DES Waste Management Division
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095

Spring 2019 Water Quality Monitoring Data Submittal
Tinkham Garage Site
Londonderry, New Hampshire

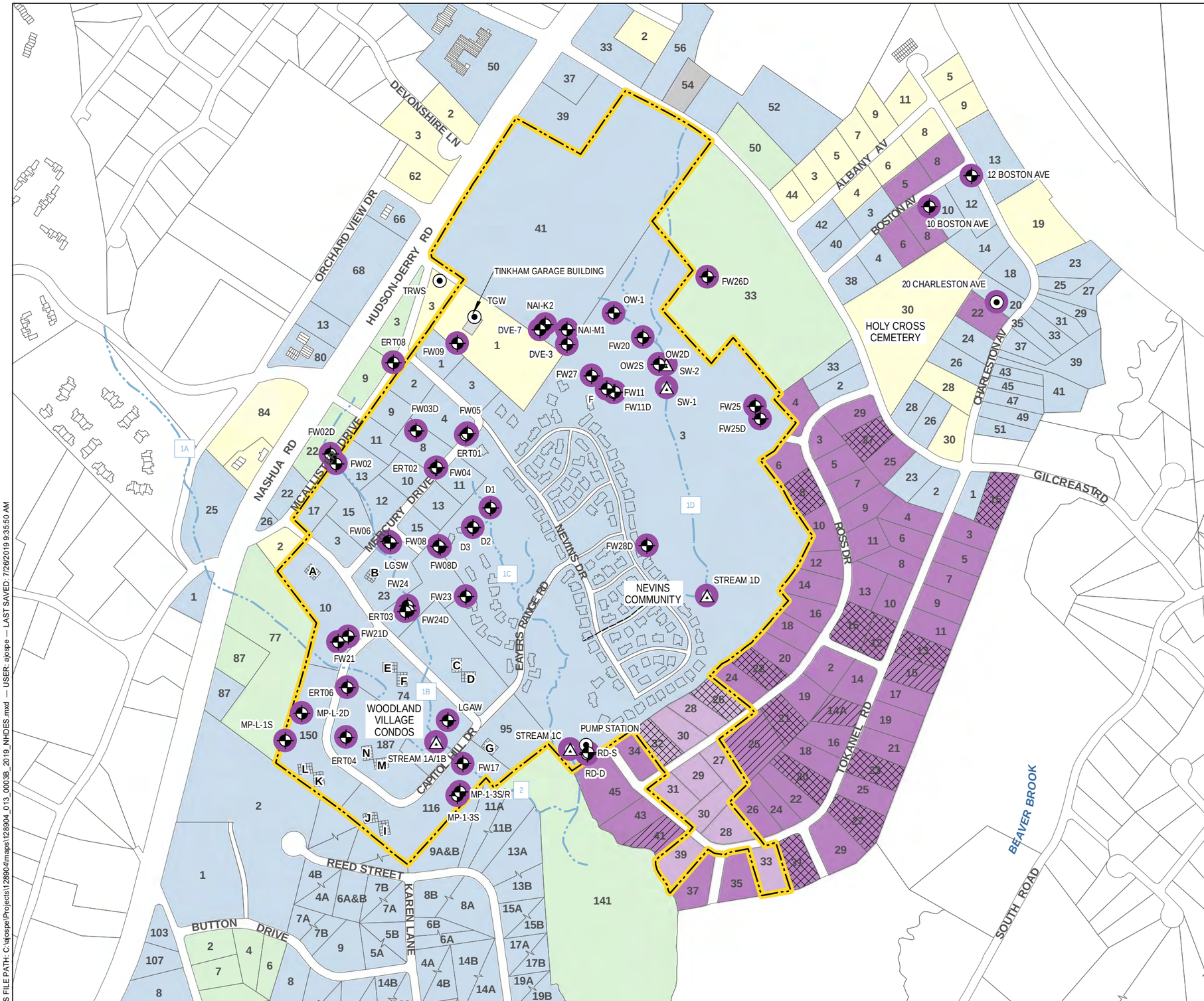
NHDES Site #: 199004008
Project Type: Superfund
Project Number: 0001880

Prepared For:
Cannons Sites Group
1500 Ardmore Blvd. | Suite 502
Pittsburgh, PA 15221-4468
412-244-0917
PRP Remedial Manager - James R. Campbell, Ph.D., P.E.
jrc@e-emi.com

Prepared By:
Haley & Aldrich, Inc.
3 Bedford Farms Drive, Suite 301
Bedford, NH 03110
Phone Number: (603) 625-5353
Contact Name: Amy B. Dykstra
Contact Email: adykstra@haleyaldrich.com

