AMENDED RECORD OF DECISION

NYSEG - Norwich MGP Site
Norwich, Chenango County, New York
Site Number 709011

March 2015

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

DECLARATION STATEMENT – AMENDED RECORD OF DECISION

NYSEG - Norwich MGP Site
Norwich, Chenango County
Site No. 709011
March 2015

Statement of Purpose and Basis

The Amended Record of Decision (AROD) presents the selected remedy for the NYSEG – Norwich MGP site. The selected remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375, and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the site and the public's input on the Proposed Amendment to the ROD presented by the Department. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the AROD.

Description of Selected Remedy

The elements of the amended remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. In-situ solidification (ISS) of soils on the offsite target area to a depth of 26 feet below ground surface to include about two feet into the underlying confining clay area. ISS is a process that binds the soil particles in place creating a low permeability solid matrix. The contaminated soil will be mixed in place together with solidifying agents (typically Portland cement) or other binding agents using an excavator or augers. The soil and binding agents are mixed to produce a low permeability solid matrix. ISS will be implemented in an approximately 0.25 acre area located across Front Street from the site of the former MGP, as indicated on Figure 2. The treatment zone will extend from approximately 7 feet below grade to two feet into the underlying clay layer or approximately 26 feet below grade, in areas where non-aqueous phase liquid is present. A seven foot pre-excavation of soil will be required to allow for the swell of soils during mixing. Of this excavated material, any MGP waste, coal tar or contaminated soils meeting one or more of the following criteria: visible tar or oil; the presence of sheens or odors with total PAHs over 500 ppm; or total BTEX concentration of 10 ppm or above, will be disposed of at an off-site treatment or disposal facility. Excavated materials which are below the criteria will be stockpiled and evaluated for reuse on-site. The solidified matrix will then be covered with a cover system as described in element 3 to prevent direct exposure to the solidified matrix. The resulting solidified matrix reduces or eliminates mobility of contamination and reduces or eliminates the matrix as a source of groundwater contamination.

3. A site cover will be required to allow for commercial use of the site, and to protect the ISS component of the remedy. In the ISS area, the function of this cover will be to provide sufficient thermal protection of the solidified mass from seasonal freeze/thaw cycles, and to protect the ISS mass from deep root penetration while still allowing re-establishment of an appropriate vegetative cover. To provide this protection, a four foot soil cover will be established between the solidified matrix and the finished ground surface. The upper six inches of the soil will be of sufficient quality to maintain a vegetation layer. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d).

4. Imposition of an institutional control in the form of an environmental easement for the controlled property site and the off-site affected area owned by NYSEG, and a site management plan subject to agreement with the owner of the affected off-site properties, that:
- requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allows the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and;
- requires compliance with the Department-approved Site Management Plan.

5. Development of an off-site management plan (SMP) is required, which includes the following:

a. Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the affected area and details the steps and media-specific requirements necessary to ensure the following engineering controls remain in place and effective.
Institutional Controls: The Environmental Easement for NYSEG owned properties and an Agreement for the privately owned property discussed in Paragraph 4 above.

• the environmental easement discussed in remedial element 4 above applicable only to the on-site area and off-site area owned by NYSEG;
• an agreement with the off-site property owners to implement the remedy and any future site management plan on the affected off-site properties.

Engineering Controls: The solidified waste discussed in Paragraph 2 and the off-site cover discussed in Paragraph 3 above.
This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement restriction including any land use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the off-site area, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification;
- provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the off-site area, including provision for implementing action recommended to address exposures related to soil vapor intrusion and
- the steps necessary for the periodic reviews and certification of the engineering controls.

b. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring of groundwater to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department; and
- monitoring for vapor intrusion for any buildings developed on the off-site area, as may be required by the Institutional and Engineering Control Plan discussed above. (modified)

New York State Department of Health Acceptance

The NYSDOH concurs that the amendment to the remedy for this site is protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

March 31, 2015
Date

Robert W. Schick, P.E., Director
Division of Environmental Remediation

AMENDED RECORD OF DECISION

NYSEG - Norwich MGP Site
Norwich, Chenango County
Site No. 709011
March 2015

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has amended the remedy for the above-referenced site. The disposal of hazardous wastes at this site, as more fully described in the original ROD document and Section 6 of this document, has resulted in the contamination of various environmental media. The amended remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This ROD Amendment identifies the selected remedy, summarizes the other alternatives considered, and discusses the reasons for the selected remedy.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375 Environmental Remediation Programs. This document is a summary of the information that can be found in the site-related reports and documents in the document repository identified below.

On March 28, 2008, the Department signed a ROD which selected a remedy to clean up the NYSEG Norwich Former Manufactured Gas Plant (MGP) Site. This ROD Amendment pertains to the off-site portion of the site south of Front Street, which is bounded by residential properties to the east and Lackawanna Railroad/Baldwin Street to the west. The selected remedy in the original ROD was in-situ solidification (ISS) of on-site soils and off-site soils (north of Front Street) on portions of two properties immediately adjacent to the former MGP, followed by placement of a soil cover system. This component of the remedy was successfully completed in April 2011. For the off-site area south of Front Street, the remedy called for the extraction of coal tar in the form of non-aqueous phase liquid (NAPL), followed by in-situ chemical oxidation (ISCO). In addition, the off-site remedy included a provision for enhanced bioremediation of dissolved contaminants, if determined necessary, based on post remedial monitoring results.

