Section 4
Schedule and Project Management Approach

4.1 Project Schedule

A project schedule for the entire RI/FS scope is included as Figure 4-1. The project schedule is based on assumptions for durations and conditions of key events occurring on the critical and non-critical path as outlined below.

- The schedule for the field activities is dependent on access to all properties being obtained by EPA without difficulty.
- Field activities will not be significantly delayed due to severe weather conditions (i.e., hurricanes) or issues with obtaining access.
- The schedule for the field activities is dependent on timely review and approval of the work plan and QAPP and the provision of adequate funding by EPA.
- The schedule for the field investigation is dependent on all field activities being performed in Level D or Level C personal protective equipment H&S protection.
- CDM Smith will receive validated data for analyses performed by EPA's CLP eight weeks after sample collection.

4.2 Project Management Approach

4.2.1 Organization and Approach

The PM, Mr. Brendan MacDonald, P.E., LEED AP®, has primary responsibility for plan development and implementation of the RI, including coordination with the RI task manager and support staff, development of bid packages for subcontractor services, acquisition of engineering or specialized technical support, and all other aspects of the day-to-day activities associated with the project. The PM identifies staff requirements, directs and monitors Site progress, ensures implementation of quality procedures and adherence to applicable codes and regulations, and is responsible for the established budget and schedule.

The RITM, Ms. Seth Kellogg, P.G., reports to, and will work directly with the PM to develop and coordinate the work plan, QAPP, staffing and physical resource requirements, and technical SOWs for professional subcontractor services. She will be responsible for the implementation of the field investigation, performance tracking of the CDM Smith subcontractor laboratory, the analysis, interpretation and presentation of data acquired relative to the Site, preparation of the data evaluation summary report, and the RI report.

The FS task manager (FSTM), Mr. Anthony Isolda, will work closely with the RITM to ensure that the field investigation generates the proper type and quantity of data for use in the initial screening of remedial technologies/ alternatives, detailed evaluation of remedial alternatives, development of requirements for and evaluation of treatability study/pilot testing, if required, and associated cost analysis. The FS report will be developed by the FS technical group.

The FTL, Ms. Frances Delano, is responsible for on-site management for the duration of all Site operations including the activities conducted by CDM Smith such as equipment mobilization, sampling, and the work performed by subcontractors such as surveying.

The RAC2 Quality Assurance Coordinator (QAC) Ms. Jeniffer Oxford is responsible for tracking implementation of quality requirements and working with project staff to select appropriate quality measures for their work. She also reviews specific task QA/QC procedures, and audits specific tasks. The QAC reports to the CDM Smith Quality Assurance Director.

The QA Director, Ms. Jo Nell Mullins, is responsible for overall quality for the RAC 2, Region 2 contract, and will have approved QACs perform the required elements of the RAC 2, Region 2 QA program of specific task QA/QC procedures, and auditing of specific tasks at established intervals. These QACs report to CDM Smith's corporate QA Director and are independent of the SM's reporting structure.

The ASC, Mr. Scott Kirchner, will assist staff in defining appropriate analytical requirements consistent with project data quality objectives; assist with preparation or review of subcontract analytical laboratory statements of work; and communicating and resolving analytical issues. The ASC will be assisted by Ms. Vanessa Macwan to solicit EPA laboratory services; act as liaison between EPA's RSCC and CDM Smith's field staff; and to meet EPA sample management and paperwork requirements.

The DQTL, Ms. Christine Julias, is responsible for coordinating data management tasks and ensuring that all QC checks are implemented. The DQTL works with data providers, the EDM, and the ASC to see that data are managed efficiently, that proper QA/QC procedures are followed, and that the data are ready and available for analysis and reporting. The DQTL, ASC, and EDM will prepare the final project EDD provided to EPA.

The task numbering system for the RI/FS effort is described in Section 3 of this work plan. Each of these tasks has been scheduled and will be tracked separately during the course of the RI/FS work. For the RAC 2 contract, the key elements of the monthly progress report will be submitted within 20 calendar days after the end of each reporting period and will consist of a summary of work completed during that period and associated costs.

Project progress meetings will be held, as needed, to evaluate project status, discuss current items of interest, and review major deliverables such as the work plan, QAPP, the data evaluation summary report, the RI report, the HHRA report, the SLERA report, and the FS report. Figure 4-2 is the project organization chart.

4.2.2 Quality Assurance and Document Control

All work by CDM Smith on this work assignment will be performed in accordance with the *CDM Smith QA Manual, Revision 11* (CDM Smith 2007).

The RAC 2 QAC will maintain QA oversight for the duration of the work assignment. A CDM Smith QAC has reviewed this work plan for QA requirements. A QAPP governing field sampling and analysis is required and will be prepared in accordance with the UFP-QAPP Guidance Manual and the EPA Guidance for QAPPs. It will be submitted to approved technical and QA reviewers for review and approval before submittal to EPA. Any reports which present measurement data generated during the work assignment will include a QA section addressing the quality of the data and its limitations. Such reports are subject to QA review following technical review. SOWs and modifications for subcontractor services and subcontractor bids and proposals will receive technical and QA review.

The CDM Smith PM is responsible for implementing appropriate QC measures on this work assignment. Such QC responsibilities include:

- Implementing the QC requirements referenced or defined in this work plan and in the QAPP
- Adhering to the CDM Smith RAC Management Information System (RACMIS) document control system
- Organizing and maintaining work assignment files
- Conducting field planning meetings, as needed, in accordance with the RAC 2 QMP
- Completing measurement and test equipment forms that specify technical and quality equipment requirements

Technical and QA review requirements as stated in the QMP will be followed on this work assignment.

Document control aspects of the program pertain to controlling and filing documents. CDM Smith has developed a program filing system that conforms to EPA's requirements to ensure that the documents are properly stored and filed. This guideline will be implemented to control and file all documents associated with this work assignment. The system includes document receipt control procedures, a file review, an inspection system, and file security measures.

The RAC 2 QA program includes both self-assessments and independent assessments as checks on quality of work performed on this work assessment. Self assessments include management system audits, trend analyses, calculation checking, data validation, and technical reviews. Independent assessments include office, field and laboratory audits and the submittal of performance evaluation samples to laboratories if required.

One QA internal system audit and one field technical system audit are required. A laboratory technical system audit may be conducted by a qualified laboratory auditor. Performance audits (i.e., performance evaluation samples) may be administered by CDM Smith as required for any analytical parameters. An audit report will be prepared and distributed to the audited group, to CDM Smith management, and to EPA. EPA may conduct or arrange a system or performance audit.

4.2.3 Project Coordination

The PM will coordinate all project activities with the EPA RPM. Regular telephone contact will be maintained to provide updates on project status. Field activities at the Site will require coordination

among federal, Commonwealth, and local agencies and coordination with involved private organizations. Coordination of activities with these stakeholders is described below.

EPA is responsible for overall direction and approval of all activities for the Site. EPA may designate technical advisors and experts from academia or its technical support branches to assist on the Site. Agency advisors could provide important sources of technical information and review, which the CDM Smith team will use from initiation of RI/FS activities through final reporting.

Sources of technical information include EPA, Puerto Rico Environmental Quality Board (PREQB), PRASA, USGS, and sampling conducted during previous investigations. These sources can be used for background information on the Site and surrounding areas.

The Commonwealth, through PREQB, may provide review, direction, and input during the RI/FS. EPA's RPM will coordinate contact with personnel from other agencies.

Local agencies that may be involved include PRASA, and local departments such as planning boards, zoning and building commissions, police, fire, health departments, and utilities (water and sewer). Contacts with these local agencies will be coordinated through EPA.

Private organizations requiring coordination during the RI/FS include residents in the area and public interest groups such as environmental organizations and the press. Coordination with these interested parties will be performed through EPA.

Section 5
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Tables

Table 1-1
Summary of Historic VOC Detections in the Cabo Rojo Urbano Public Supply Wells
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

Well	Sampling event	PCE (µg/L)	TCE (µg/L)	1,1-DCE (µg/L)	cis-1,2-DCE (µg/L)	Party
Hacienda Margarita	2004-2005	detected	detected	not detected	not detected	PRASA
	Jul-06	not detected	not detected	not detected	not detected	EPA
Ana Maria	2002-2006	1.8 - 4.0	0.5 - 1.6	not detected	not detected	PRASA
	Jul-06	1.9	0.62 - 0.63	0.66 - 0.67	not detected	EPA
	Sep-09	1.1	not detected	not detected	not detected	EPA
Club de Leones	Jul-06	not detected	not detected	not detected	0.96	EPA
Cabo Rojo 2	Jul-06	not detected	not detected	not detected	not detected	EPA
	Sep-09	not detected	not detected	not detected	not detected	EPA
Cabo Rojo 2	Jul-06	not detected	not detected	not detected	not detected	EPA
	Sep-09	not detected	not detected	not detected	not detected	EPA

Abbreviations:

EPA - U.S. Environmental Protection Agency
PRASA - Puerto Rico Aqueduct and Sewer Authority
µg/L - microgram per liter
VOC - volatile organic compounds
PCE - tetrachloroethene
TCE - trichlotoethene
DCE - dichloroethene

Table 1-2
Cabo Rojo Area Well Construction and Status
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

Name	Depth of Well[1]	Open or Screened Section depth interval[1]	Status
Ana Maria	200	40-200	Operating
Club de Leones	150	90-150	Operating
Cabo Rojo 1	n/a	n/a	Operating*
Cabo Rojo 2	n/a	n/a	Operating
Cabo Rojo 3	n/a	n/a	Operating*
Hacienda Margarita	n/a	n/a	Operating*
MacDougal	175	50-175	Operating/Pump Station
Terminal de Carros Publicos	n/a	n/a	Inactive
Weko 1	n/a	n/a	Inactive
Weko 2	n/a	n/a	Inactive
Remanzo	n/a	n/a	n/a

[1] in feet, taken from Rodriguez 1996 (USGS)

* Source for well status is based on ASTDR report

Table 2-1
Potetential ARARS and TBCs
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

Chemical-Specific ARARs	
Federal	**Commonwealth of Puerto Rico**
RCRA Groundwater Protection Standards and Maximum Concentration Limits (40 Code of Federal Regulations (CFR) 264, Subpart F)	Puerto Rico Water Quality Standards - PREQB, Water Quality Standards Regulation, March 28, 2003)
Clean Water Act, Water Quality Criteria (Section 304) (May 1, 1987 - Gold Book)	PRDOH National Primary Regulations of Potable Water, March 1992
Safe Drinking Water Act, Maximum Contaminant Levels (40 CFR 141.11-.16) issued July 1, 1991 and amended in the Federal Register 40 CFR Part 141 issued June 29, 1995. Includes secondary MCLs, which are not enforceable but set standards for aesthetic factors that may affect public acceptance of water	PRDOH General Regulation for Environmental Health, Regulation No. 6090, February 4, 2000
RCRA (toxicity characteristic leaching procedure) TCLP and Land Ban Requirements for Landfilling (40 CFR 261)	
Location-Specific ARARs	
Federal	**Commonwealth of Puerto Rico**
Executive Order on Wetlands Protection (CERCLA Wetlands Assessments) No. 11990	Puerto Rico EQB, Guidelines for Environmental Impact Statements
National Historic Preservation Act (16 United States Code [USC] 470) Section 106 et seq. (36 CFR 800)	Puerto Rico Department of Natural and Environmental Resources, Critical Element and Endangered Species Database, 1998
Endangered Species Act of 1973 (16 USC 1531) (Generally, 50 CFR Part 402)	
RCRA Location Requirements for 100-year Flood Plains (40 CFR 264.18(b))	
Fish and Wildlife Coordination Act (16 USC 661 et seq.)	
Wetlands Construction and Management Procedures (40 CFR 6, Appendix A)	
Executive Order 11990, "Protection of Wetlands"	
1985 Statement of Policy on Floodplains/Wetlands Assessments for CERCLA Action	
Action-Specific ARARs	
Federal	**Commonwealth of Puerto Rico**
RCRA Subtitle C Hazardous Waste Treatment Facility Design and Operating Standards for Treatment and Disposal Systems, (i.e., landfill, incinerators, tanks, containers, etc.)(40 CFR 264 and 265) (Minimum Technology Requirements)	Puerto Rico General Requirements for Permitting Wells
RCRA Ground Water Monitoring and Protection Standards (40 CFR 264, Subpart F)	Puerto Rico EQB, regulation for the Control of Atmospheric Pollution, 1995
RCRA Manifesting, Transport and Recordkeeping Requirements (40 CFR 262)	Puerto Rico EQB, Regulation for the Control of Hazardous and Non-Hazardous Waste, 1982 as amended, 1985, 1986 and 1987
RCRA Wastewater Treatment System Standards (40 CFR 264, Subpart X)	Puerto Rico EQB, Underground Storage Tank Control Regulations, 1990
RCRA Storage Requirements (40 CFR 264; 40 CFR 265, Subparts I and J)	Puerto Rico EQB, underground Injection Control Regulations, 1988
RCRA Subtitle D Nonhazardous Waste Management Standards (40 CFR 257)	
RCRA - Part 260 General Hazardous Waste Management System Regulations (40 CFR Part 260)	
RCRA - Part 261 Identification and Listing of Hazardous Waste (40 CFR Part 261-265, 270, and 271)	
RCRA - Part 262 Standards for Generators. Part 263 Standards for Transporters (40 CFR Parts 262 and 263	
RCRA - Part 264, Subtitle C (40 CFR Part 264)	
Toxic Substances Control Act (TSCA)(40 CFR 761)	
Off-Site Transport of Hazardous Waste (EPA Office of Solid Waste and Emergency Response [OSWER] Directive 9834.11)	
Clean Water Act – NPDES permitting	
Permitting Requirements for Discharge of Treatment System Effluent (40 CFR 122-125)	
Clean Water Act Discharge to Publicly Owned Treatment Works (POTW) (40 CFR 403)	

