S2C2 inc.

Streamlined Site Characterization & Closure

May 13, 2016

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Division of Environmental Remediation - Region 8
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RE: Supplemental Remedial Investigation Activities at Carlson Park in Rochester, NY. (NYSDEC VCP Number V00514-8)

Dear Greg:

This letter addendum is intended to provide a description of the additional and final supplemental Remedial Investigation (RI) activities that 100 Carlson Road, LLC anticipates conducting prior to preparing and presenting an updated comprehensive Conceptual Site Model (CSM) to the Agencies, and subsequently preparing a comprehensive RI report for the Carlson Park Site (Site). The proposed supplemental RI activities addressed herein have been discussed with you during recent telephone conversations. These activities represent an expansion of the Scope of Work outlined in the Supplemental Work Plan for Initial Bedrock Evaluation Activities dated February 28, 2010 (Supplemental Work Plan), and other supplemental Work Plan Addendum letters dated September 2010, August 2011, November 2011, June 2012, June 2013, June 2014, and September and October 2014. The Supplemental Work Plan, and subsequent addendum letters, are all addenda to the original Voluntary Cleanup Program Remedial Investigation Work Plan for Carlson Park, dated October 2004 (RI Work Plan). Accordingly, we request that this letter be considered an additional attachment to the Supplemental Work Plan.

The remainder of this letter provides an explanation of the rational for, and description of, the additional on-site RI activities currently being proposed. It is hoped that information obtained from these activities will primarily be used to help better define both groundwater quality and hydraulic conditions within the various water-bearing zones underlying the southeastern portion of the Site in the vicinity of BR-6, and within saturated overburden in the vicinity of BR-3. Additionally, together with information previously obtained, this new information should also be useful in evaluating potential remedial alternatives subsequent to the completion of the RI.

Rational for Proposed Supplemental RI Activities:

Information obtained during the completion of Supplemental RI activities to date have provided a significant amount of information regarding groundwater quality conditions within the saturated overburden and bedrock water-bearing zones underlying the Site, as well

as limited information pertaining to hydraulic conditions within such water-bearing zones. Such information has been very useful in assessing the types of groundwater quality impacts present, the magnitude and distribution of such impacts, the general pattern of groundwater hydraulic head and gradients across the Site, and an initial assessment of the general hydraulic relationship between the overburden and bedrock water-bearing zones and the hydraulic properties within these zones.

The primary purposes for conducting the currently proposed supplemental RI activities are to specifically focus on better defining subsurface conditions in the southeastern portion of the Site proximal to the area where Dense Non-Aqueous Phase Liquid (DNAPL) was previously identified or strongly suspected of being present either near the bedrock surface and/or within shallow bedrock. Such subsurface DNAPL area (or zone) is believed to represent a potential long-term ongoing source of dissolved chlorinated volatile organic compounds (CVOCs) within groundwater in the bedrock. The subsurface conditions to be better defined in the southeast portion of the Site include: the lateral on-site migration pattern of dissolved CVOCs within bedrock groundwater downgradient of the DNAPL zone, the vertical extent of such CVOC impacts, and the hydraulic conditions and relationship within the various water-bearing zones underlying that portion of the Site. In addition, the placement of additional shallow groundwater monitoring wells in the vicinity of BR-3 will provide a more comprehensive network of wells from which to better monitor long-term changes in overburden groundwater quality, as well as better defining groundwater flow and dissolved plume migration patterns in that portion of the Site.

Please note that the currently proposed supplemental on-site RI activities will be conducted using methods and procedures similar to those previously approved and used during implementation of the original RI Work Plan and/or the Supplemental Work Plan and addenda. The approximate locations of the currently proposed on-site supplemental RI activities are presented on attached Figures 1 and 2. The currently proposed supplemental RI activities will be completed during three generally consecutive field events. As described in more detail below, the specific scope of work will be somewhat dependent upon observations and/or information generated in the field. Accordingly, an element of the work scope associated with the subject RI activities will be dynamic in nature.

A. Description of supplemental RI activities in the Southeastern Portion of the Site:

In order to accomplish the objectives in southeastern portion of the Site, it is proposed that three activities be conducted in that area. These three activities include the following:

- **Bedrock Evaluation and Overburden/Bedrock Groundwater Monitoring Well Installation;**
- **Hydraulic Monitoring, Testing, and Evaluation; and**
- **Groundwater Monitoring Well Sampling and Analysis.**

Additional Bedrock Evaluation and Overburden/Bedrock Groundwater Monitoring Well Installation.