Recovery of NAPL began in August 2009, resulting in the removal of approximately 83,356 gallons of total fluids (NAPL and water), of which, 34,092 gallons is coal tar in the form of a NAPL. This unexpected volume of coal tar recovery prompted a more thorough investigation into the current estimate of coal tar remaining in the subsurface. It is now estimated that approximately 45,000 gallons of mobile tar remains in the subsurface, which is estimated to take over 15 years to recover and still leave 5,000 to 10,000 gallons of residual tar remaining in the subsurface requiring

ISCO treatment. This new understanding of the large amount of NAPL in the subsurface and extended recovery time, has led the Department to re-evaluate alternatives to address the off-site area of Front Street. Given the success of the ISS project that has been completed on-site and off-site at two properties immediately adjacent to the former MGP, the Department is proposing to implement the ISS technology for the off-site area south of Front Street.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repositories:

Guernsey Memorial Library
3 Court Street
Norwich, N.Y. 13815
(607) 334-4034

NYSDEC Region 7
615 Erie Boulevard West
Syracuse, New York 13204-2400

NYSDEC Albany Office
625 Broadway
Albany, New York 12233-7014
(518) 402-9662

A public meeting was also conducted. At the meeting, the findings of the remedial program were presented, along with a summary of the proposed remedy. After the presentation, a question-and-answer period was held, during which verbal or written comments were accepted on the proposed remedy.

Comments on the remedy received during the comment period are summarized and addressed in the responsiveness summary section of the AROD.

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The NYSEG Norwich Former MGP Site is approximately one acre in size and is located in an urban setting, at 24 Birdsall Street, in the City of Norwich, Chenango County, New York.

Site Features: An active NYSEG substation occupies the eastern portion of the site. The remaining portion of the site, approximately 70%, is a lawn or covered in gravel. The northern part of the former MGP has been developed as a shopping plaza with retail shops. The Lackawanna railroad tracks run immediately west of the property.

Current Zoning and Land Use: The site is currently inactive, and is zoned for commercial use. The surrounding parcels are used for a combination of commercial, light industrial, utility right-of-ways, and residential. The nearest residential property is approximately 100 feet south of the site.

Past Use of the Site: The plant operations started in1863 until gas production ended in 1953. By 1887, the Norwich MGP was supplying gas to the City of Norwich under the name "Norwich Light Company". In the years following cessation of gas production in 1953, the site was used as the Aero Products facility. NYSEG purchased the Aero Products facility in 1995 and subsequently used it for equipment storage until the buildings were demolished in the summer of 2006.

Operable Units:
The project is being performed as one operable unit that is comprised of one on-site parcel, two off-site parcels north of Front Street, and one off-site parcel south of Front Street.

Site Geology and Hydrogeology: The site consists of fill materials (varying quantities of silt, sand and gravel) ranging in thickness from 1-8 feet. This fill material was underlain by glacier outwash sand and gravel varying in thickness from 7 to 15 feet. The glacial outwash is underlain by a silt and clay confining layer. The groundwater depth ranges from 4 to 14 feet below grade and flows generally to the south.

A site location map is attached as Figure 1. Figure 2 represents the site boundaries and identifies the completed and off-site areas of ISS.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. The site is currently zoned for commercial use. It is anticipated that an industrial or commercial use will continue into the foreseeable future.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The Department and New York State Electric and Gas (NYSEG) entered into a multi-site Consent Order on March 30, 1994. The Consent Order (#D0-0002-9309) obligates the responsible party to implement a full remedial program for 33 former MGP sites across the State, including the Norwich site. After the revised remedy is selected, NYSEG will be required to implement the selected remedy under the Order on Consent.

SECTION 6: SITE CONTAMINATION

6.1: Summary of Environmental Assessment

Site investigations indicate a subsurface soil contamination associated with the operation of the former MGP with a plume of groundwater contamination that extends southwest beyond the property border. The primary contaminants of concern at the site include volatile organic compounds (BTEX), semi-volatile organic compounds (PAHs) and coal tars. The extent of tar and dissolved groundwater contamination off-site has been delineated. On-site and off-site subsurface soil contamination has negatively impacted the groundwater resource in the unconsolidated geologic units beneath the site. The impacted soil has been an ongoing leaching source of contamination resulting in the downgradient migration of coal tar contamination into the groundwater off-site. Impacted areas on-site and beneath the two off-site properties north of Front Street have been successfully remediated by in-situ solidification (ISS). The impacted off-site areas south of Front Street have not yet been addressed.

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Record of Decision.

An IRM consisting of an air sparge/soil vapor extraction system was installed at the former plant site in 1999. The purpose was to remove a layer of floating petroleum, or light non-aqueous phase liquid (LNAPL) off the water table and collect the contaminated vapor from the unsaturated soil layer above it. The AS/SVE system operated from December 1999 until June 2003, when system evaluations indicated the system was no longer effective. Monitoring results determined that the system was able to remove approximately 586 pounds of BTEX and 761 pounds of total volatile organic compounds (VOCs) during the operational time period.

6.3: Summary of Human Exposure Pathways

People are not drinking contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. Measures are in place to control the potential for coming in contact with soil contamination on-site and on the off-site portion located north of Front Street. In addition, exposure to remaining subsurface soil contamination on the quarter acre parcel of land south of Front Street, is not likely unless they dig below the surface materials. Volatile organic compounds in the groundwater may move into the soil vapor (air between soil particles), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Currently there are no occupied buildings on the site. An evaluation of the potential for soil vapor intrusion to occur will be completed should the current use of the site change. Environmental sampling indicates soil vapor intrusion is not a current concern for off-site buildings. The potential for soil vapor intrusion to occur will be evaluated should any buildings be constructed on the quarter acre parcel of land south of Front Street where contamination remains.

SECTION 7: SUMMARY OF ORIGINAL REMEDY AND AMENDMENT

7.1 Original Remedy

The original remedy called for the treatment of the on-site impacted area to a depth up to 26 feet below grade using ISS. ISS is a process that binds the soil particles in place creating a low permeability mass. The contaminated soil is mixed in place together with solidifying agents (Portland cement) and other binding agents using augers. ISS was successfully implemented on-site and at two off-site parcels.

The off-site area south of Front Street was to be addressed through the installation of NAPL extraction wells, with periodic extraction and off-site disposal of collected fluids. An estimated 2,400 gallons of fluids were to be removed from four locations on a monthly basis for a 3-year period. The specific number of extraction wells and their locations were to be determined during the remedial design phase.

Following a sufficient period of NAPL removal, ISCO treatment of the remaining off-site source material was to be conducted. The location of the treatment area was to be finalized during the remedial design phase.