Table 2-1
Potetential ARARS and TBCs
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

Chemical-Specific ARARs	
Federal	**Commonwealth of Puerto Rico**
National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR 61)	
Occupational Safety and Health Standards for Hazardous Responses and General Construction Activities (29 CFR 1904, 1910, 1926)	
Fish and Wildlife Coordination Act (16 UC 661 et seq.). (Requires actions to protect fish or wildlife when diverting, channeling or modifying a stream)	
National Primary and Secondary Ambient Air Quality Standards (40 CFR Part 50)	
The Endangered Species Act	
TBCs	
Federal	**Commonwealth of Puerto Rico**
Safe Drinking Water Act National Primary Drinking Water Regulations, Maximum Contaminant Level Goals (MCLGs)	Puerto Rico EQB, Guidelines for Environmental Impact Statements
National Recommended Water Quality Criteria, EPA 2006b	PREQB, Soil Erosion Control and Sediment Prevention Regulation
Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario - Lowest Effect Level (LEL) and Severe Effects Level (SEL) (Ontario 1993)	Puerto Rico EQB, Mixing Zone and Bioassay Guideline, 1988
EPA Regional Screening Levels (RSLs), EPA September 2010	Puerto Rico Departmental of Natural and Environmental Resources, Critical Element and Endangered Species Database, 1998
EPA Drinking Water Health Advisories	
Policy for the Development of Water-Quality-Based Permit Limitations for Toxic Pollutants (49 CFR 8711)	
Ground Water Classification Guidelines	
Ground Water Protection Strategy	
Fish and Wildlife Coordination Act Advisories	
Control of Air Emissions from Superfund Air Stripper at Superfund Groundwater Sites (OSWER Directive 9355.0-28)	
Draft Guidance for Evaluation of the Vapor Intrusion to Indoor Air Pathway, EPA 2002	
Waste Load Allocation Procedures	
Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario (D. Persaud *et al.* , August 1993)	
Ontario Ministry of the Environment and Energy - LEL and SEL	
EPA Soil Screening Guidance: Technical Background Document, EPA May 1996	
EPA Health Effects Assessment (HEAs)	
Toxicological Profiles, Agency for Toxic Substances and Disease Registry, U.S. Public Health Service	
Cancer Assessment Group (National Academy of Science) Guidance	
Proposed RCRA Corrective Action Regulations (July 27, 1990)	
Guidelines for the Protection and Management of Sediment Quality in Ontario, Ontario Ministry	
EPA Region 5, Resource, Conservation, Recovery, Act (RCRA) Ecological Screening Levels, 2003	
Consensus-based threshold effects concentrations (TEC), (MacDonald et al. 2000)	

Notes:
ARAR - Applicable Relevant and Appropriate Requirements
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act of 1980
PRDOH - Puerto Rico Department of Health
PREQB - Puerto Rico Environmental Quality Board
RCRA - Resource Conservation and Recovery Act
TBC - "To Be Considered"

Table 2-2
Summary of Data Quality Levels
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

Data Uses	Analytical Level [1]	Types of Analysis
Site Characterization Monitoring during implementation of field events	Screening level	- Total organic vapor using field instruments - TCE, PCE and DCE using field GC - Water quality field measurements using portable instruments
Risk Assessment Site Characterization	Definitive level	- Organics/Inorganics using EPA-approved methods - CLP SOWs - Standard water analyses - Analyses performed by laboratory
Site Characterization	Screening level with definitive level confirmation Field instrument [2]	- Measurements from field equipment - Qualitative measurements

Notes:

(1) Definitions of analytical levels: Screening data are generated by rapid, less precise methods of analysis with less rigorous sample preparation. Screening data provide analyte (or at least chemical class) identification and quantification, although the quantification may be relatively imprecise. For definitive confirmation, approximately 10 percent of the screening data are confirmed using analytical methods and quality control procedures and criteria associated with definitive data. Screening data without associated confirmation data are generally not considered to be data of known quality.

Definitive data are generated using rigorous analytical methods, such as EPA reference methods. Data are analyte-specific, with confirmation of analyte identity and concentration. Methods generating definitive data produce tangible raw data (e.g., chromatograms, spectra, digital values) in the form of paper printouts or computer-generated electronic files. Data may be generated at the site or at an off-site location, as long as the quality control requirements are satisfied. For the data to be definitive, either analytical or total measurement error must be determined.

(2) DQO = Measurement-specific Data Quality Objective requirements will be defined in the QAPP.

Abbreviations:
CLP = Contract Laboratory Program
DQO = data quality objective
DCE = dichloroethene
EPA = Environmental Protection Agency
GC = gas chromatograph
PCE = tetrachloroethene
QAPP = quality assurance project plan
SOW = Statement of Work
TCE = trichloroethene

Table 3-1
Potential Source Area Reconnaissance
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

No.	Potential Source Area Location	Reconnaissance
1	Extasy Q Prints	Completed by EPA
2	Cabo Rojo Professional Dry Cleaners	Completed by EPA
3	D'Elegant Fantastic Dry Cleaners	Completed by EPA
4	Serrano II Dry Cleaners	Completed by EPA
5	PRIDCO East	Partially Completed
6	PRIDCO West	Yes
7	RETRO Plant	Yes
8	Raul Lugo	Yes
9	Former Don Paco #1	Yes
10	Former Don Paco #2	Yes
11	Unfinished Strip Mall	Yes
12	TBD 1	Yes

Abbreviations:
EPA = Environmental Protection Agency
PRIDCO = Puerto Rico Industrial Development Company
TBD = to be determined

Table 3-2
Existing Well Evaluation
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

No.	Well Name	Well Type	Geophysics[1]	Analyses (CLP)[2]	Samples
1	Anna Maria	Supply Well	Yes	TCL VOCs	6
2	Club de Leones	Supply Well	Yes	TCL VOCs	6
3	Terminal de Carros Publicos	Supply Well	Yes	TCL VOCs	6
4	Hacienda	Supply Well	No	None planned	NA
	Total Samples				**18**

[1] Geopohysical logs will include natural gamma, specific conductance, temperature, caliper, acoustic televiewer, and heat pulse flow meter

[2] CDM Smith assumes that these samples will be analyzed by CLP (with two-week turn-around time for preliminary results)

Abbreviations:
CLP = Contract Laboratory Program
NA = not applicable
TCL = Target Compound List
VOC = volatile organic compound

Table 3-3
Proposed Multiport Monitoring Wells
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

Well Name	Location	Geophysics[1]	Wireline Sampling [2, 3]	Round 1 Sampling	
				(CLP)	(CLP/DESA)[4, 5]
Multiport 1	between CRPDC, EQP, and Anna Maria	Yes	TCL VOCs	TCL VOCs, TAL metals with Hg and CN	MNA parameters
Multiport 2	PRIDCO West	Yes	TCL VOCs	TCL VOCs, TAL metals with Hg and CN	MNA parameters
Multiport 3	PRIDCO East	Yes	TCL VOCs	TCL VOCs, TAL metals with Hg and CN	MNA parameters
Multiport 4	between Serrano II and PRASA well	Yes	TCL VOCs	TCL VOCs, TAL metals with Hg and CN	MNA parameters
Multiport 5	Background south of PRIDCO	Yes	TCL VOCs	TCL VOCs, TAL metals with Hg and CN	MNA parameters
Total Samples			**30**	**30**	**15**

[1] Geopohysical logs will include natural gamma, specific conductance, temperature, caliper, acoustic televiewer, and heat pulse flow meter
[2] CDM Smith assumes that wireline samples will be analyzed by a local NELAP lab with 48 hours turn-around time
[3] CDM Smith assumes that one duplicate and one MS/MSD will be collected from each well.
[4] MNA parameters include: TSS, TDS, alkalinity, ammonia, hardness, TKN, chloride, MEE, nitrate/nitrite, sulfate, sulfide, TOC
[5] MNA parameters will be collected from 3 ports from each well, for a total of 24 samples

Abbreviations

CN	cyanide
CLP	Contract Laboratory Program
CRPDC	Cabo Rojo Professional Dry Cleaners
DESA	Division of Environmental Science and Assessment
EQP	Extasy Q Prints
Hg	mercury
MEE	methane/ethane/ethene
MNA	Monitored natual attenuation
MS/MSD	matrix spike/matric spike duplicate
NELAP	National Environmental Laboratory Accreditation Program
PRIDCO	Puerto Rico Industrial Development Company
TAL	Target Analyte List
TCL	Target Compound List
TDS	total dissolved solids
TKN	total Kjeldahl nitrogen
TOC	total organic carbon
TSS	total suspended solids
VOC	volatile organic compound

Table 3-4
Potential Source Area Soil Vapor Screening
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

No.	PSA Location[1]	Reconnaissance	Soil Vapor	Analytical (field GC)[2]	Analytical (local laboratory)[3,4]
1	Extasy Q Prints	Complete	Complete	None	None
2	Cabo Rojo Professional Dry Cleaners	Complete	Complete	None	None
3	D'Elegant Fantastic Dry Cleaners	Complete	Complete	None	None
4	Serrano II Dry Cleaners	Complete	Complete	None	None
5	PRIDCO East	Yes	10 locations, 1 sample each	PCE, TCE and DCE	TCL VOCs
6	PRIDCO West	Yes	20 locations, 1 sample each	PCE, TCE and DCE	TCL VOCs
7	RETRO Plant	Yes	10 locations, 1 sample each	PCE, TCE and DCE	TCL VOCs
8	Raul Lugo	Yes	10 locations, 1 sample each	PCE, TCE and DCE	TCL VOCs
9	Former Don Paco #1	Yes	10 locations, 1 sample each	PCE, TCE and DCE	TCL VOCs
10	Former Don Paco #2	Yes	10 locations, 1 sample each	PCE, TCE and DCE	TCL VOCs
11	Unfinished Strip Mall	Yes	10 locations, 1 sample each	PCE, TCE and DCE	TCL VOCs
12	TBD A	Yes	None (eliminated via reconnaissance)	None	None
	Total Samples			**80**	**7**

[1] CDM Smith assumes 8 PSAs will require soil vapor screening to evaluate contamination. The actual locations will be determined based on PSA reconnaissance.

[2] CDM Smith assumes 1 duplicate per property

[3] CDM Smith assumes at least 1 sample per property

[4] CDM Smith assumes that these samples will be analyzed by a local NELAP certified laboratory on 48 hour turn-around time, except the first PSA, which will be analyzed with 24 hour turn-around time

Abbreviations:

DCE = cis-1,2-dichloroethene
GC = gas chromatograph
NELAP = National Environmental Laboratory Accreditation Program
PCE = tetrachloroethene
PSA = potential source area
PRIDCO = Puerto Rico Industrial Development Company
TBD = to be determined
TCE = trichloroethene
TCL = Target Compound List
VOC = volatile organic compound

Table 3-5
Potential Source Area Soil Screening
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

No.	PSA Location[1]	Soil Screening	Analytical (field GC)[2]	Analytical (Local laboratory)[3,4]
1	Extasy Q Prints	10 borings, 3 samples per boring	PCE, TCE and DCE	TCL VOCs
2	Cabo Rojo Professional Dry Cleaners	10 borings, 3 samples per boring	PCE, TCE and DCE	TCL VOCs
3	D'Elegant Fantastic Dry Cleaners	10 borings, 3 samples per boring	PCE, TCE and DCE	TCL VOCs
4	Serrano II Dry Cleaners	10 borings, 3 samples per boring	PCE, TCE and DCE	TCL VOCs
5	PRIDCO East	10 borings, 3 samples per boring	PCE, TCE and DCE	TCL VOCs
6	PRIDCO West	20 borings, 3 samples per boring	PCE, TCE and DCE	TCL VOCs
7	RETRO Plant	None (eliminated via soil vapor screening)	None	None
8	Raul Lugo	None (eliminated via soil vapor screening)	None	None
9	Former Don Paco #1	None (eliminated via soil vapor screening)	None	None
10	Former Don Paco #2	None (eliminated via soil vapor screening)	None	None
11	Unfinished Strip Mall	None (eliminated via soil vapor screening)	None	None
12	TBD A	Eliminated via reconnaissance	None	None
	Total Samples		**210**	**11**

[1] CDM Smith assumes 11 PSAs will require soil screening to evaluate soil contamination. The actual locations will be determined based on the sampling results.