Date of Report: 1 August 2019

File No. 128904-032



LEGEND

- EXISTING MONITORING WELL
- SURFACE WATER SAMPLE
- 2019 GMP FORMER TAP SAMPLE
- 2019 GMP MONITORING LOCATION
- STREAM
- APPROXIMATE LOCATION OF STREAM 1D CULVERT
- STREAM DESIGNATION
- 2018 GROUNDWATER MANAGEMENT ZONE (GMZ)

RESIDENTIAL WELL SAMPLING KEY

- CONNECTED TO PUBLIC WATER SUPPLY
- PRIVATE WELL
- POTENTIAL PRIVATE WELL
- UNDEVELOPED PARCEL
- 2019 GMP PRIVATE WELL SAMPLE LOCATION
- 2019 GMP PRIVATE WELL SAMPLE LOCATIONS WITHIN GMZ
- ACCESS DENIED BY OWNER
- NO RESPONSE FROM OWNER

NOTES

1. ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE.
2. PARCEL ADDRESS SOURCE: TOWN OF LONDONDERRY GIS
3. TAX ID SOURCE: NH GRANIT GIS
4. PARCELS CONNECTED TO PUBLIC WATER BASED ON INFORMATION PROVIDED BY PENNICHUCK WATER IN 2016 AND MAY 2018.

N

0 600 1,200
SCALE IN FEET

HALEY ALDRICH

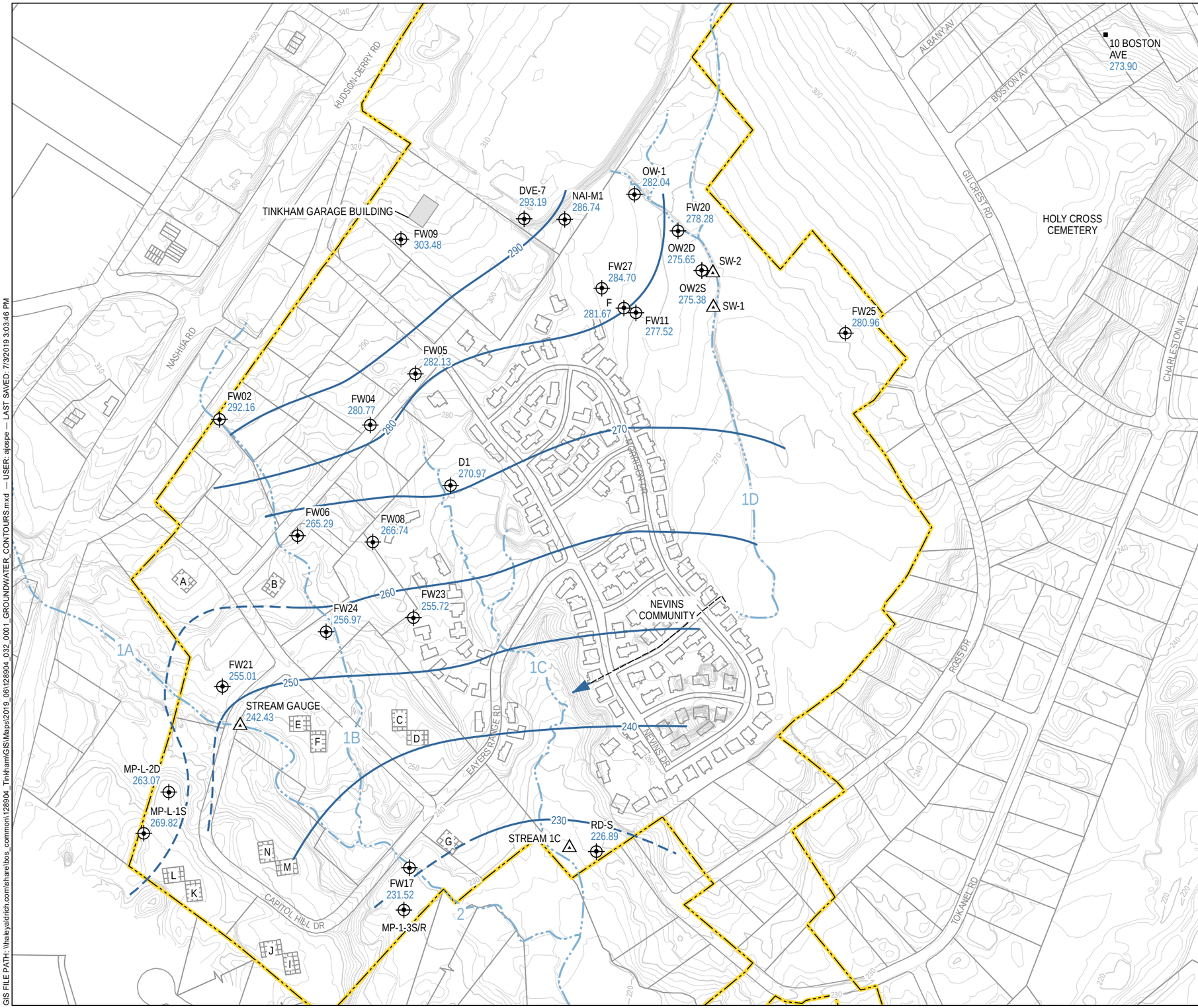
TINKHAM GARAGE SITE
LONDONDERRY, NEW HAMPSHIRE