Enhanced bioremediation of dissolved contaminants was to be performed, if determined necessary through groundwater monitoring, following the ISCO treatment. This treatment would involve injection of an oxygen-supplying product using temporary borings to increase dissolved oxygen concentrations in groundwater, stimulating microbial activity and the breakdown of dissolved contaminants. The treatment area may include areas of previously treated source materials, and/or untreated areas beyond the source area. Details regarding the location and spacing of injection borings, the quantity of oxidant injected per boring and the number of applications was to be developed during the remedial design phase.

To address any remaining contamination in subsurface soil, a site management plan was to be developed for properties adjacent to the former MGP property. The site management plan would address excavations of soils where MGP contamination may be present.

7.2 Elements of the Remedy Already Performed

The selected components of the on-site remedy that have been successfully performed include the solidification of 52,103 cubic yards of impacted soil. Additionally, 1,733 tons of impacted material was shipped to ESMI of Fort Edward, New York for treatment by thermal desorption and 27,125 tons of soil and ISS “swell” material was disposed of at Seneca Meadows Landfill in Waterloo, New York. Approximately 3,076 cubic yards of site soil that met the requirements for re-use at the site were staged at the NYSEG Service Center and transported back to the site and used as backfill; the remainder of the backfill was imported from a local source and met the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d) and DER-10 Appendix 5.

The NAPL recovery component of the off-site remedy began in August 2009, resulting in the removal of approximately 83,356 gallons of total fluids (NAPL and water), of which, 34,092 gallons is coal tar in the form of NAPL.

7.3 New Information

A current estimate of the remaining NAPL in the off-site subsurface soil is approximately 45,000 gallons; which could take over 15 years to recover at the projected rate of recovery, and would still leave 5,000 to 10,000 gallons of residual NAPL in the subsurface requiring ISCO treatment. Given the large amount of NAPL remaining in the subsurface and the projected recovery time, and the success of ISS that has been completed, the Department has re-evaluated alternatives to the selected NAPL recovery followed by ISCO remedy for the off-site properties south of Front Street. Based on the re-evaluation and the success of ISS technology in addressing the other contaminated areas, the Department is now proposing ISS to address the remaining off-site impacted areas. ISS technology was not initially selected to remediate this area because the information available at that time indicated that only a limited quantity of recoverable NAPL was present in the subsurface. Recovery was the preferred option at the time because the available data indicated that it could be completed in a reasonable time frame.

7.4 Changes to the Original Remedy

A summary of the changes to the original ROD as provided in this document are shown in the following table:

SUMMARY OF REMEDY CHANGES

Media:	March 28, 2008 ROD (off-site portion south of Front Street)	Amended ROD (off-site portion south of Front Street)
Groundwater	(1) Monitoring of ground water parameters and quality to assess effectiveness of the ISS remedy; (2) Long term monitoring;	(1) Monitoring of ground water parameters and quality to assess effectiveness of the ISS remedy; (2) Long term monitoring; (3) Agreement with the off-site owner to restrict ground water use.
Subsurface NAPL/Soil Property South of Front Street	(1) Collection of mobile NAPL at off-site areas south of Front Street. (2) Following a period of NAPL removal, treatment of the remaining off-site source material by in-situ chemical oxidation (ISCO). (3) Biodegradation of dissolved phase contaminants following the chemical oxidation injections. (4) Development of a site management plan to address residual contaminated soils that may be excavated from the site during future redevelopment.	(1) In-situ solidification of soils on the target area to a depth of approximately 26 feet below ground surface. In-situ solidification (ISS) will be implemented *in an approximately 0.25-acre area located immediately off-site of the former MGP*. (2) A site cover will be required to protect the solidified soil and allow for restricted use of the site. The cover will consist of a minimum 4-foot soil cover, with the upper six inches consisting of pavement, building foundation, or soil of sufficient quality to maintain a vegetation layer. (3) Development of an off-site management plan (SMP), which includes an Engineering Control Plan and an agreement with the off-site property owners to ensure that

Subsurface NAPL/Soil Property South of Front Street (cont.)		the soil cover remains in place and effective and an excavation plan which details the provisions for management of future excavations in the ISS treated area.
Soil Vapor/Indoor Air	(1) A provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion.	There are no changes to the remedy for soil vapor/indoor air in this amendment.

SECTION 8: EVALUATION OF AMENDED REMEDY

8.1 Remedial Goals

Goals for the cleanup of the site were established in the original ROD. The goals selected for this site are to:

- remediate, to the extent practicable, areas containing source material;
- eliminate potential exposure to source material;
- control future migration of source material from the off-site areas;
- eliminate potential human exposure to the off-site subsurface soil containing MGP-related contamination; and
- eliminate potential human exposure to groundwater containing MGP-related contamination.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient groundwater quality standards.

8.2 Evaluation Criteria

The criteria used to compare the remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each criterion, a brief description is provided. A detailed discussion of the evaluation criteria and comparative analysis is contained in the original Feasibility Study.

The first two evaluation criteria are called threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Public Health and the Environment. This criterion is an overall evaluation of

each alternative's ability to protect public health and the environment.

