

**APPENDIX D
SPECIFICATIONS**

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Ninemile Creek 100% Design

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Provision 2 of the New York State Education Law*

SPECIFICATION NO: 01030

SPECIFICATION TITLE: ENVIRONMENTAL PROTECTION

PROJECT NO: 446794

PROJECT TITLE: NINEMILE CREEK

CLIENT: HONEYWELL

				APPROVALS		
Issue	Date	Pages	Issue Description	Prepared	Checked	Approved
0	5/23/2012	8	Issued for Construction	ERK	SRB/JMO	RDD/TD
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PART 1 GENERAL**1.1 DESCRIPTION**

- A. The Work specified in this Section consists of all labor, equipment, tools, materials, services, supervision and incidentals necessary for environmental pollution control and abatement for the Work as described herein, shown on the Contract Drawings, or as directed by the Engineer. Work in this Section includes, but is not limited to:
1. Controlling environmental pollution requiring the consideration of air, water and land; management of noise, solid and hazardous waste, and other pollutants.
- B. Related Work specified in other Sections includes, but is not limited to:
1. Section 02140 - Construction Water Management
 2. Section 02219 – Waste Excavation, Dredging, Consolidation, and Disposal
 3. Section 02370 - Erosion Control
 4. Section 02910 - Wetland and Streambed Restoration
 5. Section 02990 - Finish Grading, Topsoil and Seeding

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.

1.3 REFERENCES

- A. New York State Standards and Specifications for Erosion and Sediment Control, (Latest Version).
- B. New York Department of Transportation: Standard Specifications (US Customary), 2009.
- C. New York State Department of Environmental Conservation: Draft 6 NYCRR Part 375, Environmental Remediation Programs, 2006.
- D. Title 29 Code of Federal Regulations, Part 1910 Occupational Safety and Health Standards – US Department of Labor, OSHA.

1.4 DEFINITIONS

- A. Environmental Pollution shall be defined as the presence of chemical, physical or biological elements or agents which:
1. Adversely affect human health or welfare.
 2. Unfavorably alter ecological balances of importance to human life.
 3. Affect other species of importance to man.
 4. Degrade the utility of the environment for aesthetic and/or recreational purposes.

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- B. Prohibited Construction Practices include, but are not limited to the following:
1. For any stream corridor, wetland, surface water or any unspecified location:
 - a. Dumping of spoil material.
 - b. Indiscriminate, arbitrary or capricious operation of equipment.
 - c. Pumping of silt-laden water from trenches or other excavations.
 - d. Disposal of trees, brush and other debris.
 2. Permanent or unspecified alteration of the flow line of any stream.
 3. Explosive blasting.
 4. Burning of refuse and debris at the project site.
 5. Disposal of construction water without treatment as per Section 02140 – Construction Water Management.

1.5 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:
1. A Contractor's Storm Water Pollution Prevention Plan (SWPPP) in accordance with Section 02370 – Erosion Control, with a description of and illustration showing anticipated stormwater control and erosion control measures to be implemented during construction. This shall be submitted prior to mobilization to the Site.
 2. A Contractor's Water Quality Management Plan (WQMP) in accordance with Section 02219 – Waste Excavation, Dredging, Consolidation, and Disposal, with a description of and illustrations showing anticipated measures to be implemented during dredging to protect and monitor surface water quality.
 3. Material Safety Data Sheets (MSDS) for all products having MSDS's 10 working days prior to delivery of such product to Site. MSDS's must be maintained and readily available on-site.
 4. The Contractor shall be responsible for completing an inspection form for each piece of equipment, tool or bulk recyclable remnant structure or pipe being removed from the Site that required decontamination.
 5. An "Off-Site Disposal Record" as part of the Final Closeout Report.

1.6 PROJECT AND SITE CONDITIONS

- A. The Contractor shall carefully examine the site to determine the full extent, nature and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.

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1.7 NOTIFICATIONS

- A. The Contractor shall notify the Engineer at anytime during the completion of works if separate phase mercury, non-aqueous phase liquid (NAPL), drums, tanks or other unanticipated sources of contamination are encountered.

PART 2 PRODUCTS**2.1 DECONTAMINATION PRODUCTS**

- A. Cleaning products anticipated for use in decontamination include, but are not limited to, the following:
1. A steam cleaner (or equivalent) furnished and used by the Contractor shall be a high-pressure, low-volume unit from an industry-recognized manufacturer.
 2. The Contractor shall provide miscellaneous tools such as shovels and brushes.
 3. The Contractor shall provide cleaning agents such as non-phosphate detergents for use as necessary.