2019 NHDES GROUNDWATER MANAGEMENT PERMIT MONITORING PROGRAM

AUGUST 2019

FIGURE 1

GIS FILE PATH: C:\ajospe\Projects\128904\maps\128904_013_00038_2019_NHDES.mxd — USER: ajospe — LAST SAVED: 7/26/2019 9:35:50 AM



LEGEND

- OVERBURDEN MONITORING WELL
- RESIDENTIAL WELL
- STREAM GAUGE OR SURFACE WATER SAMPLE
- APPROXIMATE OVERBURDEN GROUNDWATER ELEVATION CONTOUR, IN FEET, 10-FT INTERVAL (MAY 2019)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- STREAM
- APPROXIMATE LOCATION OF STREAM 1D CULVERT
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE.
2. TOPOGRAPHIC CONTOUR AND PARCEL ADDRESS SOURCE: TOWN OF LONDONDERRY GIS
3. MONITORING WELLS SURVEYED BY CLD CONSULTING ENGINEERS, SEPTEMBER 2016.
4. STREAM NAME DESIGNATIONS FROM HALEY & ALDRICH WORKPLAN FOR GROUNDWATER/SURFACE WATER INTERACTION, 1 JUNE 2018.
5. WATER LEVELS MEASURED 16 AND 20 MAY 2019
6. MP-1-3S/R WAS NOT INCLUDED IN CONTOURS BECAUSE IT HAS NOT BEEN SURVEYED.
7. DVE-3 WAS NOT INCLUDED IN THE CONTOURS BECAUSE THE WATER LEVEL WAS INADVERTENTLY TAKEN AT THE WRONG WELL.
8. CONTOURS ARE BASED ON TRIANGULATION BETWEEN F AND FW-11 (± 280), FW-25 (± 281), AND DOWNGRADIENT WELL RD-S (± 227). INFERRED GRADIENT IS CONSISTENT WITH SITE TOPOGRAPHY AND SURFACE DRAINAGE.

N

0 400 800
SCALE IN FEET

HALEY ALDRICH

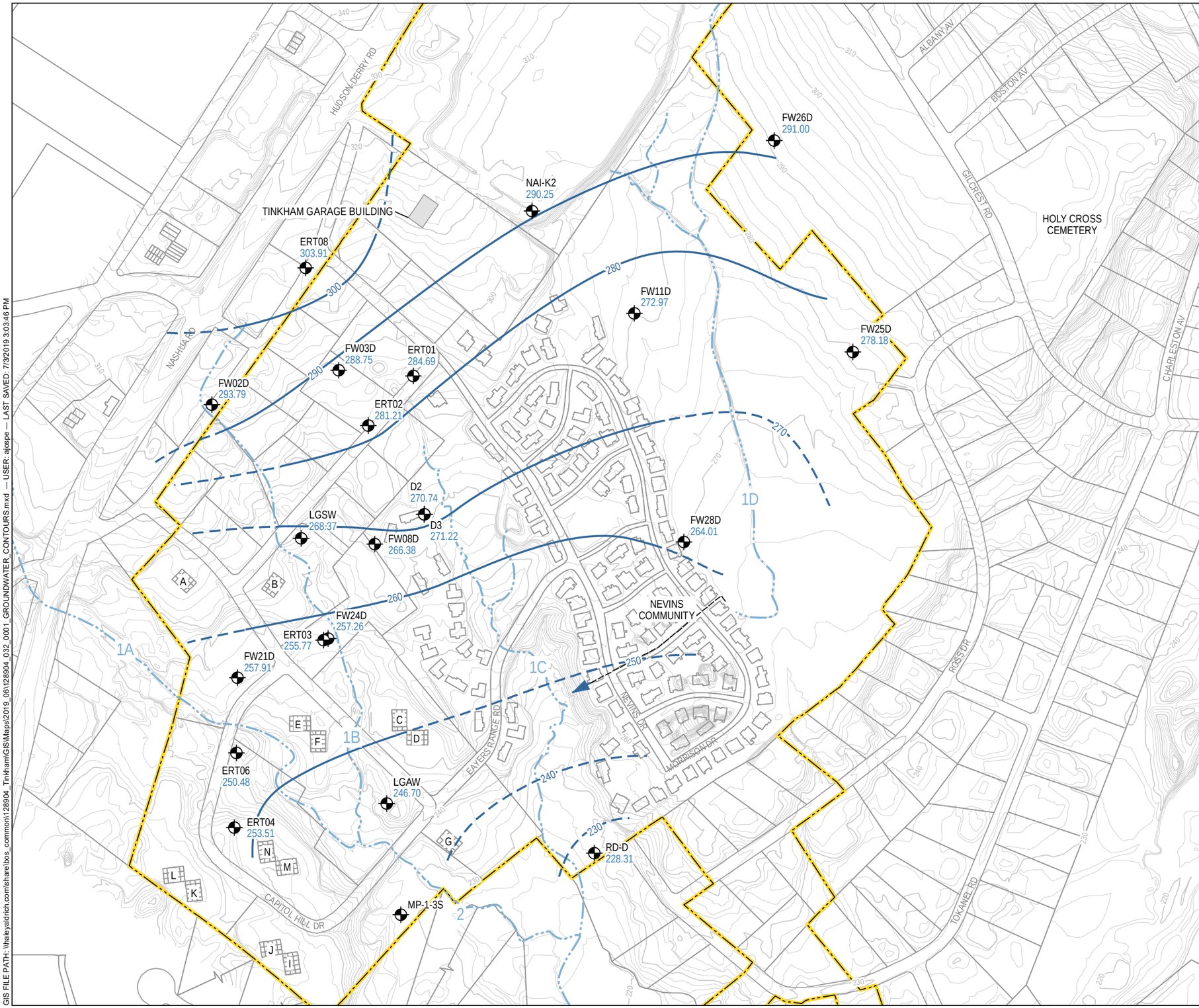
TINKHAM GARAGE SITE
LONDONDERRY, NEW HAMPSHIRE

