

MEMO



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From:
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Date:
February 22, 2021

Arcadis Project No.:
30050315

Subject:
CSM and Requested Property Specific Monitoring Program for Five Offsite Mitigation Properties related to the Ford Livonia Transmission Plant, 36200 Plymouth Road, Wayne County, Michigan EGLE Site ID No.: 82002970

On behalf of Ford Motor Company (Ford), this memo has been prepared by Arcadis of Michigan, LLC for the Livonia Transmission Plant (LTP) site (the site) to summarize the residential conceptual site models (CSMs). In addition, Ford is requesting approval for a property specific monitoring program at five off-site residential properties described herein, in lieu of additional mitigation. The information provided in this memo and the attached slide deck was discussed with the Michigan Department of Environmental, Great Lakes, and Energy (EGLE) on October 22, 2020 and has been updated to include data collected through December 31, 2020.

The five properties chosen for this evaluation each contain structures with slab foundations. These structures were evaluated using a multiple lines of evidence approach to determine that mitigation, or enhancement of existing mitigation, is not warranted at this time. The data reviewed included the following:

- The concentration of vinyl chloride (VC) in groundwater at surrounding wells, including at least one upgradient well
- The sub-slab data collected at the property

12091 Brewster Detached Garage

This structure has not been mitigated. The property is located inside the groundwater plume in an area with the highest historic shallow groundwater concentrations of VC.

Groundwater Data Summary

- The closest shallow monitoring well, MW-123S, is located approximately 50 feet southwest of the garage sub-slab sample port SSMP-1. The VC concentration at this well has ranged between 4.6 and 1.8 micrograms per liter ($\mu\text{g/L}$) during seven groundwater sampling events.
- The closest upgradient shallow monitoring well, MW-151S, is located approximately 90 feet west of the garage. The VC concentration in this well has ranged between 0.7 $\mu\text{g/L}$ and 2.2 $\mu\text{g/L}$ during five groundwater sampling events.

Sub-Slab Vapor Data Summary

- All three sub-slab samples collected from beneath the attached garage at SSMP-1 have been non-detect for VC with detection levels of 3.3 micrograms per cubic meter ($\mu\text{g/m}^3$) or less, which is an order of magnitude below the Residential Sub-Slab Volatilization to Indoor Air Criteria (VIAC) of 54 $\mu\text{g/m}^3$. Samples were collected on March 12, 2019, May 9, 2019, and January 24, 2020.
- The March 2019 sampling event coincides with a March 7, 2019 groundwater sampling event where VC in groundwater at this well was detected at a concentration of 4.4 $\mu\text{g/L}$, demonstrating that the elevated groundwater concentration did not result in VC in soil vapor beneath the garage slab and therefore was not a source of potential vapor intrusion at the garage.
- The three rounds of sub-slab samples that were collected from beneath the garage demonstrates that vapor intrusion is not occurring at concentrations of VC in groundwater as high as 4.4 $\mu\text{g/L}$.

The data indicates that mitigation at the garage is not warranted at this time. A property specific monitoring plan is proposed below to determine when mitigation will be required.

Monitoring Plan

The following monitoring is proposed:

- Complete one additional sub-slab sample in the garage. This will be the fourth sub-slab sampling event.
- Continue quarterly groundwater monitoring at MW-123S and MW-151S.

The following actions are proposed based on the monitoring results:

- If during any groundwater monitoring event the VC concentration at MW-123S or MW-151S exceeds 4.6 $\mu\text{g/L}$, quarterly sub-slab sampling at SSMP-1 will resume until the respective groundwater VC concentration is less than the newly established high concentration.
- If the VC concentration in any sub-slab sample exceeds the Residential Sub-Slab VIAC, mitigation will be implemented.

34682 Beacon Slab Living Area and Attached Garage

This structure has been mitigated, however sub-slab vacuum has not consistently reached SSMP-4, located at the west end of the slab living area, and vacuum levels have been inconsistent in the attached garage. The structure is located along the south edge of the groundwater plume.

Groundwater Data Summary

- The closest shallow monitoring well, MW-154S, is located approximately 20 feet east and downgradient of the attached garage. The VC concentration at this well has been non-detect during all seven groundwater sampling events.
- The closest upgradient shallow monitoring well, MW-115S, is located approximately 250 feet northwest of the structure. The VC concentration at this well has ranged between 3.9 and 0.8 µg/L during eight groundwater sampling events.

Sub-Slab Vapor Data Summary

- All four rounds of sub-slab samples collected from beneath both the attached garage, at SSMP-1, and the slab on grade living area, at SSMP-2, have been non-detect for VC with detection levels of 3.2 µg/m³ or less, which is an order of magnitude below the Residential Sub-Slab VIAC of 54 µg/m³. Pre-mitigation samples were collected on October 31, 2018 and February 22, 2019. Post-mitigation samples were collected on December 20, 2019 and February 26, 2020.
- Both pre and post-mitigation sampling data demonstrates that vapor intrusion is not occurring at the VC concentrations detected in groundwater at the upgradient well, MW-115S.

The data indicates that supplementing the existing mitigation system to provide increased vacuum levels in the sub-slab areas is not warranted at this time. A property specific monitoring plan is proposed below to determine when mitigation will be required.

Monitoring Plan

The following monitoring is proposed:

- Continue quarterly groundwater monitoring at MW-115S and MW-154S.

The following actions are proposed based on the monitoring results:

- If during any groundwater monitoring event the VC concentration at MW-115S exceeds 3.9 µg/L or the VC concentration at MW-154S exceeds the groundwater screening level of 1.0 µg/L, quarterly sub-slab sampling at SSMP-1 and SSMP-2 will resume until the respective groundwater VC concentration is less than the newly established high concentration or is below the groundwater screening level.

- If the VC concentration in any sub-slab sample exceeds the Residential Sub-Slab VIAC, additional mitigation measures will be implemented to consistently achieve sub-slab vacuum in the slab area where the exceedance occurred.

12100 Boston Post Raised Slab Living Area and Shed

The raised slab living area of the home has been mitigated, however the sub-slab vacuum coverage has not been demonstrated across the entire area. The shed on the property has not been mitigated. Both structures are located inside the area of groundwater impacts.

Groundwater Data Summary

- The closest shallow monitoring well, MW-79SR, is located approximately 80 feet west and is upgradient of the structures. The VC concentration at this well has been below the screening level of 1.0 µg/L during all nine groundwater sampling events.
- Shallow monitoring well MW-156S is located approximately 100 feet east of the structures. VC has not been detected at this well during all seven groundwater sampling events.
- Shallow monitoring well MW-115S is located approximately 100 feet south of the structures. The VC concentration at this well has ranged between 0.8 and 3.9 µg/L during eight groundwater sampling events.

Sub-Slab Vapor Data Summary

- All four rounds of sub-slab samples collected from beneath both the attached garage, at SSMP-1, and the raised slab living area, at SSMP-2, have been non-detect for VC with detection levels of 3.6 µg/m³ or less, which is an order of magnitude below the Residential Sub-Slab VIAC of 54 µg/m³. Pre-mitigation samples were collected on October 24, 2018 and February 21, 2019. Post-mitigation samples were collected on June 11, 2019 and February 12, 2020.
- Both pre and post-mitigation sampling data at the upgradient well MW-79SR and side gradient well MW-115S indicate that vapor intrusion is not occurring.

The data indicates that supplementing the existing mitigation system to provide increased vacuum levels in the sub-slab areas is not warranted at this time. A property specific monitoring plan is proposed below to determine when mitigation will be required.

Raised Slab Monitoring Plan

The following monitoring is proposed:

- Continue quarterly groundwater monitoring at MW-79SR and MW-115S.

The following actions are proposed based on the monitoring results:

- If during any groundwater monitoring event the VC concentration at MW-115S exceeds 3.9 µg/L or the VC concentration at MW-79SR exceeds the groundwater screening level of 1.0 µg/L, quarterly sub-slab sampling at SSMP-2 will resume until the respective groundwater VC concentration is less than the newly established high concentration or is below the groundwater screening level.
- If the VC concentration in the sub-slab of the raised slab living area exceeds the Residential Sub-Slab VIAC, additional mitigation measures will be implemented to consistently achieve sub-slab vacuum level in the raised slab living area.

Shed Monitoring Plan

The shed at this property has not been mitigated since it is currently not habitable. The primary usage of the shed is for storage of weekly household waste. Therefore, mitigation is not warranted at this time. A property specific monitoring plan is proposed below to determine when mitigation will be required. The following monitoring is proposed:

- Monitor the condition of the structure and the usage of the structure during routine OM&M events.
- Continue quarterly groundwater monitoring at MW-79SR and MW-115S.

The following actions are proposed based on the monitoring results:

- If the condition and usage of the structure were to change such that the structure were to become habitable and the VC concentration at either MW-115S or MW-79SR exceeds the levels described above, quarterly sub-slab sampling at the shed would be initiated until the respective groundwater VC concentration is less than the newly established high concentration or is below the groundwater screening level.
- If the VC concentration in the sub-slab of the shed exceeds the Residential Sub-Slab VIAC, mitigation will be implemented in the shed.

34424 Capitol Slab Living Area and Detached Garage

The detached garage at this property has not been mitigated. The slab living area of the home has been mitigated, however the sub-slab vacuum coverage has not been demonstrated across the entire area. The structures were identified to be inside the 100-foot buffer for two quarters - fall 2019 and fall 2020.

Groundwater Data Summary

- The closest shallow monitoring well, MW-103S, is located between the slab living area and the detached garage. The VC concentration at this well has been below the screening level of 1.0 µg/L during all seven groundwater sampling events.

- Shallow monitoring well, MW-169S, is located approximately 140 feet west of the structures. The VC concentration has been below the screening level of 1.0 µg/L during all seven groundwater sampling events.
- Shallow monitoring well MW-136S is located approximately 100 feet south of the structures. The VC concentration at this well was non detect for six of the eight sampling events; however, it was detected at the screening level of 1.0 µg/L during the fall of 2019 and was detected at 1.4 µg/L during the 4Q2020 sampling event.

Sub-Slab Vapor Data Summary

- All five rounds of sub-slab samples collected from beneath the detached garage have been non-detect for VC with detection levels of 3.3 µg/m³ or less, which is an order of magnitude below the Residential Sub-Slab VIAC of 54 µg/m³. Pre-mitigation samples were collected on February 6, 2019, June 11, 2019, October 3, 2019, June 30, 2020, and November 19, 2020.
- The November 2020 sampling event coincides with a November 2020 groundwater sampling event where VC in groundwater at MW-136S was at a concentration of 1.4 µg/L, demonstrating that the elevated groundwater concentration did not result in VC in soil vapor beneath the garage slab and therefore was not a source of potential vapor intrusion at the garage.
- The five rounds of pre-mitigation sampling data demonstrates that vapor intrusion is not occurring at concentrations of VC in groundwater as high as 1.4 µg/L.

The data indicates that mitigation at the slab foundation areas is not warranted at this time. A property specific monitoring plan is proposed below to determine when mitigation will be required.

Monitoring Plan

The following monitoring is proposed:

- Continue quarterly groundwater monitoring at MW-103S, MW-136S, and MW-169S.

The following actions are proposed based on the monitoring results:

- If during any groundwater monitoring event the VC concentration at MW-103S or MW-169S exceeds the groundwater screening level of 1.0 µg/L or at MW-136S exceeds the historic peak of 1.4 µg/L, quarterly sub-slab sampling at SSMP-1, located in the detached garage, will resume and quarterly sub-slab sampling will be initiated at SSMP-2, located in the slab living area, until the respective groundwater VC concentration is less than the newly established high concentration or is below the groundwater screening level.
- If the VC concentration in the sub-slab exceeds the Residential Sub-Slab VIAC in the slab living area, additional mitigation measures will be implemented to consistently achieve sub-slab vacuum.

- If the VC concentration in the sub-slab exceeds the Residential Sub-Slab VIAC in the detached garage, the structure will be mitigated.

34450 Capitol Slab Living Areas and Attached Garage

The crawlspace at the property is mitigated and has been meeting the requirements outlined by EGLE. The two slab living areas and the attached garage at this property have not been mitigated. The structures were identified to be inside the 100-foot buffer for two quarters - fall 2019 and fall 2020.

Groundwater Data Summary

- The closest shallow monitoring well, MW-169S, is upgradient and is located between approximately 60 and 80 feet from the unmitigated areas. The VC concentration at this well has been below the screening level of 1.0 µg/L during all seven groundwater sampling events.
- Shallow monitoring well MW-137S is located approximately 140 feet southwest of the structures. The VC concentration at this well was 1.1 µg/L during the fall of 2019 and has been below the screening level in each of the seven other groundwater events.

Sub-Slab Vapor Data Summary

- All three rounds of sub-slab samples collected from beneath the den (SSMP-1), and all four rounds of sub-slab samples collected from beneath the bedroom (SSMP-2) and the attached garage (SSMP-3), have been non-detect for VC with detection levels of 3.5 µg/m³ or less, which is an order of magnitude below the Residential Sub-Slab VIAC of 54 µg/m³. Pre-mitigation samples were collected on November 6, 2018; October 24, 2019, February 11, 2020, and October 22, 2020.
- The sub-slab samples collected from beneath the three slab foundation areas at this property demonstrate that vapor intrusion is not occurring.

The data indicates that mitigation at the slab foundation areas is not warranted at this time. A property specific monitoring plan is proposed below to determine when mitigation will be required.

Monitoring Plan

The following monitoring is proposed:

- Continue quarterly groundwater monitoring at MW-169S.

The following actions are proposed based on the monitoring results:

- If during any groundwater monitoring event the VC concentration at MW-169S exceeds the groundwater screening level of 1.0 µg/L, quarterly sub-slab sampling at SSMP-1, SSMP-2,

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and SSMP-3 will resume until the respective groundwater VC concentration is less than the newly established high concentration or is below the groundwater screening level.

- If the VC concentration in the sub-slab exceeds the Residential Sub-Slab VIAC, mitigation will be implemented in the slab area where the exceedance occurred.

Summary

The sub-slab data accumulated to date at the off-site properties demonstrates that the VC concentrations present in the off-site groundwater are not resulting in VI. Therefore, the proposed monitoring of groundwater, and subsequent monitoring of sub-slab vapor when increases in the VC concentration in groundwater occur, is an appropriate method to determine when mitigation should be implemented. Arcadis, on behalf of Ford, respectfully requests EGLE approval of this property specific monitoring program.