Previous RI activities conducted in the southeast portion of the property indicated elevated concentrations of dissolved trichloroethene (TCE) and other CVOCs, and related degradation compounds, as well as indications of DNAPL, at the bedrock surface and within shallow bedrock immediately east of the main facility building complex in the vicinity of Building 1. In addition, elevated concentrations of dissolved TCE and related degradation compounds, as well as indications of DNAPL, were also identified within shallow bedrock in the vicinity of BR-6 near the eastern property boundary. With the exception of deeper overburden groundwater within a limited area adjacent to the facility building near Building 1, an evaluation of overburden groundwater in that area did not indicate the presence of overburden groundwater quality impacts in that portion of the Site. However, to date, no bedrock evaluation activities have actually been conducted in the area situated between the facility building complex and the vicinity of BR-6, and no permanent groundwater monitoring wells have been installed in this area.

The primary objective of the proposed additional bedrock groundwater evaluation activities in this portion of the Site is to further evaluate the lateral migration pattern of dissolved CVOCs within bedrock groundwater in the east-southeastern portion of the Site downgradient of the area where DNAPL was identified or strongly suspected of being present in shallow bedrock. Also, although a low permeability interval has been identified to be present slightly deeper in the bedrock (on a site-wide basis) that restricts the potential for downward migration of impacts, an additional objective of this investigation is to better understand the vertical extent of potential DNAPL penetration within the shallow bedrock in this area. In addition, the installation of additional permanent groundwater monitoring wells in this area is intended to provide locations from which data can be collected to support the evaluation of hydraulic conditions and relationships, and also to conduct long-term groundwater monitoring.

In order to meet the objectives of this program, it is proposed that initial activities will consist of bedrock evaluation to be conducted at four locations as shown on Figure 1 and identified as “Overburden and Bedrock” locations. The three proposed locations situated in an east-west orientation east of Building 2 are intended to be located hydraulically downgradient of, and adjacent to, the area estimated to represent a DNAPL zone in shallow bedrock. As stated above, it is believed that such zone may represent an ongoing source of dissolved CVOCs into the shallow bedrock groundwater. Accordingly, it is anticipated that elevated dissolved CVOC concentrations will be encountered at these three proposed bedrock evaluation locations. The fourth proposed location (i.e., east of Building 1), is positioned at a location between two areas where DNAPL was previously encountered at the bedrock surface and/or within shallow bedrock (i.e., an area just east of, and adjacent to, Building 1, and the BR-6 area). Accordingly, this proposed location is anticipated to potentially be situated within the estimated DNAPL zone in shallow bedrock. The actual locations of the proposed bedrock evaluation activities may be adjusted in the field based on surface or subsurface features/utilities and/or man-made obstructions.

As described in detail in previous Supplemental Work Plan Addenda, additional bedrock evaluation activities will include some combination of bedrock drilling and/or coring coupled with packer-testing. It is anticipated that bedrock coring and packer-testing will be conducted at the two western-most locations, while bedrock drilling and packer-testing will be conducted at the two eastern-most locations. Borehole geophysical logging may also be conducted at individual borehole locations if the final depth of the open borehole is sufficient to warrant logging and borehole conditions are conducive to the successful operation and functionality of the geophysical logging tools. The geophysical logging program would include the following suite of tools: single-point resistance, spontaneous potential, natural gamma, caliper, temperature, and fluid resistivity.

At the single proposed bedrock evaluation location anticipated to potentially be situated within the DNAPL zone, the depth of bedrock coring and packer-testing is expected to be terminated once the DNAPL zone has been encountered. At the remaining three locations, it is anticipated that bedrock drilling/coring and packer-testing will extend to a depth below the shallow bedrock zone where elevated dissolved CVOC concentrations are expected to be present. Provided, however, that if DNAPL is encountered/observed, or even strongly suspected of being present in shallow bedrock at any of these three proposed bedrock evaluation locations (prior to obtaining analytical results), drilling will be terminated at that depth/location in order to limit the potential for introducing DNAPL into deeper parts of the formation via the borehole. The suspected presence of DNAPL will initially be determined through a combination of visual observations, photo ionization detector (PID) readings of drill cuttings/water, and/or VOC screening of groundwater grab samples collected during the packer-testing activities. Such information will be considered in deciding whether to suspend or terminate deeper drilling at a borehole until the analytical results of more formal analysis can be reviewed. For the purpose of this program, analytical results indicating dissolved TCE concentrations in excess of about 20 percent of the solubility of TCE (i.e., approximately 200 mg/L) will be considered sufficient to terminate further advancement of coring/drilling at that location.