OVERBURDEN GROUNDWATER CONTOURS - MAY 2019

AUGUST 2019

FIGURE 2

GIS FILE PATH: \\haleyaldrich.com\share\bos_common\128904_Tinkham\GIS\Maps\2019_06\128904_032_001_GROUNDWATER_CONTOURS.mxd — USER: ajospe — LAST SAVED: 7/3/2019 3:03:46 PM



LEGEND

- BEDROCK MONITORING WELL
- APPROXIMATE OVERBURDEN GROUNDWATER ELEVATION CONTOUR, IN FEET, 10-FT INTERVAL (MAY 2019)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- STREAM
- APPROXIMATE LOCATION OF STREAM 1D CULVERT
- GROUNDWATER MANAGEMENT ZONE BOUNDARY

NOTES

1. ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE.
2. TOPOGRAPHIC CONTOUR AND PARCEL ADDRESS SOURCE: TOWN OF LONDONDERRY GIS
3. MONITORING WELLS SURVEYED BY CLD CONSULTING ENGINEERS, SEPTEMBER 2016.
4. STREAM NAME DESIGNATIONS FROM HALEY & ALDRICH WORKPLAN FOR GROUNDWATER/SURFACE WATER INTERACTION, 1 JUNE 2018.
5. WATER LEVELS MEASURED 16 AND 20 MAY 2019
6. FOR MULTI-TIER WELLS FW11D, FW21D, FW28D, AND D3, THE WATER LEVEL FROM THE DEEPEST TIER WAS USED IN THE CONTOUR.
7. MP-1-3S WAS NOT INCLUDED IN THE CONTOURS BECAUSE IT HAS NOT BEEN SURVEYED.
8. CONTOURS ARE BASED ON LINEAR INTERPOLATION BETWEEN DATA POINTS BUT ALSO CONSIDER TOPOGRAPHY AND SURFACE WATER FEATURES.

N

0 400 800
SCALE IN FEET

HALEY ALDRICH

TINKHAM GARAGE SITE
LONDONDERRY, NEW HAMPSHIRE

BEDROCK GROUNDWATER CONTOURS - MAY 2019

AUGUST 2019

FIGURE 3

GIS FILE PATH: \\haleyaldrich.com\share\bos_common\128904_Tinkham\GIS\Maps\2019_08\128904_032_0001_GROUNDWATER_CONTOURS.mxd — USER: ajospe — LAST SAVED: 7/3/2019 3:03:46 PM

NAI-K2	
PCE	**29**
TCE	**57**
cis-1,2-DCE	**110**
VC	**3.5**
1,2-DCA	ND(0.5)

NAI-M1	
PCE	0.58
TCE	1.7
cis-1,2-DCE	2.9
VC	ND(0.5)
1,2-DCA	ND(0.5)

DVE-3	
PCE	ND(0.5)
TCE	ND(0.5)
cis-1,2-DCE	0.64
VC	ND(0.5)
1,2-DCA	ND(0.5)