Attachments

2020-10-22 Ford LTP EGLE Status Update Meeting, Updated February 3, 2021

EGLE STATUS UPDATE MEETING

Ford Livonia Transmission Plant, Livonia, Michigan

October 22, 2020

Revised February 8, 2021

Agenda

- Results From the Last Groundwater Sampling Events
- Residential CSMs - Slab Foundations
- Reduction of Monthly Update and Complaint Memos

Offsite Groundwater Sampling Results

4Q2019 Groundwater Sampling Results



1Q2020 Groundwater Sampling Results



CITY: Novi, DIV: ENV, DB: MISC, PROJECT: BELLIS, PM: K. HANIKER, PROJECT NUMBER: 5014529210104, COORDINATE SYSTEM: NAD 83, STATE: MI, COUNTY: Southfield, ADDRESS: Southfield PPS 3111 East 10th
 ZONE: Project, ENV: Michigan, PROJECT: 17170264, DATE: 2/5/20, BY: mmm

2Q2020 Groundwater Sampling Results



3Q2020 Groundwater Sampling Results



CITY: New DIV: ENV: DB: 43: PIC: R: ELLIS: PW: K: HINSKEY: PROJECT NUMBER: 30659315: COORDINATE SYSTEM: NAD: 1983: StatePlane: Michigan: South: FIPS: 2113: Feet: T: ENV: Non: Brighton: M:\Full\mva\GIS\Subarea\CEQA_2020\Figural_1_MW_Results_Airfile.mxd: PLOTTED: 5/8/2020 9:37:43 AM: BY: rj080749

4Q2020 Groundwater Sampling Results



CITY: Now, DIV: ENW, JOB: MS, POC: R. ELLIS, PM: K. HINKLEY, PROJECT NUMBER: 3030015, COORDINATE SYSTEM: NAD 83, SOURCE: ArcGIS Online, SOURCE PROJECT: 114, FILE: TLEW, WORKBOOK: D:\Ford\GIS\GISData\EGLE\4Q_2020\Figure 1.MXD, FILE: 12/15/2020 2:43:31 PM, BY: mduffy

Slab Mitigation Case Studies

Objective

- Demonstrate that the VC concentrations in groundwater offsite are not resulting in VI
- Propose VI data driven path to determine when mitigation/enhancing existing mitigation is warranted
- Implement mitigation/enhance existing mitigation only after implement VI sampling program to demonstrate if there is a VI potential

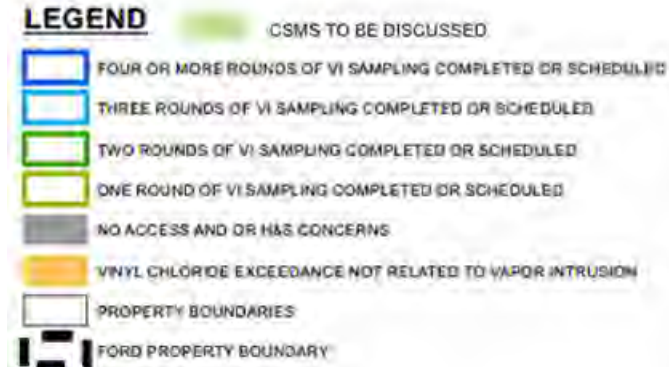
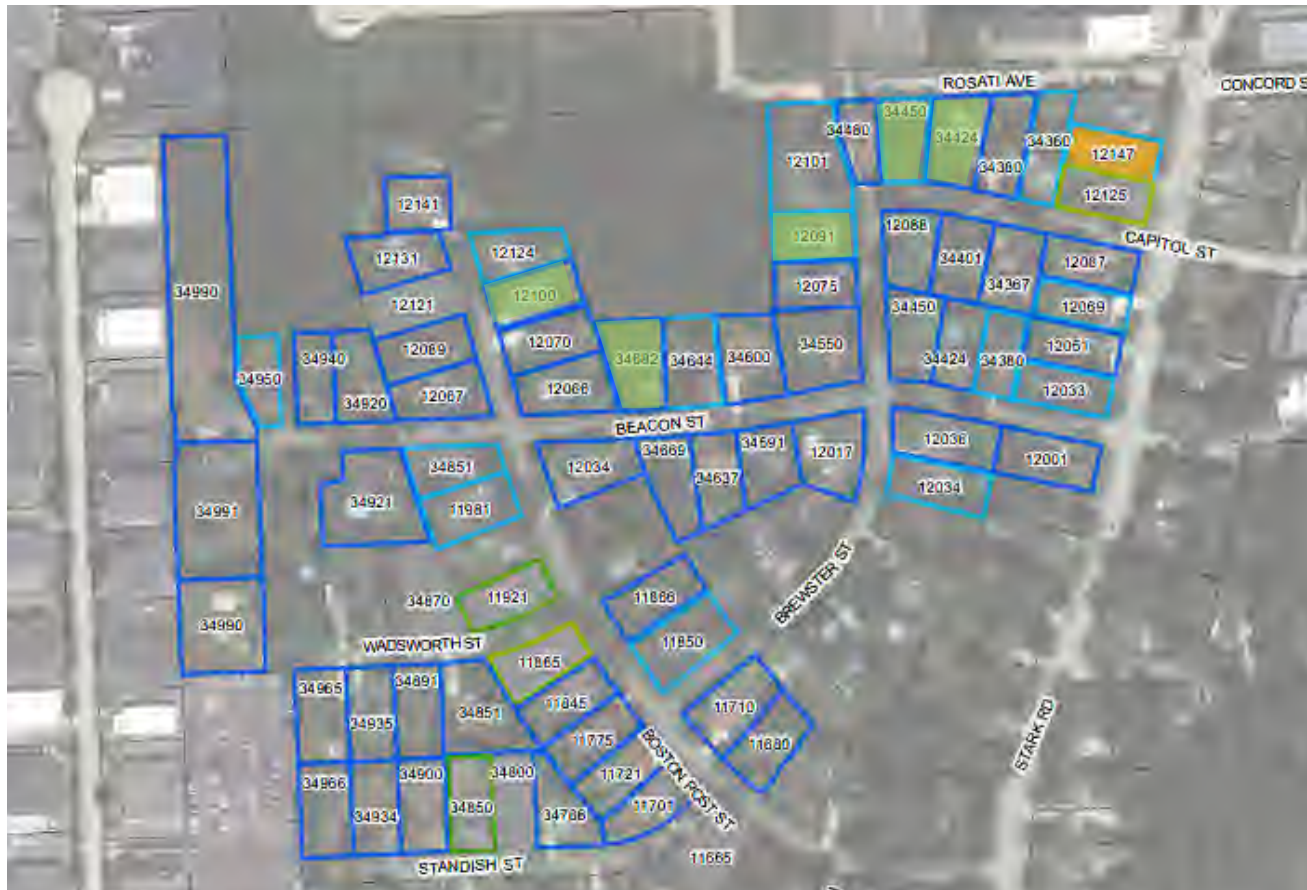
Utilize multiple lines of evidence approach in determining if mitigation is warranted

Organization

- Overview of residential GW and VI data collected to date
- 5 CSMs demonstrating property specific conditions
 - GW concentrations > 1 ppb or < 1 ppb to non-detect concentrations
 - Vadose zone or water in contact
 - GW concentrations over time at surrounding wells
 - VI Data: seasonal SS and IA data sets, crawlspace data, sump data
- Propose a path forward

VI data demonstrates VC is not posing a VI risk at the off-site properties

VI Sampling

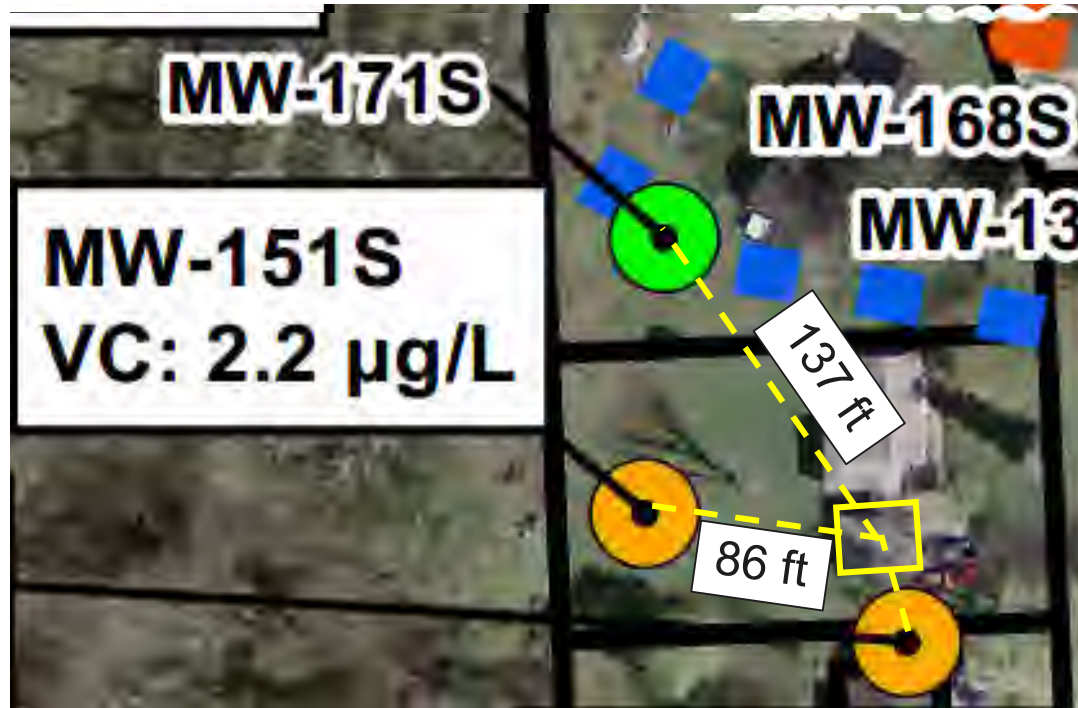


- 1,667 total samples collected to date (440 SS; 919 IA; 339 AA; 59 sump)
- 3-8 rounds of samples have been collected at each location
- No VI related air exceedance in SS or IA
- All data demonstrates that VI is not occurring

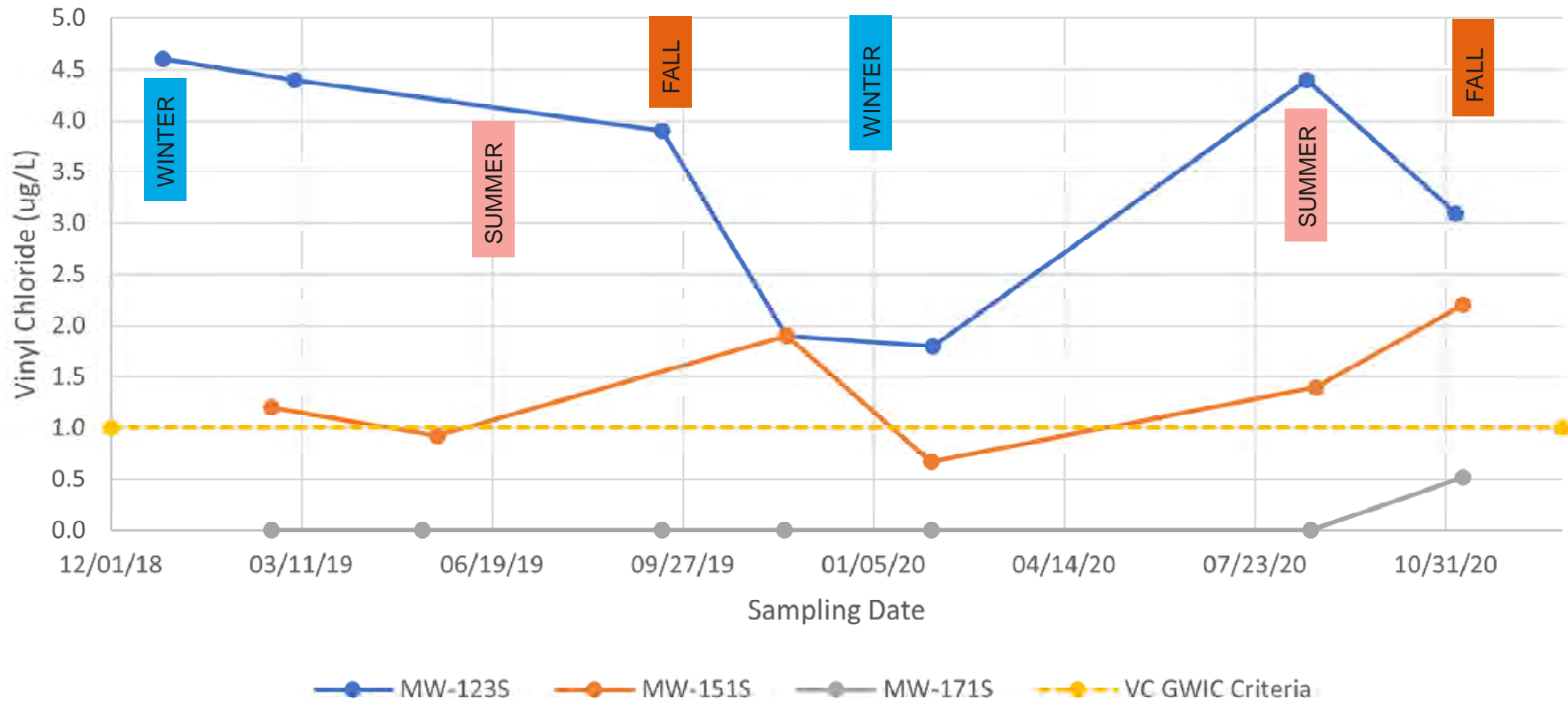
Property-Specific CSMs

- 1. 3 properties with GW greater than 1 ppb**
- 2. 2 properties with GW less than 1 ppb**
 - Location relative to the GW plume
 - GW Data
 - Vapor Data
 - Recommendations

