1993.

1.04 INFORMATIONAL SUBMITTALS

A. If replanting efforts are deemed necessary within the year after acceptance, submit a seeding and planting report before plant material is shipped to the project site that will contain the applicable components as specified in Sections 32 92 19, Seeding and 32 91 00, Planting Preparation.

B. Submit the following Product Data with each plant material delivery:

1. Invoice indicating sizes and variety of plant material.
2. Certificates of inspection required by State and Federal agencies.
3. Labels for each plant or bundles of plants indicating name and size.

PART 2 PRODUCTS

2.01 VEGETATION SPECIES AND SEED MIXTURES

A. Provide plants in accordance with a Species List for each specific restoration area, as specified in Sections 32 91 00, Planting Preparation and 32 92 19, Seeding.

B. Source of the materials for maintenance in year 2 shall be the same as approved for the original habitat restoration work performed in year 1.

PART 3 EXECUTION

3.01 GENERAL

A. Planting season is as specified in Section 01 10 00, Summary of Work. All exceptions shall be authorized in writing by the Owner's Representative. Actual planting will only occur when weather and soil conditions are suitable for the plants. No plant material will be planted when the ground is frozen. Water temperatures should be within 5 degrees of where the plant stock was harvested or grown. Planting shall not occur during high flow events, when water levels are above the Ordinary High Water Mark (OHWM) of 573.4, or when water levels are below the Low Water Datum (LWD) of 569.2. Planting shall only occur when the river sustains its mean water elevation.

3.02 PERFORMANCE MONITORING AND WARRANTY

A. General:

1. The contractor shall warranty plant material installed under this Contract for a period of 1 year from the date of final acceptance of the installed plants. Final acceptance of the installed plant material is defined in Section 32 91 00. At the end of the warranty period, the planting shall meet the coverage requirements stated below. Failed plantings shall be replaced as determined

by the Owner's Representative and may involve changes to species or locations to optimize survival.

2. The Contractor will not be required to replace an individual plant more than once as a result of warranty coverage replacement.
3. The contractor can plant at a higher density, at no additional cost to the owner, than that is prescribed in the Specification 32 91 00 Planting Preparation, to achieve the warranty requirements of the project.

B. Aquatic Vegetation

1. SAV and EV plants that are healthy (showing sprouting and leaf growth) and properly installed as determined by the Owner's Representative at the time of final inspection will be accepted.
2. For each of the restoration sites, SAV and EV planting acceptance at the end of the 1-year warranty period shall be based on planting areas without bare spots greater than 4 square feet.
   a. Annual monitoring shall be conducted by the owner's representative prior to and during the growing season (June – September) for aquatic vegetation species. The monitoring windows shall remain flexible and be subject to adjustment based on seasonal variations in factors affecting the plant communities.
   b. During monitoring, percent cover and species composition at each of the restoration sites will be measured using a cover abundance evaluation method such as Braun-Blanquet method or approved equal. The proposed method will be determined and performed by the Owner's Representative. Percent cover will identify areas where plant coverage is deficient while plant species composition will assist with identifying species that could be used if replanting is necessary.
   c. Based on the results of this monitoring, as determined by the Owner's Representative, the Contractor, shall undertake the following steps:
      1) In areas bare spots areas that exceed the requirement, replant with species which are performing well at the site. The selected species shall be of similar size as originally specified.
      2) Update allowable planting species list for year two. If unsatisfactory survival of a particular species is observed following year one, as determined by the Owner's Representative, the Owner's Representative reserves the right to remove the species from the allowable species list to be used in year two.

3.03 CARE OF PLANTINGS

A. Maintenance responsibilities shall include removing, repairing or replacing herbivory protection measures for the duration of the maintenance period.

3.04 CLEAN-UP

A. All non-vegetative waste materials shall be disposed of offsite at an approved landfill or recycling center. The site shall be restored to pre-existing conditions to the extent reasonably possible and to the satisfaction of the Owner's Representative.

3.05 FIELD QUALITY CONTROL

A. The work site will be inspected by the Owner's Representative prior to acceptance of work at the end of the 1 year warranty period. A punch list noting deficiencies will be compiled by the Owner's Representative and provided to the Contractor. Perform, repair, adjust, align, or otherwise comply with the specified work on the punch list to the satisfaction of the Owner's Representative. The Contractor shall be responsible for notifying the Owner's Representative at least 2 days prior to the inspection that work will be ready for inspection. Work will not be accepted until all punch list items are resolved and all work meets or exceeds contract requirements. Acceptance of work at the end of the 1 year warranty period will not be provided by the Owner's Representative until all defects or deficiencies are corrected. Acceptance at the end of the 1 year warranty period will occur only after all corrective actions and supplemental viable plantings are complete and the area meets performance standards and all contract requirements.

END OF SECTION

SECTION 32 91 00
PLANTING PREPARATION

GENERAL

1.01 DESCRIPTION

A. This section provides the requirements for preparation of the planting areas shown on the Drawings, the plants to be provided, installing emergent vegetation (hereafter referred to as EV) and submerged aquatic vegetation (hereafter referred to as SAV), and installing herbivory protection measures.

1.02 RELATED SECTIONS

A. Section 01 11 00, Summary of Work.

B. Section 31 11 00, Clearing, and Grubbing.

C. Section 31 05 00, Common Work Results for Earthwork

D. Section 31 37 00, Rip-Rap.

E. Section 32 92 19, Seeding.

F. Section 35 44 00, Waterway Habitat Features

1.03 REFERENCES

A. Plant Nomenclature: Conform to the latest edition of “Standardized Plant Names” as adopted by the American Joint Committee of Horticultural Nomenclature

B. Size and Grading Standards: Conform to the current edition of “American Standard for Nursery Stock” – Sponsor – the American Association of Nurserymen Inc., unless otherwise specified.