[2] CDM Smith assumes duplicate at five percent.

[3] CDM Smith assumes five percent of the GC samples will be analyzed by the local laboratory.

[4] CDM Smith assumes these samples will be analyzed by a local NELAP certified laboratory on 48 hour turn-around time.

Abbreviations:

DCE = dichloroethene
GC = gas chromatograph
NELAP = National Environmental Laboratory Accreditation Program
PSA = potential source area
PCE = tetrachloroethene
PRIDCO = Puerto Rico Industrial Development Company
TBD = to be determined
TCE = trichloroethene
TCL = Target Compound List
VOC = volatile organic compound

Table 3-6
Potential Source Area Groundwater Screening
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

No.	PSA Location[1]	Groundwater Screening	Analytical (field GC)[2]	Analytical (Local laboratory)[3,4]
1	Extasy Q Prints	10 borings, 2 samples per boring	PCE, TCE and DCE	TCL VOCs
2	Cabo Rojo Professional Dry Cleaners	10 borings, 2 samples per boring	PCE, TCE and DCE	TCL VOCs
3	D'Elegant Fantastic Dry Cleaners	10 borings, 2 samples per boring	PCE, TCE and DCE	TCL VOCs
4	Serrano II Dry Cleaners	10 borings, 2 samples per boring	PCE, TCE and DCE	TCL VOCs
5	PRIDCO East	10 borings, 2 samples per boring	PCE, TCE and DCE	TCL VOCs
6	PRIDCO West	20 borings, 2 samples per boring	PCE, TCE and DCE	TCL VOCs
7	RETRO Plant	None (eliminated via soil vapor screening)	None	None
8	Raul Lugo	None (eliminated via soil vapor screening)	None	None
9	Former Don Paco #1	None (eliminated via soil vapor screening)	None	None
10	Former Don Paco #2	None (eliminated via soil vapor screening)	None	None
11	Unfinished Strip Mall	None (eliminated via soil vapor screening)	None	None
12	TBD A	Eliminated via reconnaissance	None	None
	Total Samples		**140**	**7**

[1] CDM Smith assumes 6 PSAs will require groundwater screening to evaluate the impact of contaminated soil on the groundwater. The actual locations will be determined based on the vapor sampling results.

[2] CDM Smith assumes duplicates at a rate of five percent.

[3] CDM Smith assumes five percent of GC samples will be sent for laboratory analysis.

[4] CDM Smith assumes that these samples will be analyzed by a local NELAP certified laboratory on 48 hour turn-around time

Abbreviations:

DCE = dichloroethene
GC = gas chromatograph
NELAP = National Environmental Laboratory Accreditation Program
PCE = tetrachloroethene
PSA = potential source area
PRIDCO = Puerto Rico Industrial Development Company
TBD = to be determined
TCE = trichloroethene
TCL = Target Compound List
VOC = volatile organic compound

Table 3-7
Potential Source Area Soil Delineation Samples
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

No.	PSA Location[1]	Soil	Analytical (CLP)[2]
1	Extasy Q Prints	6 borings, 2 samples per boring	TCL VOCs, TAL metals, soil moisture, pH, TOC, grain size
2	Cabo Rojo Professional Dry Cleaners	6 borings, 2 samples per boring	TCL VOCs, TAL metals, soil moisture, pH, TOC, grain size
3	D'Elegant Fantastic Dry Cleaners	6 borings, 2 samples per boring	TCL VOCs, TAL metals, soil moisture, pH, TOC, grain size
4	Serrano II Dry Cleaners	6 borings, 2 samples per boring	TCL VOCs, TAL metals, soil moisture, pH, TOC, grain size
5	PRIDCO East	6 borings, 2 samples per boring	TCL VOCs, TAL metals, soil moisture, pH, TOC, grain size
6	PRIDCO West	6 borings, 2 samples per boring	TCL VOCs, TAL metals, soil moisture, pH, TOC, grain size
7	RETRO Plant	None (eliminated via soil vapor screening)	None
8	Raul Lugo	None (eliminated via soil vapor screening)	None
9	Former Don Paco #1	None (eliminated via soil vapor screening)	None
10	Former Don Paco #2	None (eliminated via soil vapor screening)	None
11	Unfinished Strip Mall	None (eliminated via soil vapor screening)	None
12	TBD A	Eliminated via reconnaissance	None
	Total Samples		**72 TCL/TAL, 36 moisture/pH/TOC/GS**

[1] CDM Smith assumes 6 PSAs will require soil sampling to delineate contamination. The actual locations will be determined based on the sampling results.
[2] CDM Smith assumes that 1 sample per boring will be analyzed for soil moisture, pH, and grain size.

Abbreviations:
CLP = Contract Laboratory Program
GS = grain size
PSA = potential source area
PRIDCO = Puerto Rico Industrial Development Company
TAL = Target Analyte List
TBD = to be determined
TOC = total organic carbon
TCL = Target Compound List
VOC = volatile organic compound

Table 3-8
Potential Source Area Overburden Monitoring Wells
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

No.	PSA Location[1]	Groundwater	Analytical - Round 1 (CLP)[2]
1	Extasy Q Prints	2 overburden wells	TCL VOCs, TAL metals with Hg and CN, MNA parameters
2	Cabo Rojo Professional Dry Cleaners	2 overburden wells	TCL VOCs, TAL metals with Hg and CN, MNA parameters
3	D'Elegant Fantastic Dry Cleaners	2 overburden wells	TCL VOCs, TAL metals with Hg and CN, MNA parameters
4	Serrano II Dry Cleaners	2 overburden wells	TCL VOCs, TAL metals with Hg and CN, MNA parameters
5	PRIDCO East	3 overburden wells	TCL VOCs, TAL metals with Hg and CN, MNA parameters
6	PRIDCO West	3 overburden wells	TCL VOCs, TAL metals with Hg and CN, MNA parameters
7	RETRO Plant	None (eliminated via soil vapor screening)	None
8	Raul Lugo	None (eliminated via soil vapor screening)	None
9	Former Don Paco #1	None (eliminated via soil vapor screening)	None
10	Former Don Paco #2	None (eliminated via soil vapor screening)	None
11	Unfinished Strip Mall	None (eliminated via soil vapor screening)	None
12	TBD A	Eliminated via reconnaissance	None
	Total Samples		**14 TCL VOCs/TAL metals/5 MNA parameters**

[1] CDM Smith assumes 6 PSAs will require overburden monitoring wells. The actual locations will be determined based on the sampling results.
[2] MNA parameters will be collected from 5 overburden wells and will include: TSS, TDS, alkalinity, ammonia, hardness, TKN, chloride, MEE, nitrate/nitrite, sulfate, sulfide, TOC

Abbreviations:
CLP = Contract Laboratory Program
CN = cyanide
Hg = mercury
MEE = methane/ethene/ethane
MNA = monitored natural attenuation
PRIDCO = Puerto Rico Industrial Development Company
PSA = potential source area
TAL = Target Analyte List
TCL = Target Compound List
TDS = total dissolved solids
TKN = total Kjeldahl nitrogen
TOC = total organic carbon
TSS = total suspended solids
VOC = volatile organic compound

Table 3-9
Indoor Air Sampling
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

No.	Location name*	Analysis - CLP	Samples
1	Property A	TO-15	2
2	Property B	TO-15	2
3	Property C	TO-15	2
4	Property D	TO-15	2
5	Property E	TO-15	2
6	Ambient air samples	TO-15	5
7	TBD*	TO-15	2
	Total		**17 samples**

*Additional site reconnaissance may be required to identify additional properties.

Abbreviations:
CLP = Contract Laboratory Program
TBD = to be determined

Table 3-10
Potential Source Area Drainage Feature Sampling
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

No.	PSA Location[1]	Surface Water	Analytical (CLP)	Sediment	Analytical (CLP)
1	Extasy Q Prints	2 samples	TCL VOCs and hardness	2 samples	TCL VOCs and TOC
2	Cabo Rojo Professional Dry Cleaners	2 samples	TCL VOCs and hardness	2 samples	TCL VOCs and TOC
3	D'Elegant Fantastic Dry Cleaners	2 samples	TCL VOCs and hardness	2 samples	TCL VOCs and TOC
4	Serrano II Dry Cleaners	2 samples	TCL VOCs and hardness	2 samples	TCL VOCs and TOC
5	PRIDCO East	3 samples	TCL VOCs and hardness	3 samples	TCL VOCs and TOC
6	PRIDCO West	3 samples	TCL VOCs and hardness	3 samples	TCL VOCs and TOC
7	RETRO Plant	None (eliminated via soil vapor screening)	None	None	None
8	Raul Lugo	None (eliminated via soil vapor screening)	None	None	None
9	Former Don Paco #1	None (eliminated via soil vapor screening)	None	None	None
10	Former Don Paco #2	None (eliminated via soil vapor screening)	None	None	None
11	Unfinished Strip Mall	None (eliminated via soil vapor screening)	None	None	None
12	TBD A	Eliminated via reconnaissance	None	None	None
	Total Samples		**14**	**14**	**14**

[1] CDM Smith assume 6 PSAs will require surface water and sediment sampling to evaluate contamination. The actual locations will be determined based on PSA reconnaissance.

Abbreviations:
CLP = Contract Laboratory Program
PRIDCO = Puerto Rico Industrial Developm
PSA = potential source area
TBD = to be determined
TCL = Target Compound List
TOC = total organic carbon
VOC = volatile organic compound

Table 3-11
Analytical Summary
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

Sample Type	CLP Analysis															Non-RAS Analysis						Field Screening							
	TCL VOC[1]	TAL Inorganics[2]	TO-15	Soil Moisture	chloride	nitrate/nitrite	sulfate	sulfide	TOC (aqueous)	TSS	TDS	alkalinity	ammonia	hardness	TKN	TCL VOCs[3]	TOC (soil)	pH	Soil Moisture	Grain size	MEE	Field GC[4]	Ferrous Iron	pH	ORP	Temperature	Turbidity	SpC	DO
Existing Well Sampling	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GROUNDWATER	18																												
Duplicates	1																												
MS/MSD	1																												
Field Blank	2																												
Trip Blank	8																												
PSA Soil Vapor Screening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	84	0	0	0	0	0	0	0
SOIL VAPOR																7						80							
Duplicates																1						4							
MS/MSD																1													
Field Blank																1													
Trip Blank																													
PSA Soil Screening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	221	0	0	0	0	0	0	0
SOIL																11			0			210							
Duplicates																1			0			11							
MS/MSD																1													
Field Blank																1													
Trip Blank																													
PSA Groundwater Screening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	147	0	0	0	0	0	0	0
GROUNDWATER																7						140							
Duplicates																1						7							
MS/MSD																1													
Field Blank																1													
Trip Blank																1													
PSA Soil Delination Sampling	90	90	0	38	0	0	0	0	0	0	0	0	0	0	0	0	38	38	0	38	0	0	0	0	0	0	0	0	0
SOIL	72	72		36													36	36		36									
Duplicates	3	3		2													2	2		2									
MS/MSD	3	3																											
Field Blank	12	12																											
Trip Blank																													
Multiport Wireline Sampling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0
GROUNDWATER																30													
Duplicates																2													
MS/MSD																2													
Field Blank																3													
Trip Blank																9													
Well Sampling - Round 1[5]	61	56	0	0	22	22	22	22	22	22	22	22	22	22	22	0	0	0	0	0	22	0	17	44	44	44	44	44	44
GROUNDWATER	44	44			20	20	20	20	20	20	20	20	20	20	20						20		15	44	44	44	44	44	44
Duplicates	3	3			1	1	1	1	1	1	1	1	1	1	1						1		1						
MS/MSD	3	3			1	1	1	1	1	1	1	1	1	1	1						1		1						
Field Blank	6	6																											
Trip Blank	5																												
Indoor Air Sampling	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AIR			17																										
Duplicates			2																										
MS/MSD																													
Field Blank																													
Trip Blank																													
Drainage Features Sampling	22	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SURFACE WATER	14													14															
Duplicates	1													2															
MS/MSD	1																												
Field Blank	3																												
Trip Blank	3																												
Drainage Features Sampling	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0
SEDIMENT	14																14												
Duplicates	1																2												
MS/MSD	1																												
Field Blank	3																												
Trip Blank	0																												
	222	146	19	38	22	22	22	22	22	22	22	22	22	38	22	81	54	38	0	38	22	452	17	44	44	44	44	44	44

Notes:

[1] SOM01.2
[2] ISM01.3, including mercury and cyanide
[3] 48 hour turn-around time
[4] tetrachloroethene (PCE), trichloroethene (TCE) and dichloroethene (DCE)
[5] Round 1 includes 30 ports and 14 single screen wells.