12 BOSTON AVE	
PCE	ND(0.5)
TCE	0.67
cis-1,2-DCE	ND(0.5)
VC	ND(0.5)
1,2-DCA	ND(0.5)

DVE-7	
PCE	**6.7**
TCE	**6.2**
cis-1,2-DCE	7.2
VC	ND(0.5)
1,2-DCA	ND(0.5)

FW20	
PCE	ND(0.5)
TCE	4.2
cis-1,2-DCE	49
VC	**29**
1,2-DCA	**15**

OW2D	
PCE	0.7
TCE	2.6
cis-1,2-DCE	27
VC	**2.5**
1,2-DCA	**5.8**

ERT01	
PCE	ND(0.5)
TCE	2
cis-1,2-DCE	12
VC	ND(0.5)
1,2-DCA	ND(0.5)

OW2S	
PCE	ND(0.5)
TCE	ND(0.5)
cis-1,2-DCE	2.8
VC	ND(0.5)
1,2-DCA	0.73

LGSW	
PCE	ND(0.5)
TCE	ND(0.5)
cis-1,2-DCE	0.58
VC	ND(0.5)
1,2-DCA	0.63

FW05	
PCE	ND(0.5)
TCE	0.76
cis-1,2-DCE	3.1
VC	ND(0.5)
1,2-DCA	ND(0.5)

FW11D	55 ft	70 ft	90 ft
PCE	ND(0.5)	ND(0.5)	ND(0.5)
TCE	**18**	**20**	0.51
cis-1,2-DCE	**62**	43	43
VC	**2.7**	**7.6**	**30**
1,2-DCA	**6.9**	**21**	**22**

FW21	
PCE	ND(0.5)
TCE	ND(0.5)
cis-1,2-DCE	18
VC	**2.2**
1,2-DCA	ND(0.5)

FW24D	
PCE	ND(0.5)
TCE	ND(0.5)
cis-1,2-DCE	2.1
VC	**2.2**
1,2-DCA	ND(0.5)

FW21D	40 ft	60 ft	78 ft
PCE	ND(0.5)	ND(0.5)	ND(0.5)
TCE	ND(0.5)	ND(0.5)	ND(0.5)
cis-1,2-DCE	22	16	5.8
VC	**5.6**	**2.3**	1.3
1,2-DCA	0.61	0.64	0.61

LGAW	
PCE	ND(0.5)
TCE	ND(0.5)
cis-1,2-DCE	2.8
VC	**2.1**
1,2-DCA	ND(0.5)

ERT04	
PCE	3
TCE	**30**
cis-1,2-DCE	11
VC	ND(0.5)
1,2-DCA	ND(0.5)

MP-1-3S	
PCE	ND(0.5)
TCE	0.53
cis-1,2-DCE	0.79
VC	ND(0.5)
1,2-DCA	ND(0.5)

MP-1-3S/R	
PCE	ND(0.5)
TCE	0.51
cis-1,2-DCE	0.66
VC	ND(0.5)
1,2-DCA	ND(0.5)

FW17	
PCE	ND(0.5)
TCE	ND(0.5)
cis-1,2-DCE	2
VC	ND(0.5)
1,2-DCA	ND(0.5)

LEGEND

- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- SURFACE WATER
- TAP SAMPLE

VOC RESULTS

- SELECT CHLORINATED VOCs DETECTED AT A CONCENTRATION ABOVE AGQS
- SELECT CHLORINATED VOCs DETECTED AT A CONCENTRATION BELOW AGQS
- SELECT CHLORINATED VOCs NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

VOC RESULTS

- SELECT CHLORINATED VOCs DETECTED AT A CONCENTRATION BELOW AGQS
- SELECT CHLORINATED VOCs NOT DETECTED ABOVE LABORATORY REPORTING LIMITS
- 1D STREAM WITH DESIGNATION
- GROUNDWATER MANAGEMENT ZONE
- ACCESS DENIED BY OWNER
- NO RESPONSE FROM OWNER

NOTES

1. ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

2. WELL LOCATIONS SURVEYED IN 2016, SOME OLDER WELLS WERE DIGITIZED FROM A DRAWING TITLED "MONITORING LOCATIONS AND TOTAL VOLATILE ORGANIC CONCENTRATIONS, MAY 2008" BY CANNONS ENGINEERING, ROUX ASSOCIATES, INC.

3. TOPOGRAPHIC CONTOUR AND PARCEL ADDRESS SOURCE: TOWN OF LONDONDERRY GIS

4. PARCEL BOUNDARY AND ROAD CENTERLINE SOURCE NH GRANIT GIS CLEARINGHOUSE (WWW.GRANIT.UNH.EDU).

5. GROUNDWATER AND SURFACE WATER SAMPLES COLLECTED BY EASTERN ANALYTICAL AND RESIDENTIAL SAMPLES COLLECTED BY HALEY & ALDRICH, INC. IN MAY AND JUNE 2019. SAMPLES ANALYZED BY ALPHA ANALYTICAL, INC.