If DNAPL is not believed to have been encountered in the expected high dissolved CVOC zone at any given bedrock evaluation location, bedrock coring/drilling and packer-testing activities will continue to a depth where analytical results from groundwater grab samples indicate a decrease in dissolved TCE concentrations to approximately less than 1 percent of TCE solubility (i.e., less than about 10 mg/L), or to a depth approaching the underlying natural gas accumulations as previously encountered, whichever is shallower.

At each bedrock evaluation location, a permanent 6” diameter steel casing will be installed to a depth of approximately one to two feet below the bedrock surface and grouted in place prior to initiating any bedrock evaluation activities. The bedrock surface in this portion of the Site has generally been found to be present at a depth of up to about 20 to 25 feet below grade. As previously observed during overburden investigation activities conducted in this area (i.e., the collection of groundwater grab samples via temporary points), no substantial groundwater quality impacts have been observed in overburden groundwater with the exception of locations situated directly adjacent to the facility complex. However,

observations and PID measurements of the overburden drill cuttings will be made during the installation of the 6" steel casings as a precaution to screen for possible CVOC impacts. If these observations suggest that such impacts may be present, additional measures may be taken as part of the packer-testing activities to reduce the potential for overburden conditions to affect packer-testing results near the bedrock surface.

Once all of the permanent steel casings have been set, the borehole drilling/coring and packer-testing activities will be initiated. At all bedrock evaluation locations, the initial borehole or corehole will be considered a pilot hole within which a permanent bedrock groundwater monitoring well will subsequently be installed. At locations where bedrock coring will not be conducted, a 4" borehole will be advanced through the casing, and extended into bedrock to a depth of approximately 10 feet below the base of the steel casing. Such borehole advancement is anticipated to be conducted with the use of roller bit drilling using water as the drilling fluid. Packer-testing will then commence with the use of a straddle-packer assembly utilizing only the top packer. Groundwater grab sampling will then be conducted within the bedrock borehole beneath the packer. Subsequent borehole advancement and packer-testing will continue at approximate five to 10-foot intervals. This procedure will continue in an iterative pattern until the vertical extent of evaluation has been achieved at each location. At locations where bedrock coring will be conducted, a similar procedure will be employed. However, in this case, the borehole will be advanced with the use of a triple core barrel configuration instead of a roller bit. The approximate yield/rate and volume of water extracted from each packer test interval will be recorded, and downhole equipment will be decontaminated between locations.

All groundwater grab samples collected to undergo VOC analysis as part of the packer-testing program will be analyzed for VOCs using rapid turnaround at a fixed-base laboratory in accordance with USEPA SW-846 Method 8260C. Additionally, field screening of groundwater grab samples collected from less impacted underlying bedrock zones may be conducted with an on-site GC to help determine if the vertical extent of borehole advancement can be terminated prior to the receipt fixed-base lab analytical results. Please note that air monitoring will also be conducted in the work area during all subsurface drilling and/or packing testing activities.

Once all packer-testing and geophysical logging activities have been completed, a single permanent bedrock groundwater monitoring well will be installed within the borehole advanced at each of the four shallow bedrock evaluation locations. The results of the above-described field evaluations will be used to select the well screen interval at each well location. Any portion of the initial borehole which was drilled deeper than the subsequently selected well screen setting at each well location will be sealed. The remaining portion of the borehole will then be reamed to 6 inches in diameter for the installation of bedrock groundwater monitoring wells.

Furthermore, a single overburden groundwater monitoring well will also be installed adjacent to each of the four new bedrock wells to form a well "nest". In addition, it is proposed that a single additional overburden groundwater monitoring well be installed at each of two

locations as approximately depicted on Figure 1. One of these overburden wells will be installed adjacent to existing bedrock groundwater monitoring well MWBR-06A, while the other will be installed south of location BR-6 and adjacent to the eastern property boundary. Overburden groundwater monitoring wells will be installed with the use of hollow-stem auger drilling or with the use of direct-push technology. An attempt will be made to conduct continuous soil sampling from the ground surface to the bedrock surface at the proposed overburden groundwater monitoring well locations for soil logging purposes. Depending on the drilling technique used, the soil sampling will either be conducted with the use of split-spoon samplers (for hollow-stem auger drilling) or with Macrocore® samplers (for direct-push drilling).