Abbreviations:

DO = dissolved oxygen
GC = gas chromatograph
MEE = methane/ethane/ethene
MS/MSD = matric spike/matrix spike duplicate
ORP = oxidation reduciton potential
PSA = potential source area
SpC = specific conductivity
TAL = Target Analyte List
TCL = Target Compound List
TDS = total dissolved solids
TKN = total Kjeldahl nitrogen
TOC = total organic carbon
TSS = total suspended solids
VOC = volatile organic compound

Table 3-12
Proposed RI Report Format
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

1.0 Introduction
- 1.1 Purpose of Report
- 1.2 Site Background
  - 1.2.1 Site Description
  - 1.2.2 Site History
  - 1.2.3 Previous Investigations
- 1.3 Report Organization

2.0 Study Area Investigation
- 2.1 Surface Features
- 2.2 Contaminant Source Investigations
- 2.3 Meteorological Investigations
- 2.4 Surface Water and Sediment Investigations
- 2.5 Geological Investigations
- 2.6 Soil and Vadose Zone Investigation
- 2.7 Groundwater Investigation
- 2.8 Human Population Surveys
- 2.9 Ecologic Investigation

3.0 Physical Characteristics of Site
- 3.1 Topography
- 3.2 Meteorology
- 3.3 Surface Water and Sediment
- 3.4 Geology
- 3.5 Hydrogeology
- 3.6 Soils
- 3.7 Demographics and Land Use

4.0 Nature and Extent of Contamination
- 4.1 Sources of Contamination
- 4.2 Soils
- 4.3 Groundwater
- 4.4 Surface Water and Sediments

5.0 Contaminant Fate and Transport
- 5.1 Routes of Migration
- 5.2 Contaminant Persistence
- 5.3 Contaminant Migration

6.0 Baseline Risk Assessment (If conducted, submitted separately from RI report)

7.0 Screening Level Ecological Risk Assessment (if conducted, submitted separately from RI report)

8.0 Summary and Conclusions
- 7.1 Source(s) of Contamination
- 7.2 Nature and Extent of Contamination
- 7.3 Fate and Transport
- 7.4 Risk Assessment
- 7.5 Data Limitations and Recommendations for Future Work
- 7.6 Recommended Remedial Action Objectives

Appendices: Boring Logs, Hydrogeologic Data, Analytical Data/QA/QC Evaluation

Table 3-13
Detailed Evaluation Criteria for Remedial Alternatives
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

- SHORT-TERM EFFECTIVENESS
  - Protection of community during remedial action
  - Protection of workers during remedial actions
  - Time until remedial response objectives are achieved
  - Environmental impacts
- LONG-TERM EFFECTIVENESS
  - Magnitude of risk remaining at the site after the response objectives have been met
  - Adequacy of controls
  - Reliability of controls
- REDUCTION OF TOXICITY, MOBILITY OR VOLUME THROUGH TREATMENT
  - Treatment process and remedy
  - Amount of hazardous material destroyed or treated
  - Reduction in toxicity, mobility or volume of the contaminants
  - Irreversibility of the treatment
  - Type and quantity of treatment residuals
- IMPLEMENTABILITY
  - Ability to construct technology
  - Reliability of technology
  - Ease of undertaking additional remedial action, if necessary
  - Monitoring considerations
  - Coordination with other agencies
  - Availability of treatment, storage capacity, and disposal services
  - Availability of necessary equipment and specialists
  - Availability of prospective technologies
- COST
  - Capital costs
  - Annual operating and maintenance costs
  - Present worth
  - Sensitivity Analysis
- COMPLIANCE WITH ARARs
  - Compliance with chemical-specific ARARs
  - Compliance with action-specific ARARs
  - Compliance with location-specific ARARs
  - Compliance with appropriate criteria, advisories and guidance
- OVERALL PROTECTION OF HUMAN HEALTH AND ENVIRONMENT
- COMMONWEALTH ACCEPTANCE
- COMMUNITY ACCEPTANCE

Table 3-14
Proposed Feasibility Study Report Format
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

1.0 Introduction
- 1.1 Purpose and Organization of Report
- 1.2 Site Description and History
- 1.3 Summary of the Remedial Investigation
- 1.4 Physical Characteristics of the Study Area
- 1.5 Nature and Extent of Contamination
- 1.6 Contaminant Fate and Transport and Conceptual Site Model
- 1.7 Baseline Risk Assessment

2.0 Identification and Screening of Technologies
- 2.1 Identification of Remedial Action Objectives
  - Contaminants of Interest
  - Allowable Exposure Based on Risk Assessment
  - Allowable Exposure Based on ARARs
  - Development of Remedial Action Objectives
- 2.2 Potential ARARs, Guidelines, and Other Criteria
  - Chemical-specific ARARs and TBCs
  - Location-specific ARARs
  - Action-specific ARAs and TBCs
- 2.3 Preliminary Remediation Goals
- 2.2 General Response Actions for Each Medium
  - No Action
  - Technologies
- 2.3 Identification and Screening of Remedial Technologies and Process Options
  - 2.3.1 Description of Technologies
  - 2.3.2 Screening of Technologies

3.0 Development of Remedial Alternatives
- 3.1 Assumptions
- 3.2 Description of Remedial Alternatives
  - 3.2.1 Elements Common to all Alternatives
  - 3.2.2 Alternative 1
- 3.3 Screening of Alternatives
  - 3.3.1 Alternative 1

4.0 Detailed Analysis of Alternatives
- 4.1 Description of Evaluation Criteria
  - Short-Term Effectiveness
  - Long-Term Effectiveness and Permanence
  - Implementability
  - Reduction of Mobility, Toxicity, or Volume Through Treatment
  - Compliance with ARARs
  - Overall Protection
  - Cost
  - State Acceptance
  - Community Acceptance
- 4.2 Individual Analysis of Alternatives
- 4.3 Summary

5.0 Comparative Analysis of Alternatives
- 5.1 Comparison Among Alternatives For Each Medium

Figures

LEGEND

- Public Supply Well with VOCs detections
- Public Supply Well
- MacDougal Pump Station

0 Approximate Scale 1 mile

Figure 1-1
Site Location Map
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

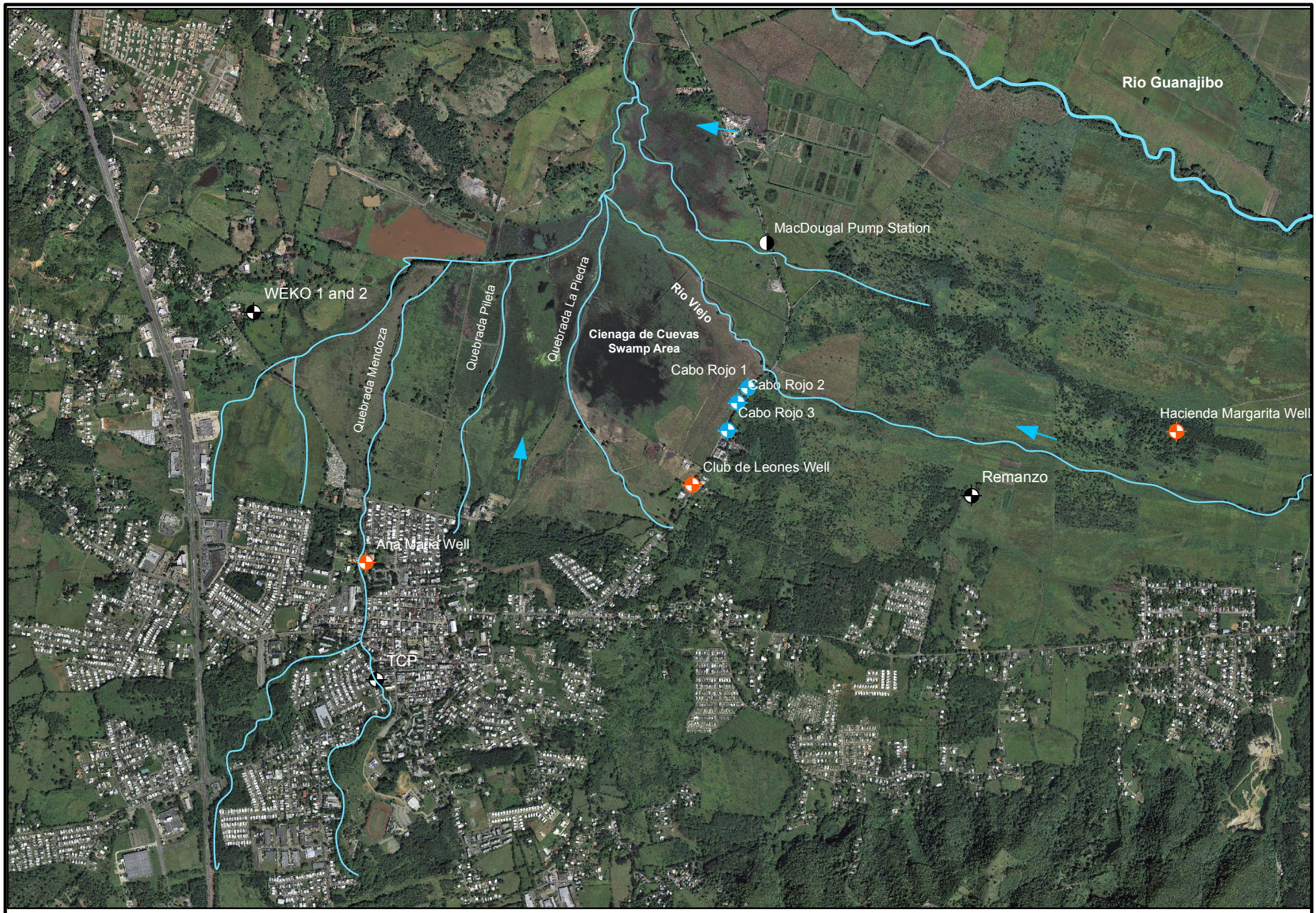
CDM Smith

Table 1-2
Cabo Rojo Area Well Construction and Status
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

Name	Depth of Well[1]	Open or Screened Section depth interval[1]	Status
Ana Maria	200	40-200	Operating
Club de Leones	150	90-150	Operating
Cabo Rojo 1	n/a	n/a	Operating*
Cabo Rojo 2	n/a	n/a	Operating
Cabo Rojo 3	n/a	n/a	Operating*
Hacienda Margarita	n/a	n/a	Operating*
MacDougal	175	50-175	Operating/Pump Station
Terminal de Carros Publicos	n/a	n/a	Inactive
Weko 1	n/a	n/a	Inactive
Weko 2	n/a	n/a	Inactive
Remanzo	n/a	n/a	n/a

[1] in feet, taken from Rodriguez 1996 (USGS)

* Source for well status is based on ASTDR report



Legend

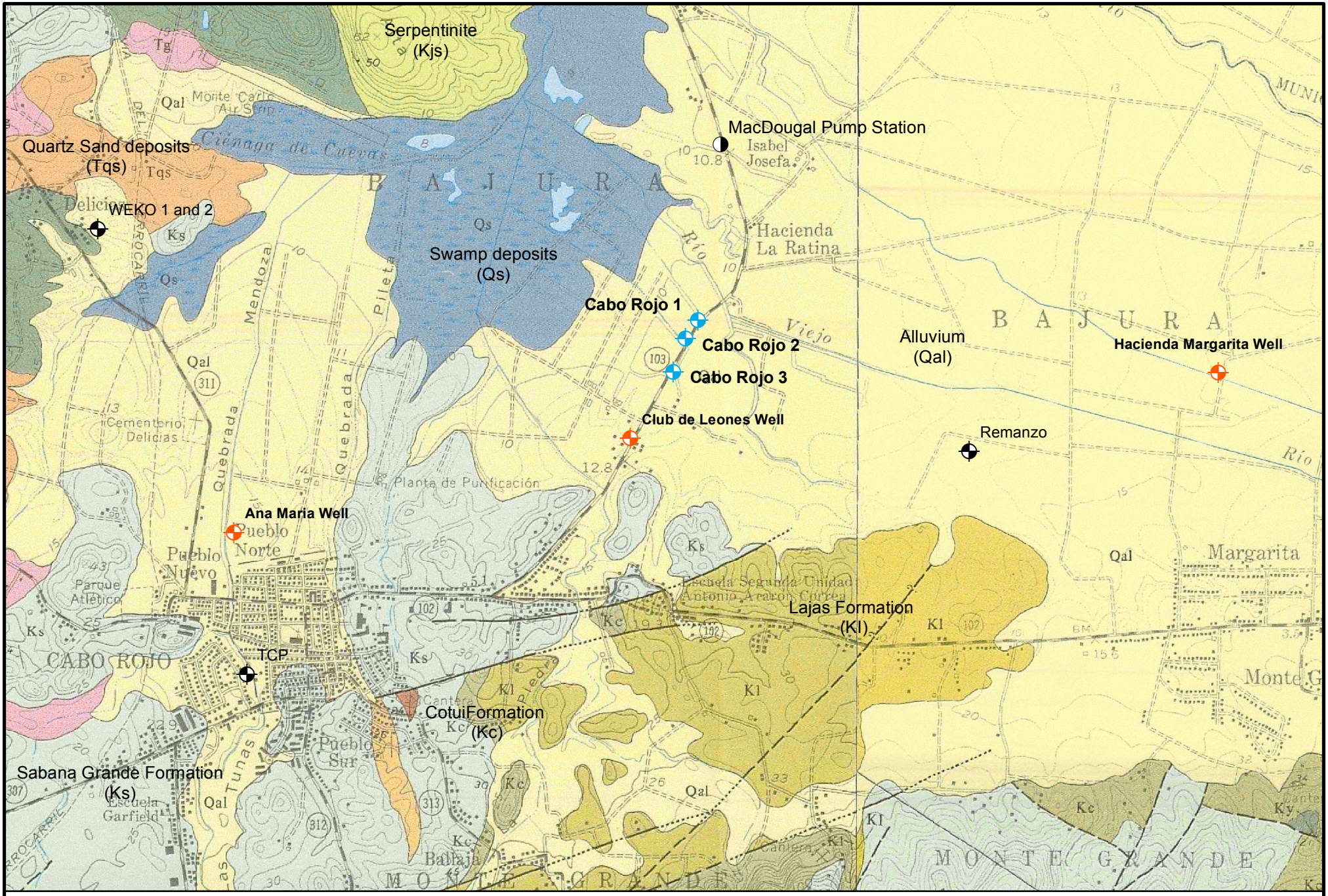
- CR Urbano Public Supply Wells
- Public Supply Wells with VOC's detections
- MacDougal Pump Station
- Inactive Wells