C. Planting and Care Standards: Conform to the current edition of “The American National Standard for Tree Care Operations” ANSI A300. Sponsor – International Society of Arboriculture, unless otherwise specified.

D. Thunhorst, Gwendolyn A., Wetland Planting Guide for the Northeastern United States, Environmental Concern, Inc. 1993.

1.04 SUBMITTALS

A. Pre-Construction

1. Prepare, submit, and revise as required, a Planting Plan to the Owner's Representative for written approval by the Construction Manager that describes:
   a. Procedures for installing SAV including but not limited to:
      1) Description of equipment used to install SAV
      2) Proposed method and equipment, which could include, but is not limited to, dropping soil and tuber filled mesh bags, seed buoys, or diver assisted tuber or plug planting. Include means for installing and anchoring plants at the necessary locations and with the necessary spacing to achieve the requirements in Paragraph 3.05.A.
      3) Method and equipment to be used to efficiently position planting vessels(s) if used; and
      4) How adjacent planted areas will be protected so that they are not disturbed by vessels or other equipment or activities associated with planting.
   b. Procedures for installing EV including but not limited to:
      1) Description of equipment used to install EV
      2) Proposed method and equipment, which could include, but is not limited to, planting and anchoring bare root rhizomes, tubers, or plugs. Include means for installing plants at the necessary locations and with the necessary spacing to achieve the requirements in Paragraph 4.05.A.

      Any proposed methods complementary to coir bank buffer (Section 3544 00) to minimize damage by animals such as waterfowl (e.g., Canada geese), whitetail deer, muskrats, fish, turtles and beaver, shall be included in this submittal. Methods for the installation and removal (prior to final acceptance) of protective material (e.g., fencing) shall be included in this submittal. It is recommended the Contractor contact the local NYSDEC biologist for area specific recommendations.
   c. Contractor's proposed location for staging materials, and equipment. Provide a scale map showing the proposed limits and arrangement of the staging area.
   d. Contractor's proposed planting sequence and production rate, including but not limited to:
      1) Description of the planting sequence that describes the order in which the Planting Areas will be planted;
      2) How the planting sequence would be altered if higher river flows or other similar potentially disruptive events are experienced; and
      3) For each Planting Area provide target planting rate per day and the basis for those target rates.

B. During-Construction

1. Submit updates to the Planting Plan as requested by the Owner's Representative or, as necessary, to account for different methods, procedures, or conditions as compared to those presented in the approved Planting Plan.
2. Submit the following Product Data with each plant material delivery:
   a. Invoice indicating sizes and variety of plant material.
   b. Certificates of inspection required by State and Federal agencies.
   c. Labels for each plant or bundles of plants indicating name and size.
3. As part of the daily report, provide the total number of plants installed by location each day.

C. Post-Construction

1. Record Drawing
   Submit drawings that depict the date, location and type of Planting Unit installation, including quantities and species. Record Drawings shall be submitted with the Approval request.
2. Approval
   After completing planting in a discrete Planting Area, submit in writing a request to the Owner's Representative for approval of each discrete completed Planting Area. The approval request shall contain a Record Drawing(s) of the subject Planting Area(s). The Construction Manager shall grant approval of the Planting Area when the requirements of Paragraph 3.06 below have been met. Approvals will be granted for completed discrete Planting Areas, by species, as deemed appropriate by the Owner's Representative.

1.05 DEFINITIONS

A. Planting
Planting includes installation of tubers and containerized plants and/or deployment of seed buoys.

B. Planting Area
Planting Areas are the locations at which EV and SAV will be planted. Preliminary Planting Areas are shown on the Drawings. The suitability of each preliminary Planting Area will be determined by a pre-planting survey conducted in the spring of the planting year by the Contractor. Revised Drawings depicting the final Planting Areas will be issued by the Owner's Representative prior to planting.

C. Acceptable Plant Material

1. Plants: Plants shall be free of insects and diseases, appear healthy and exhibit visible signs of viability such as green leaves and stems; plants do not

appear chlorotic or exhibit signs of desiccation. Plants do not exhibit visible signs of herbivory. Roots and rhizomes/runners are present.

2. Tubers: Tubers are firm, healthy and brownish-white in color. Tubers must have an observable growing tip.

1.06 QUALITY REQUIREMENTS

A. Worker Qualification Data: Contractor's personnel shall have worked on five (5) similar projects in the past (2) years. Contractor shall submit documentation indicating project names and addresses and dates of construction for the five similar projects.

1.07 PROJECT CONDITIONS

A. Do not install plant material when ambient temperatures may drop below 35 degrees F or above 80 degrees.

B. All plants shall be installed between June 1st and August 15th of any year. Any deviations from this plant installation period must be approved by the Owner's Representative.

C. Do not install plants when wind velocity exceeds 30 miles per hour.

PART 2 PRODUCTS

2.01 PLANTS

A. Provide plants in accordance with the Plant Schedule in the Drawings.

B. Invasive vegetation species shall not be allowed. Materials must be healthy and vigorous, free of disease, insects, eggs, larvae, and defects such as decay, rot, knots, sun scald, injuries, abrasion, and poor or unusual form. All substitutions to the species list provided in the design drawings must be approved by the Owner's Representative prior to placing the plant order. Quantity required for planting could potentially impact the project schedule and shall be planned ahead of time.

2.02 ANCHORS

A. Means to anchor plant materials into substrate.

2.03 PART 3 EXECUTION GENERAL

A. Conditions that are prohibitive of planting are specified in Section 1.07, Project Conditions. All exceptions must be authorized in writing by the Owner's Representative.

B. Layout and stake the locations for the SAV and EV plants and outline the areas that will be planted on the ground prior to installing plants. The Owner's Representative will then verify and approve of the planting locations prior to plants being installed.

C. Notify the Owner's Representative at least two (2) full weeks prior to delivery of planting material if any substitutions are proposed. The Owner's Representative will then respond within three (3) full work days whether or not the plant substitutions will be accepted. If not accepted, the Contractor is responsible for locating plant species that are acceptable to the Owner's Representative.