PART 3 EXECUTION**3.1 PREPARATION**

- A. Prior to commencement of the Work, the Contractor shall meet with the Engineer to develop mutual understanding relative to compliance with these provisions and administration of the environmental pollution control program.
- B. The Contractor shall schedule and conduct all Work in a manner that will minimize the erosion of soils in the area of the Work and shall provide erosion control measures as described in Section 02370 – Erosion Control. All erosion control measures shall be in place and in operating condition in an area prior to any construction activity in that area.
- C. The Contractor shall manage construction water in accordance with Section 02140 – Construction Water Management and sequence and conduct earthwork activities to limit the generation of construction water as appropriate.

3.2 TEMPORARY ENVIRONMENTAL CONTROL FEATURES

- A. Exclusion Zones will be defined and operated as described in 29 CFR 1910.210 Hazardous Waste Operations.
- B. The Contractor will dismantle and remove temporary environmental control features only when permanent control features have been installed and assessed as correctly functioning by the Engineer. Permanent control features shall be incorporated into the Project at the earliest practicable time in light of construction scheduling, and shall be in place and functioning upon project completion.

3.3 GENERAL REQUIREMENTS

- A. Flow of surface water into excavated areas shall be prevented as much as is practical.

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- B. Ditches around construction areas shall be used as necessary to carry non-contact surface storm water away from the excavated areas.
- C. At the completion of the Work, temporary ditches shall be backfilled and the ground surface restored to its original condition.

3.4 PROTECTION OF STREAMS AND SURFACE WATERS

- A. The Contractor shall take all precautions to prevent, or reduce to a minimum, any damage to any stream or surface water from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such streams or surface water.
- B. The Contractor shall take all preventative measures to avoid spillage of petroleum products and other pollutants. In the event of any spillage, immediate notification and prompt remedial action shall be taken in accordance with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.
- C. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the stream or surface water, shall not be directly returned to the stream or surface water. Such waters shall be managed as Construction Water as per Section 02140 – Construction Water.
- D. On-Site Discharge: Refer to Section 02140 – Construction Water Management regarding potential discharge into streams, surfacewater, groundwater and/or storm sewers.
- E. Dredging: Refer to Section 02219 – Waste Excavation, Dredging, Consolidation, and Disposal regarding Water Quality Management Plan.

3.5 PROTECTION OF LAND RESOURCES

- A. The Contractor shall restore land resources within the project boundaries and outside the limits of permanent Work to conditions upon completion of construction such that these will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas shown on the Contract Drawings or as approved by the Engineer.
- B. Outside the Limits of Clearing and Grubbing as indicated on the Contract Drawings, the Contractor shall not de-face, injure, destroy or remove trees, shrubs, fencing, structures or other landscape features without prior approval by the Engineer. No ropes, cables, or guys shall be fastened to any existing trees, shrubs, fencing, structures or other landscape features for anchorage unless specifically authorized by the Engineer.
- C. Prior to operations, the Contractor shall ensure adequate protection for trees, shrubs, fencing, structures or other landscape features that may possibly be de-faced, bruised, injured or otherwise damaged by the construction equipment or other operations. Monuments and markers shall be similarly protected.
- D. Any trees, shrubs, fencing, structures or other landscape features scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to

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their original condition. The Engineer will decide the method of restoration to be used and whether damaged trees shall be treated and healed or removed and disposed of.

1. All scars on trees caused by equipment, construction operations or by the removal of limbs larger than 1-inch in diameter shall be coated as soon as possible with an approved tree wound dressing. Experienced personnel shall perform all trimming or pruning in an approved manner with saws or pruning shears. Tree trimming with axes will not be permitted.
 2. Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established Limits of Clearing and Grubbing that are subsequently damaged by the Contractor, and in the opinion of the Engineer are beyond saving, shall be immediately removed or replaced.
- E. The location of the Contractor's support areas shall be approved by the Engineer and shall not be within wetlands or floodplains. The preservation of the landscape shall be an imperative consideration in the selection of support area locations. Drawings showing support area locations shall be submitted for approval of the Engineer.
- F. If the Contractor proposes to construct temporary roads or embankments and excavations for support areas, it shall submit the following for approval at least 10 days prior to scheduled start of such temporary work:
1. A layout of all temporary roads, excavations, embankments and drainage to be constructed within the site.
 2. Details of temporary road construction.
 3. Drawings and cross-sections of proposed embankments and their foundations, including a description of proposed materials.
 4. A landscaping drawing showing the proposed restoration of the area. The Drawing must include, but not be limited to the following:
 - a. The proposed removal of any trees, shrubs, fencing, structures or other landscape features outside the limits of clearing and grubbing.
 - b. The locations of guard posts or barriers required to protect trees, shrubs, fencing, structures or other landscape features to be maintained undamaged.
 - c. The locations of guard posts or barriers required to control vehicular traffic.
 - d. The provision for the obliteration of construction scars and for a natural final appearance of the area.
- G. Modification of the Contractor's approved drawings shall be made only with the written approval of the Engineer. No unauthorized road construction, excavation or embankment construction, including disposal areas, will be permitted.
- H. The Contractor shall remove all signs of support areas or any other vestiges of construction as directed by the Engineer. Roadways will be restored to existing conditions or as directed by the Engineer. The disturbed areas shall be prepared and