N

0 440 880 1,760 2,640 3,520 Feet

Figure 2-1
Surface Drainage System
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

CDM Smith



Legend

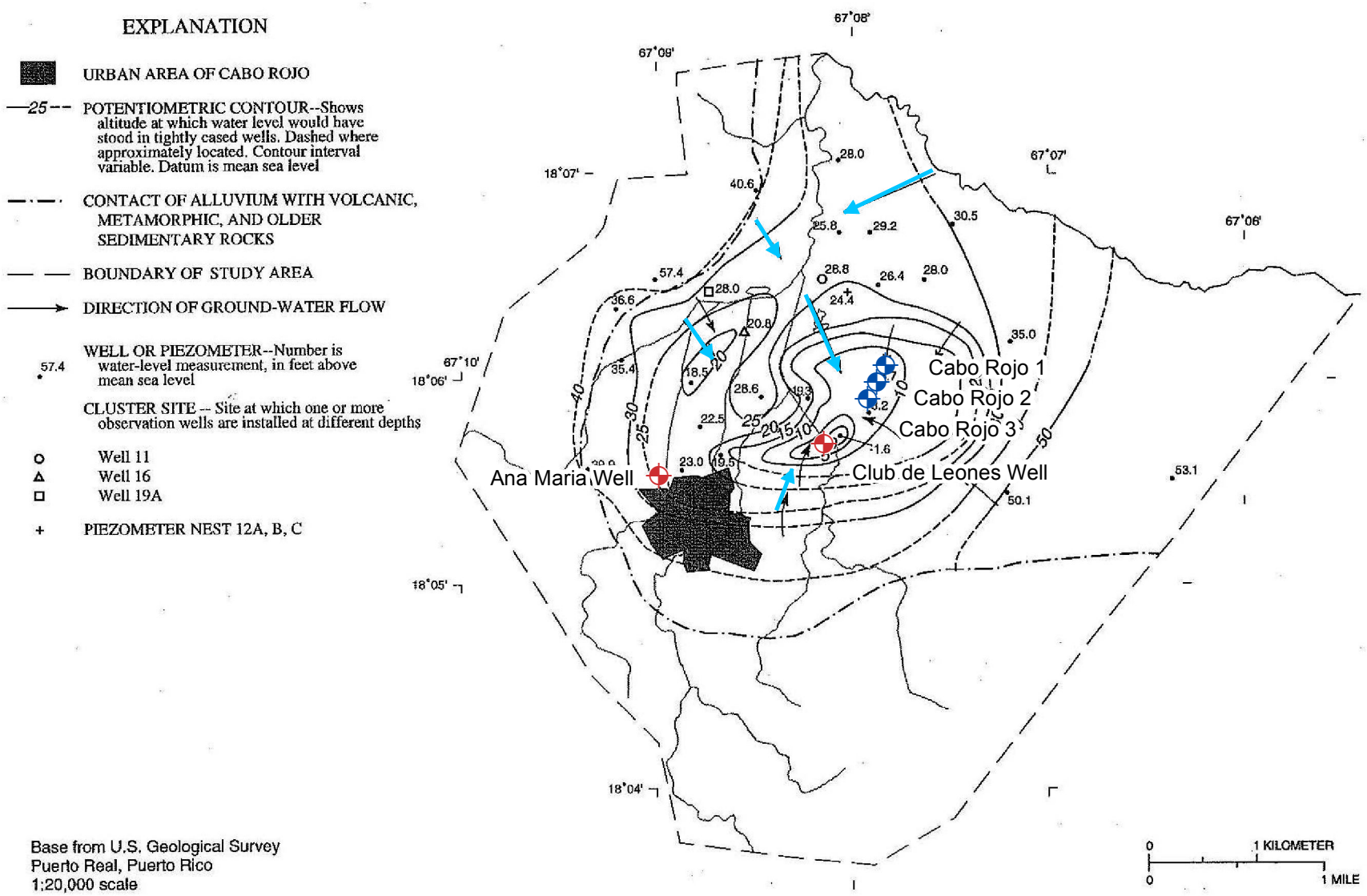
- Public Supply Wells w/VOCs detections
- Public Supply Wells
- MacDougal Pump Station
- Inactive Wells

N

0 362.5 725 1,450 2,175 2,900 Feet

Figure 2-2
Site Geologic Map
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

CDM Smith



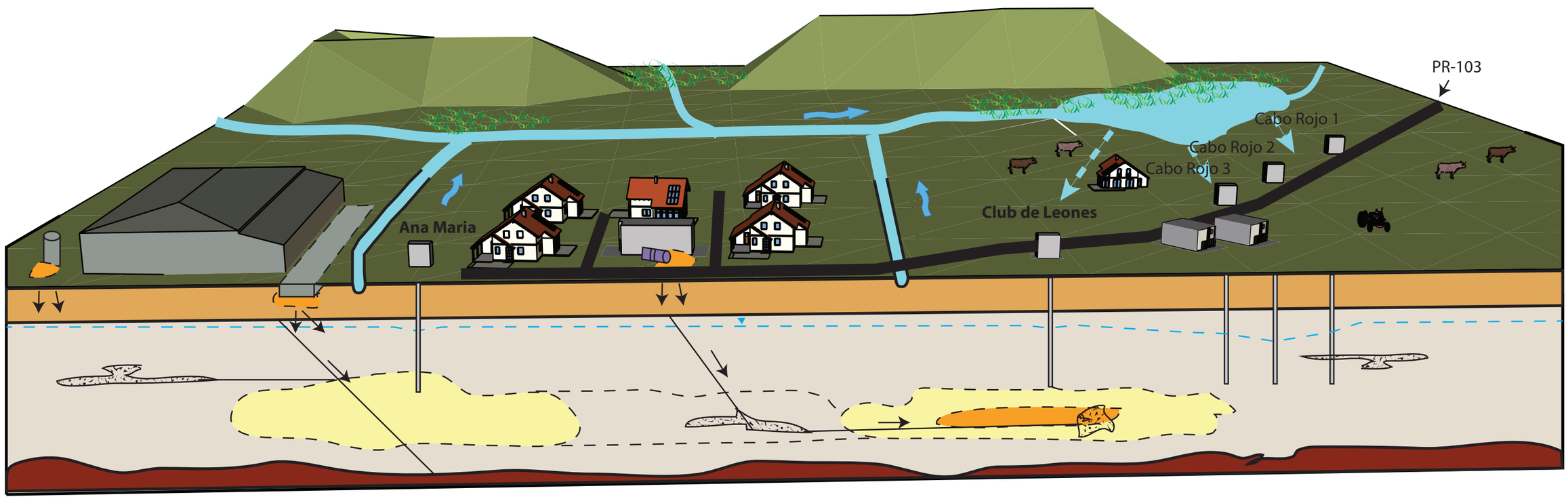
LEGEND

CR Public Supply Well Approximate Location

Taken from Rodríguez,1996

Figure 2-3
Site Vicinity Proposed Potentiometric Surfaces
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

CDM Smith



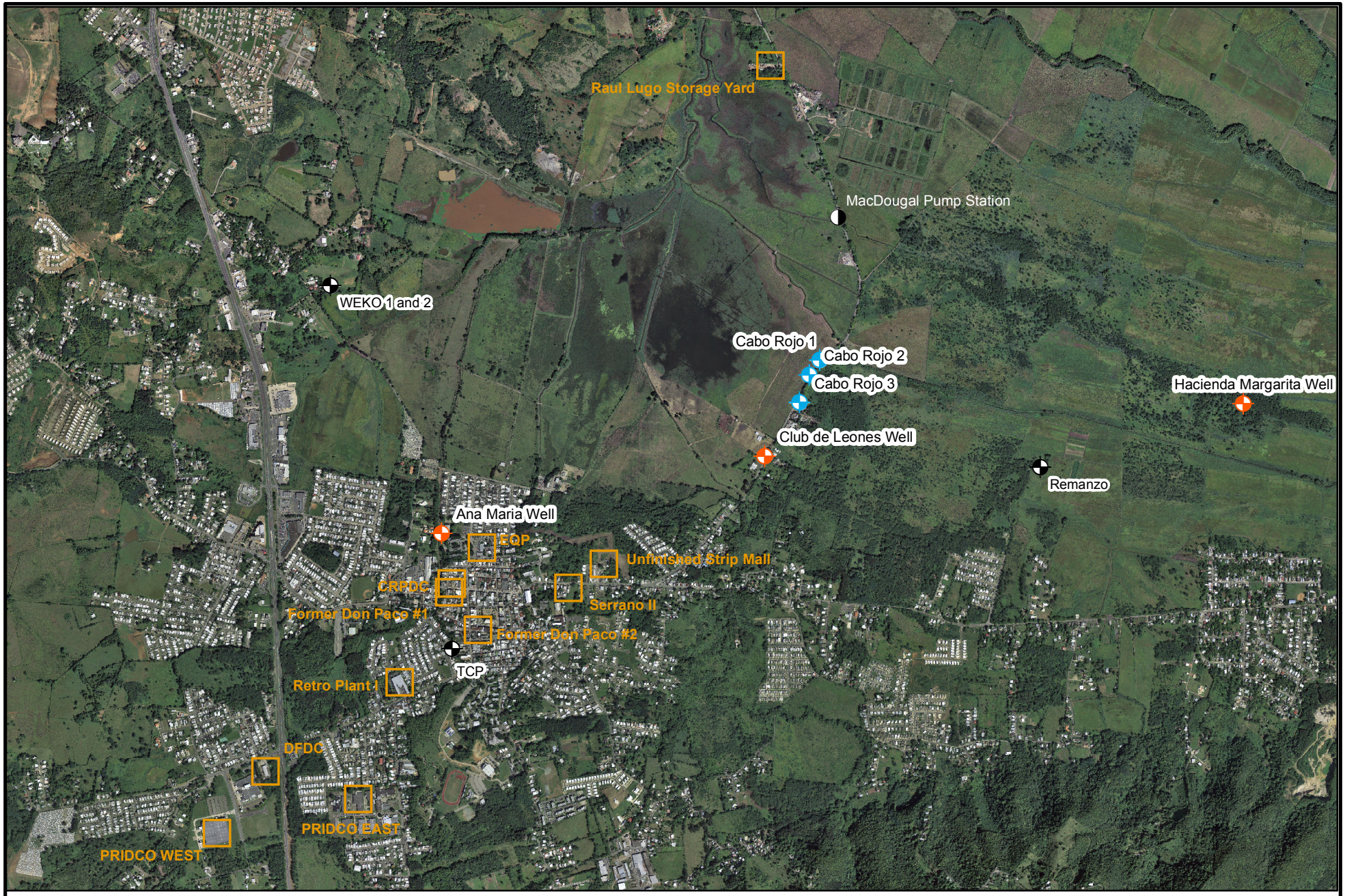
LEGEND

- Overburden
- Limestone rock
- Volcanic rock
- Potential solution features
- Groundwater flow
- Water table
- Contamination plume
- Surface drainage
- Dissolved contaminant flow
- Fracture planes

Not to scale

Figure 2-4
Conceptual Site Model
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