All permanent groundwater monitoring wells to be installed as part of this program will be constructed of 2" diameter PVC screen and riser. The actual depth of well screen settings will be dependent upon observations made and information obtained in the field. Once installed, the new monitoring wells will be developed. Development and/or purge water will be placed into the on-site carbon treatment system for water situated in the basement of Building 10. The locations and elevations of all permanent groundwater monitoring wells installed during this program will subsequently be surveyed.

Hydraulic Testing, Monitoring, and Evaluation

A series of hydraulic testing and monitoring is proposed to better define the hydraulic relationship between the overburden and bedrock water-bearing zones, confirm the identification and evaluate the lateral continuity of individual water-bearing zones within bedrock, evaluate the degree of hydraulic connection between bedrock water-bearing zones, identify the potential influences on groundwater flow, evaluate the potential to control groundwater flow in the vicinity of the Site, and to estimate various hydraulic properties within these water-bearing zones. These activities will generally be conducted after the well installation activities described above are completed, and may include: in-situ hydraulic conductivity testing, continuous water level monitoring; and possibly short-term pumping tests.

In Situ Hydraulic Conductivity Tests

In-situ hydraulic conductivity tests, also referred to as slug tests, will be performed on the new bedrock groundwater monitoring wells to be installed as part of this program. In addition, based upon observations made in the field, selected overburden groundwater monitoring wells may also be selected to undergo slug testing. The slug test data will be used to evaluate the horizontal hydraulic conductivity (K_h) of the formation adjacent to the well screen. Rising head and/or falling head slug tests will be conducted; falling head tests may only be performed where the well intake interval is entirely beneath the water table. Estimates of the K_h will be made using methods appropriate for conditions in the water-bearing zone such as Cooper, *et al.* (1967) for confined aquifers, Bouwer and Rice (1976) and Bouwer (1989) for unconfined and leaky aquifers, or Hvorlsev (1951) for unconfined or confined aquifers. The K_h estimates from these slug tests will be used to assess the spatial variability of K_h, and will also be used to facilitate the selection of a pumping well

for the optional short-term pumping test, if conducted. These K_h estimates, in conjunction with the K_h estimates obtained from slug tests previously conducted on existing wells, will facilitate the interpretation of data collected during site-wide water level measurements, the continuous water level monitoring, and from any additional short-term pumping tests that may be conducted.

Continuous Water Level Monitoring.

For a period of approximately one week, water levels will be continuously monitored in each of the four the bedrock monitoring wells proposed to be installed as part of this program, as well as in the Building 10 sump and in select groundwater monitoring wells and piezometers situated in the vicinity of the sump and the proposed new bedrock monitoring wells. A table identifying the specific locations from which continuous water level monitoring will be measured will be prepared and presented once the above-mentioned packer-testing, slug test data, and/or borehole geophysical logging, etc., to be conducted on the new bedrock groundwater monitoring wells has been completed and the data evaluated.

The continuous water level monitoring will be conducted by temporarily installing pressure transducers equipped with automatic data loggers (e.g., In Situ Mini-TROLL® or equivalent) at the final locations selected to undergo such monitoring. The automatic data loggers will be set to record water levels from the pressure transducers every five (5) minutes for the monitoring throughout the duration of the monitoring period. A manual water level meter will also be used to measure water levels in the wells to undergo continuous monitoring (and in selected other monitoring wells), at the beginning and end of the continuous water level monitoring period.

Hourly barometric pressure data and precipitation data for the monitoring period will be obtained from the National Oceanic and Atmospheric Administration (NOAA) meteorological measurement station located at the Greater Rochester International Airport. This station is located approximately six miles from the Site, and thus, the data should be generally representative of Site conditions. Additionally, barometric pressure will be measured on-site every five (5) minutes using a pressure transducer and automatic data logger configured to measure and record barometric pressure (e.g., an In-Situ BaroTROLL® or equivalent). Note that the collection of barometric pressure and precipitation data as described here will also be conducted during the short-term pumping test activities described below, if this optional testing is conducted.

Measurements or estimates of the flow rate from the pump in the Building 10 sump will be made during the monitoring period. The pumping system for the sump is equipped with a meter that measures the total amount of volumetric flow that has been pumped through the system (i.e., a flow totalizing meter). During the period of continuous water level monitoring readings of the total flow volume will be recorded on a daily, or more frequent, basis. The date and time will be recorded for each such reading.