D. Nursery stock used in the installation of SAV, and EV areas shall not be subjected to cold or excessive heat or drying during transport. The plants shall be carefully unloaded at the staging area and placed in a shaded area. Plants shall be watered and maintained in healthy condition until the time of installation. Damaged, wilted, diseased or dead nursery stock will not be accepted and shall be immediately replaced by Contractor at no expense to the Owner.

E. All plants shall be properly protected from damage, drying out, and browsing by animals. Such protection shall include the time when the plants are in transit, being handled or in temporary storage. All plants not planted immediately shall be watered as specified by the supplier. Plants shall be planted within 48 hours of delivery.

2.04 PROJECT SITE PREPARATION

A. Provide the Owner's Representative with unfettered access to inspect plant material at the staging and stockpiling areas or off-site nursery.

B. Lay out the locations of Planting Areas in the field in accordance with the approved Planting Plan prior to installing any Plants.

2.05 PLANTING SCHEDULE

A. The contractor shall plant as many planting units as reasonably possible in contiguous areas during the planting period as directed by the Owner's Representative.

2.06 PLANT INSTALLATION

A. Planting and other construction operations shall minimize overall planting substrate disturbance of imported planting substrate.

B. Planting Units shall be installed at the locations as shown on the Drawings. The required planting density is two (2) feet on center with one (1) plant placed every four (4) square feet (ft^2). The Planting Units shall be installed relatively uniformly throughout the Planting Area, with this typical 2-foot spacing. Planting Units may be placed within 0.5 foot of each target location but shall not be placed such that

gaps greater than 3.0 feet exist between plants in each planting row. Planting Units installed beyond the boundaries of the Planting Area shall not count towards the required planting densities and quantities.

C. All plant material shall be installed in accordance with the approved Planting Plan. All plants shall be installed such that their ability to grow into mature plants is not compromised.

D. The Contractor shall immediately notify the Owner's Representative if they encounter conditions that prevent the installation of Planting Units within the identified Planting Areas. If adjustments to the Planting Area boundaries are necessary, the Owner's Representative will issue revised Planting Areas boundaries.

E. Alternative spacing arrangements, layout, and transplanting techniques may be submitted in writing to the Owner's Representative for review and approval. At a minimum, any alternative methods must provide for uniform coverage of the Planting Area, and adherence to water depth and plant embedment requirements.

F. Any diving proposed shall be conducted by certified commercial divers and in accordance with OSHA Commercial Diving Regulations. The Contractor is responsible for obtaining appropriate insurances for any diving operations. Documentation of diver certification shall be provided to the Owner's Representative 30 days in advance of diving operations.

G. All vessel operations shall be in accordance with the NYSCC Regulations.

2.07 HERBIVORY PROTECTION

A. Install approved protection measures within 48 hours of planting EV.

B. Herbivory Protection shall be maintained by the contractor for the entirety of the growing season. Herbivory Protection shall be removed by the contractor prior to the presence of ice in the Ship Canal and the River.

2.08 FIELD QUALITY CONTROL

A. Sediment preparation work will be inspected by the Owner's Representative prior to setting plants. The contractor shall notify the Owner's Representative in writing at least 2 days prior to the inspection that work will be ready for inspection. The Owner's Representative will note deficiencies in writing and communicate these to the Contractor. Work will not be accepted until all noted deficiencies are resolved and all work meets or exceeds contract requirements. Do not install plants in a planting area until final acceptance of Planting Preparation work by the Owner's Representative.

B. On a daily basis schedule and attend an inspection of the area planted during the previous work day with the Owner's Representative. Promptly replace missing

Planting Units, Planting Units damaged during installation, or Planting Units that, at the time of planting, did not meet the definition in Paragraph 1.05 C, Acceptable Planting Material above.

END OF SECTION

SECTION 32 92 19
SEEDING

PART 1 GENERAL

1.01 DESCRIPTION

A. This section provides the appropriate seed mixes to be applied at the appropriate locations in conjunction with the relevant schedule items (erosion control measures).

1.02 RELATED SECTIONS

A. Section 01 11 00, Summary of Work.

B. Section 01 57 23 Storm Water Pollution Control

C. Section 31 11 00, Clearing and Grubbing.

D. Section 32 01 90, Operation and Maintenance of Planting.

E. Section 32 91 00, Planting Preparation.

1.03 REFERENCES

A. Plant Nomenclature: Conform to the latest edition of “Standardized Plant Names” as adopted by the American Joint Committee of Horticultural Nomenclature.

PART 2 PRODUCTS

2.01 SEED MIXTURES

A. Provide seed mixes in accordance with the tables below for each type of seed mix. Seed mix will be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Invasive vegetation species shall not be allowed.

B. Provide seed mixes that are fresh, clean, and of the current season's crop. The seed mixes shall be delivered in unopened containers.

C. Seed mixes for each mix type shall be as follow in Tables 1 and 2 and shall be applied at rates specified in Table 3.

Table 1: Seed Mix – Erosion Control

	Percentage of Seed Mix
Annual Rye	50%
Oats	50%

Table 2: Seed Mix – Native Grasses

	Percentage of Seed Mix
Elymus virginicus Virginia Wild Rye, PA Ecotype	20%
Carex vulpinoidea, Fox Sedge, PA Ecotype	20%
Panicum clandestinum (Dichanthelium c.) Deer Tongue, 'Tioga'	14%
Sorghastrum nutans, 'Southlow'-MI Ecotype Indiangrass	10%
Andropogon gerardii, 'Niagara' Big Bluestem	10%
Panicum virgatum, Switchgrass, 'Cave-In-Rock'	5%
Carex crinita Fringed (Nodding) Sedge, PA Ecotype	4%
Helenium autumnale, Common Sneezeweed, PA Ecotype	3%
PART 1 - Verbena hastata, Blue Vervain, PA Ecotype	3%
Heliopsis helianthoides, Oxeye Sunflower, PA Ecotype	2%
Eupatorium perfoliatum, Boneset, PA Ecotype	2%
Aster puniceus (Symphyotrichum puniceum),	1%
Purplestem Aster, PA Ecotype	1%
PART 2 - Asclepias incarnata, Swamp milkweed, PA Ecotype	1%
Ludwigia alternifolia, Seedbox, PA Ecotype	1%
Lobelia siphilitica, Great Blue Lobelia, PA Ecotype	1%
Monarda punctata, Spotted Beeblam, Coastal Plain SC Ecotype	1%
Euthamia graminifolia (Solidago g.), Grassleaf Golden-rod, PA Ecotype	1%