The original remedy (coal tar recovery) is protective of public health and the environment but would require an additional 15 years of recovery while still leaving significant amount of product in place. This extended recovery time could potentially increase the potential for public and worker exposure to the contaminants, and would increase the potential for groundwater and soil vapor migration from this source material. Solidification of the source material will minimize the potential for direct contact with contaminants of concern. Solidification will also protect the environment by immediately preventing further off-site migration by reducing the mobility of contamination through solidification. As a result, the amended remedy provides a higher degree of health and environmental protection.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

The ongoing coal tar recovery operation will conform to the applicable soil SCGs over time by removing coal tar. However, recent investigations have estimated that about 45,000 gallons of coal tar still remain in the subsurface and will take an additional 15 years to recover. The amended remedy will conform to the applicable soil SCGs by solidifying the soil that exceeds the SCOs (in areas where non-aqueous phase liquid is present based on site investigations) on the off-site area south of Front Street. The solidified monolith will redirect the natural groundwater flow around the impacted solidified soils and thus reduce the potential for groundwater contamination. By preventing the release of contaminants to groundwater, the Department expects that ambient groundwater quality standards will be achieved over time. The original remedy of tar recovery followed by ISCO application will equally comply with SCGs. However, it will take a significant additional amount of time (over 15 years) to achieve this compliance.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Based on new information, the original remedy would not be effective in the short term due to the estimated 15 years of coal tar removal required before the chemical oxidation treatment could be implemented. During this time, there would be some impacts to the neighborhood in the form of tank truck removals and monthly system checks. The amended remedy will have higher short-term impacts on the surrounding neighbors due to the construction activities, but these can be controlled through Department-approved plans. The amended remedy is expected to be completed and effective within one year, which is significantly less than the extended period required by the existing remedy.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

The amended remedy will provide a high level of effectiveness and permanence as contaminated source materials are solidified to a depth up to 26 feet below grade. This is similar to the long-term effectiveness of the existing remedy, in which recoverable coal tar would be first removed and disposed off-site, after which residual coal tar would be treated by chemical oxidation. However, the successful implementation of ISS in the on-site areas demonstrates that this technology is able to successfully treat coal tar. The ISCO technology requires the chemical oxidant to come in contact with the contamination after it is injected into the subsurface through a series of wells. The ISS technology uses a more aggressive mixing method to bind the contaminated soil to the solidifying agent. As a result, ISS has greater reliability (in this particular case) in remediating the entire amount of contamination.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

The current remedy would reduce the volume of contamination over approximately 15 years through the recovery of approximately 45,000 gallons of NAPL and treatment of the remaining 5,000 to 10,000 gallons of NAPL by chemical oxidation. The amended remedy would reduce the mobility of the contamination through solidification by binding the material in-place while creating a low permeability mass, but would not reduce the volume or toxicity.

6. Implementability. The technical feasibility and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

The amended (ISS) remedy is readily implementable and the ISS technology was successfully applied at the on-site portion of the project. It has a similar level of implementability as the existing remedy.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

The estimated present worth cost of the amended remedy for the off-site portion (south of Front Street) of the project is $4,358,000, as compared to the estimated cost of $17,276,000 for implementing the existing off-site remedy. The cost of the current remedy has increased significantly due to; the length of time (estimated 15 years) required to recover the re-evaluated

quantity of coal tar remaining in the subsurface soils; and the quantity of chemical oxidant needed to treat the residual coal tar through ISCO technology.

This final criterion is considered a modifying criterion and is considered after evaluating those above. It is focused upon after public comments on the ROD amendment have been received.

8. Community Acceptance. Concerns of the community regarding the proposed changes have been evaluated. A responsiveness summary (Appendix A) presents the public comments received and the manner in which the Department will address the concerns raised. The public generally supported the amended remedy.

SECTION 9: SUMMARY OF ROD AMENDMENT

The Department has amended the Record of Decision (ROD) for the off-site area south of Front Street of the NYSEG Norwich Former Manufactured Gas Plant (MGP) Site.

The elements of the amended remedy listed below are identified as modified when compared to the March 2008 ROD remedy. The estimated present worth cost to carry out the amended remedy is $4,358,000. The cost to construct the amended remedy is estimated to be $4,172,000. The annual monitoring cost is $24,000 for an estimated period of 10 years totaling $186,000 (present worth OM&M). The estimated present worth to complete the original off-site remedy is estimated to be $17,276,000 (based on 15 additional years of operation).

The elements of the amended remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development. (*unchanged*)

2. In-situ solidification (ISS) of soils on the offsite target area to a depth of 26 feet below ground surface to include about two feet into the underlying confining clay area. ISS is a process that binds the soil particles in place creating a low permeability solid matrix. The contaminated soil will be mixed in place together with solidifying agents (typically Portland cement) or other binding agents using an excavator or augers. The soil and binding agents are mixed to produce a low permeability solid matrix. ISS will be implemented in an approximately 0.25 acre area located across Front Street from the site of the former MGP, as indicated on Figure 2. The treatment zone will extend from approximately 7 feet below grade to two feet into the underlying clay layer or approximately 26 feet below grade, in areas where non-aqueous phase liquid is present. A seven foot pre- excavation of soil will be required to allow for the swell of soils during mixing. Of this excavated material, any MGP waste, coal tar or contaminated soils meeting one or more of the following criteria: visible tar or oil; the presence of sheens or odors with total PAHs over 500 ppm; or total BTEX concentration of 10 ppm or above, will be disposed of at an off-site treatment or disposal facility. Excavated materials which are below the criteria will be stockpiled and evaluated for reuse on-site. The solidified matrix will then be covered with a cover system as described in element 3 to prevent direct exposure to the solidified matrix. The resulting solidified matrix reduces or eliminates mobility of contamination and reduces or eliminates the matrix as a source of groundwater contamination. (*new*)

3. A site cover will be required to allow for commercial use of the site, and to protect the ISS component of the remedy. In the ISS area, the function of this cover will be to provide sufficient thermal protection of the solidified mass from seasonal freeze/thaw cycles, and to protect the ISS mass from deep root penetration while still allowing re-establishment of an appropriate vegetative cover. To provide this protection, a four foot soil cover will be established between the solidified matrix and the finished ground surface. The upper six inches of the soil will be of sufficient quality to maintain a vegetation layer. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d). (*modified*)

4. Imposition of an institutional control in the form of an environmental easement for the controlled property site and the off-site affected area owned by NYSEG, and a site management plan subject to agreement with the owner of the affected off-site properties, that:

- requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allows the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and;
- requires compliance with the Department approved Site Management Plan.

5. Development of an off-site management plan (SMP) is required, which includes the following:

a. Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the affected area and details the steps and media-specific requirements necessary to ensure the following engineering controls remain in place and effective.