CDM Smith



Legend

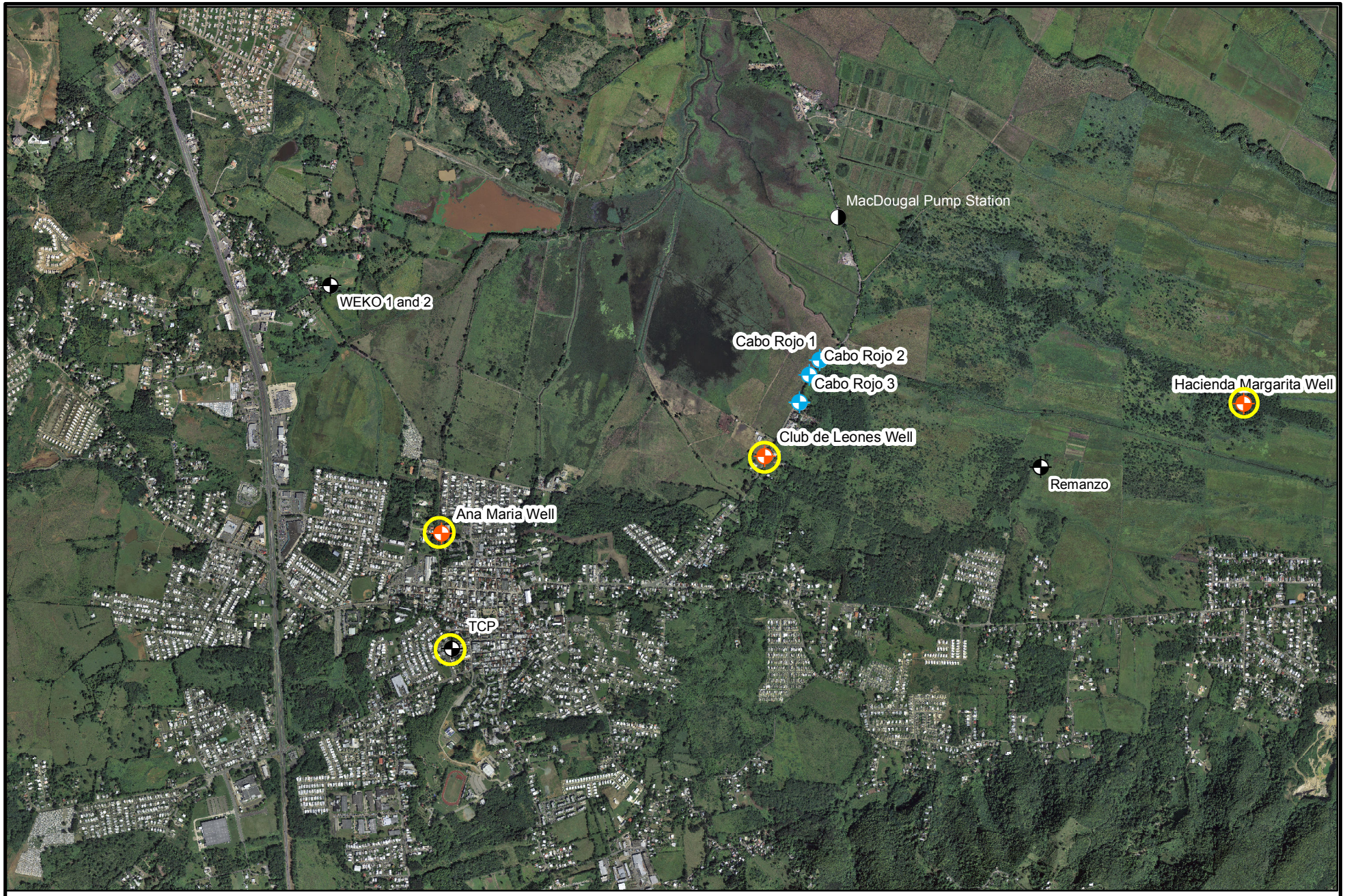
- Public Supply Wells
- Public Supply Wells
- Inactive Wells
- Potential Source Area Location*
- Pump Station Location

0 4,000 Feet

*** Additional locations would be identified during the site reconnaissance and as site information becomes available.**

Figure 3-1
Proposed Potential Sorce Area Investigation Locations
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

CDM Smith



Legend

- Public Supply Wells
- Pump Station Location
- Inactive Wells
- Geophysical Logging and Well Evaluation Location *
- Public Supply Wells w/VOCs detections

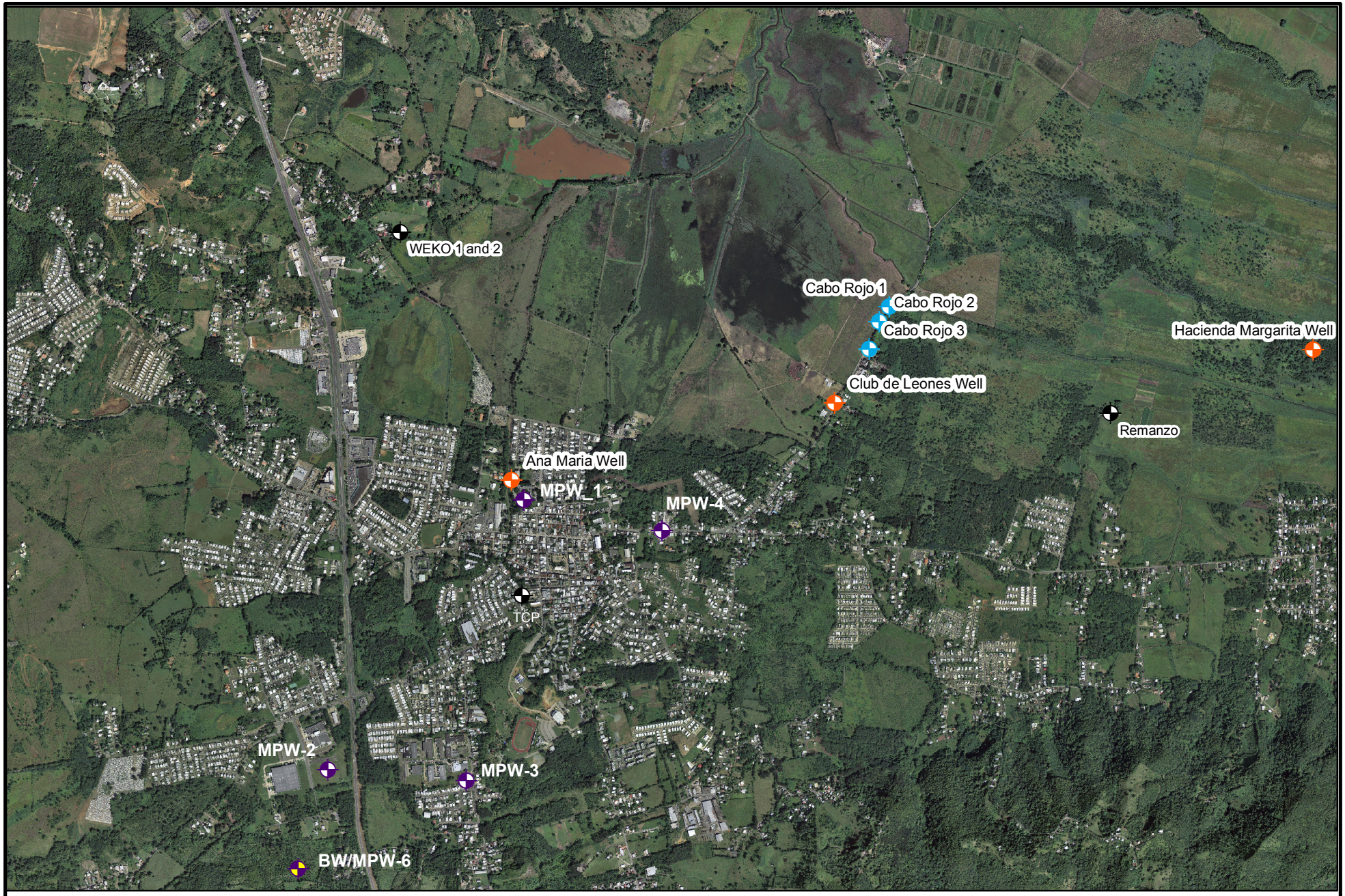
N

0 — 4,000 Feet

* Additional locations would be identified during the site reconnaissance and as site information becomes available.

Figure 3-2
Proposed Geophysical logging and Well Evaluation Location
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

CDM Smith



Legend

- Public Supply Wells
- Public Supply Wells
- Inactive Wells
- Multiport Well Location*
- Background/Miltiport Well Location

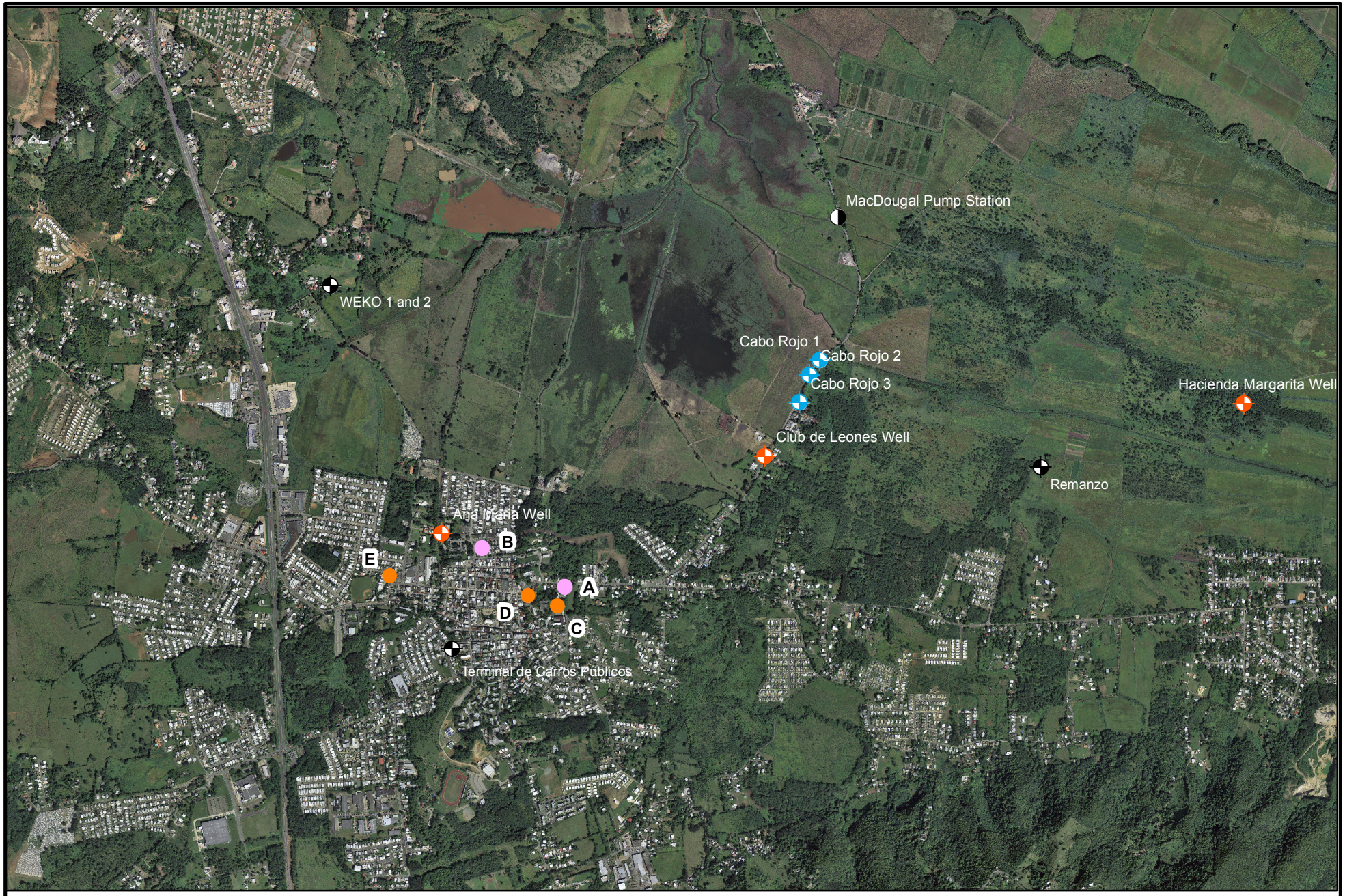
* Additional locations would be identified during site reconnaissance and as site information becomes available.