Table 3: Specified Application Rate

Seed Mix	**Average Rate**
Erosion Control	6 lbs/1000sf
Native Grass	1.5 lbs/1000sf

PART 3 EXECUTION

3.01 GENERAL

A. Erosion Control seed mix shall be installed in conjunction with erosion control methods specified in Section 01 57 23 Storm Water Pollution Control

B. Erosion Control seed mix shall be spread by Hydroseed, providing that a pre-germinated hydroseed mix is used. Notify the Owner's Representative at least two (2) full work days before intended delivery of seed mixes to the site. Furnish, to the Owner's Representative, legible copies of the certificates of inspection of seed mixes and a copy of the invoice for each shipment showing point of origin, species composition, percentages of each species, and kinds of materials supplied. Seed mixes which fail to meet the specifications will be rejected.

C. Temporary storage of seed mix will be in a dry secured area with all labels in place.

3.02 PERFORMING SEEDING

A. When hydraulic application is used, the minimum rate of water of 500 gallons per acre shall be used.

B. Lightly rake or drag the entire seeded area after sowing the seed.

C. Contractor shall not apply mulch or fertilizer at a location, or in a manner in which mulch and fertilizer materials would enter the River.

3.03 FIELD QUALITY CONTROL

A. The work site will be inspected by the Owner's Representative prior to final acceptance of work. The contractor shall notify the Owner's Representative in writing at least two (2) days prior to the inspection that work will be ready for inspection. A punch list noting deficiencies in the seeding will be compiled by the Owner's Representative in writing and provided to the Contractor. Final acceptance of work will not be provided by the Owner's Representative until all defects or deficiencies are corrected and the seeding work meets performance standards and all contract requirements.

END OF SECTION

SECTION 35 22 00
WATERWAY HABITAT FEATURES

PART 1 GENERAL

1.01 SUMMARY

A. Waterway Habitat Features: This section covers requirements for construction and placement of the following features:

1. Coir Bank Buffer
2. Bank Rootwad Chains
3. Anchored Rootwads
4. Porcupine Cribs
5. Gravel Spawning Beds
6. *Rock Vanes (See SECTION 31 37 00 – RIP-RAP)*

B. Products include:

1. Coir Fabric
2. Coir Twine
3. Wood Stakes
4. Large Woody Materials: Rootwad Logs and Log Poles
5. Wire Rope and associated Hardware
6. Natural Stone Blocks
7. Fish Gravel
8. Boulders
9. Rough Cut Lumber
10. Hardware Supplies *(various)*

C. On-site materials that conform to these specifications shall be used at the discretion of the Owner's Representative.

1.02 PROJECT CONDITIONS

A. Material delivery and on site stockpiling must be coordinated with ongoing site operations, including the dredging operations.

B. Only stockpile fill materials at the staging area. Do not stockpile at individual restoration sites, or on adjacent land outside of the restoration site boundaries without written consent of the Owner's Representative and the Property Owner.

C. Protect all partially completed work; Buffalo River is known to rise rapidly during storm and seiche events.

D. Do not remove, change the location of, obstruct, willfully damage, make fast to or interfere with any Aid to Navigation except in accordance with approval of the New York State Canal Corporation (NYSCC).

1.03 RELATED WORK

A. Section 31 05 00, Common Work Results for Earthwork

B. Section 31 37 00, Rip-Rap

C. Section 32 91 00, Planting Preparation

1.04 REFERENCES

A. Abbreviations and Acronyms

1. LWM = large woody material

2. RW = rootwad

3. DBH = diameter at breast height

4. dia. = diameter

5. lb = pound(s)

6. WLL = working load limit

B. Definitions

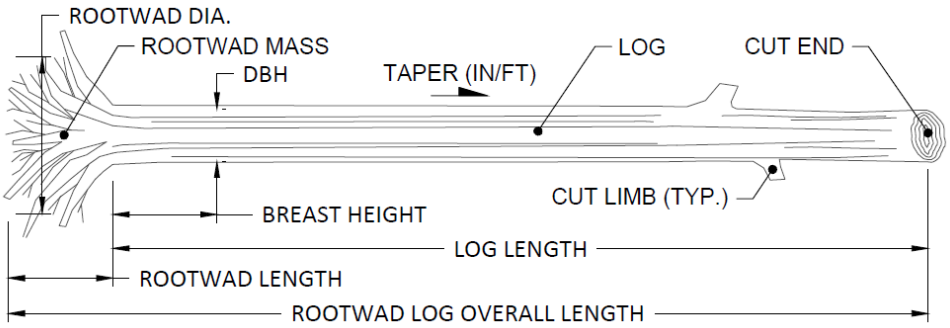
1. Large woody material: Natural logs meeting the dimensions and characteristics indicated on the Contract Drawings and described in the Specifications.