12091 Brewster – Distance to Surrounding Wells

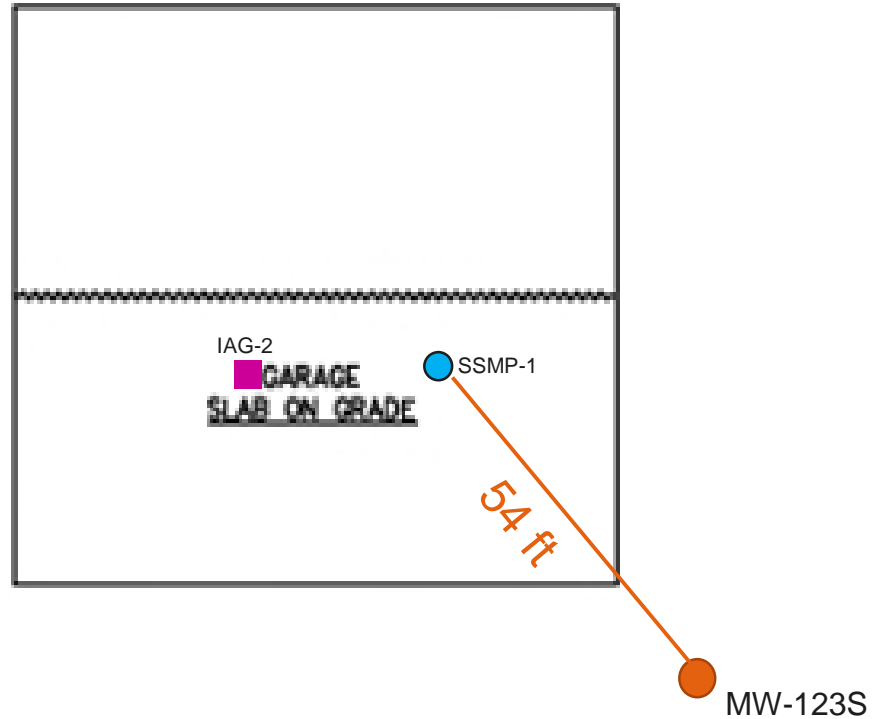


12091 Brewster Ave VC Concentration in GW Over Time



7 Events - GW concentration has not exceeded historic level of 4.6 ppb

12091 Brewster Ave



| Sample Location | Sample Date | Sample ID | Sampling Objective | Vinyl chloride (µg/m³) |
|---------------------------------------|-------------|-----------|--------------------|----------------------------|
| Garage Indoor Air (IAG) | 3/12/2019 | IAG-02 | Pre Mitigation | < 0.40 [<0.40] |
| | 5/9/2019 | IAG-02 | | < 0.43 [<0.41] |
| | 1/24/2020 | IAG-02 | | < 0.41 |
| Residential Indoor Air (IASL) (µg/m³) | | | | 1.6 |

| Sample Location | Sample Date | Sample ID | Sampling Objective | Vinyl chloride (µg/m³) |
|-----------------------------------|-------------|-----------|--------------------|------------------------|
| Sub-Slab Vapor (SSMP) | 3/12/2019 | SSMP-01 | Pre Mitigation | < 3.0 |
| | 5/9/2019 | SSMP-01 | | < 3.3 |
| | 1/24/2020 | SSMP-01 | | < 3.2 |
| Residential Sub-Slab VIAC (µg/m³) | | | | 5.4 |

| Sample Location | Sample Date | Sample ID | Depth from bottom of slab to water table (ft) | Vinyl chloride (µg/L) |
|-----------------|-------------|-----------|---|-----------------------|
| Monitoring Well | 12/28/2018 | MW-123S | 2.86 | 4.6 [3.2] |
| | 3/7/2019 | MW-123S | 3.63 | 4.4 |
| | 9/16/2019 | MW-123S | 5.29 | 3.9 |
| | 11/20/2019 | MW-123S | 4.04 | 1.9 |
| | 2/5/2020 | MW-123S | 2.76 | 1.8 |
| | 8/19/2020 | MW-123S | 5.54 | 4.4 |
| | 11/5/2020 | MW-123S | 5.11 | 3.1 |

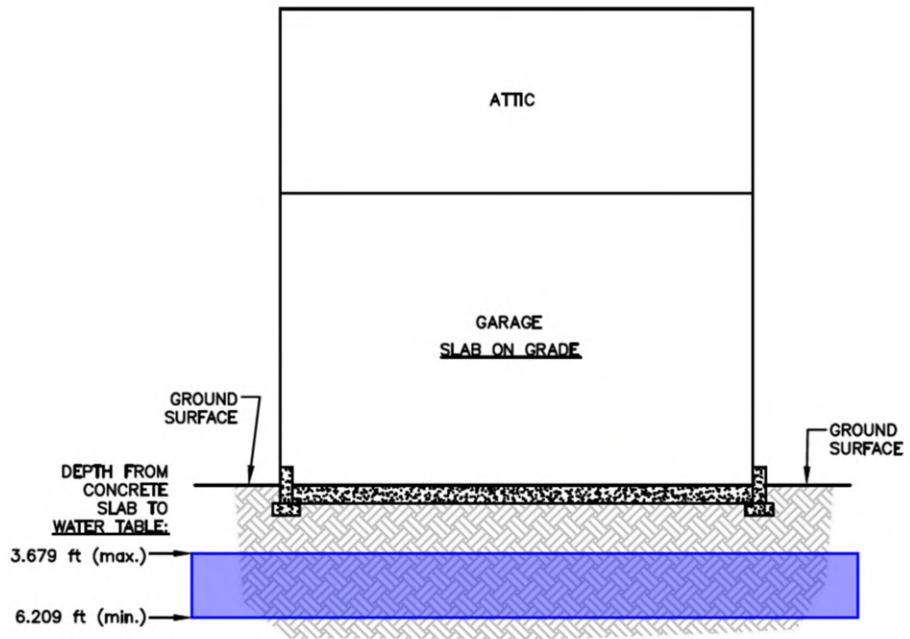
Notes:

- Indicates worst case (Spring) sampling comparisons
- Indicates worst case (Winter) sampling comparisons
- [] Indicates duplicate sampling result
- < Indicates not detected above reporting limit

Data Summary

- 3 rounds of IA and SS data (pre-mitigation) with no detections of VC
- Sampled during worst case seasons based on GW conc. – Winter and Spring

12091 Brewster Ave



DTW below garage ranges from 3.6 to 6.2 feet (calculations based upon data collected from MW-123S).



two-car detached garage

Proposed Path Forward for the Garage

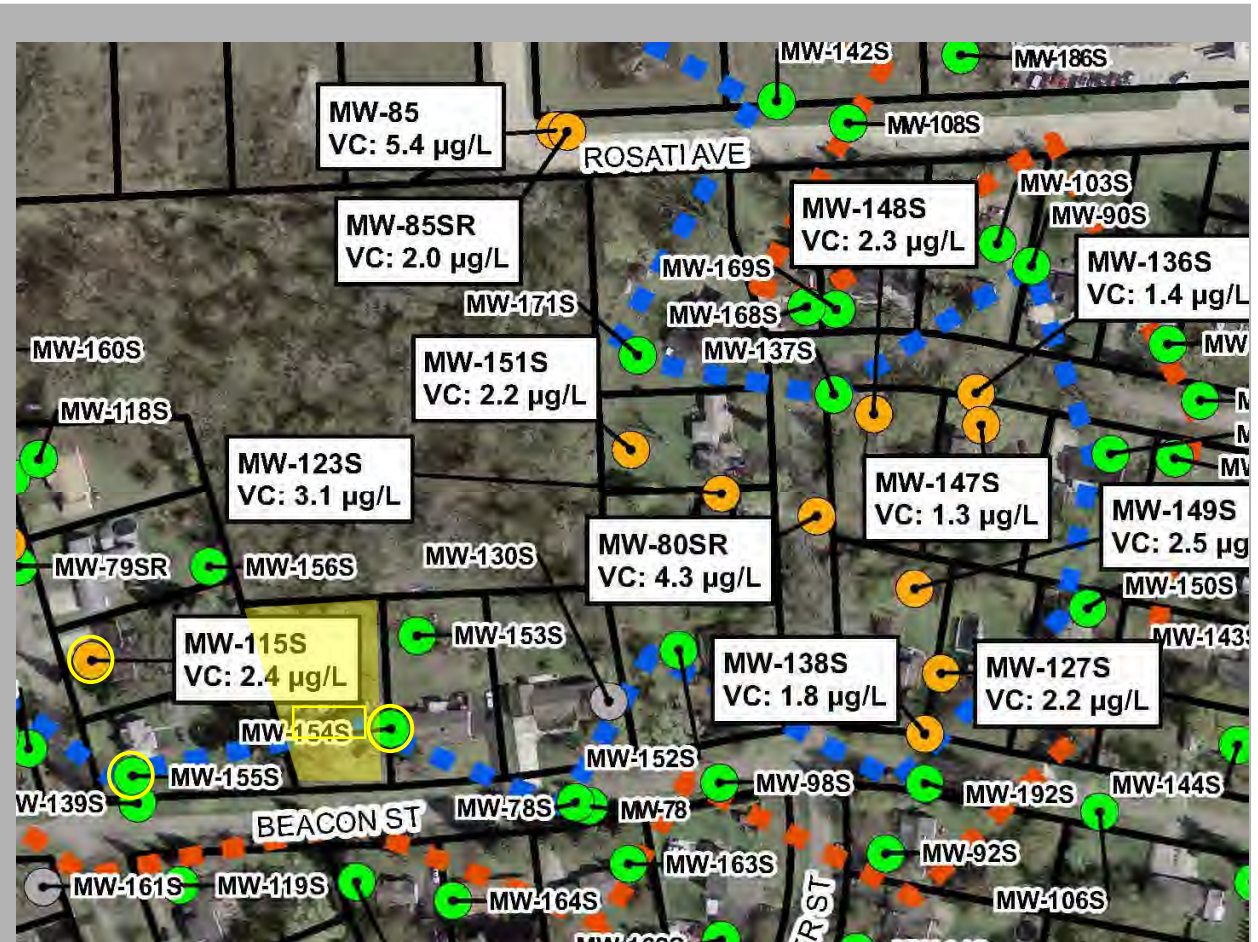
- Collect 1 additional SS sample (total of 4 rounds below residential VIAC)
- Continue quarterly GW sampling
- If GW concentration exceeds historic high of 4.6 ppb at MW-123S or MW-151S, collect quarterly SS samples until GW concentration is decreasing
- If SS sample exceeds Residential Sub-Slab VIAC, mitigate

Summary of Recommendations

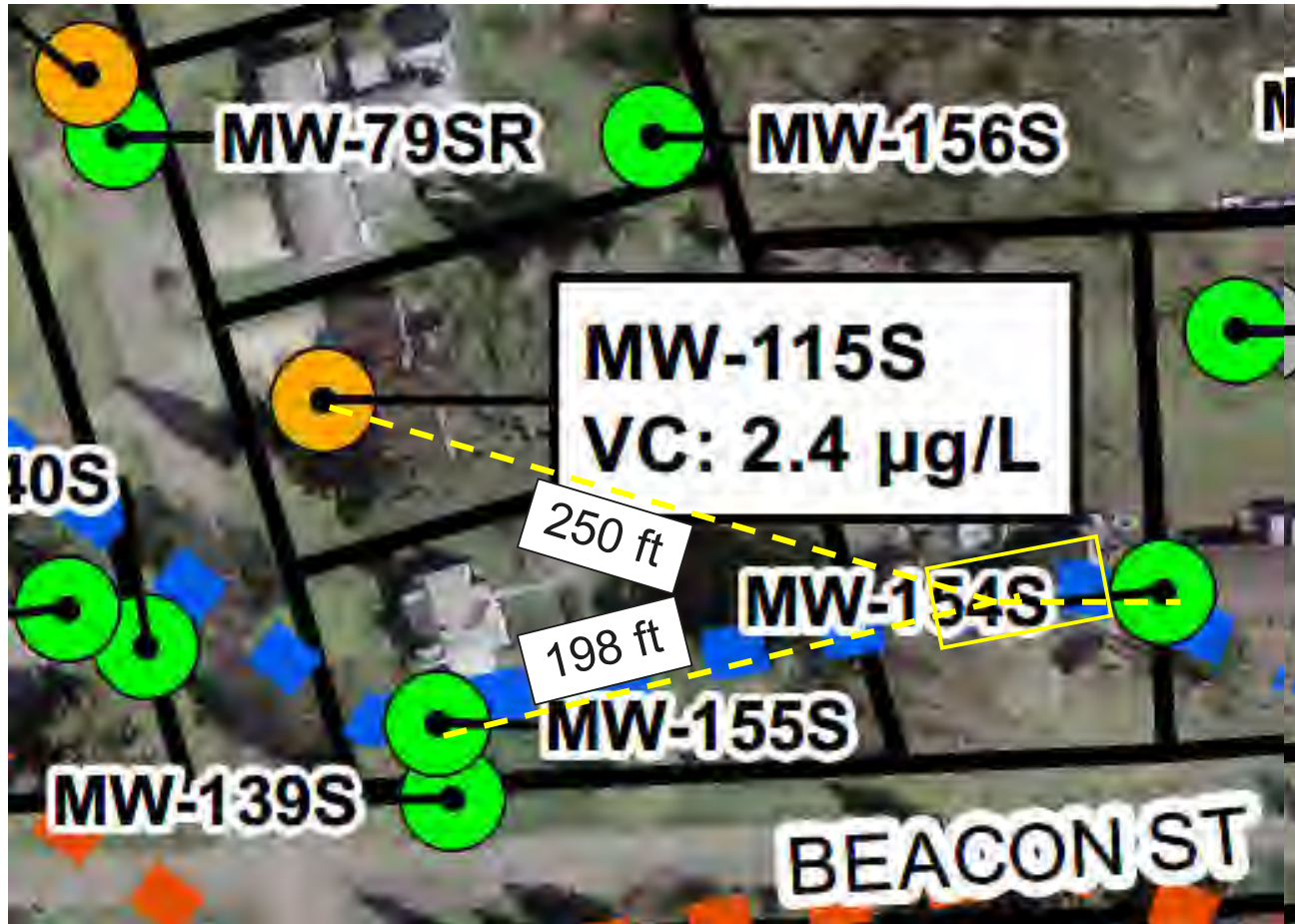
- Complete 4th SS sample from beneath garage
- Continue quarterly GW sampling
 - If GW concentration increases to greater than historic peak at MW-123S or MW-151S => resume SS sampling quarterly until GW decreasing
 - If SS sample exceeds residential sub-slab VIAC => mitigate