N

0 — 4,000 Feet

Figure 3-3
Proposed Multiport and Background Well Locations
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

CDM Smith



Legend

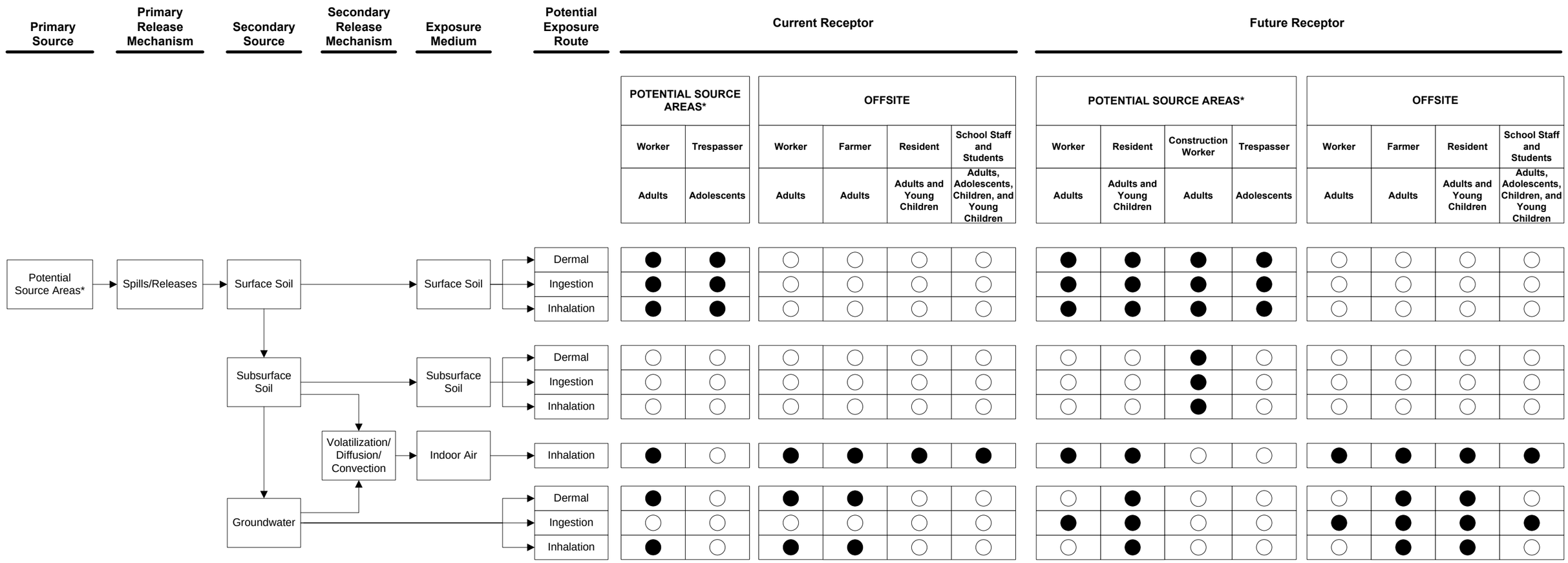
- Soil Vapor Location
- Indoor Air Location
- Public Supply Wells
- Public Supply Well with VOCs detections
- Inactive Wells
- Pump Station Location

N

0 4,000 Feet

Figure 3-4
Proposed Soil Vapor and Indoor Air Investigation Locations
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

CDM Smith



*Potential source areas currently include Cabo Rojo Professional Dry Cleaner, Extasy Q Prints, D'Elegant Fantastic Dry Cleaners, Lifescan, Cutler Hammer, PRIDCO Complex, Reto Plant 1, Raul Lugo Storage, and WR Recycling. Each potential source area may be evaluated separately.

Age Group: Adolescents 12-18 years old; Children 6-12 years old; Young Children 0-6 years old

Legend:

● complete exposure pathway

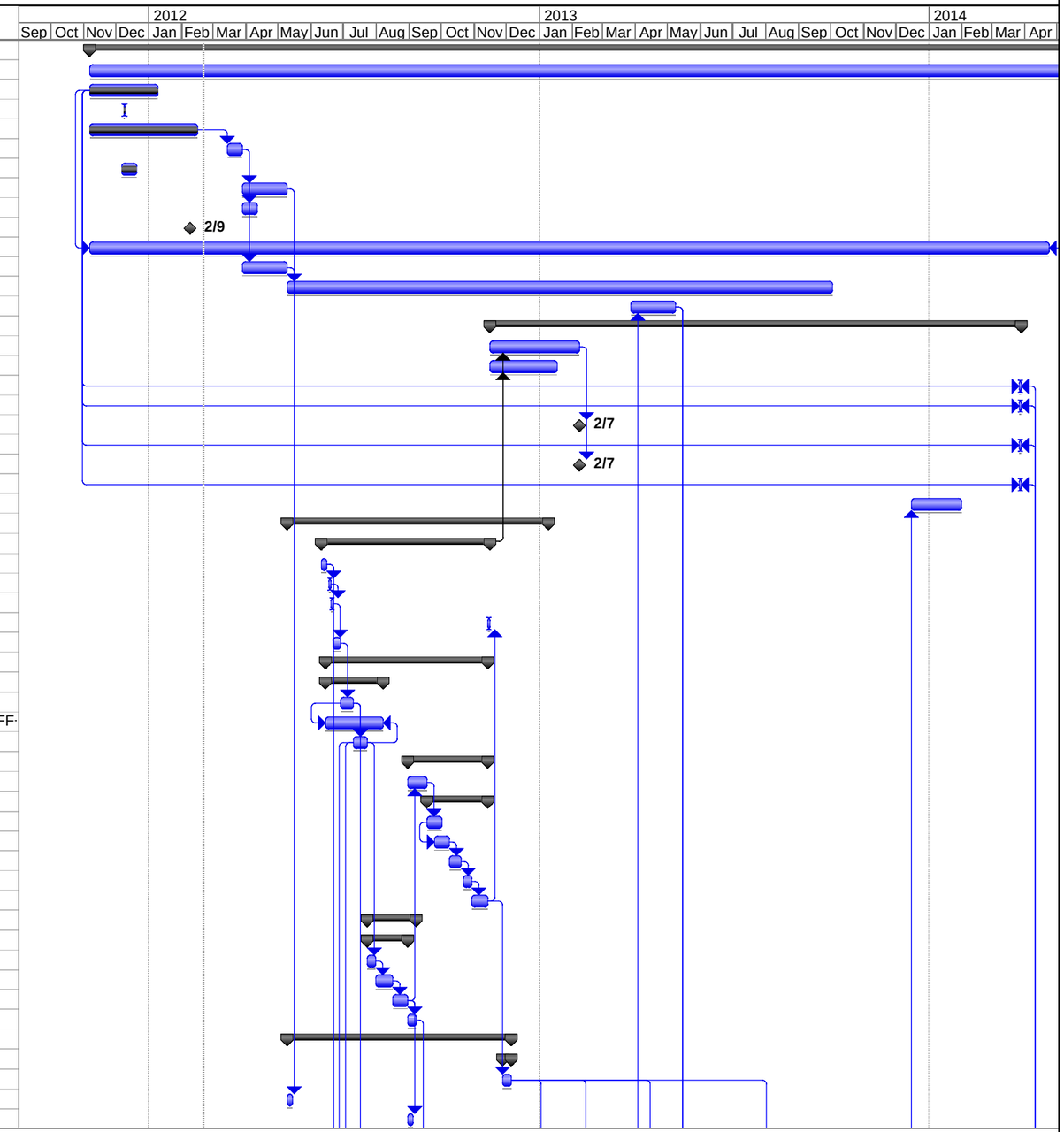
○ incomplete/insignificant exposure pathway

CDM Smith

Figure 3-5
Preliminary Conceptual Site Model
Human Health Risk Assessment
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

Figure 4-1
Proposed Project Schedule
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

ID	Task Name	Subtask	Duration	Start	Finish	Predecessors
1	**Task 1 Project Planning and Support**		**780 days**	**Mon 11/7/11**	**Fri 10/31/14**	
2	Project Administration	1.1	780 days	Mon 11/7/11	Fri 10/31/14	
3	Attend Scoping Meeting	1.2	46 days	Mon 11/7/11	Mon 1/9/12	
4	Conduct Site Visit	1.3	1 day	Fri 12/9/11	Fri 12/9/11	
5	Develop Draft Work Plan and Associated Cost Estimate	1.4	73 days	Mon 11/7/11	Wed 2/15/12	
6	Negotiate and Finalize Draft Work Plan/Budget	1.5	10 days	Thu 3/15/12	Wed 3/28/12	5FS+4 wks
7	Evaluate Existing Data and Documents	1.6	10 days	Wed 12/7/11	Tue 12/20/11	
8	Quality Assurance Project Plan	1.7	30 days	Thu 3/29/12	Wed 5/9/12	6
9	Health and Safety Plan	1.8	10 days	Thu 3/29/12	Wed 4/11/12	6
10	Non-RAS Analysis	1.9	0 days	Thu 2/9/12	Thu 2/9/12	
11	Meetings	1.10	643 days	Mon 11/7/11	Wed 4/23/14	3SS,93FF
12	Subcontract Procurement	1.11	30 days	Thu 3/29/12	Wed 5/9/12	6
13	Subcontract Management	1.12	365 days	Thu 5/10/12	Wed 10/2/13	12
14	Pathway Analysis Report	1.13	6 wks	Thu 3/28/13	Wed 5/8/13	73
15	**Task 2 Community Involvement**		**356 days**	**Fri 11/16/12**	**Fri 3/28/14**	
16	Community Interviews	2.1	60 days	Fri 11/16/12	Thu 2/7/13	26
17	Community Involvement Plan	2.2	45 days	Fri 11/16/12	Thu 1/17/13	26
18	Public Meeting Support	2.3	2 days	Thu 3/27/14	Fri 3/28/14	3SS,99FF
19	Fact Sheet Preparation	2.4	2 days	Thu 3/27/14	Fri 3/28/14	3SS,99FF
20	Proposed Plan Support	2.5	0 days	Thu 2/7/13	Thu 2/7/13	16
21	Public Notices	2.6	2 days	Thu 3/27/14	Fri 3/28/14	3SS,99FF
22	Information Repositories	2.7	0 days	Thu 2/7/13	Thu 2/7/13	16
23	Site Mailing List	2.8	2 days	Thu 3/27/14	Fri 3/28/14	3SS,99FF
24	Reponsiveness Summary Report	2.9	35 days	Mon 12/16/13	Fri 1/31/14	94FS+3 wks
25	**Task 3 Field Investigation**		**175 days**	**Thu 5/10/12**	**Wed 1/9/13**	
26	**Site Reconnaissance**	**3.1**	**114 days**	**Mon 6/11/12**	**Thu 11/15/12**	
27	Potential Source Area Reconnaissance	3.1.1	5 days	Mon 6/11/12	Fri 6/15/12	
28	Existing Well Reconnaissance	3.1.2	2 days	Mon 6/18/12	Tue 6/19/12	27
29	Cultural Resources Survey Oversight	3.1.3	2 days	Wed 6/20/12	Thu 6/21/12	28
30	Topographic Survey Oversight	3.1.4	2 days	Wed 11/14/12	Thu 11/15/12	44
31	Mobilization and Demobilization	3.2	1 wk	Fri 6/22/12	Thu 6/28/12	29
32	**Hydrogeological Assessment**	**3.3**	**108 days**	**Fri 6/15/12**	**Tue 11/13/12**	
33	**Existing Well Evaluation**	**3.3.1**	**38 days**	**Fri 6/15/12**	**Tue 8/7/12**	
34	Downhole Geophysics of Existing Wells	3.3.1.1	8 days	Fri 6/29/12	Tue 7/10/12	31
35	Continuous Water Level Monitoring	3.3.1.2	38 days	Fri 6/15/12	Tue 8/7/12	34SS-2 wks,36FF-
36	Wireline Fracture Zone Groundwater Sampling	3.3.1.3	9 days	Wed 7/11/12	Mon 7/23/12	34
37	**Monitoring Well Installation**	**3.3.2**	**53 days**	**Fri 8/31/12**	**Tue 11/13/12**	
38	Overburden Monitoring Well Installation	3.3.2.1	12 days	Fri 8/31/12	Mon 9/17/12	49
39	**Multiport Well Installation**	**3.3.2.2**	**41 days**	**Tue 9/18/12**	**Tue 11/13/12**	
40	Borehole Drilling	3.3.2.2.1	10 days	Tue 9/18/12	Mon 10/1/12	38
41	Borehole Geophysics	3.3.2.2.2	10 days	Tue 9/25/12	Mon 10/8/12	40SS+1 wk
42	Wireline Fracture Zone Sampling	3.3.2.2.3	9 days	Tue 10/9/12	Fri 10/19/12	41
43	Borehole Hydraulic Conductivity Profiling	3.3.2.2.4	6 days	Mon 10/22/12	Mon 10/29/12	42
44	Multiport Monitoring Well Installation	3.3.2.2.5	11 days	Tue 10/30/12	Tue 11/13/12	43
45	**Soil Boring Drilling and Testing**	**3.4**	**34 days**	**Tue 7/24/12**	**Fri 9/7/12**	
46	**Potential Source Area Investigations**	**3.4.1**	**28 days**	**Tue 7/24/12**	**Thu 8/30/12**	
47	Soil Gas Screening	3.4.1.1	6 days	Tue 7/24/12	Tue 7/31/12	36
48	Soil Screening	3.1.4.2	12 days	Wed 8/1/12	Thu 8/16/12	47
49	Groundwater Screening	3.1.4.3	10 days	Fri 8/17/12	Thu 8/30/12	48
50	Source Area Soil Delineation Borings	3.4.2	6 days	Fri 8/31/12	Fri 9/7/12	49
51	**Environmental Sampling**	**3.5**	**150 days**	**Thu 5/10/12**	**Wed 12/5/12**	
52	**Groundwater Sampling**	**3.5.1**	**6 days**	**Wed 11/28/12**	**Wed 12/5/12**	
53	Groundwater Sampling Round 1	3.5.1.1	6 days	Wed 11/28/12	Wed 12/5/12	44FS+10 days
58	Sub-slab and Indoor Air Sampling	3.5.2	3 days	Thu 5/10/12	Mon 5/14/12	8
56	Drainage Feature Sampling	3.5.3	3 days	Fri 8/31/12	Tue 9/4/12	49