2. Members: Individual pieces of large woody material.

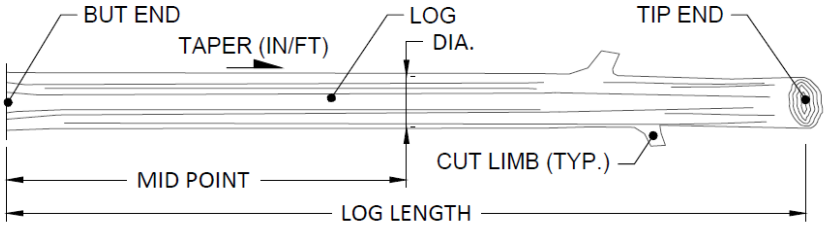
3. Bole: the trunk of a tree

4. Rootwad mass: the roots and the flared portion of the tree transitioning between the rootwad mass and the bole.

5. Rootwad log: large woody material that includes an intact rootwad mass connected to a portion of the bole of the tree. Rootwad logs are typically produced by removing an entire tree including the rootwad mass from the ground, removing the limbs and cutting the log to a specified length. The principal features and dimensions of a rootwad log are show below:



6. Log pole: large woody material consisting of a tree bole with the limbs removed. Log poles include bark and are un-treated. The principal features and dimensions of a log pole are show below:



7. Nominal: a generally accepted value for a dimension or load. Actual dimensions may vary. Nominal loads may be an average.

8. Approved Connection: An approved connection is one that is free of slack and excess length of rope (of any approved type), rope ends are protected from unraveling, and wire rope clips are tightened to the specified torque.

C. Reference Standards: The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

1. American Society for Testing and Materials (ASTM)

a. ASTM C136 – 06 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

b. ASTM D5519 – 07 Standard Test Methods for Particle Size Analysis of Natural and Man-Made Riprap Materials

c. ASTM F541 - 12 Standard Specification for Alloy Steel Eyebolts

d. ASTM D3776 – 09a(2013) Standard Test Methods for Mass Per Unit Area (Weight) of Fabric

e. ASTM D4595 – 11 Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method

f. ASTM D1777 – 96(2011)e1 - Standard Test Method for Thickness of Textile Materials

2. U. S. Federal Specifications (Fed Spec)

a. FS RR-W-410 (Rev E, or newer) Wire Rope and Strand

b. FF-C-450 (Rev E) Clamps, Wire Rope

3. New York State Department of Transportation

a. Standard Specifications (US Customary Units) January 9, 2014

1.05 ACTION SUBMITTALS

A. Prior to beginning assembly or installation of the listed item, submit for review:

1. Coir Fabric; cut sheet from manufacturer and/or supplier showing that product meets all requirements of these Specifications, a one (1) square foot sample of the product.
2. Coir Twine; cut sheet from manufacturer and/or supplier showing that product meets all requirements of these Specifications, a three (3) foot long sample of the product.
3. Wood Stakes; cut sheet from manufacturer and/or supplier showing that product meets all requirements of these Specifications, three (3) samples of the product.
4. Large Woody Materials: Source site information including an inventory of members from the source(s), age of material since cutting, tree species of material (prior written approval is required for tree species not listed in the Specifications or indicated on the Contract Drawings), and written permission for the Owner's Representative to gain access to the source site to evaluate materials. Photo documentation of the materials proposed to be furnished is encouraged to be included in the inventory. Materials shall meet the requirements of the Specifications.
5. Wire Rope: cut sheet from manufacturer and/or supplier showing that product meets all requirements of these Specifications.
6. Wire Rope Clips: cut sheet from manufacturer and/or supplier showing that product meets all requirements of these Specifications.
7. Eye Bolts: cut sheet from manufacturer and/or supplier showing that product meets all requirements of these Specifications.

8. Rock Anchors: cut sheet from manufacturer and/or supplier showing that product meets all requirements of these Specifications. For adhesive anchor systems provide shop drawings and anchor strength calculations.
9. Block Connections: shop drawings for any modifications to the typical connection detail shown on the Contract Drawings. Include a list of alternate materials and connection strength calculations showing that the alternate connection detail meets or exceeds the strength provided by the detail shown on the Contract Drawings.
10. Stone Blocks: Source site information including approximate quantity of material available, stone type, typical stone dimensions, and photographs of representative materials. Materials shall meet the requirements of the Specifications.
11. Fish Gravel: One (1) thirty- (30-) pound (lb) material sample, source site information including, rock type, gradation analysis test results, and photographs of the material source. Materials shall meet the requirements of the Specifications.
12. Boulders: A statement from the material supplier indicating the materials meet the referenced standard New York State Department of Transportation, Standard Specifications. Gradation results for the material from the chosen source and supplier.
13. Rough Cut Lumber: cut sheet from manufacturer and/or supplier showing that product meets all requirements of these Specifications.
14. Hardware Supplies: cut sheet from manufacturer and/or supplier showing that product meets all requirements of these Specifications.

B. Supervisor's Qualifications

1. Installation supervisor's qualification record. Provide, at a minimum, a supervisor at the Project Site who is experienced in the installation of similar features. The supervisor shall have performed work similar to that required in this Contract on at least three occasions. Submit the approved Supervisor's experience before work at the Project Site may begin.

1.06 QUALITY ASSURANCE

A. Areas selected as sources of borrow material shall have access guaranteed to the Owner’s Representative for inspection and approval or another source shall be found.

B. Collect samples and conduct analytical testing as specified in Section 02 24 23, Chemical Sampling and Analysis of Soils and Sediments to confirm materials are free of contamination.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements

1. It is the Contractor's responsibility to ensure that the materials are transported and delivered in a manner that does not damage or adversely affect the materials. Damaged materials may be rejected by the Owner's Representative, at no additional cost to the Owner.

2. Upon delivery to the Contractor's work or storage area, the wire rope shall be inspected in the presence of the Owner's Representative. In particular, the wire rope shall be inspected for dings, kinks or other damage.

B. Storage and Handling Requirements

1. Products shall be stored in the Contractor's staging and storage areas or otherwise approved by the Owner's Representative.

2. It is the Contractor's responsibility to ensure that the materials are stored and handled in a manner that does not damage or adversely affect the materials. Damaged materials may be rejected by the Owner's Representative, at no additional cost to the Owner.