Institutional Controls: The Environmental Easement for NYSEG owned properties and an Agreement for the privately owned property discussed in Paragraph 4 above.

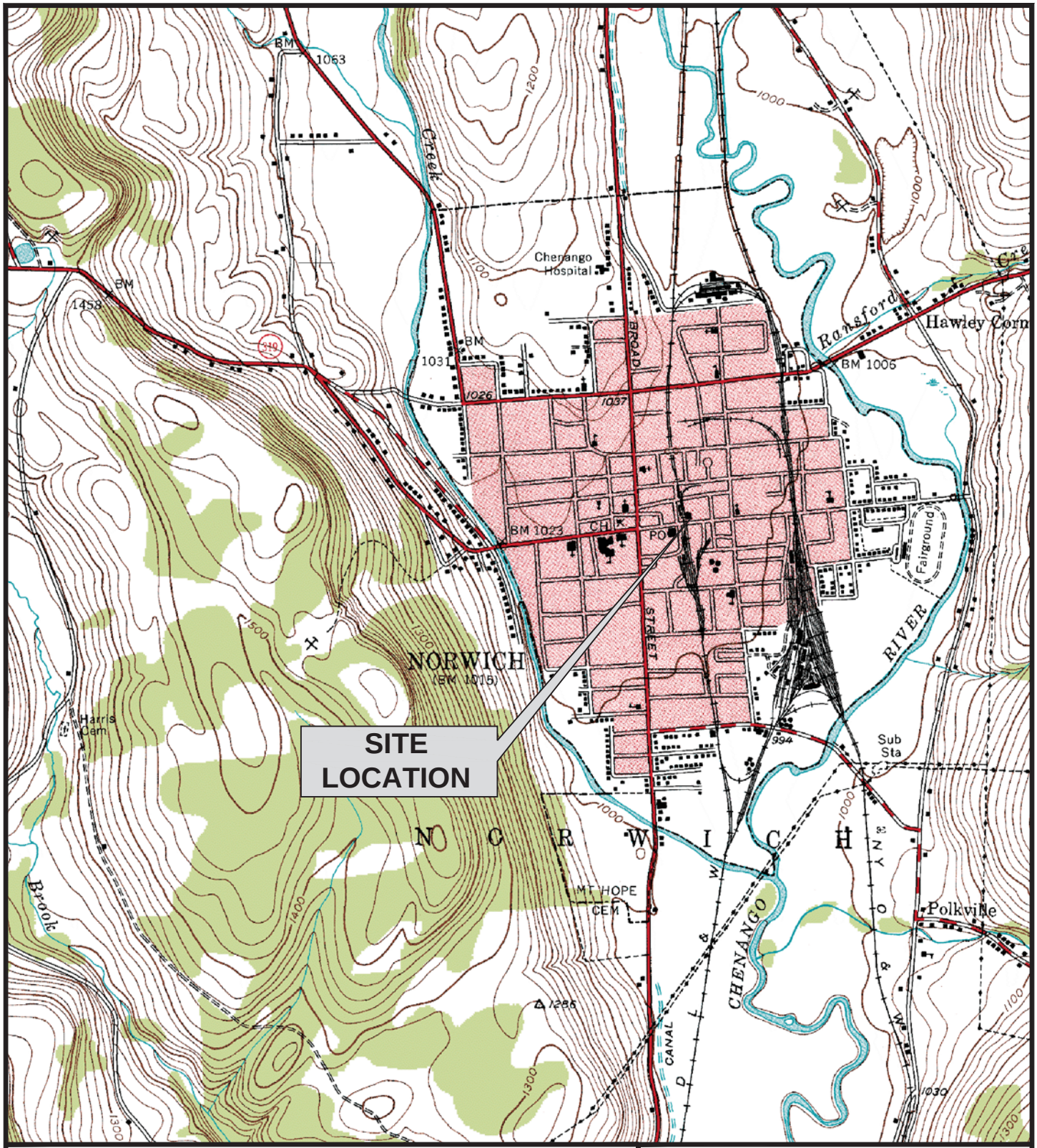
• the environmental easement discussed in remedial element 4 above applicable only to the on-site area and off-site area owned by NYSEG;
• an agreement with the off-site property owners to implement the remedy and any future site management plan on the affected off-site properties. (*modified*)

Engineering Controls: The solidified waste discussed in Paragraph 2 and the off-site cover discussed in Paragraph 3 above.

This plan includes, but may not be limited to:

o an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
o descriptions of the provisions of the environmental easement restriction including any land use restrictions;
o a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the off-site area, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
o provisions for the management and inspection of the identified engineering controls;
o maintaining site access controls and Department notification;
o provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the off-site area, including provision for implementing action recommended to address exposures related to soil vapor intrusion and
o the steps necessary for the periodic reviews and certification of the engineering controls.

b. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
o monitoring of groundwater to assess the performance and effectiveness of the remedy;
o a schedule of monitoring and frequency of submittals to the Department; and
o monitoring for vapor intrusion for any buildings developed on the off-site area, as may be required by the Institutional and Engineering Control Plan discussed above. (*modified*)



SOURCE: USGS NORWICH
7.5' QUADRANGLE

0' 1000' 2000' 4000'