6. ND(0.5) = NOT DETECTED, NUMBER IN PARENTHESES IS A LABRATORY REPORTING LIMIT.

7. RESULTS POSTED IN PARTS PER BILLION (PPB).

8. **BOLDED** RESULTS EXCEED NH AMBIENT GROUNDWATER QUALITY STANDARDS (AGQS).

9. VOCs REPORTED HISTORICALLY HAVE EXCEEDED AGQS. SEE TABLE I-III FOR A COMPLETE LIST OF DETECTED VOCs IN MAY AND JUNE 2019.

10. SELECT CHLORINATED VOCs:
    PCE = TETRACHLOROETHENE (AGQS=5)
    TCE = TRICHLOROETHENE (AGQS=5)
    cis-1,2-DCE = cis-1,2-DICHLOROETHENE (AGQS=70)
    VC = VINYL CHLORIDE (AGQS=2)
    1,2-DCA = 1,2-DICHLOROETHANE (AGQS=5)

HALEY ALDRICH

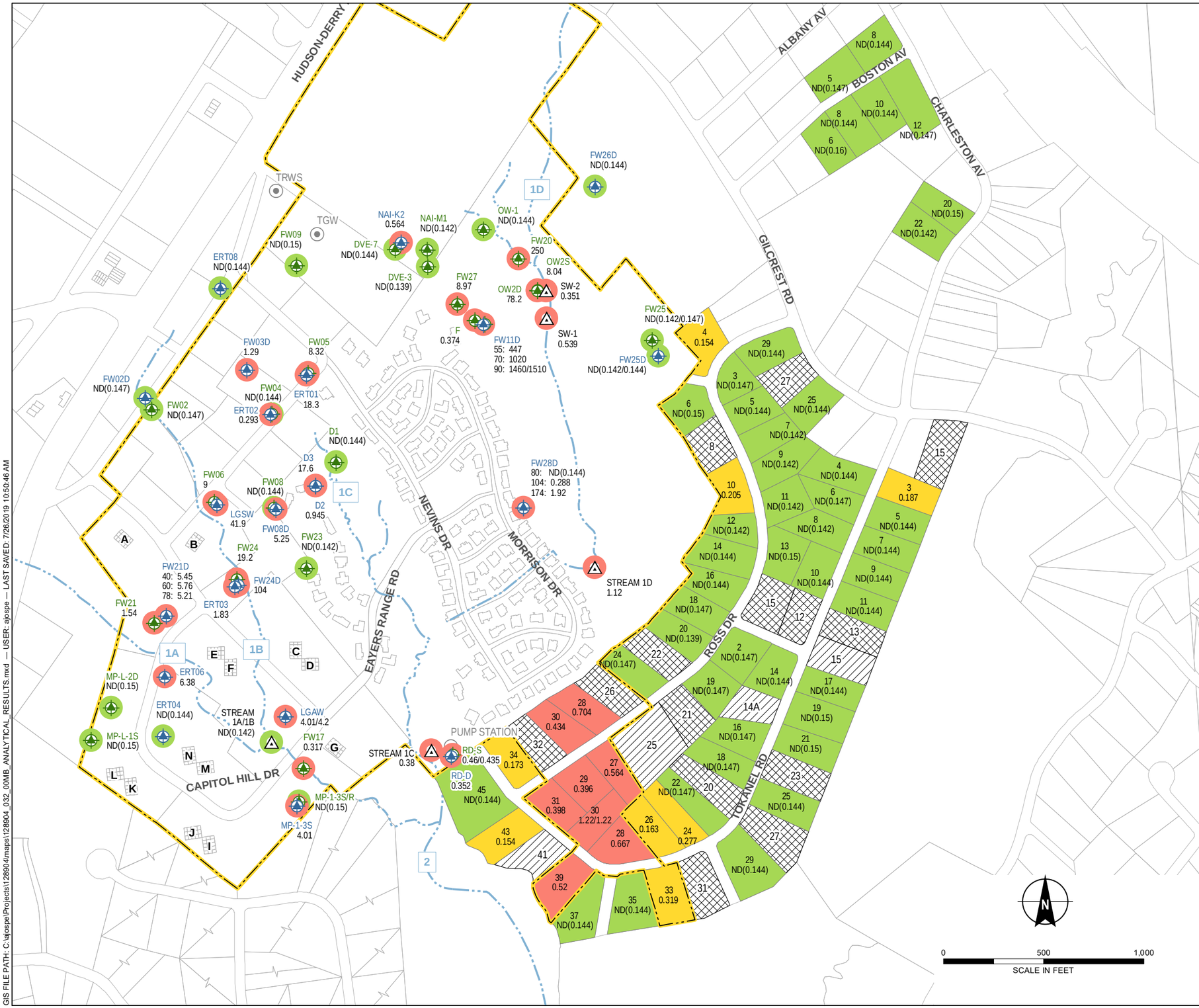
TINKHAM GARAGE SITE
LONDONDERRY, NEW HAMPSHIRE