34682 Beacon

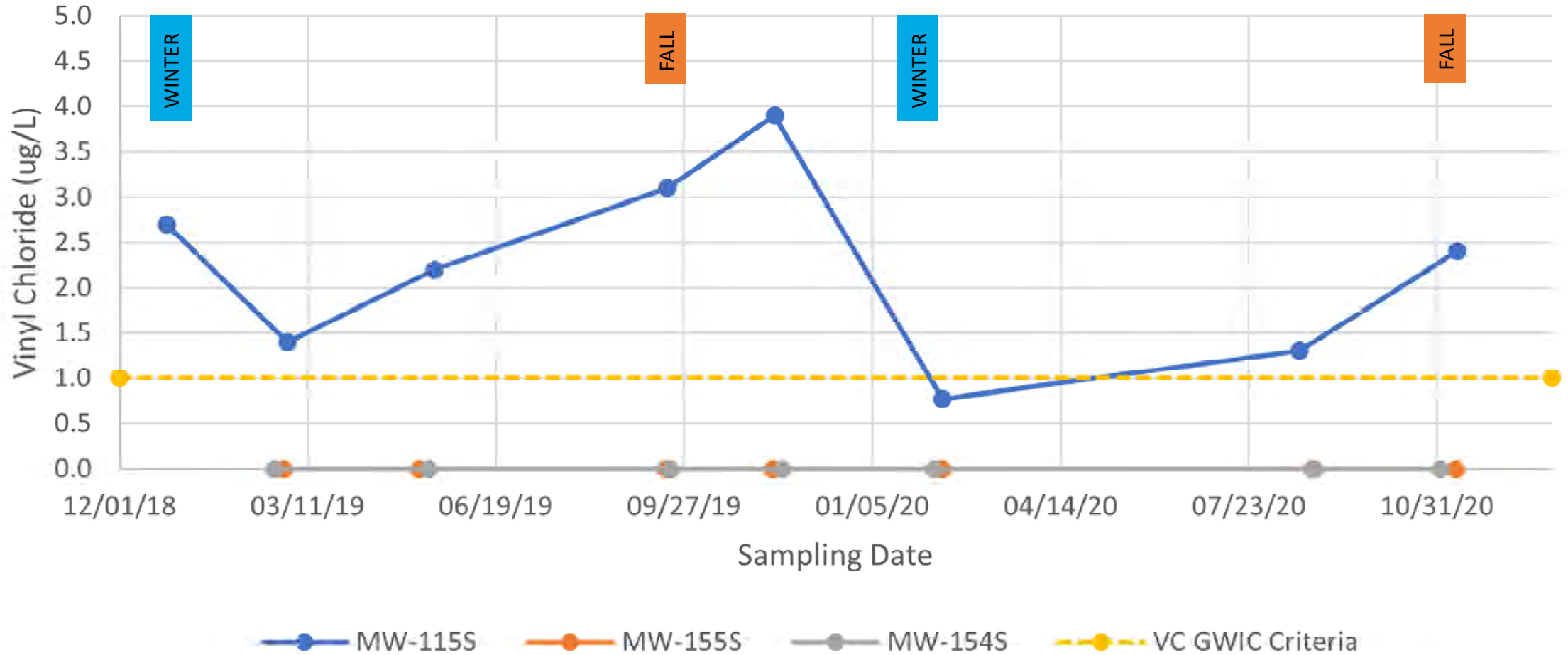
- Attached Garage and Slab Living Area
 - Mitigated - Not meeting criteria
- Structure in on the plume boundary
 - MW-154S and MW-155S – all 7 rounds ND
 - Upgradient MW-115S – peaked at 3.9 ppb, currently at 2.4 ppb
- Foundation not in contact with GW
- 4 Rounds SS data – ND
- Recommendation – continue GW sampling



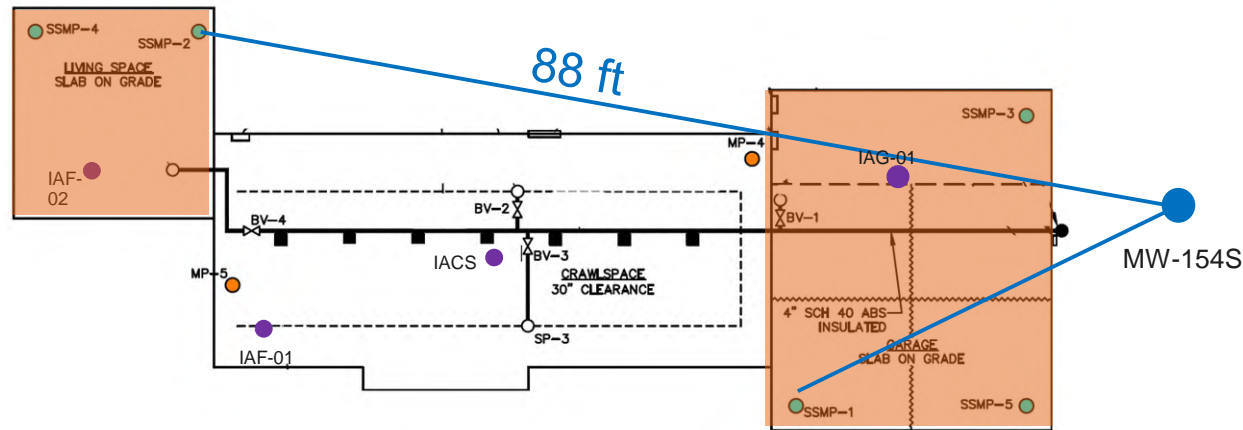
34682 Beacon – Distance to Surrounding Wells



34682 Beacon Ave VC Concentration in GW Over Time



7 Events – no GW detections at two closest wells



| Sample Location | Sample Date | Sample ID | Sampling Objective | Vinyl chloride (µg/m ³) |
|--|-------------|-----------|--------------------|-------------------------------------|
| Crawl Space Indoor Air (IACS) | 10/31/2018 | IACS-04 | Pre Mitigation | < 0.41 |
| | 10/31/2018 | IAF-02 | | < 0.42 |
| | 10/31/2018 | IAF-03 | | < 0.43 |
| Main Floor Indoor Air (IAF) | 2/22/2019 | IAF-02 | Pre Mitigation | < 0.40 |
| | 2/22/2019 | IAF-03 | | < 0.41 |
| | | DUP-01 | | < 0.41 |
| | 12/20/2019 | IAF-02 | Post Mitigation | < 0.45 |
| | 12/20/2019 | IAF-03 | | < 0.45 |
| | 2/26/2020 | IAF-03 | OMM | < 0.43 |
| Garage Indoor Air (IAG) | 2/26/2020 | IAF-02 | OMM | < 0.40 |
| | 10/31/2018 | IAG-01 | | < 0.42 |
| | 3/15/2019 | IAG-01 | Pre Mitigation | < 0.43 |
| | | DUP-01 | | < 0.48 |
| | 12/20/2019 | IAG-01 | Post Mitigation | < 0.42 |
| | 2/26/2020 | DUP-01 | | < 0.43 |
| | 2/26/2020 | IAG-01 | OMM | < 4.1 |
| Residential Indoor Air RIASL (µg/m ³): | | | | 1.6 |

Data Summary

- No detections of VC in crawlspace (pre-mitigation)
- CS mitigation meeting vacuum criteria
- 2 rounds of pre-mitigation and 2 rounds of post mitigation IA and SS data with no detections of VC
- Pre-mitigation samples during worst case based on GW sampling and heating season – Fall and Winter
- MW-154S and MW-155S no detections of VC

| Sample Location | Sample Date | Sample ID | Sampling Objective | Vinyl chloride (µg/m ³) |
|---|-------------|-----------|--------------------|-------------------------------------|
| Sub-Slab Vapor (SSMP) | 10/31/2018 | SSMP-01 | Pre Mitigation | < 3.0 |
| | 10/31/2018 | SSMP-02 | | < 3.1 |
| | 2/22/2019 | SSMP-01 | | < 2.8 |
| | 2/22/2019 | SSMP-02 | Post Mitigation | < 3.1 |
| | 12/20/2019 | SSMP-01 | | < 3.2 |
| | 12/20/2019 | SSMP-02 | | < 3.2 |
| | 2/26/2020 | SSMP-01 | OMM | < 3.1 |
| | 2/26/2020 | SSMP-02 | | < 3.2 |
| Residential Sub-Slab VIAC (µg/m ³): | | | | 54 |

Path Forward for Slab Living Space and Attached Garage

- Continue quarterly GW sampling
- If GW exceeds screening level at MW-154S or historic peak at MW-115S, resume quarterly SS sampling until GW concentration is decreasing
- If SS sample exceeds Residential Sub-Slab VIAC, supplement existing mitigation



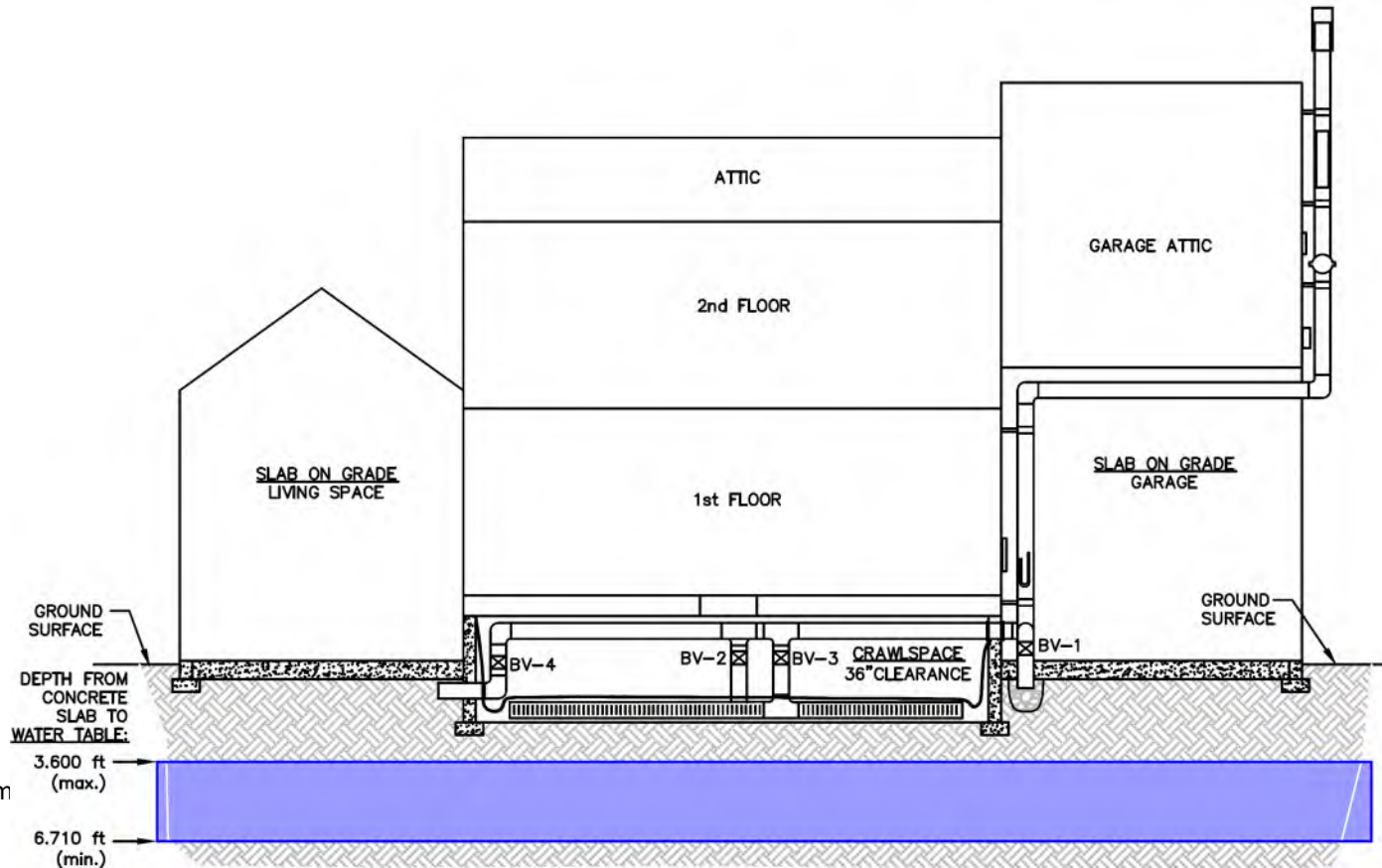
living space over concrete slab.



elevated subfloor, west living space.



attached two-car garage.



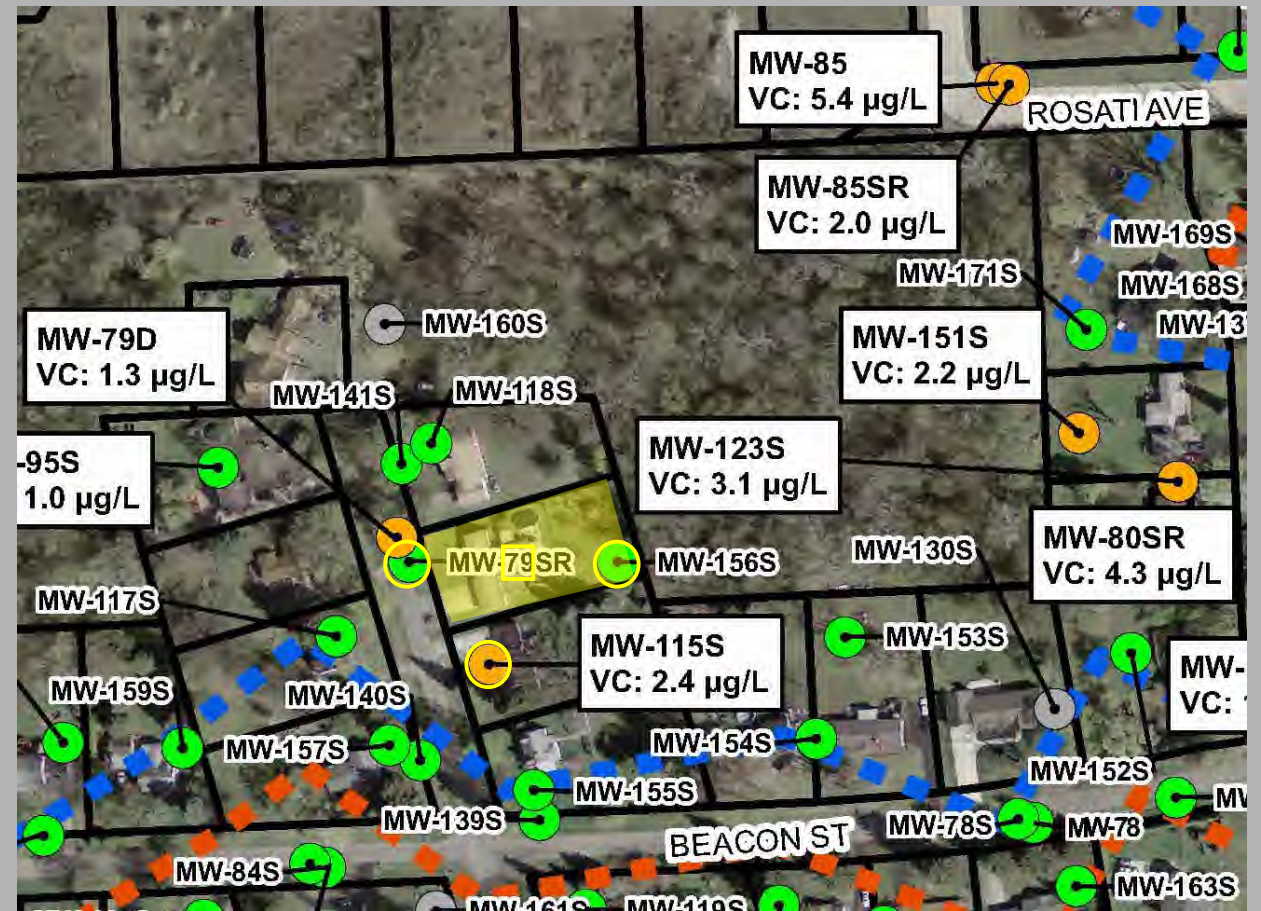
DTW below slab ranges from 3.6 to 6.7 feet (calculations based upon data collected from MW-154S).