Data from the continuous water level monitoring will be used to:

- Assess the influence that pumping from the sump under Building 10 may have on groundwater levels and flow direction in the bedrock, particularly in the southeastern portion of the site where the new bedrock monitoring wells are proposed, and provide insight into the extent to which the operation of the sump in Building 10 may have on influencing and/or capturing groundwater flow from the site;
- Further assess the degree of hydraulic continuity and interconnection between water-bearing fracture zones identified within the bedrock at the new bedrock well locations and those identified at other locations during previous investigation activities;
- Identify if other constructed features besides the Building 10 sump (e.g., roof drains, sewer lines, etc.) may be influencing groundwater flow at the site; and
- Assess the response of precipitation events (assuming they occur during the monitoring period) on groundwater elevations and the volume of water entering the sump.

Short-Term Pumping Test (Optional)

A short-term pumping test (or tests) may be conducted directly after the continuous water level monitoring period, if warranted, pending the findings obtained from the drilling and well installation program at the proposed new bedrock well locations and the continuous water level monitoring. More specific information to be assessed includes: the direction of groundwater flow in bedrock in the vicinity of the new wells, bedrock groundwater quality conditions, and potential well yield, etc. Such information would also be used to identify the most appropriate well or wells from which to pump as part any short-term pumping test. If a determination is made that any short-term pumping test is warranted at this time, the data to be obtained from such testing, including the monitoring of changes in water levels in each pumping well and the surrounding monitoring wells, would be used, if needed, to facilitate several qualitative assessments including:

- Evaluation of the continuity of water-bearing zones identified at the proposed new bedrock well locations and those identified at other locations during previous investigation activities;
- Assessment of hydraulic characteristics of bedrock water-bearing zones;
- Assessment of the degree of hydraulic connection between the groundwater in the upper bedrock and in the overburden;
- Confirmation of which wells monitor the same water-bearing zone(s); and,
- A preliminary assessment of the lateral and vertical extent of groundwater capture that can be achieved by pumping.

Pending a field assessment of the results to be obtained from an optional initial test, additional short-term pumping tests may be conducted using different bedrock monitoring wells as the pumping well.

If remedial actions involving groundwater migration control (i.e., hydraulic control) are to be considered, data from these additional possible short-term pumping test(s) may be used to help develop a subsequent longer-term pumping test program to more qualitatively assess the hydraulic characteristics of the water-bearing zones (e.g., transmissivity, storativity, etc.), the extent to which groundwater capture zones can be achieved, and the rate of groundwater extraction required to obtain capture.

If conducted, the duration of any short-term pumping test is anticipated to be up to approximately two (2) hours, followed by a period at least as long as the pumping period during which the recovery of water levels will be monitored. Groundwater will be extracted at a rate to be determined in the field. As the pumping of groundwater begins during a test, the water level in the pumping well will be measured frequently to estimate the amount and rate of water level drawdown. The pumping rate will be measured using the bucket and stop watch method or with a flow meter. The rate will be adjusted at the beginning of the test, as necessary, in an attempt to stabilize the water level in the well at a position at, or just above, the top of the well intake (i.e., top of the well screen). The pumping rate and water level in the pumping well will also be measured and recorded periodically during the course of the test, and the pumping rate adjusted, if necessary, to maintain the target water level.

During the test, water levels will be measured using pressure transducers with automatic data loggers in the pumping well and select monitoring wells. To the extent practicable, the selected locations will be the same as those that that will be equipped with transducers during the continuous water level monitoring period described above. Prior to the beginning of the pumping test, the automatic data loggers will be reset to record water levels on a more frequent schedule (i.e., once a minute). Water levels will also be measured manually in these wells and in other site monitoring wells (See Table 1) just prior to the initiation of pumping and periodically throughout the test.

Measurement of water levels, both manual and automatic, will continue during the post-pumping recovery period. The duration of the recovery monitoring period will be, at a minimum, as long as the duration of the pumping period.

The collection of barometric and precipitation data as described above for the continuous water level monitoring will continue during the course of the short-term pumping tests. These data will allow an evaluation of the degree to which water level changes measured in the wells were associated with the pumping of water from the pumping well versus other potential influences.