3. The wire ropes shall be kept wound on spools in the same direction as they were bent during manufacturing until cut for use.

4. The Contractor shall protect the large woody materials from theft and damage from fire, breakage during handling, vandalism, rot, infestation, and other means that result in the large woody materials not meeting the requirements indicated on the Contract Drawings and as described in the Specifications.

5. The Contractor shall replace, at no additional cost to the Contracting Agency, members of large woody materials that are damaged, stolen, and/or do not meet the requirements indicated on the Contract Drawings and as described in the Specifications.

6. The Contractor shall handle the large woody material with equipment appropriate for the task. <u>Handling shall not damage the large woody material.</u>

7. The Contractor shall place large woody material into position using appropriate equipment and methods, and shall not drop large woody material into position.

8. Handling and moving large woody material shall not damage existing features or landscapes.

C. Packaging Waste Management

1. Properly dispose of all product packaging, remove all paper and plastic product labels or tags prior to installation.

PART 2 PRODUCTS

2.01 COIR FABRIC

A. General

1. Provide coir fabric which is the standard product of a manufacturer regularly engaged in the manufacture of coir fabric, and that essentially duplicates products having been in satisfactory use for at least 3 years prior to bid opening.

2. Shall match the size, configuration and material type indicated on the Drawings and described in the Specifications, or as approved by the Owner's Representative. Where there is a conflict between what is indicated on the Drawings or described in the Specifications, the Owner's Representative shall determine which takes precedence.

B. Quantity

1. Furnish fabric with sufficient dimensions to complete the installation as shown in the Contract Drawings for the feature. Vertical seams are allowed, horizontal seams are not allowed.

2. Pre-cut pieces are acceptable, but it is the responsibility of the Contractor to ensure that pieces are suitable for the application. Pre-cut pieces of fabric that do not meet the dimensional requirements shown on the Contract Drawings will be rejected by the Owner's Representative at no cost to the Owner.

C. Types

1. RoLonka™ BioD-Mat® 90 woven machine-spun bristle coir twine mat, or equal as approved by the Owner's Representative.

D. Performance

1. Meets or exceeds the values listed in Table 2.01a.

Table 2.01a

Property	**Test Method**	**Acceptable Values**
Weight	ASTM D 3776	29 oz/SY (980 g/m^2)
Wide width tensile strength **Wet** Machine direction Cross direction	ASTM D 4595	Min. 1776 lb/ft (26 kN/m) 936 lb/ft (13.7 kN/m)
Wide width tensile strength **Dry** Machine direction Cross direction	ASTM D 4595	Min. 2024 lb/ft (29.6 kN/m) 1160 lb/ft (17 kN/m)
Elongation at failure **Wet** Machine direction Cross direction	ASTM D 4595	50% to 55% 22% to 26%
Open area	Calculated	35% to 45%
Thickness	ASTM D 1777	0.35 inch (9 mm)
Minimum twine count per foot MD x CD		39 x 18

2.02 COIR TWINE

A. General

1. Provide wire rope which is the standard product of a manufacturer regularly engaged in the manufacture of wire rope, and that essentially duplicates products having been in satisfactory use for at least 3 years prior to bid opening.

2. Shall match the diameter, configuration and material type indicated on the Drawings and described in the Specifications, or as approved by the Owner's Representative. Where there is a conflict between what is indicated on the Drawings or described in the Specifications, the Owner's Representative shall determine which takes precedence.

B. Quantity

1. Furnish twine with sufficient length to complete the installation as shown in the Contract Drawings for the feature. The twine shall be wound on spools in a continuous length such that individual lengths of twine will be available for use, as splicing will not be allowed.

2. Pre-cut lengths of twine are acceptable, but it is the responsibility of the Contractor to ensure that lengths are suitable for the application. Pre-cut lengths of twine that do not meet a sufficient length for an approved lashing will be rejected by the Owner's Representative at no cost to the Owner.

C. Types

1. RoLonka BioD-Twine™ coir twine made from machine-spun bristle coir fiber, or equal as approved by the Owner's Representative.

D. Performance

1. Meets or exceeds the values listed in Table 2.01b.

Table 2.01b

Property	**Acceptable Values**
Static strength of twine	90 lb (400 N)
Thickness of twine (dia.)	0.24 inches (6 mm)

2.03 WOOD STAKES

A. General

1. Shall match the dimensions and material type indicated on the Drawings and described in the Specifications, or as approved by the Owner's Representative. Where there is a conflict between what is indicated on the Drawings or described in the Specifications, the Owner's Representative shall determine which takes precedence.

B. Quantity

1. Furnish wood stakes with sufficient dimensions to complete the installation as shown in the Contract Drawings for the feature. The wood stakes shall be pre-cut such that individual stakes are of a similar length and ready for installation.

C. Quality

1. Treatment: Untreated. Finish: rough cut. Grade: Standard or better (visually graded). Species groups in descending order of preference: Mixed Oak, Spruce-Pine-Fir, Hem-Fir.

2.04 ROOTWAD LOGS:

A. Shall not be milled or chemically treated.

B. Shall have intact bark, unless otherwise approved by the Owner's Representative.

C. Include an intact rootwad mass consisting of root fibers ranging in size down to a minimum diameter of 1 inch.

D. Limbs shall be trimmed within 1 inch of the face of the log, unless otherwise approved by the Owner's Representative. Limbs do not include the root mass.

E. Shall conform to the dimensions as indicated in the Contract Drawings for the particular application.

F. Shall have a DBH of no more than -2 inches (-2") and +2 inches (+2") from the diameter indicated on the Contract Drawings.

G. Shall have a maximum diameter taper as described below:

1. 1-inch diameter per 5-foot length, or as otherwise approved by the Owner's Representative.