Summary of Recommendations

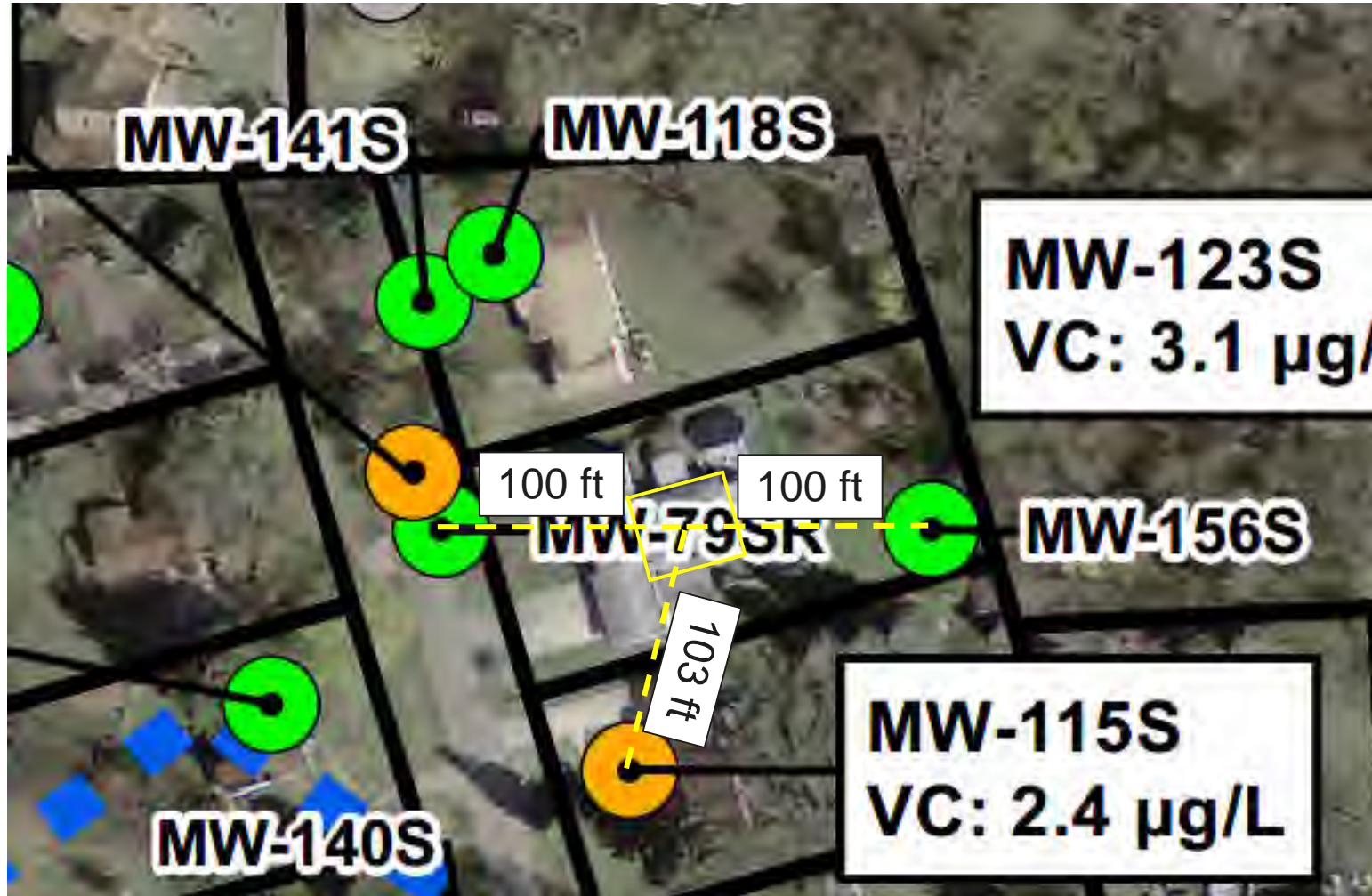
- Continue quarterly GW sampling
 - If GW concentration increases to greater than historic peak at MW-115S or increases at MW-154S to greater than criteria => SS sample quarterly until GW concentration is decreasing
 - If SS sample exceeds residential sub-slab VIAC => supplement existing mitigation

12100 Boston Post

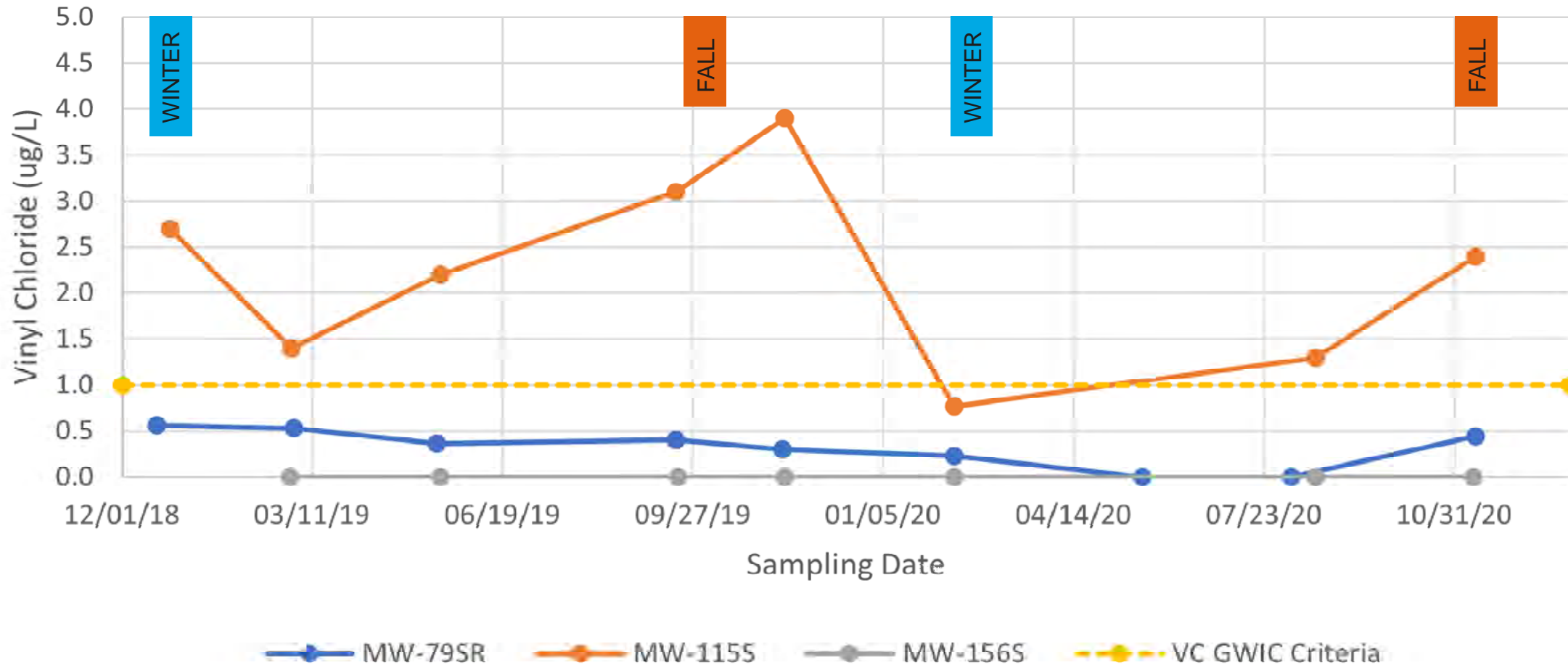
- Raised Slab Living Area
 - Mitigated - Not meeting criteria
- Shed – Not mitigated
- Structures inside the plume boundary
 - MW-79SR– all 9 rounds below criteria
 - MW-156S – all 7 rounds ND
 - MW-115S – peaked at 3.9 ppb, currently at 2.4 ppb
- Foundation not in contact with GW
- 4 Rounds SS data under raised slab – ND
- Recommendation – continue GW sampling



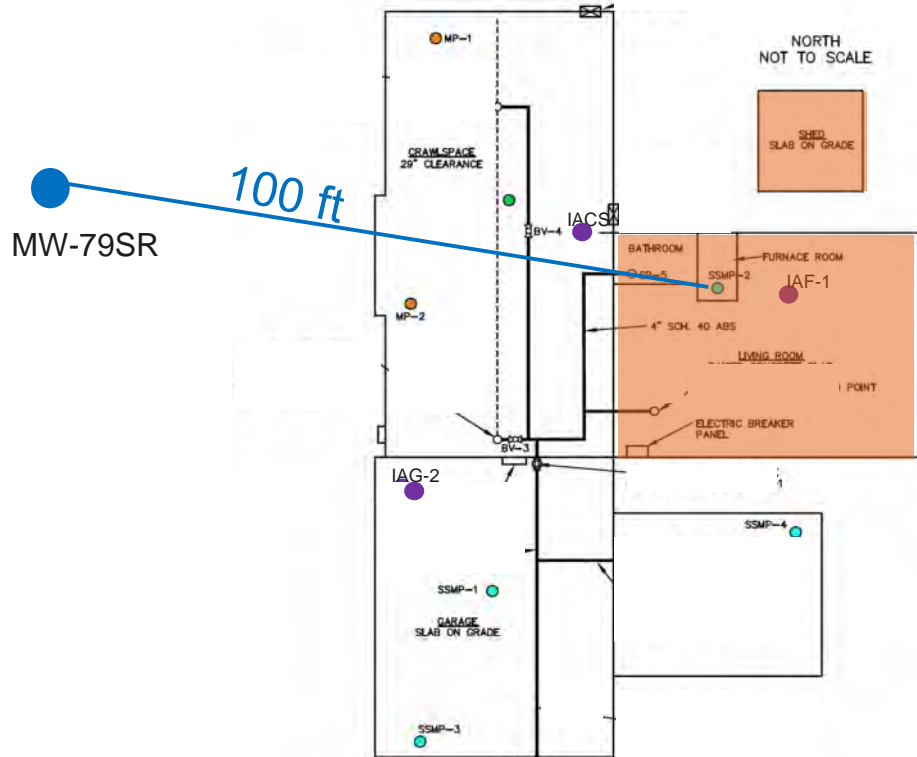
12100 Boston Post – Distance to Surrounding Wells



12100 Boston Post St VC Concentration in GW Over Time



9 Events - VC Detections in Upgradient GW are below Screening Value

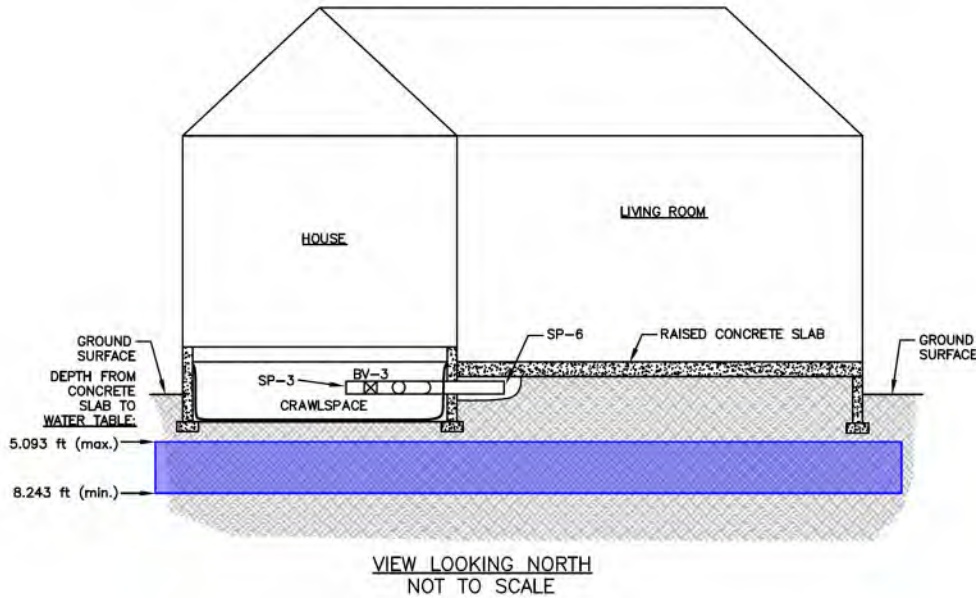


| Sample Location | Sample Date | Sample ID | Sampling Objective | Vinyl chloride ($\mu\text{g}/\text{m}^3$) |
|--|-------------|-----------|--------------------|---|
| Crawl Space Indoor Air (IACS) | 10/24/2018 | IACS-03 | Pre Mitigation | < 0.41 |
| | 10/24/2018 | IAF-01 | Pre Mitigation | < 0.42 |
| Main Floor Indoor Air (IAF) | 2/21/2019 | IAF-01 | Pre Mitigation | < 0.46 |
| | 5/2/2019 | IAF-01 | Post Mitigation | < 0.46 |
| | | DUP-03 | | < 0.38 |
| | 2/12/2020 | IAF-01 | OMM | < 0.47 |
| Garage Indoor Air (IAG) | 10/24/2018 | IAG-02 | | < 0.38 |
| | 3/14/2019 | IAG-02 | Pre Mitigation | < 0.44 |
| | | DUP-01 | | < 0.43 |
| | 5/2/2019 | IAG-02 | Post Mitigation | < 0.45 |
| | | DUP-02 | | < 0.40 |
| | 2/12/2020 | IAG-02 | OMM | < 0.39 |
| Residential Indoor Air RIASL ($\mu\text{g}/\text{m}^3$): | | | | 1.6 |
| Sample Location | Sample Date | Sample ID | Sampling Objective | Vinyl chloride ($\mu\text{g}/\text{m}^3$) |
| Sub-Slab Vapor (SSMP) | 10/24/2018 | SSMP-01 | Pre Mitigation | < 3.0 |
| | 10/24/2018 | SSMP-02 | | < 3.1 |
| | 2/21/2019 | SSMP-01 | | < 2.9 |
| | 2/21/2019 | SSMP-02 | | < 3.0 |
| | 6/11/2019 | SSMP-01 | Post Mitigation | < 3.3 |
| | 6/11/2019 | SSMP-02 | | < 3.2 |
| | 2/12/2020 | SSMP-01 | OMM | < 3.4 |
| | 2/12/2020 | SSMP-02 | | < 3.6 |
| Residential Sub-Slab VIAC ($\mu\text{g}/\text{m}^3$): | | | | 54 |