GMP MONITORING LOCATIONS AND SELECT CHLORINATED VOLATILE ORGANIC COMPOUND RESULTS - MAY-JUNE 2019

AUGUST 2019

FIGURE 4

GIS FILE PATH: C:\ajospe\Projects\128904\maps\128904_032_00MB_ANALYTICAL_RESULTS.mxd — USER: ajospe — LAST SAVED: 7/26/2019 9:58:35 AM



LEGEND

- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- SURFACE WATER
- TAP SAMPLE

1,4-DIOXANE RESULTS

- 1,4-DIOXANE DETECTED AT CONCENTRATION EXCEEDING AGQS (0.32ppb)
- 1,4-DIOXANE DETECTED AT CONCENTRATION BELOW AGQS (0.32ppb)
- 1,4-DIOXANE NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

1,4-DIOXANE RESULTS

- 1,4-DIOXANE DETECTED AT A CONCENTRATION EXCEEDING AGQS (0.32ppb)
- 1,4-DIOXANE DETECTED AT A CONCENTRATION BELOW AGQS (0.32ppb)
- 1,4-DIOXANE NOT DETECTED ABOVE LABORATORY REPORTING LIMITS
- 1D STREAM WITH DESIGNATION
- GROUNDWATER MANAGEMENT ZONE
- ACCESS DENIED BY OWNER
- NO RESPONSE FROM OWNER

NOTES

1. ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE.
2. PARCEL ADDRESS SOURCE: TOWN OF LONDONDERRY GIS
3. PARCEL BOUNDARY AND ROAD CENTERLINE SOURCE NH GRANIT GIS CLEARINGHOUSE (WWW.GRANIT.UNH.EDU).
4. GROUNDWATER AND SURFACE WATER SAMPLES COLLECTED BY EASTERN ANALYTICAL AND RESIDENTIAL SAMPLES COLLECTED BY HALEY & ALDRICH, INC. IN MAY AND JUNE 2019. SAMPLES ANALYZED BY ALPHA ANALYTICAL, INC.
5. NON-DETECT RESULTS ARE NOT INCLUDED ON FIGURE, REFERENCE TABLES I-III.
6. 1,4-DIOXANE RESULTS IN PARTS PER BILLION (ppb) AT MONITORING LOCATIONS WHERE DETECTED.

HALEY ALDRICH

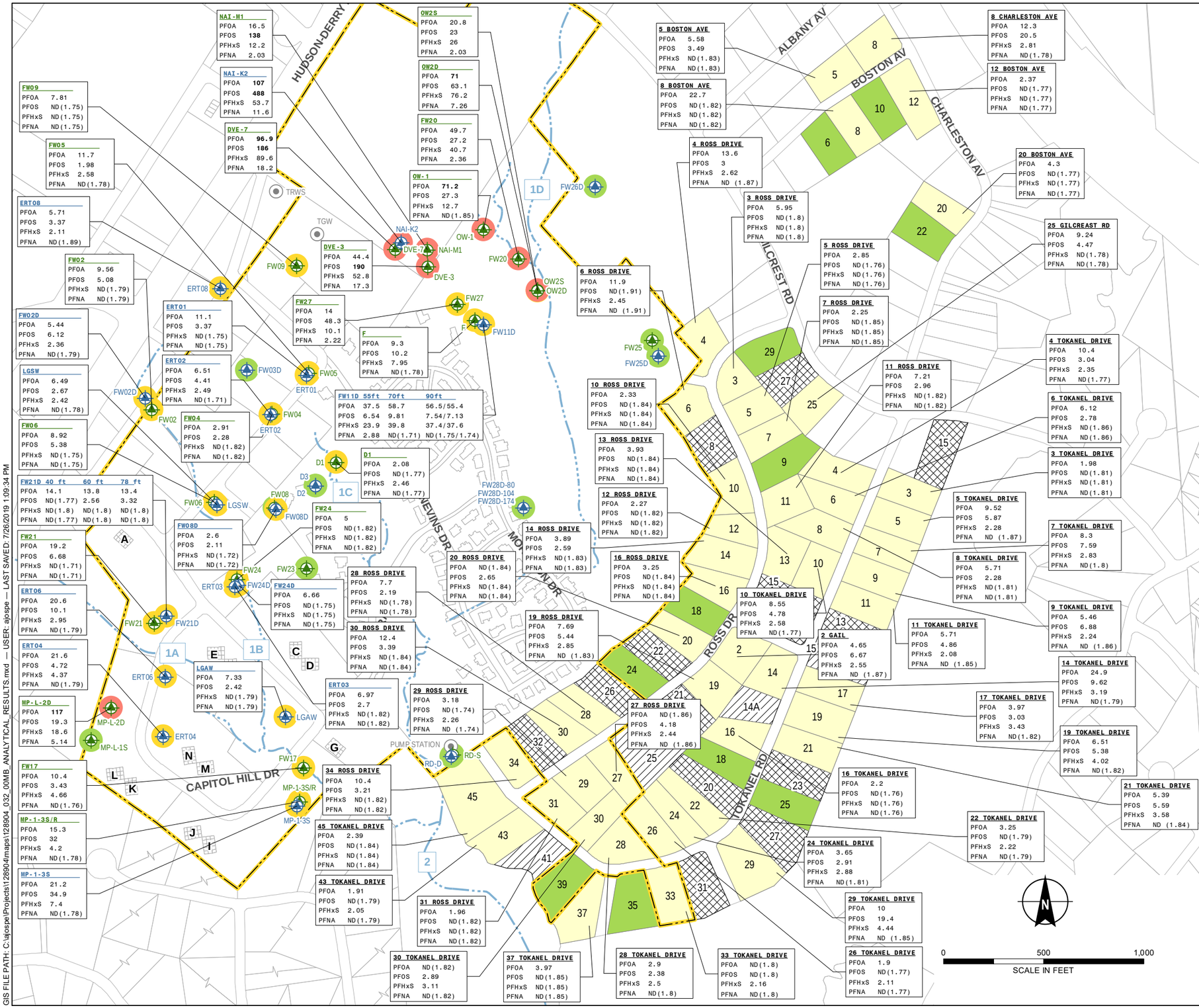
TINKHAM GARAGE SITE
LONDONDERRY, NEW HAMPSHIRE