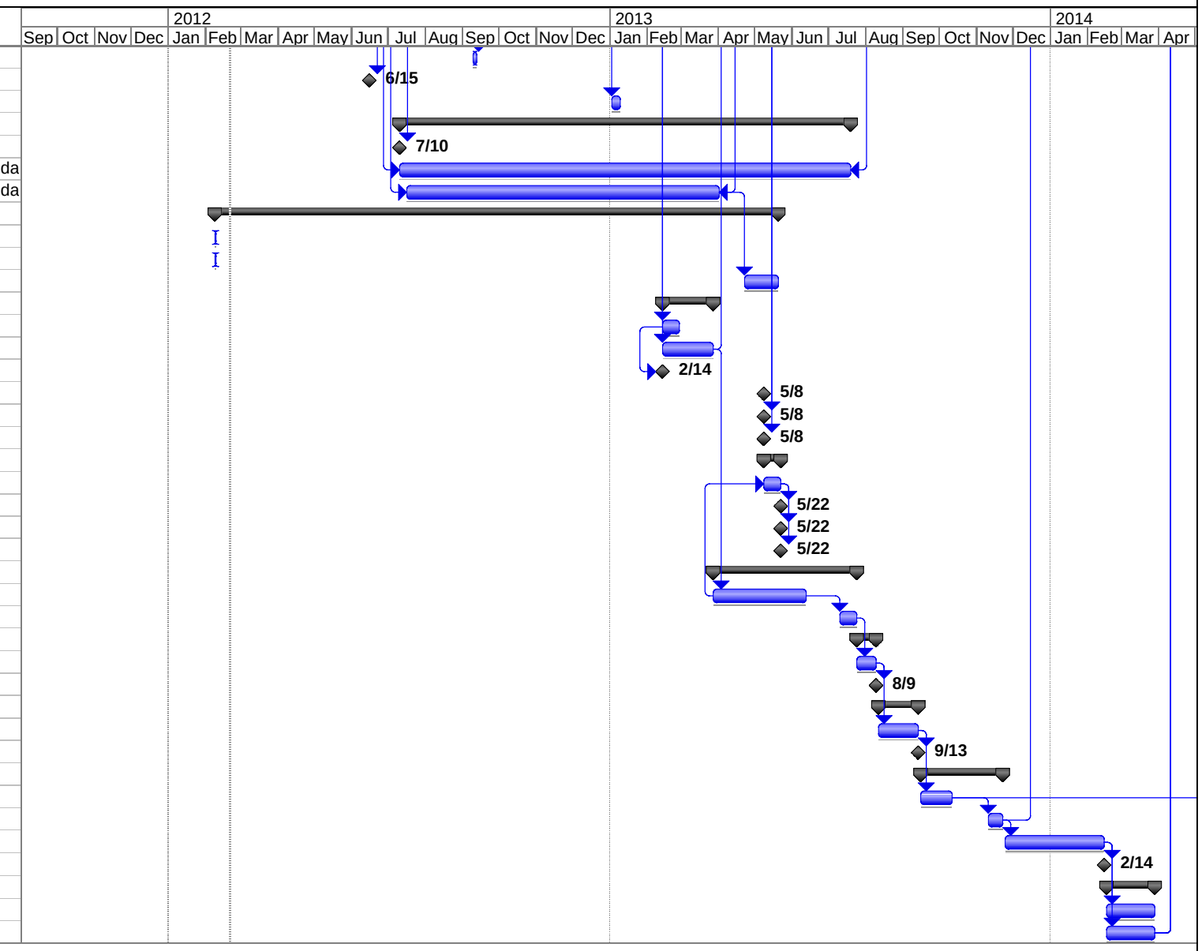


Project: Cabo_Rojo_Schedule-201202
Date: Tue 2/21/12

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Figure 4-1
Proposed Project Schedule
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico

ID	Task Name	Subtask	Duration	Start	Finish	Predecessors
59	Ecological Characterization	3.6	3 days	Mon 9/10/12	Wed 9/12/12	50
61	Geotechnical Survey	3.7	0 days	Fri 6/15/12	Fri 6/15/12	27
62	Investigation Derived Waste	3.8	5 days	Thu 1/3/13	Wed 1/9/13	53FS+4 wks
63	**Task 4 Sample Analytis**		**268 days**	**Tue 7/10/12**	**Fri 7/19/13**	
64	Innovative Methods/Field Screening Sample Analysis	4.1	0 days	Tue 7/10/12	Tue 7/10/12	34
65	Analytical Services Provided by CLP, DESA or EPA-ERT	4.2	268 days	Wed 7/11/12	Fri 7/19/13	36SS,53FF+28 da
66	Non-Routine Analytical Services	4.3	185 days	Tue 7/17/12	Mon 4/1/13	36SS,53FF+28 da
67	**Task 5 Analytical Apport and Data Validation**		**333 days?**	**Thu 2/9/12**	**Mon 5/20/13**	
68	Prepare and Ship Samples	5.1	1 day?	Thu 2/9/12	Thu 2/9/12	
69	Sample Management	5.2	1 day?	Thu 2/9/12	Thu 2/9/12	
70	Data Validation	5.3	4 wks	Tue 4/23/13	Mon 5/20/13	66FS+3 wks
71	**Task 6 Data Evaluation**		**30 days**	**Thu 2/14/13**	**Wed 3/27/13**	
72	Data Usability Evaluation	6.1	10 days	Thu 2/14/13	Wed 2/27/13	53FS+10 wks
73	Data Reduction, Tabulation and Evaluation	6.2	30 days	Thu 2/14/13	Wed 3/27/13	53FS+10 wks
74	Modeling - OPTIONAL	6.3	0 days	Thu 2/14/13	Thu 2/14/13	72SS
75	**Task 7 Risk Assessment**		**0 days**	**Wed 5/8/13**	**Wed 5/8/13**	
76	Baseline Risk Assessment (Human Health) - OPTIONAL	7.1	0 days	Wed 5/8/13	Wed 5/8/13	14
77	Screening Level Ecological Risk Assessment - OPTIONAL	7.2	0 days	Wed 5/8/13	Wed 5/8/13	14
78	**Task 8 Treatibility Study and Pilot Testing**		**10 days**	**Thu 5/9/13**	**Wed 5/22/13**	
79	Literature Search	8.1	2 wks	Thu 5/9/13	Wed 5/22/13	84SS+6 wks
80	Treatibility Study Work Plan - OPTIONAL	8.2	0 days	Wed 5/22/13	Wed 5/22/13	79
81	Conduct Treatibility Studies - OPTIONAL	8.3	0 days	Wed 5/22/13	Wed 5/22/13	79
82	Treatibility Study Report - OPTIONAL	8.4	0 days	Wed 5/22/13	Wed 5/22/13	79
83	**Task 9 Remedial Investigation Report**		**85 days**	**Thu 3/28/13**	**Wed 7/24/13**	
84	Draft Remedial Investigation Report	9.1	11 wks	Thu 3/28/13	Wed 6/12/13	73
85	Final Remedial Investigation Report	9.2	10 days	Thu 7/11/13	Wed 7/24/13	84FS+4 wks
86	**Task 10 Remedial Alternatives Screening**		**12 days**	**Thu 7/25/13**	**Fri 8/9/13**	
87	Draft Technical Memorandum	10.1	12 days	Thu 7/25/13	Fri 8/9/13	85
88	Final Technical Memorandum	10.2	0 days	Fri 8/9/13	Fri 8/9/13	87
89	**Task 11 Remedial Alternatives Evaluation**		**25 days**	**Mon 8/12/13**	**Fri 9/13/13**	
90	Draft Technical Memorandum	11.1	25 days	Mon 8/12/13	Fri 9/13/13	87
91	Final Technical Memorandum	11.2	0 days	Fri 9/13/13	Fri 9/13/13	90
92	**Task 12 Feasibility Study**		**50 days**	**Mon 9/16/13**	**Fri 11/22/13**	
93	Draft Feasibility Study Report	12.1	20 days	Mon 9/16/13	Fri 10/11/13	90
94	Final Feasibility Study Report	12.2	10 days	Mon 11/11/13	Fri 11/22/13	93FS+4 wks
95	**Task 13 Post RI/FS Support - OPTIONAL**		60 days	Mon 11/25/13	Fri 2/14/14	94
96	**Task 14 Administrative Record**		0 days	Fri 2/14/14	Fri 2/14/14	95
97	**Task 15 Work Assignment Closeout**		**30 days**	**Mon 2/17/14**	**Fri 3/28/14**	
98	Document Indexing	15.1	30 days	Mon 2/17/14	Fri 3/28/14	95
99	Document Retention/Conversion	15.2	30 days	Mon 2/17/14	Fri 3/28/14	95



Project: Cabo_Rojo_Schedule-201202
Date: Tue 2/21/12

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

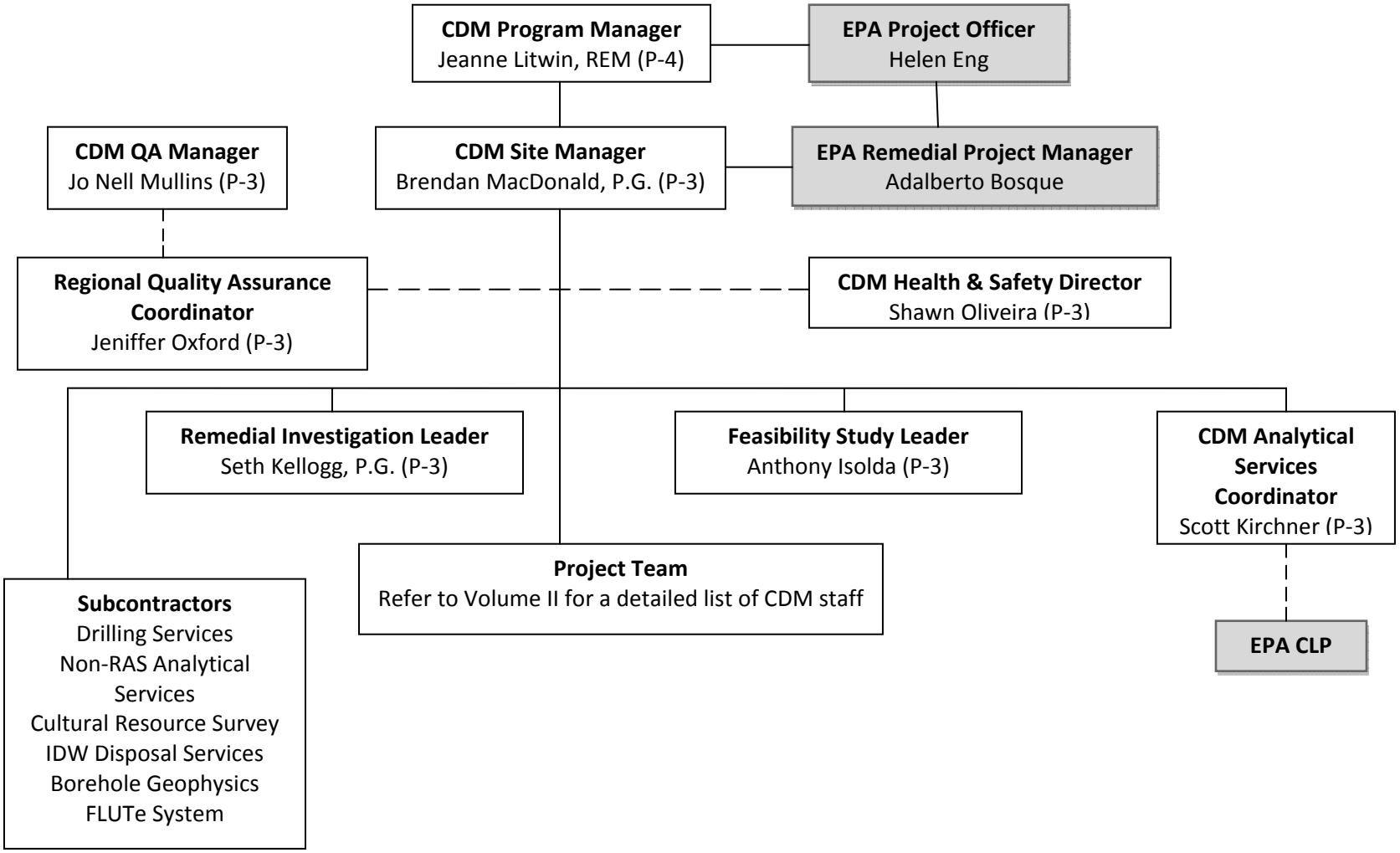



Figure 4-2
Project Organization
Cabo Rojo Groundwater Contamination Site
Cabo Rojo, Puerto Rico