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seeded as described in Section 02910 – Wetland and Streambed Restoration and/or Section 02990 – Finish Grading, Topsoil and Seeding, or as approved by the Engineer.

3.6 PROTECTION OF AIR QUALITY**A. Dust Control**

1. The Contractor is responsible for dust control for all excavations, embankments, stockpiles, access roads, plant sites, waste areas, borrow areas and all other work areas.
2. An approved method of dust control is sprinkling of water from a water source approved by the Engineer.
3. The use of other stabilization methods may be permitted with approval from the Engineer. Product samples and manufacturer's literature must be submitted to the Engineer in accordance with Section 01300 - Submittals and all other relevant Sections contained in the Specifications. All products that are approved for dust control shall be used in accordance with the manufacturer's instructions.
4. Sprinkling must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor shall have sufficient competent equipment to accomplish this. Dust control shall be performed as the Work proceeds and whenever a dust nuisance or hazard occurs, or as determined by the Engineer.

B. Odor Control

1. If odors are an issue as determined by the Engineer, the Contractor shall provide an odor control material or applicable procedure acceptable to the Engineer.

3.7 NOISE CONTROL

- A. The Contractor shall be aware of and comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards related to noise. The Contractor shall adhere to any local regulations and restrictions regarding the start and stop times of work activities at the site.

3.8 USE OF CHEMICAL PRODUCTS

- A. Chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall be approved by U.S. EPA or U.S. Department of Agriculture or any other applicable regulatory agency.
- B. The Contractor shall obtain required certifications, permits and inspections and comply with all Federal, State, Local, and DOT codes, ordinances, regulations, statutes and standards governing transportation, handling, storage and use of chemical products and residues.

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- C. The Contactor shall refer to the pertinent MSDS for information on all chemical products used or present at the Site.

3.9 FUEL AND LUBRICANTS

- A. The Contractor shall comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards concerning transportation and storage of fuels and lubricants.
- B. Fuel storage area and fuel equipment shall be approved by the Engineer prior to installation.
- C. The Contractor shall report spills or leaks from fueling equipment or construction equipment to the Engineer and as required by law, and conduct cleanup activities as required.
- D. The Engineer will require the Contractor to remove damaged or leaking equipment from Project site.

3.10 DECONTAMINATION

- A. The Contractor shall properly decontaminate all tools and equipment before removal from site.
- B. The Contractor shall properly decontaminate all supplies and materials before removal from site, or manage as waste materials in accordance with the requirements of this specification.
- C. The Contractor shall use decontamination pads in order to separate exclusion and clean zones as required as follows:
 - 1. The decontamination pad shall be used and maintained to accommodate the anticipated construction equipment at the approved location. The area shall be returned to its previous condition upon completion of the Work unless otherwise directed by the Engineer.
 - 2. When not in use, each decontamination pad shall be covered with a waterproof liner to prevent the collection of precipitation.
 - 3. Wood planks may be placed over the impermeable liner at the Contractor's discretion to provide a traveling surface for vehicle wheels and equipment tracks.
 - 4. All decontamination water collected in the decontamination pad shall be managed as construction water as per Section 02140 – Construction Water.
 - 5. All equipment and material decontamination procedures shall be carried out on the decontamination pad.
 - 6. The collection sump shall be purged at the end of each work day and as required, and/or following a rainfall event.