H. Rootwad masses shall conform to the dimensions as indicated in the Contract Drawings for the particular structure. In general, the dimensions of the rootwad masses shall be no smaller than:

1. Diameter of three times the DBH.
2. Length of two times the DBH.

I. Rootwad masses shall be reasonably uniform and full; rootwad logs with asymmetrical rootwad masses may be rejected by the Owner's Representative.

J. Shall be sourced from species native to New York state, such as elm, hemlock, hickory, black locust, honeylocust, oak, maple, ash, or beech; other species may be used as approved by the Owner's Representative.

K. Shall be from sound stock and appropriate for structural constructions. The log shall be reasonably straight and uniform, and free of excessive bends, bulges, and limbs that will impede the placement of additional logs in the applicable structure or feature. Rootwad logs exhibiting breakage, rot, splitting, holes, pest infestation, foreign objects/finishes, vandalism, burn, and other damages are not allowed and may be rejected by the Owner's Representative.

2.05 LOG POLES:

A. Shall not be milled or chemically treated.

B. Shall have intact bark, unless otherwise approved by the Owner's Representative.

C. Limbs shall be trimmed within 1 inch of the face of the log, unless otherwise approved by the Owner's Representative.

D. Do not include an intact rootwad mass.

E. Shall conform to the dimensions as indicated in the Contract Drawings for the particular structure.

F. Shall have a diameter no more than -2 inches (-2”) and +2 inches (+2”) from the diameter indicated on the Contract Drawings, measured at the midpoint of the log length (cut end to cut end).

G. Shall have a maximum diameter taper as described below:

1. 1 inch diameter per 5 foot length, or as otherwise approved by the Owner’s Representative.

H. Shall be sourced from species native to New York state, such as elm, hemlock, hickory, black locust, honeylocust, oak, maple, ash, or beech; other species may be used as approved by the Owner’s Representative.

I. Shall be from sound stock and appropriate for structural constructions. The log shall be reasonably straight and uniform, and free of excessive bends, bulges, and limbs that will impede the placement of additional logs in the applicable structure or feature. Logs exhibiting breakage, rot, splitting, holes, pest infestation, foreign objects and finishes, vandalism, burn, and other damages are not allowed may be rejected by the Owner’s Representative.

2.06 WIRE ROPE

A. General

1. Provide wire rope which is the standard product of a manufacturer regularly engaged in the manufacture of wire rope, and that essentially duplicates products having been in satisfactory use for at least 3 years prior to bid opening.

2. Shall meet or exceed the performance requirements and match the material type indicated on the Drawings and described in the Specifications, or as approved by the Owner’s Representative. Where there is a conflict between what is indicated on the Drawings or described in the Specifications, the Owner’s Representative shall determine which takes precedence.

B. Quantity

1. Furnish sufficient length of wire rope to complete the wire rope connections as shown in the Contract Drawings for the structure and features. Each wire rope shall be, at a minimum, the length indicated on

the Contract Drawings. The wire rope shall be wound on reels in a continuous length such that individual lengths of wire rope will be available for use, as splicing will not be allowed.

2. Pre-cut lengths are acceptable, but it is the responsibility of the Contractor to ensure that lengths are suitable for an approved connection. Pre-cut lengths of wire rope that do not meet a sufficient length for an approved connection will be rejected by the Owner's Representative at no cost to the Owner.

C. Performance

1. Minimum nominal breaking strength: 26,600 lb in accordance with FS RR-W-410E.

D. Quality

1. Material: galvanized, Coating: none

2. Shall meet the applicable construction, material, and testing requirements of FS RR-W-410E, or newer.

2.07 WIRE ROPE CLIPS

A. General

1. Provide wire rope clips that are the standard product of a manufacturer regularly engaged in the manufacture of wire rope clips, and that essentially duplicate products having been in satisfactory use for at least 3 years prior to bid opening.

2. Shall match the size, type, class, and material indicated on the Drawings and described in the Specifications, or as approved by the Owner's Representative. Where there is a conflict between what is indicated on the Drawings or described in the Specifications, the Owner's Representative shall determine which takes precedence.

B. Types

1. Size: for Wire Rope dia., Type: I, Class: I, Material: galvanized drop forged.

C. Quality

1. Shall meet the applicable construction, material, and testing requirements of FF-C-450E, or newer.

2.08 EYE BOLTS

A. General

1. Provide eye bolts that are the standard product of a manufacturer regularly engaged in the manufacture of eye bolts, and that essentially duplicate products having been in satisfactory use for at least 3 years prior to bid opening.

2. Shall meet or exceed the performance requirements and match the type, construction, and material indicated on the Drawings and described in the Specifications, or as approved by the Owner’s Representative. Where there is a conflict between what is indicated on the Drawings or described in the Specifications, the Owner’s Representative shall determine which takes precedence.

B. Performance

1. WWL: 6,000 lb in accordance with ASTM F541-12.

C. Quality

1. Type: for lifting without shoulder, Material: hot dipped galvanized steel

2. Shall meet the applicable requirements of ASTM F541-12, or newer.

2.09 ROCK ANCHORS

A. General

1. Provide mechanical rock anchors or a rock anchor adhesive system that are the standard product of a manufacturer regularly engaged in the manufacture of rock anchors or rock anchor adhesive systems, and that essentially duplicate products having been in satisfactory use for at least 1 year prior to bid opening. Provide the manufacturer's qualifications as specified in the Submittals paragraph.

2. Shall meet or exceed the performance requirements indicated on the Drawings and described in the Specifications, or as approved by the Owner’s Representative. Where there is a conflict between what is indicated on the Drawings or described in the Specifications, the Owner’s Representative shall determine which takes precedence.

B. Performance

1. The mechanical anchor or adhesive anchor system shall have a minimum 9,800 lb ultimate pull out capacity as reported by the manufacture or as shown in the anchor system design analysis.
2. The mechanical anchor or adhesive anchor system shall be compatible with the specified galvanized steel eye bolts.