DETECTED 1,4-DIOXANE RESULTS OF GMP MONITORING LOCATIONS (MAY - JUNE 2019)

AUGUST 2019

FIGURE 5

GIS FILE PATH: C:\ajospe\Projects\128904\maps\128904_032_00MB_ANALYTICAL_RESULTS.mxd — USER: ajospe — LAST SAVED: 7/26/2019 10:50:46 AM



LEGEND

- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- TAP SAMPLE

PFAS RESULTS

- PFOA + PFOS > 70ppt AGQS
- SELECT PFAS COMPOUNDS HAD A DETECTION
- SELECT PFAS COMPOUNDS WERE NON-DETECT
- SAMPLING LOCATION WITH NON-DETECT FOR SELECT PFAS COMPOUNDS
- SAMPLING LOCATION WITH A DETECTION FOR ANY ONE SELECT PFAS COMPOUND
- 1D STREAM WITH DESIGNATION
- GROUNDWATER MANAGEMENT ZONE
- ACCESS DENIED BY OWNER
- NO RESPONSE FROM OWNER

NOTES

1. ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE.
2. PARCEL ADDRESS SOURCE: TOWN OF LONDONDERRY GIS
3. PARCEL BOUNDARY AND ROAD CENTERLINE SOURCE NH GRANIT GIS CLEARINGHOUSE (WWW.GRANIT.UNH.EDU).
4. GROUNDWATER AND SURFACE WATER SAMPLES COLLECTED BY EASTERN ANALYTICAL AND RESIDENTIAL SAMPLES COLLECTED BY HALEY & ALDRICH, INC. IN MAY AND JUNE 2019. SAMPLES ANALYZED BY ALPHA ANALYTICAL, INC.
5. REFERENCE TABLES II-IV FOR COMPLETE LIST OF PFAS RESULTS IN MAY AND JUNE 2019.
6. PFAS RESULTS IN PARTS PER TRILLION (ppt) AT MONITORING LOCATIONS WHERE DETECTED.
7. SELECT PFAS COMPOUNDS WITH PROPOSED RULE READOPTION IN OCTOBER 2019:
   PFOA = PERFLUOROOCTANOIC ACID
   PFOS = PERFLUOROOCTANESULFONIC ACID
   PFHxS = PERFLUOROHEXANESULFONIC ACID
   PFNA = PERFLUORONONANOIC ACID

HALEY ALDRICH

TINKHAM GARAGE SITE
LONDONDERRY, NEW HAMPSHIRE

PFOA, PFOS, PFHXS, AND PFNA RESULTS OF GMP MONITORING LOCATIONS (MAY - JUNE 2019)

AUGUST 2019

FIGURE 6

GIS FILE PATH: C:\ajospe\Projects\128904\maps\128904_032_00MB_ANALYTICAL_RESULTS.mxd — USER: ajospe — LAST SAVED: 7/26/2019 1:09:34 PM