END OF SECTION

SPECIFICATION NO: 01300

SPECIFICATION TITLE: DOCUMENT SUBMITTAL PROCEDURE

PROJECT NO: 446794

PROJECT TITLE: NINEMILE CREEK

CLIENT: HONEYWELL

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<input checked="" type="checkbox"/> Entire Specification Issued this Revision <input type="checkbox"/> Revised Pages Only Issued this Revision			SPECIFICATION ISSUED FOR: <input type="checkbox"/> In-house Review <input type="checkbox"/> Bid <input type="checkbox"/> Client Review/Approval <input checked="" type="checkbox"/> Construction <input type="checkbox"/> Information Only <input type="checkbox"/> <i>Other</i>			

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Specification Title	Document Submittal Procedure	Date:	5/23/2012

PART 1 GENERAL

1.1 SUMMARY

- A. The purpose of this Section is to define the roles and responsibilities of the Contractor, Engineer and Owner in the submittal process and to present the procedures for review, approval and final disposition of contractor submittals during the construction phase.
- B. This specification applies to all incoming or outgoing documentation originated by the Contractor throughout the duration of the project.

1.2 DEFINITIONS

- A. The following definitions apply to this section:
 - 1. Contractor – Parsons Construction Team, Subcontractor, or Supplier
 - 2. Owner - Honeywell, Inc.
 - 3. Engineer - Parsons Design Team
- B. General definitions:
 - 1. Document- Any technical drawings, specifications, data sheets, manuals, calculations, etc., received from the Contractor including electronic media such as CD-ROM, email file attachments, etc.
 - 2. Document Control Coordinator- Employee of Parsons responsible for the receipt, coordination, and status reporting, of Contractor documentation.
 - 3. Procurement Manager- Employee of Parsons responsible for distributing request for proposal and supporting documentation packages.
 - 4. Website Administrator- Employee of Parsons responsible for providing access to the software programs, assisting with questions and maintaining the websites
 - 5. Prints/Copies- The documents submitted will be distributed for Engineer/Owner review.
 - 6. Reproducible- Unbound document available for use in duplication.
 - 7. Electronic Copy- Files and attachments sent electronically via email or uploaded to the project software shall be in **PDF, XLS, DOC**, formatting, unless otherwise requested.

1.3 SUBMITTAL REQUIREMENTS

- A. General: The submittal of all documentation will include:

- 1. Dimensions and calculations are to be in standard units.

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2. Language Requirements: English
 3. All documents must be numbered appropriately (See Paragraph 1.5.B)
 4. Submittals shall include a document transmittal form.
- B. Documents shall contain sufficient information to enable the Engineer to provide adequate review.
- C. Project Management and Documentation Software
1. Primavera Contract Manager (PCM)

PCM is a document control and management software designed to centrally locate, link and provide tools for documenting correspondence, issues, meeting minutes, transmittals, and submittals. The Document Control Coordinator is responsible for uploading documents as appropriate.
 2. Project Collaboration Portal / SharePoint Site/ Project Website

The Engineer and Contractor may utilize, as appropriate, a Microsoft SharePoint Site which is accessible through the internet and allows for faster uploading and downloading of files while working in the field.

Documents uploaded by the Contractor will not be accessible by any other group other than the Engineer. If outside parties are required to review the documents, then the files will be transferred appropriately.
 3. Project Software Access
 - a. The Contractor must receive permission from the Website Administrator to access the Project Website. Permission will be assigned based on the intended use and activity of the Contractor.
 - b. The Contractor will receive an email from the Website Administrator that provides a username, password and appropriate instructions for access
- D. All submittals shall be labeled with the submittal number and shall be included on the Document Transmittal Form.

1.4 SUBMITTAL PROCEDURES

- A. The Contractor shall email or upload the required documents to the Project Management and Documentation Software and work with the Document Control Coordinator for proper requirements.

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- B. The Document Control Coordinator will distribute the submittal documents to the Engineer/Owner for appropriate management, engineering/design, project control document review.
- C. Following the Engineer/Owner document review, the Document Control Coordinator shall return the submittal with the disposition based on the review.
 - 1. The Document Control Coordinator will upload the submittal response to the Project Software Program.
 - 2. The Document Control Coordinator will notify the Contractor that the submittal has been reviewed via email.
 - 3. The Engineer will provide a disposition to each reviewed submittal using the following codes:
 - a. No Exceptions
 - b. Exceptions as Noted
 - c. Proceed with Work
 - d. Resubmit
 - e. Submit Certified Prints
 - 4. If comments or revisions are provided by the Engineer, the Document Control Coordinator shall return redlined, submittals showing changes, and/or comments to the Contractor either electronically or on hardcopy, as appropriate for the document submittal.
 - 5. A document transmittal shall be included identifying disposition, comments, and include the statement *“Action taken hereon does not supersede requirements of applicable design drawings, specifications, orders, codes or regulations or relieve the Contractor or Supplier from responsibility for errors or omissions”*.
 - 6. The Contractor shall resubmit revised documents when the “Resubmit” disposition is indicated. The Contractor shall not proceed with work unless the “Proceed with Work” disposition is indicated.