Prior to using the water level and pumping rate data to conduct some of the above-described assessments, the data will be reviewed to evaluate the degree to which changes in groundwater levels were influenced by pumping versus other possible influences (e.g., barometric pressure change, recharge from precipitation, naturally occurring changes/trends in groundwater level, etc.). The barometric pressure data, precipitation data and water level

data collected during both the continuous water level monitoring period, the short-term pumping test periods, and the post-pumping recovery periods will be used as part of this assessment. Once the adjustments to the water level data are made, if any, the water level data from the monitoring wells and the pumping well will be plotted on hydrographs to show changes in groundwater elevation with time. This will facilitate the evaluation of the degree of hydraulic response in each well due to pumping and will allow the above-described assessments to be conducted, including: evaluating of the continuity of water-bearing zones; assessing hydraulic characteristics of bedrock water-bearing zones; assessing the degree of hydraulic connection between the groundwater in the upper bedrock and in the overburden; and confirming which wells monitor the same water-bearing zone(s). Also, the amount of water level drawdown and groundwater elevations at the end of each pumping period will be plotted on a figure and contoured. These figures will allow for an evaluation of the area of influence of the pumping test, the anisotropy in hydraulic conductivity in the water-bearing zones (e.g., potential preferential flow directions) and the extent of groundwater capture at the end of the pumping test. In addition, the water level data and pumping rate data from the pumping wells will be used to assess the amount of water the wells can yield per foot of water level drawdown (i.e., specific capacity) which will assist in the assessment of potential remedial alternatives for the site.

Groundwater extracted during the short-term pumping tests will be containerized as it is being pumped. The extracted groundwater will be put through the on-site carbon treatment system, which is currently in-place to treat water removed from the Building 10 sump.

Groundwater Monitoring Well Sampling and Analysis.

Approximately two to four weeks after completing the hydraulic testing and monitoring activities described above (or at least four weeks after installing the new groundwater monitoring wells), each of the permanent groundwater monitoring wells installed in the southeast portion of the Site as part of this program will be sampled and subsequently analyzed for CVOCs. Accordingly, it is anticipated that a minimum of 10 new wells (i.e., 4 bedrock and 6 overburden) will be sampled from this portion of the Site. Such sampling will be conducted as part of an overall comprehensive round of groundwater sampling as described below (see Section C).

B. Description of Supplemental RI activities in the Vicinity of BR-3:

In order to accomplish the current objectives in the vicinity of BR-3, it is proposed that the following two activities be conducted:

- **Installation of Additional Overburden Groundwater Monitoring Wells; and**
- **Groundwater Monitoring Well Sampling and Analysis.**

Installation of Additional Overburden Groundwater Monitoring Wells.

Previous RI activities conducted in the vicinity of BR-3 consistently indicate the presence of dissolved TCE and related degradation compounds in shallow overburden groundwater. The highest dissolved TCE concentrations in this portion of the Site have been identified to be limited to a localized area situated along the eastern Site boundary in the vicinity of groundwater monitoring well MWBR-03 OB. Such elevated concentrations have historically ranged between about 800 to 1,400 ug/L (ppb). Based on groundwater elevation and quality data, the shallow dissolved plume associated with these findings appears to be migrating towards Hampden Road in an east-northeasterly direction.

To date, no specific source of these impacts has been identified, and there has been no indication of an on-going source of dissolved TCE in this area. In fact, existing groundwater quality monitoring data collected from overburden groundwater monitoring well MWBR-03 OB suggests that the concentration of dissolved TCE in shallow overburden groundwater in this area has been declining over time. Other than overburden groundwater quality data obtained from the single permanent overburden well currently installed in this area, most of the overburden groundwater quality information previously obtained was from temporary points which provided fairly detailed "snapshots" of conditions over limited timeframes.

The primary objective of the proposed additional overburden groundwater activities in this portion of the Site is to establish a more comprehensive network of permanent overburden groundwater monitoring wells from which to better monitor long-term changes in overburden groundwater quality, as well as gaining a better understanding of shallow groundwater flow and dissolved CVOC plume migration patterns in that portion of the Site. It is believed that this type of information will be useful when evaluating various remedial alternatives to address this area, including the potential viability of Monitored Natural Attenuation (MNA).

In order to meet the objectives of this task, it is proposed that a total of nine additional permanent overburden groundwater monitoring wells be installed at six locations to supplement the single existing overburden well. As depicted on Figure 2, three of these locations are situated on-site and three locations are situated within the right-of-way along the west side of Hampden Road. A single permanent overburden groundwater monitoring well will be installed at three of the six locations, while a nested well pair will be installed at the remaining three locations.