Data Summary

- No detections of VC in crawlspace (pre-mitigation)
- CS mitigation meeting vacuum criteria
- 2 rounds of pre-mitigation and 2 rounds of post mitigation IA and SS data with no detections of VC
- Pre-mitigation samples during worst case seasons based on GW detections and heating season – Fall and Winter
- MW-79SR ranges between 55% of screening level and non-detect, and no detections at MW-156S

12100 Boston Post



DTW below living room slab ranges from 5 to 8 feet (calculations based upon data collected from MW-79SR).



living space built above the elevated concrete slab



living space built above the elevated concrete slab

Proposed Path Forward for Slab Living Area and Shed

- Continue quarterly GW sampling
- If GW exceeds screening level at MW-79SR or historic peak at MW-115S, resume quarterly SS sampling until GW concentration is decreasing
- If SSMP-2 sample exceeds Residential Sub-Slab VIAC, supplement existing mitigation
- If shed becomes occupiable and SS sample at shed exceeds Residential Sub-Slab VIAC, mitigate

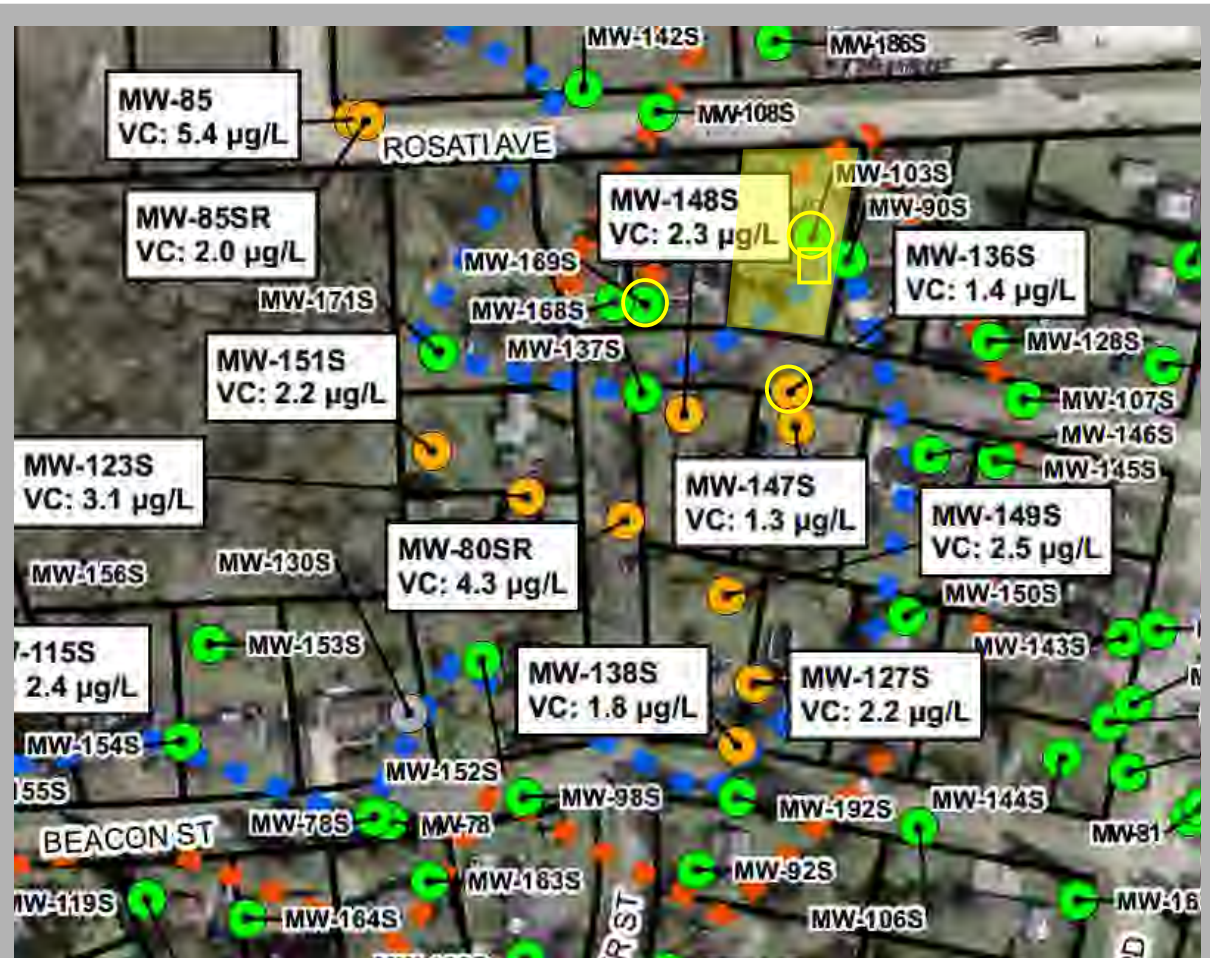
Summary of Recommendations

- Continue quarterly GW sampling
 - If GW concentration increases to greater than historic peak at MW-115S or increases at MW-154S to greater than criteria => SS sample quarterly until GW concentration is decreasing
 - If SS sample at raised slab exceeds residential sub-slab VIAC => supplement existing mitigation
 - If shed becomes occupiable and SS sample at shed exceeds residential sub-slab VIAC => mitigate

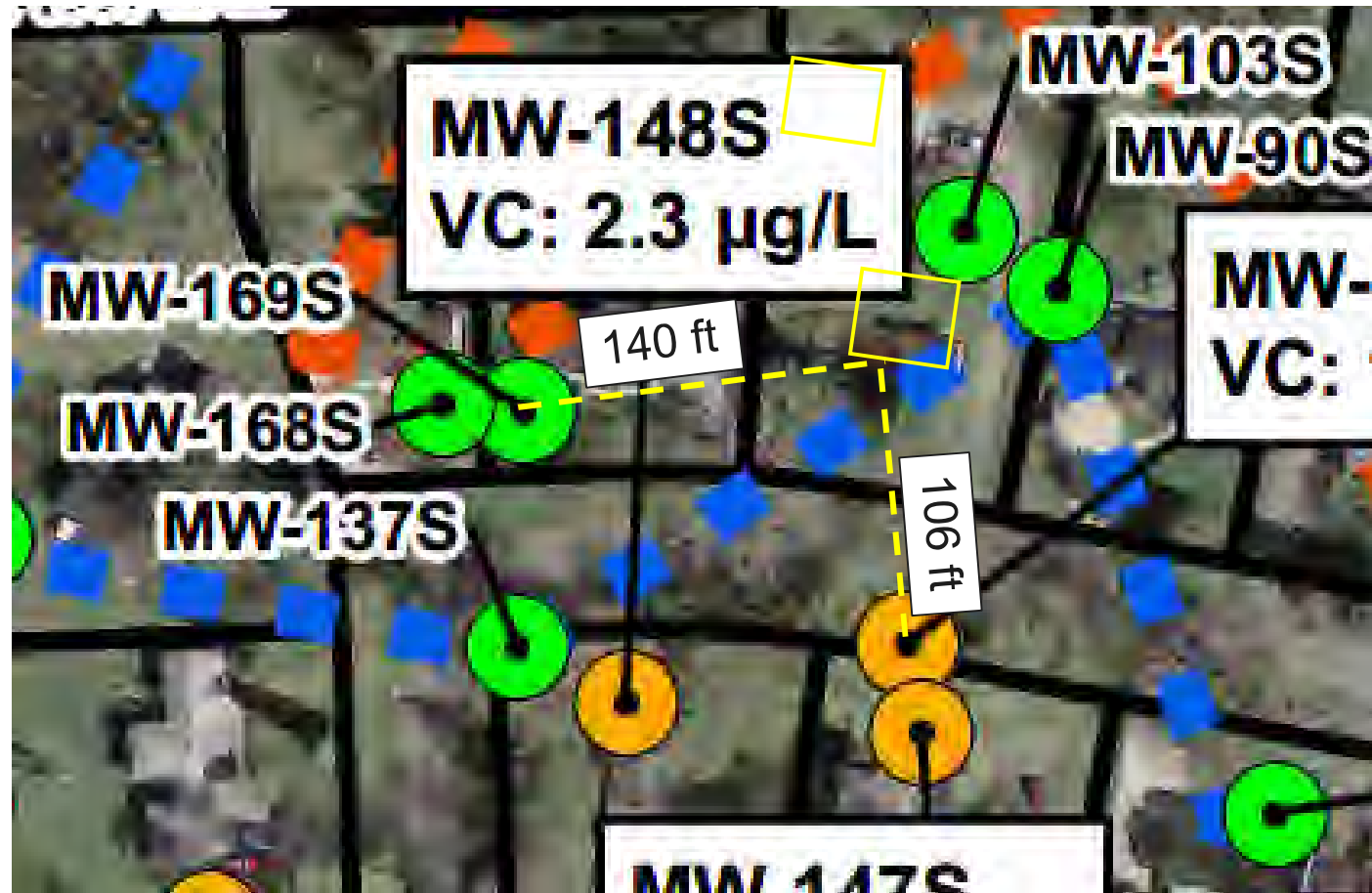
2 Properties with GW Less Than 1.0 PPB

34424 Capitol

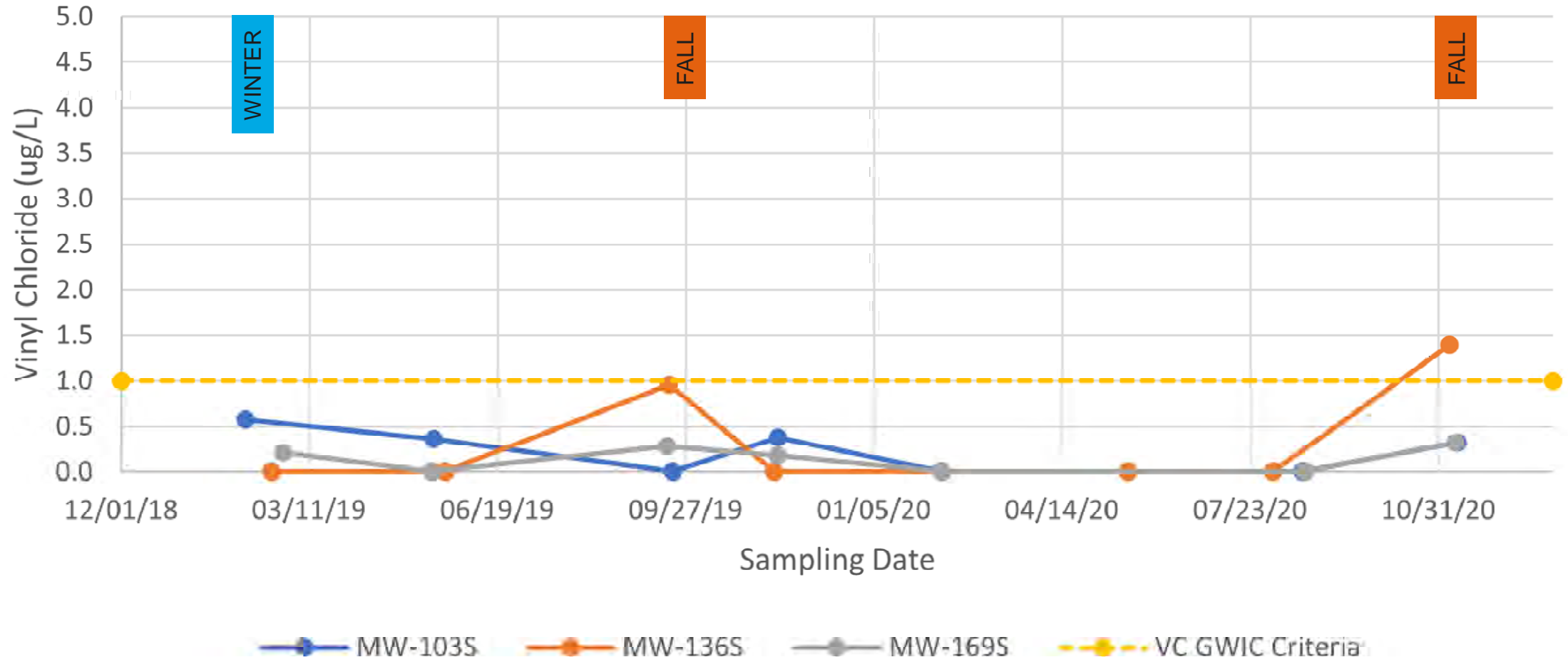
- Slab Living Area – Mitigated, Not meeting criteria
- Detached Garage – Not mitigated
- Structures inside buffer for 2 quarters – Fall 2019 and Fall 2020
 - MW-136S – Fall 2019 at criteria, 6 rounds ND, Fall 2020 1.4 ug/L
 - MW-103S – all 7 rounds below criteria
 - MW-169S – all 7 rounds below criteria
- Foundation not in contact with GW
- 5 Rounds SS data under garage – ND
- Recommendation – continue GW sampling