C. Quality

1. Installation of the mechanical anchor or adhesive anchoring system shall be in strict accordance with the manufactures recommendations.
2. Mechanical anchors shall be internally threaded four-way expansion anchors (a.k.a vibration resistant expansion anchors).
3. Mechanical anchors shall be zinc coated and have a Class 2B thread fit.

2.10 STONE BLOCKS

A. General

1. Shall match the size, weight, and material indicated on the Drawings and described in the Specifications, or as approved by the Owner's Representative. Where there is a conflict between what is indicated on the Drawings or described in the Specifications, the Owner's Representative shall determine which takes precedence.

B. Quality

1. Shall be hard, durable and free of cracks.
2. Acceptable stone types include; limestone, granite, basalt, gneiss, or others as approved by the Owner's Representative.

2.11 FISH GRAVEL

A. Fish gravel shall be rounded (glacial-fluvial source) and meet the gradation and material quality requirements of NYSDOT 703-0203 – Screened Gravel - Number 1 Size. Fish gravel shall meet the following gradation verified per ASTM C136:

Screen Size	**Percent Passing by Weight**
1 inch	100
½ inch	90-100
¼ inch	0-15
#200	0-1.0

B. Following initial material testing and approval material shall be tested to verify that it meets the requirements no less often than once per 5,000 cubic yards placed.

2.12 BOULDERS

A. Boulders shall be subangular and meet the requirements of NYSDOT 733.2103 – Stone Filling, Medium. Boulders shall meet the following gradation verified per ASTM D5519:

Stone Size	**Percent of Total by Weight**
Heavier than 100 lb	50-100
Smaller than 4 inches	0-10

B. Following initial material testing and approval material shall be tested to verify that it meets the requirements no less often than once per 5,000 cubic yards placed.

2.13 ROUGH CUT LUMBER

A. General

1. Shall match the dimensions and material type indicated on the Drawings and described in the Specifications, or as approved by the Owner's Representative. Where there is a conflict between what is indicated on the Drawings or described in the Specifications, the Owner's Representative shall determine which takes precedence.

B. Quantity

1. Furnish rough cut lumber at the dimensions and in sufficient quantity to complete the features as shown on the Contract Drawings. The rough cut lumber shall be pre-cut such that individual boards are of a similar length and ready for installation.

C. Quality

1. Moisture Content: Green. Finish: rough cut. Treatment: Untreated. Grade: Standard or better (visually graded). Species groups in descending order of preference: Mixed Oak, Spruce-Pine-Fir, Hem-Fir.

2.14 HARDWARE SUPPLIES

A. Nails: see Contract Drawings for applications

1. 16D common nails, 0.16 inch diameter, 3.5 inch length, bright finish

B. Nylon Strap

1. Nylon Endless Loop Cambuckle Strap, 915 lb WWL as reported by the manufacturer.

PART 3 EXECUTION

3.01 COIR BANK BUFFER

A. Pre-Assemble sections of the coir bank buffer fence in the dry

1. Lash wood stakes to coir fabric using coir twine at the spacing shown on the Contract Drawings. Lashing shall secure the fabric to the wood stake at a minimum of 4 locations spaced evenly over the distance shown on the Contract Drawings. Attachment points shall include the top of the wood stake and the location where the coir fabric meets the finished grade.
2. Provide an example lashing to the Owner's Representative for approval prior to installation.

B. Installation

1. Install fence with coir fabric on the up slope (bankward) side of the stakes.
2. Drive stakes verticaly to the elevation shown on the Contract Drawings
3. Stakes damaged during installation shall be replaced as the contractor's expense. When replacing stakes lash the new stake to the coir fabric after stake has been driven to the depth shown on the Contract Drawings.
4. Lay excess fabric upslope at the bottom of the fence and cover with a line of NYSDOT Fine Stone Filling (733.2101) stones at the spacing shown on the Contract Drawings.

3.02 BANK ROOTWAD CHAINS

A. Pre-Assemble portions of the bank rootwad chain in the dry

1. Connect stone blocks to the rootwad logs and log poles as shown on the Contract Drawings or per approved connection shop drawing.
2. Finish all connections prior to placement in the water.

B. Installation

1. Place Rootwad Logs and log poles with stone blocks attached as shown on the Contract Drawings.

2. Placement shall occur prior to final placement of backfill to meet finished grade so the bottom of the log bole sites flush on the finished grade.

3.03 ANCHORED ROOTWAD

A. Pre-Assemble the anchored rootwad in the dry

1. Connect stone blocks to the rootwad log as shown on the Contract Drawings or per approved connection shop drawing.
2. Finish all connections prior to placement in the water.

B. Installation

1. Place rootwad logs with stone blocks attached as shown on the Contract Drawings.
2. Placement shall occur prior to final placement of backfill to meet finished grade so the bottom of the log bole sites flush on the finished grade.

3.04 PORCUPINE CRIBS

A. Assemble the lower layers of the crib to height sufficient to contain the required ballast material.

1. Each overlap location shall be nailed together using a 16D nail driven at the center of the intersection vertically through the upper board and into the board below.
2. Nails that do not drive straight shall be removed and replaced.
3. Spilt or broken boards shall be replaced at no cost to the Owner.

B. Place Boulder ballast material in the interior of the assembled lower layers

C. Finish assembly of the upper layers as shown on the Contract Drawings in the same fashion as the lower layers and nail to the lower portion of the crib.

D. Place nylon strap around crib as shown on the Contract Drawings. Tighten strap using the cam-buckle and tie the lose end of the nylon strap back on it’s self at the cam-buckle.

E. Place cribs on the finished grade at the locations shown on the Contract Drawings. Nylon strap may be used for lifting the crib.

3.05 GRAVEL SPAWNING BEDS

A. Place Fish Gravel on the subgrade at the location and to the dimensions shown on the Contract Drawings and as approved by the Owner's Representative.

B. Following placement survey exposed gravel spawning beds to verify total coverage area to be no less the area shown on the Contract Drawings.

END OF SECTION