Norwich MGP AROD

Figure 1

Norwich AROD

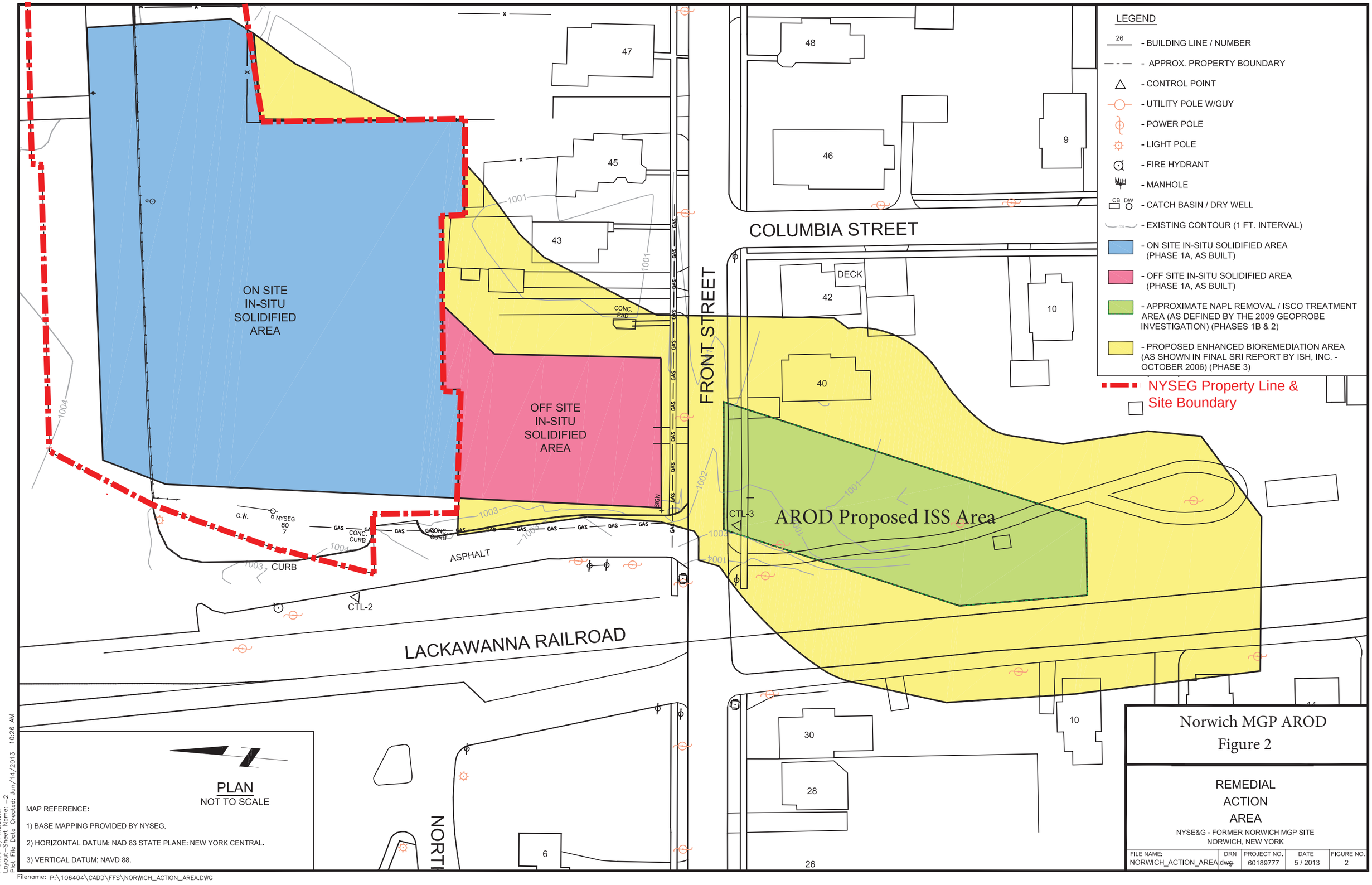
SITE
LOCATION
PLAN

NYSE&G - FORMER NORWICH MGP SITE
NORWICH, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
	---	60189777	9 / 1714	1

Plotted By: meisterk
Layout-Sheet Name: FFS-1
Plot File Date Created: Jun/14/2013 10:41 AM

Filename: P:\106404\CADD\FFS\NORWICH-COVER.DWG



PLAN
NOT TO SCALE

MAP REFERENCE:

1) BASE MAPPING PROVIDED BY NYSEG.

2) HORIZONTAL DATUM: NAD 83 STATE PLANE: NEW YORK CENTRAL.

3) VERTICAL DATUM: NAVD 88.