34424 Capitol – Distance to Surrounding Wells

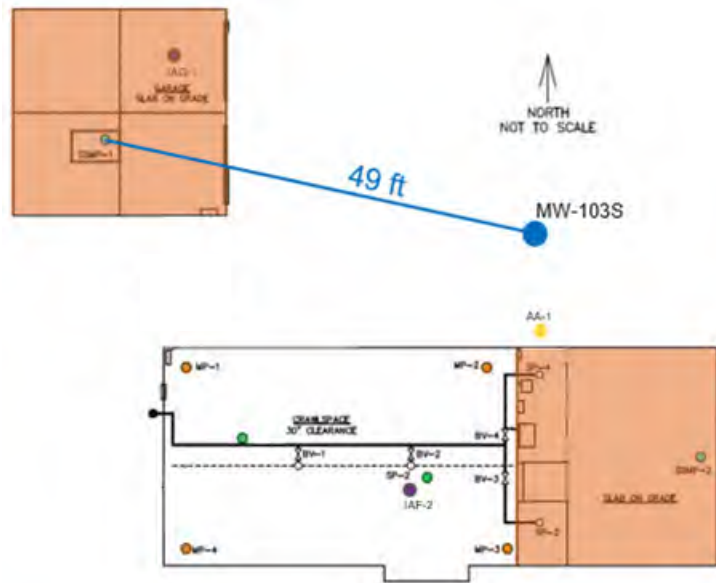


34424 Capitol Ave VC Concentration in GW Over Time



Property in mitigation area for 2 quarters, 6 quarters ND at MW-136S

34424 Capitol Ave



| Sample Location | Sample Date | Sample ID | Sampling Objective | Vinyl chloride (µg/m ³) |
|---|-------------|-----------|--------------------|-------------------------------------|
| Main Floor Indoor Air (IAF) | 2/6/2019 | IAF-02 | Pre Mitigation | <0.39 |
| | 8/11/2019 | IAF-02 | | <0.89 |
| | | DUP-01 | | <0.89 |
| | 10/3/2019 | IAF-02 | | <0.43 |
| | 5/30/2020 | DUP-01 | | <0.42 |
| | | IAF-02 | | <0.41 |
| Garage Indoor Air (IAG) | 5/30/2020 | DUP-01 | <0.41 | |
| | 11/19/2020 | IAF-02 | Post Mitigation | <0.45 |
| | 2/6/2019 | IAG-01 | Pre Mitigation | <0.41 |
| | 8/11/2019 | IAG-01 | | <0.41 |
| | 10/3/2019 | IAG-01 | | <0.43 |
| 5/30/2020 | IAG-01 | <0.42 | | |
| 11/19/2020 | IAG-01 | <0.40 | | |
| Residential Indoor Air RIASL (µg/m ³) | | | | 1E |

| Sample Location | Sample Date | Sample ID | Sampling Objective | Vinyl chloride (µg/m ³) |
|---|-------------|-----------|--------------------|-------------------------------------|
| Sub-Slab Vapor (SSMP) | 2/6/2019 | SSMP-01 | Pre Mitigation | <2.9 |
| | 8/11/2019 | SSMP-01 | | <3.2 |
| | 10/3/2019 | SSMP-01 | | <3.2 |
| | 5/30/2020 | SSMP-01 | | <3.3 |
| | 11/19/2020 | DUP-02 | | <3.1 |
| SSMP-01 | | <3.0 | | |
| Residential Sub-Slab VAC (µg/m ³) | | | | 51 |

Data Summary

- No detections of VC in crawlspace (pre-mitigation)
- CS mitigation meeting vacuum criteria
- 5 rounds of pre-mitigation IA and SS data with no detections of VC
- Pre-mitigation samples during worst case based on GW detections and heating season – Fall and Winter
- All GW detection less than the screening level at MW-103S, 3 most recent have been ND



bathroom attached to the master bedroom

mechanical/ laundry room above the concrete slab.

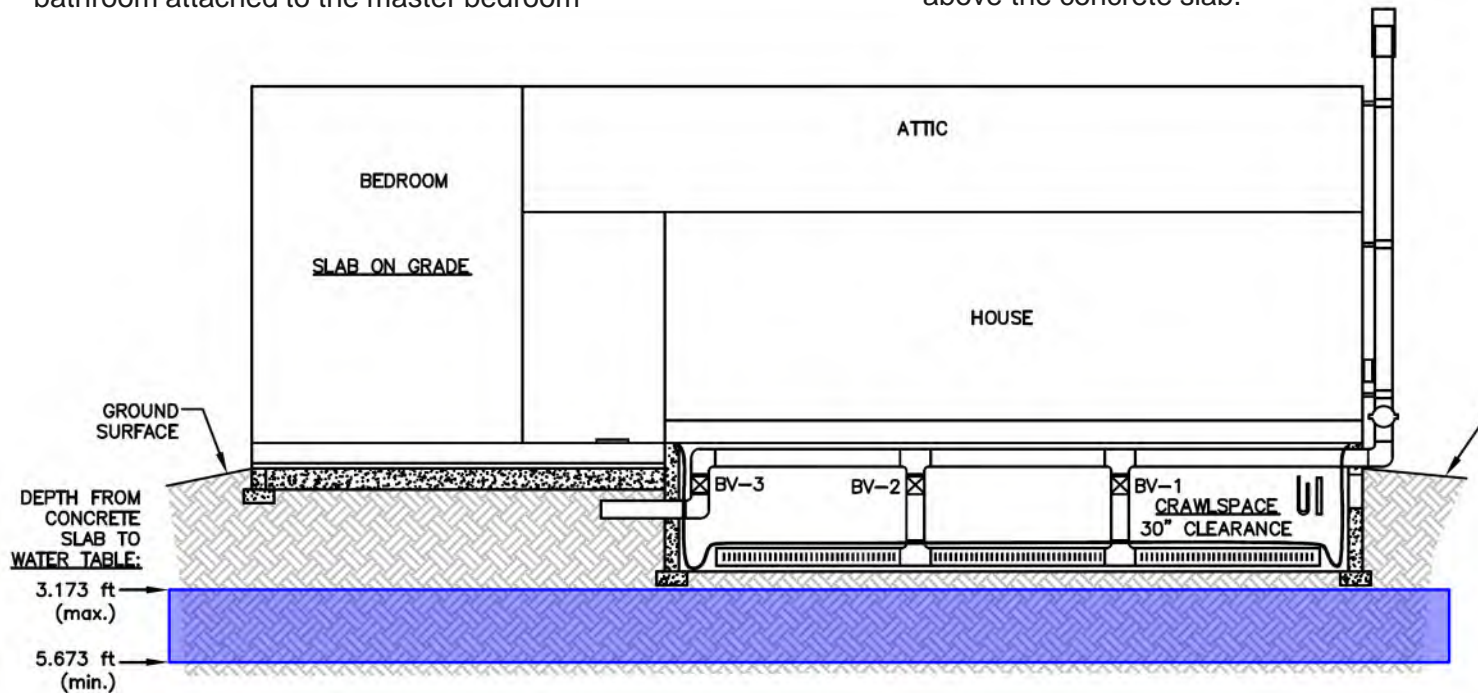
34424 Capitol Ave

Path Forward for Slab Living Area

- Continue quarterly GW sampling
- If GW exceeds screening level at MW-103S or MW-169S, or historic peak of 1.4 ug/L as MW-136S begin quarterly SS sampling at slab until GW concentration is decreasing
- If SS sample exceeds Residential Sub-Slab VIAC, supplement existing mitigation

Path Forward for Garage

- Continue quarterly GW sampling
- If GW exceeds screening level at MW-103S, MW-136S, or MW-169S, resume quarterly SS sampling at garage until GW concentration is decreasing
- If SS sample exceeds Residential Sub-Slab VIAC, mitigate



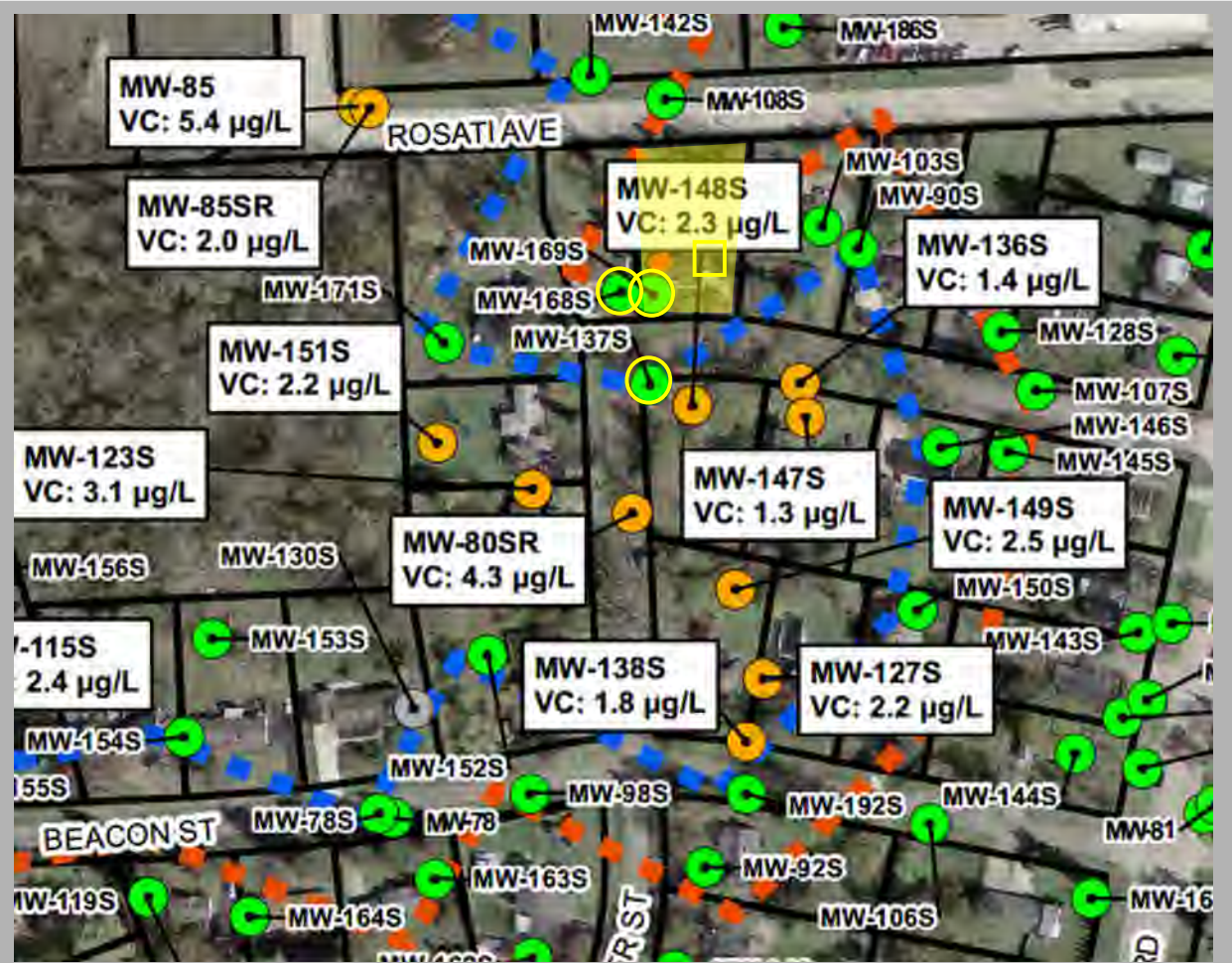
DTW below slab ranges from 3 to 6 feet beneath the slab addition (calculations based upon data collected from MW-103S).

Summary of Recommendations

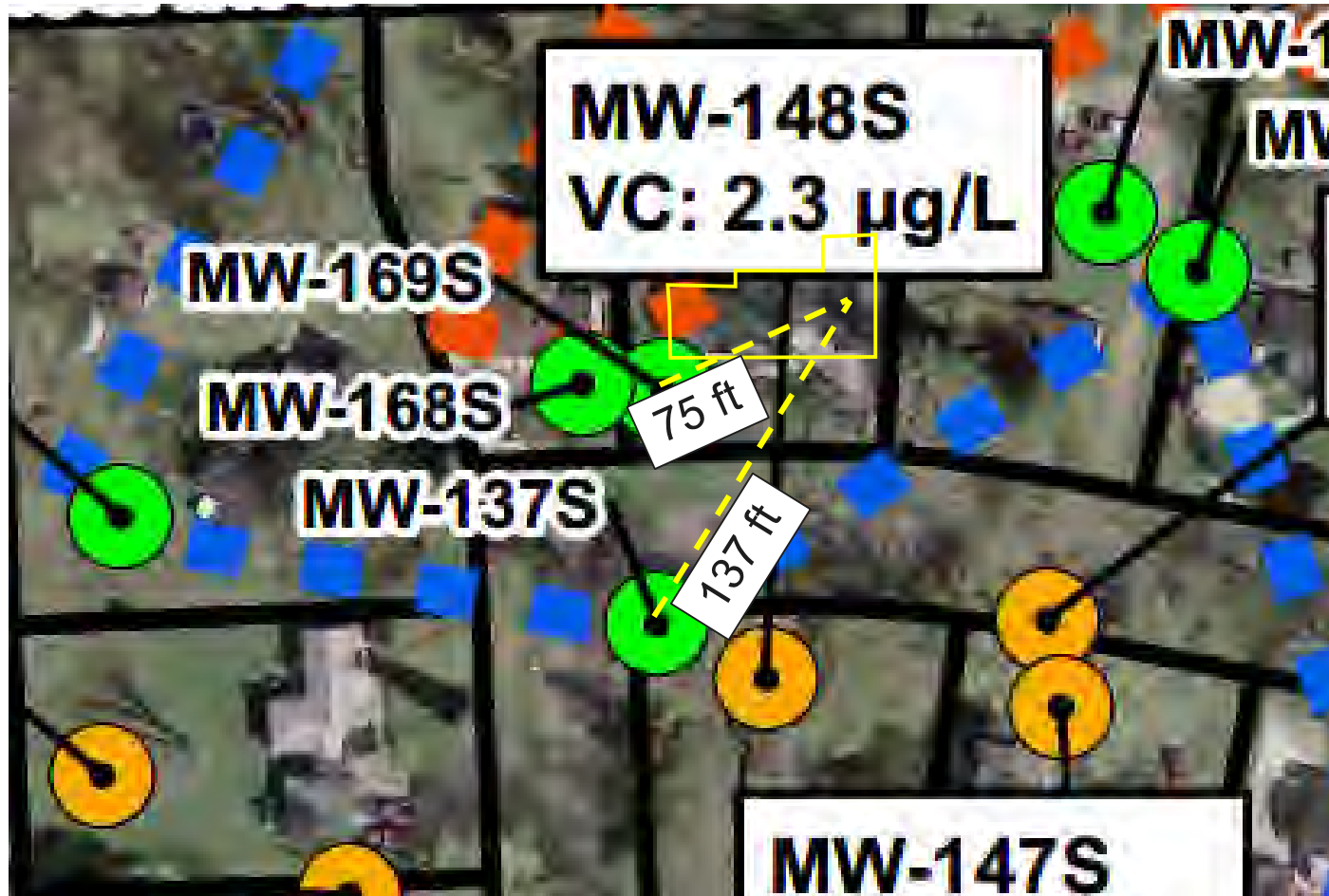
- Continue quarterly GW sampling
 - If GW concentration at MW-103S or MW-169S is greater than criteria or MW-136S is greater than historic peak of 1.4 ug/L => SS sample quarterly until GW decreasing
 - If SS sample at slab living area exceeds residential sub-slab VIAC => supplement existing mitigation
 - If SS sample at garage exceeds residential sub-slab VIAC => mitigate