It is proposed that both of the existing small diameter piezometers situated along Hampden Road be replaced with a single permanent 2" diameter overburden groundwater monitoring well. A single overburden groundwater monitoring well will also be installed slightly south of MWBR-03 OB. At the three locations where nested well pairs are proposed, previous data indicate that the overburden/bedrock interface (i.e., the bedrock surface) is deeper, and that the saturated overburden thickness is greater, than at other locations in that vicinity. At these locations, previous vertical groundwater quality profiling (achieved with depth-discrete groundwater grab sampling from temporary points) indicated higher dissolved TCE concentrations at the overburden/bedrock interface than at the water table. Accordingly, an

attempt will be made at each of these three locations (i.e., two on-site locations and one along Hampden Rd.) to install pairs of permanent nested overburden groundwater monitoring wells. It is anticipated that saturated overburden thickness at each of these locations will be sufficient to permit the installation of a pair of nested wells, each with screen lengths of about two feet, to be positioned at different depth intervals within the saturated overburden. The proposed monitoring well configuration for this area will provide data with which to more thoroughly characterize both the lateral and vertical distribution of dissolved TCE and related compounds in the overburden groundwater, and to monitor long-term trends of groundwater quality conditions.

Overburden groundwater monitoring wells to be installed as part of this program will be constructed of 2" diameter PVC screen and riser. The actual locations of the wells and the depth of the well screen settings will be dependent upon conditions encountered in the field. Once installed, the new groundwater monitoring wells will be developed. Development and/or purge water will be placed into the on-site carbon treatment system. The locations and elevations of the monitoring wells installed during this program will subsequently be surveyed.

Groundwater Monitoring Well Sampling and Analysis.

Approximately four weeks after the installation of these nine additional permanent overburden groundwater monitoring wells in the vicinity of BR-3, each of these wells will be sampled and subsequently analyzed for CVOCs. This sampling event will be conducted as part of an overall comprehensive round of groundwater sampling as described below.

Once analytical results have been obtained and evaluated from these new nine wells and the single existing overburden well in this area (i.e., MWBR-03 OB), along with groundwater elevation data from these wells, a recommended on-going overburden groundwater monitoring program for this area will be developed and proposed. Such on-going monitoring program will address sampling frequency, methodology, and parameters to be measured. As mentioned above, this type of information will be useful when evaluating various remedial alternatives to address this area, including the potential viability of MNA.

C. Comprehensive round of overburden and bedrock groundwater monitoring well sampling.

After the completion of the above-mentioned hydraulic testing and/or groundwater monitoring well installation activities, a comprehensive round of all Site-related groundwater monitoring well sampling will be conducted. This comprehensive sampling event will include all 2" diameter permanent groundwater monitoring wells installed at that time (e.g., expected to be about 44 wells). As part of this comprehensive groundwater sampling event, a complete round of water level measurements will also be taken from all accessible Site-related groundwater monitoring wells and piezometers.

Groundwater sampling to be conducted from all wells to be included in this event will be accomplished with the use of passive diffusion bags (PDBs). PDBs will be installed in all such wells at least two weeks prior to sample collection. A single PDB, measuring 18 inches in length, will initially be installed for every five feet of saturated screened interval in any given well. The use of a multiple PDB configuration will help provide potential vertical groundwater quality profiling within the wells. Based upon the analytical results from this initial PDB sampling event, it is anticipated that subsequent groundwater sampling events will be accomplished with the use of a single PDB in each well. Each PDB will be placed at the optimal sampling depth (i.e., the highest CVOC concentration) identified by the groundwater quality profiling data initially obtained from the use of multiple PDBs.

In addition, subsequent to the PDB sampling, all new bedrock wells and selected new overburden groundwater monitoring wells to be installed as part of this RI Work Plan addendum will also be sampled in general accordance with the "Low Flow" sampling methodology as outlined in USEPA-Region I "Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples From Monitoring Wells", EQASOP-GW 001, January 19, 2010. This methodology is similar to that utilized in previous groundwater sampling events conducted at the Site and as described in previous RI Work Plan addendums. Accordingly, initial purging will be accomplished with the use of a submersible bladder pump. The pump intake will typically be set in the center of the screened interval, unless a specific water-bearing fracture interval has been targeted during packer-testing activities. Water level drawdown will be monitored during purging activities. In addition, purged water will pass through a low-flow cell and will be monitored for a variety of field parameters. Such field parameters will include: temperature, pH, specific conductance, dissolved oxygen (DO), and oxidation-reduction potential (ORP). Purge water will be containerized and subsequently treated on-site with the existing carbon treatment system.

In an effort to obtain representative low flow groundwater samples, an attempt will be made to allow all the above field parameters to stabilize to within specific variance ranges for three consecutive readings prior to initiating groundwater sample collection. Such ranges include: <0.3' for water level drawdown; +/- 3% for temperature and specific conductivity; +/- 0.1 unit for pH; +/- 10% for DO; and +/- 10 millivolts for ORP.