Norwich MGP AROD
Figure 2

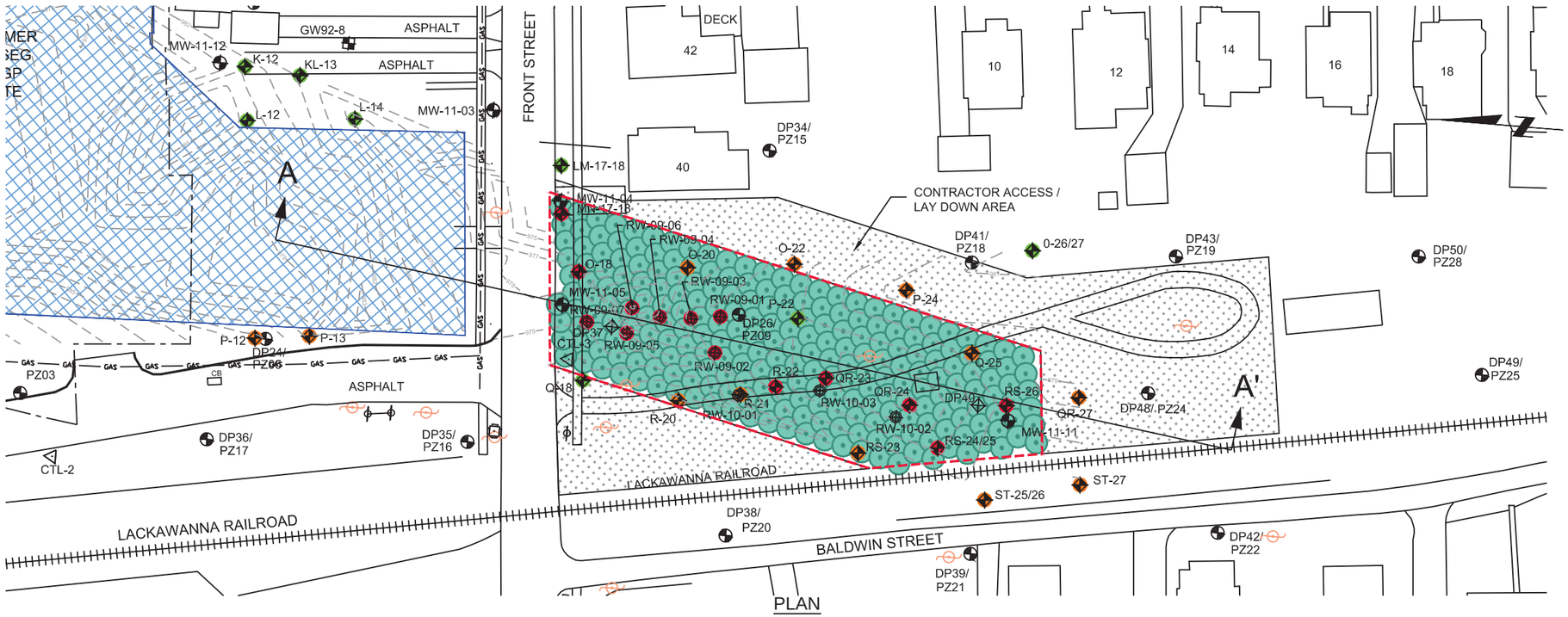
REMEDIAL ACTION AREA

NYSE&G - FORMER NORWICH MGP SITE
NORWICH, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
NORWICH_ACTION_AREA.dwg		60189777	5 / 2013	2

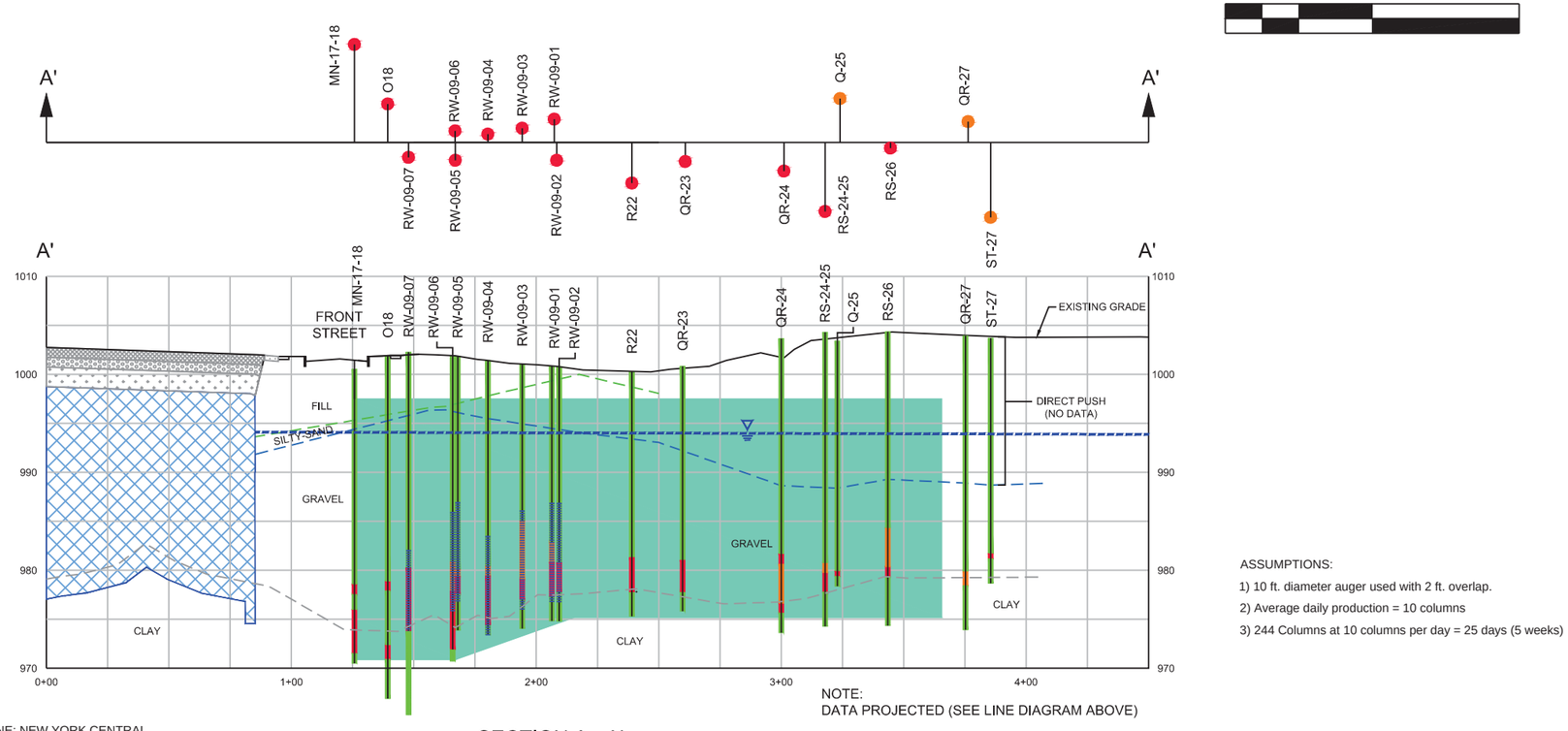
Plotted By: meisterk
Layout-Sheet Name: --2
Plot File Date Created: Jun/14/2013 10:26 AM

Filename: P:\106404\CADD\FFS\NORWICH_ACTION_AREA.DWG



PLAN

0' 30' 60' 120'



SECTION A - A'

NOTE:
DATA PROJECTED (SEE LINE DIAGRAM ABOVE)

LEGEND

- 26 - BUILDING LINE / NUMBER
- - APPROX. PROPERTY BOUNDARY
- - CONTROL POINT
- - BENCHMARK
- - UTILITY POLE W/GUY
- - POWER POLE
- - LIGHT POLE
- - FIRE HYDRANT
- MH - MANHOLE
- CB - CATCH BASIN
- - FENCE LINE
- 978 - TOP OF CLAY SURFACE CONTOUR
- - LIMITS OF 2010 / 2011 ISS TREATED AREA
- - TREATMENT AREA

HISTORICAL SAMPLE KEY

- - GROUND WATER WELL
- - SPARGE POINT MONITORING POINT
- - SPARGE WELL
- - PIEZOMETER
- - DIRECT PUSH (PRE-2009)
- - DIRECT PUSH (2009)
- - RECOVERY WELL (2009/2010)
- - MONITORING WELL (2011)

NAPL OBSERVATION KEY

- - NO OBSERVED IMPACTS
- - MGP STAINED SOILS OR NAPL BLEBS
- - NAPL SATURATED SOILS

REMEDY KEY

- - IN-SITU SOLIDIFICATION (ISS) COLUMN (AUGER DIAMETER ASSUMED 10 FT.)