34450 Capitol

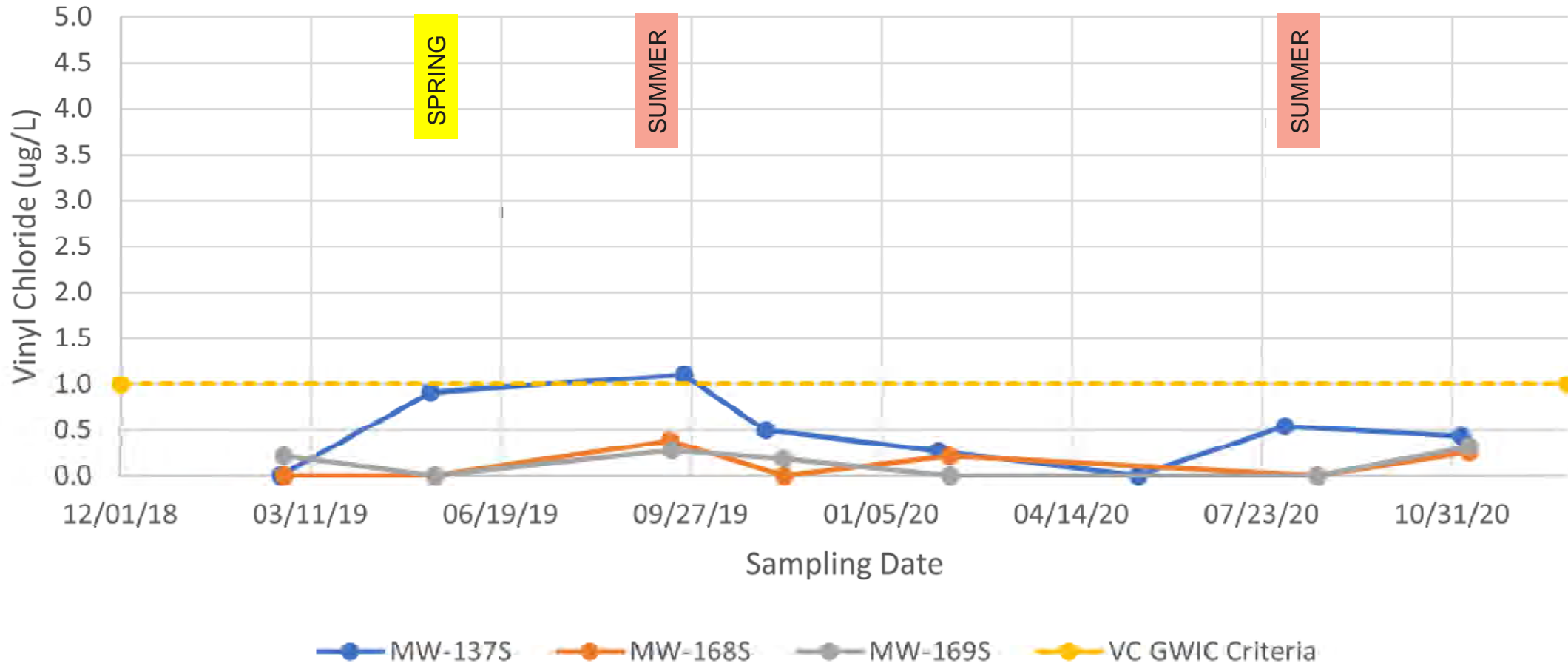
- Slab Living Areas – Not mitigated
- Attached Garage – Not mitigated
- Structures inside buffer for 2 quarters – Fall 2019 and Fall 2020
 - MW-137S – Fall 2019 at criteria, 7 rounds below criteria
 - MW-168S – all 7 rounds below criteria
 - MW-169S – all 7 rounds below criteria
- Slab footings potentially in contact with GW
- 3 - 4 Rounds SS data under living areas and garage – ND
- Recommendation – continue GW sampling



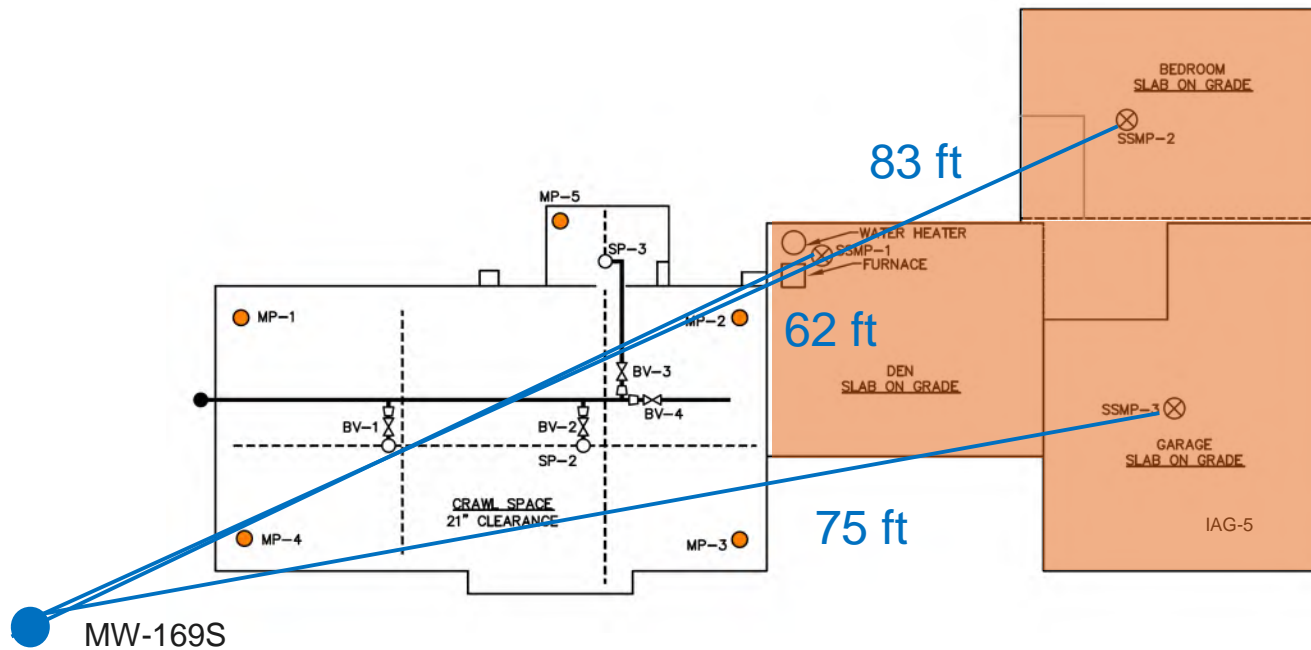
34450 Capitol – Distance to Surrounding Wells



34450 Capitol Ave VC Concentration in GW Over Time



Three upgradient wells have been below criterial for 5 quarters



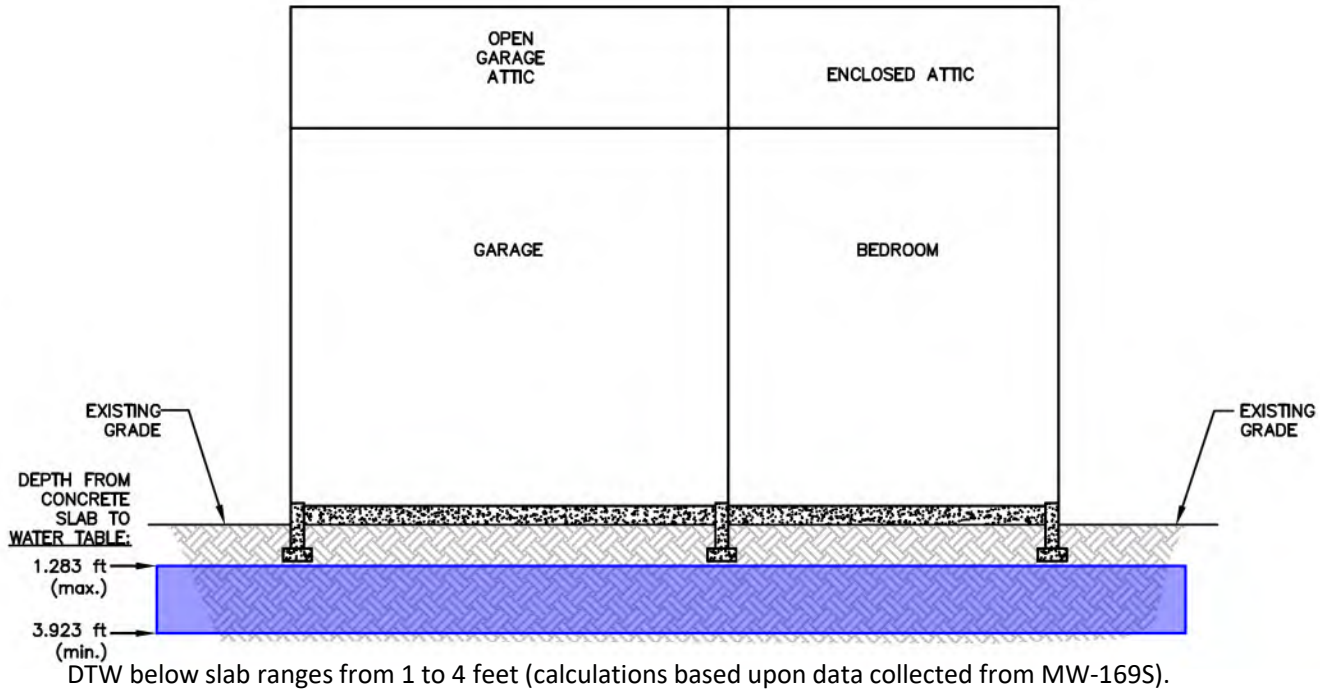
| Sample Location | Sample Date | Sample ID | Sampling Objective | Vinyl chloride (µg/m ³) |
|--|-------------|-----------|--------------------|-------------------------------------|
| Crawl Space Indoor Air (IACS) | 11/6/2018 | IACS-04 | Pre Mitigation | < 0.44 |
| | | | | |
| Main Floor Indoor Air (IAF) | 10/24/2019 | IAF-01 | Pre Mitigation | < 0.44 |
| | 2/11/2020 | IAF-01 | | < 0.47 |
| | 11/6/2018 | IAF-02 | | < 0.44 |
| | 10/24/2019 | IAF-02 | | < 0.44 |
| | 2/11/2020 | IAF-02 | | < 0.46 |
| | 10/22/2020 | IAF-02 | | < 0.42 |
| | 11/6/2018 | IAF-03 | | < 0.39 |
| | 10/24/2019 | IAF-03 | | < 0.48 |
| | 2/11/2020 | IAF-03 | | < 0.44 |
| | 10/22/2020 | IAF-03 | | < 0.42 |
| Garage Indoor Air (IAG) | 10/22/2020 | IAF-01 | Post Mitigation | < 0.43 |
| | 11/6/2018 | IAG-05 | Pre Mitigation | < 0.52 |
| | 10/24/2019 | IAG-05 | | < 0.44 |
| | 2/11/2020 | IAG-05 | | < 0.44 |
| 10/22/2020 | IAG-05 | < 0.42 | | |
| Residential Indoor Air RAGL (µg/m ³) | | | | 1.0 |

Data Summary

- No detections of VC in crawlspace (fall, pre-mitigation)
- CS mitigation meeting vacuum criteria
- 3 to 4 rounds of IA and SS data (all pre-mitigation) with no detections of VC
- Sampled during worst case seasons based on GW detections and heating season – Fall and Winter
- MW-169S – all detections <50% of screening level

| Sample Location | Sample Date | Sample ID | Sampling Objective | Vinyl chloride (µg/m ³) |
|-----------------------|---|-----------|--------------------|-------------------------------------|
| Sub-Slab Vapor (SSMP) | 11/6/2018 | SSMP-01 | Pre Mitigation | < 3.1 |
| | 11/6/2018 | SSMP-02 | | < 3.1 |
| | 11/6/2018 | SSMP-03 | | < 3.2 |
| | 10/24/2019 | SSMP-02 | | < 3.2 |
| | 10/24/2019 | SSMP-03 | | < 3.2 |
| | 2/11/2020 | SSMP-01 | | < 3.2 |
| | 2/11/2020 | SSMP-02 | | < 3.1 |
| | 2/11/2020 | SSMP-03 | | < 3.1 |
| | 10/22/2020 | SSMP-01 | | < 3.5 |
| | 10/22/2020 | SSMP-02 | | < 3.2 |
| | 10/22/2020 | SSMP-03 | | < 3.2 |
| | Residential Sub-Slab VAC (µg/m ³) | | | |

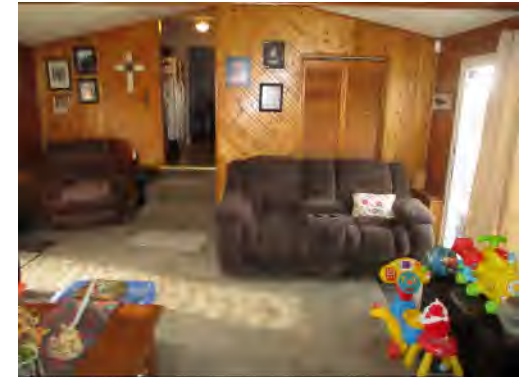
34450 Capitol Ave



two-car attached garage.



den on concrete slab on grade.



bedroom on concrete slab on grade.

Proposed Path Forward for Slab Living Areas and Attached Garage

- Continue quarterly GW sampling
- If GW exceeds screening level at MW-169S, resume quarterly SS sampling until GW concentration is decreasing
- If SS sample exceeds Residential Sub-Slab VIAC, mitigate

Summary of Recommendations

- Continue quarterly GW sampling
 - If GW concentration at MW-169S is greater than criteria => SS sample quarterly until GW decreasing
 - If SS sample at den area exceeds residential sub-slab VIAC => mitigate den area
 - If SS sample at bedroom area exceeds residential sub-slab VIAC => mitigate bedroom area
 - If SS sample at garage exceeds residential sub-slab VIAC => mitigate garage area

Summary

- The off-site data accumulated to date and the CSMs presented demonstrate that the VC concentrations in groundwater offsite are not resulting in VI
- It is appropriate for VI data to drive the determination of when mitigation/enhancing existing mitigation is warranted

The VI data demonstrates that VC is not present in the sub-slab soil vapor, therefore there is no mechanism for VI to occur

Path Forward

- Submit request to implement recommendations at 5 properties
- Prepare and submit CSMs for additional off-site mitigation properties
- Before implementing/enhancing mitigation at properties, implement VI sampling program with sub-slab samples (ie. 4 quarters) to demonstrate if there is a VI potential
- Out buildings that are not habitable will not be mitigated. The condition and usage of the structure will be monitored during routine O&M visits.
- Reduce the frequency of mitigation updates from monthly to quarterly.

VI data demonstrates preemptive mitigation is not warranted