In the event that well yields in any of the new wells targeted to undergo low-flow sampling are too low to accommodate this sampling technique, only the PDB sampling will be conducted in that well. PDB sampling will be conducted prior to attempting low-flow sampling in any well planned to undergo both sampling techniques during the same sampling event.

All groundwater samples collected as part of this event will be analyzed for the presence of VOCs by a NYSDOH Environmental Laboratory Approval Program (ELAP) certified laboratory in accordance with USEPA SW-846 Method 8260C. QA/QC samples consisting of field duplicates, field and trip blanks, will be included with the sampling event. Analytical results will be validated and a Data Usability Summary Report (DUSR) will be prepared.

Please note that although it is anticipated that subsequent groundwater sampling events conducted for VOC analysis will be accomplished with the use of PDBs, there may be some situations where the exclusive use of PDBs may need to be further evaluated. For example, in the event that analytical results obtained from the two sampling methodologies (i.e., PDB vs low-flow) utilized in the new wells do not correlate well to each other, a decision will need to be made as how to accomplish subsequent groundwater sampling in any such wells. In addition, if there is poor correlation between the analytical results obtained from the initial PDB sampling to be conducted in wells for which previous low-flow data exists, a determination will need to be made if any such discrepancy can be explained by variation in sampling intervals or perhaps by expected trends in concentration flux. It is also possible that low-flow sampling may be conducted in the future at specific depth intervals in selected wells to correlate PDB vertical groundwater quality profiling data which may indicate large variations in dissolved VOC concentrations within a given well screen.

Schedule

As recently discussed over the phone, it is currently anticipated that the subject drilling and well installation activities will be initiated by mid-June 2016. Subsequent hydraulic testing and monitoring activities, and a comprehensive round of groundwater monitoring well sampling, will be conducted once the well installation activities have been completed. PDB placement will occur after the new groundwater monitoring wells have been installed or after the hydraulic testing/monitoring has been completed. The comprehensive groundwater sampling event will be initiated once the PDBs have been in place for approximately two to four weeks. An attempt will be made to complete all the subject field events by early to mid-August 2016. The final field schedule will be somewhat dependent upon receiving NYSDEC approval to proceed and driller availability.

The supplemental RI activities proposed in this Work Plan addendum will be completed in a similar manner as previously conducted as part of the ongoing RI activities being completed at the Site, and will be consistent with the methodologies presented in prior Work Plans and/or addendums as previously approved by NYSDEC for this Site as applicable, or as otherwise stated herein. Please feel free to contact me at (908) 625-3192 if you have any questions or comments concerning this matter, or if you require any additional information.

Sincerely,
S2C2 Inc.

Steven B. Gelb

Steven B. Gelb
Project Manager

CC: Jim Goff

Carlson Park Facility
Building Complex

Building 9

Building 7

Building 1

Building 2

Build

MW-10

MW-09/MW-09D

Carlson Road

MWBR-05 A

MWBR-05 B

MWBR-05 OB

MWBR-06 A

MWBR-11 OB

MWBR-11 A

Legend

Proposed Locations

- Overburden/Bedrock Nested Well Pair
- Overburden Well

Existing Locations

- Bedrock Well - A
- Bedrock Well - B
- Overburden Well

Features

- Roads
- Railroad
- Sidewalks
- Buildings
- Property Boundary
- Building_Footprints

0 15 30 60 90 120 Feet

S2C2 inc.

CARLSON PARK FACILITY
CARLSON ROAD
ROCHESTER, NEW YORK

TITLE
BR-06 Area
Proposed OB/BR Evaluation Activities

FIGURE 1

SCALE 1:600

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PZ-02

PZ-01

Carlson Park Facility
Parking Lot

MW-BR-03AI

MW-BR-03A

MWBR-03 OB

PZ-163HA

PZ-167HA

PZ-177HA

PZ-HA 1

PZ-HA 2

Hampden Road

Legend

Proposed Overburden Evaluation Locations

- Overburden Well
- Overburden - Nested Well Pair
- Convert Existing Piezometer to OB Well

Existing Locations

- Bedrock Well - A
- Overburden Well - OB
- Piezometer

Features

- Roads
- Sidewalks
- Buildings
- Property Boundary

0 10 20 40 60 80 Feet

BR-03 Area
Proposed Overburden Evaluation Activities

CARLSON PARK FACILITY

CARLSON ROAD, ROCHESTER, NY

S_2C_2 inc.

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