ASSUMPTIONS:
1) 10 ft. diameter auger used with 2 ft. overlap.
2) Average daily production = 10 columns
3) 244 Columns at 10 columns per day = 25 days (5 weeks)

MAP REFERENCE:
1) BASE MAPPING PROVIDED BY NYSEG.
2) HORIZONTAL DATUM: NAD 83 STATE PLANE: NEW YORK CENTRAL.
3) VERTICAL DATUM: NAVD 88.

Norwich MGP AROD
Figure 3

FOCUSED FEASIBILITY STUDY

IN-SITU SOLIDIFICATION (ISS)
LAYOUT
PLAN

NYSE&G - FORMER NORWICH MGP SITE
NORWICH, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
Norwich_FFS.dwg	---	60189777	9 / 2014	3

Plotted By: meisterk
Layout-Sheet Name: FFS-ISS
Plot File Date Created: Jun/17/2013 8:12 AM

Filename: P:\106404\CADD\FFS\NORWICH_FFS.DWG

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

NYSEG – Norwich MGP Site
Norwich, Chenango County, New York
Site No. 709011

The Proposed Record of Decision Amendment for the NYSEG – Norwich MGP site was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 23, 2015. The Proposed ROD Amendment outlined the remedial measure proposed for the contaminated soil, and groundwater at the NYSEG – Norwich MGP site.

The release of the plan was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on March 4, 2015, which included a presentation of the remedial investigation alternative analysis (RI/AA) for the NYSEG – Norwich MGP Site as well as a discussion of the proposed remedy amendment. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on March 25, 2015.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the Department's responses:

COMMENT 1: Is the In-Situ Solidification (ISS) mixture permeable? Can water migrate through the mass?

RESPONSE 1: The ISS process involves mixing the soil with agents such as Portland cement to encapsulate the waste in a matrix with greatly reduced permeability when compared to the surrounding materials. The ISS mixture is not impermeable, but has a very low permeability, similar to a silty clay. Because the surrounding soil will have a much higher permeability compared to the ISS mass, groundwater will flow around the ISS mass naturally, following the path of least resistance.

COMMENT 2: Is the ISS material homogeneous?

RESPONSE 2: The ISS material is expected to be homogenous when installed in accordance with the Department-approved specifications. Quality Assurance (QA)/Quality Control (QC) procedures will be implemented during ISS installation to ensure the solidified material is uniform and effective in preventing contaminant migration.

COMMENT3: Why is the top seven feet of soil being excavated in the proposed area of the ISS prior to implementation of the ISS remedy?

RESPONSE 3: A seven foot pre-excavation of soil is required to allow for the swell of soils that will occur during mixing of natural soil with the added agents and to ensure that the final ISS surface is installed below the frost line to prevent damage (fracturing) from freeze and thaw processes during the winter months.

COMMENT 4: What happens if the ISS fractures?

RESPONSE 4: Proper QA/QC will be conducted in the field to demonstrate that the ISS is installed properly and that the solidified mass is homogeneous. If QA/QC completed in the field indicates the ISS has not been installed properly, measures will be put in-place to address the deficiencies and ensure that the remedy is protective of human health and the environment. The solidified mass will also be placed below the frost line to ensure that cracking does not occur due to freeze/thaw processes. If minor fracturing occurs during or after the ISS solidification process, water could only migrate a short distance through the ISS mass until it reaches a competent zone, and the overall protectiveness of the remedy would not be affected. Major fracturing would be detected during the long-term monitoring program for the site, and would have to be repaired by grouting or a similar method.

APPENDIX B

Administrative Record

Administrative Record

NYSEG – Norwich MGP Site
Norwich, Chenango County, New York
Site No. 709011

1. Proposed Remedial Action Plan for the NYSEG – Norwich MGP *site,* dated February 23, 2015, prepared by the Department.

2. Consent Order (#D0-0002-9309) between the Department and New York State Electric and Gas (NYSEG), March 30, 1994.

3. Task I Assessment Report for the Former Manufactured Gas Plant Site, Norwich, New York, 1990, prepared by Engineering-Science, Inc.

4. Task II Investigation Report for the Former Manufactured Gas Plant Site, Norwich, New York, July 1992, prepared by Engineering-Science, Inc.

5. Task III Investigation Report for the Former Manufactured Gas Plant Site, Norwich, New York, July 1997, prepared by Engineering-Science, Inc.

6. Final Report Phase III Interim Remedial Measures Work Plan for Norwich Former MGP Site, October 1997, prepared by Fluor Daniel GTI, Inc.

7. Interim Remedial Measures Completion Report for System Enhancement Norwich Former MGP Site Norwich, New York, March 2002, prepared by IT Corporation, Inc.

8. Semi-Annual Status Report - January 2003 to June 2003, Air Sparge/SVE System – Operation & Maintenance, Norwich Former MGP Site, July 2003, prepared by Shaw Environmental, Inc.

9. Final Supplemental Remedial Investigation (SRI) Report Norwich Former MGP Site, Norwich New York, October 2006, prepared by Ish Inc.

10. Final Feasibility Study Report, Norwich Former MGP Site Norwich, New York, November 2007, prepared by Ish Inc.

11. Evaluation of Remedial Alternatives for the Off-Site Area Norwich Former MGP Site Norwich, New York, October 2013, prepared by AECOM.

12. Letter dated February 26, 2013 from Scott Underhill P.E., AECOM.