1.5 TRANSMITTAL PROCEDURES

- A. The Contractor shall include a document transmittal form with the submittal.
- B. Document transmittal forms must include:
 - 1. Engineers’ project number, the Contractor’s contract number, and reference for the submittal (i.e., specification number, drawing number, health safety requirements).

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2. The transmittal will also include a statement indicating that the document(s) provided for review meet all requirements of the contract documents, or will explicitly indicate exceptions and/or substitutions.

1.6 REVIEW PROCEDURE

- A. The Contractor shall be required to submit all documentation in accordance with the agreed dates.
- B. The Engineer/Owner shall review the documentation within two (2) weeks following the submittal.
- C. The Contractor shall have one (1) week to revise and make any necessary comments. The Contractor may request addition revision time if needed based on the extent of comments. The Engineer must acknowledge and confirm extension in writing to the Contractor.
- D. The Engineer/Owner shall have one (1) week to review and return any resubmitted documents.
- E. Subsequent reviews and resubmittals will follow the guideline of one (1) week review cycle.

1.7 REQUEST FOR INFORMATION

- A. The Contractor may request additional information/clarification from the Engineer through a Request for Information (RFI) process and submittal of the RFI Form.
- B. The Contractor shall email or upload a completed RFI form to the Project Software Program and notify the Project Manager and Document Control Coordinator
- C. RFI Forms shall be numbered sequentially
 1. Example- RFI-01; RFI-02

END OF SECTION

SPECIFICATION NO: 01720
SPECIFICATION TITLE: PROJECT SURVEYING
PROJECT NO: 446794
PROJECT TITLE: NINEMILE CREEK
CLIENT: HONEYWELL

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Specification Title	Project Surveying	Date:	5/23/2012

PART 1 GENERAL**1.1 DESCRIPTION**

- A. The Work specified in this Section consists of all labor, equipment, tools, materials, services, supervision and incidentals necessary to perform all surveying necessary for completion of the Work as described herein, shown on the Contract Drawings, or as directed by the Engineer. Work in this Section includes, but is not limited to:
1. Using recognized engineering and survey practices to:
 - a. Establish elevations, lines, levels and utility locations, slopes and invert elevations.
 - b. Locate and lay out construction features including necessary stakes for cut, fill, placement, and grading operations.
 - c. Verify set-backs and easements.
 2. Confirming drawing dimensions and elevations.
 3. Establishing survey control.
 4. Performing pre-construction, intermediate, and post-construction surveys.
 5. Verifying thickness and elevations of placed materials with those shown on the Contract Drawings or as directed by the Engineer.
 6. Preparing Final Record Survey Drawings of the construction.
- B. Related Work specified in other Sections includes, but is not limited to:
1. Section 02200 – General Earthwork
 2. Section 02222 – Excavation
 3. Section 02910 – Wetland and Streambed Restoration
 4. Section 02990 – Finish Grading, Topsoil and Seeding

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.
- B. Surveying shall be conducted in accordance with Education Law Article 145. Where the Contract Documents require work to be performed by, or under the direction of, a Professional Land Surveyor, (PLS) or a Professional Engineer (PE), that person and firm shall be currently licensed in New York as per Article 145.

1.3 REFERENCES

- A. Federal Geodetic Control Committee (FGCC) – Standards and Specifications for Geodetic Control Networks, (1984).
- B. US Army Corp of Engineers (USACE) – Engineering and Design – Hydrographic Surveying, (2002).

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1.4 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:
1. Name and address of Professional Engineers or Surveyors to be used.
 2. Resumes of the Professional Engineers or Surveyors conducting the work at least 10 workdays in advance of survey work.
 3. Survey methods and equipment to be used at least 10 workdays in advance of survey work.
 4. Electronic survey files in AutoCAD, version 2007 or more recent, to the Engineer prior to proceeding to the next construction phase.
 5. Related surveyor information, calibration certificates, field notes and as-built drawings.
 6. Signed and sealed as-built survey in D-size, (Final Record Survey Drawings with Letter of Certification), showing final grades and lines.

1.5 QUALITY CONTROL

- A. The following minimum standards are required for:
1. Project Control, as per the Standards and Specifications for Geodetic Control Networks, (1984):
 - a. Horizontal control at Third Order, Class I.
 - b. Vertical control at Third Order.
 2. Bathymetric Survey Control as per the Engineering and Design – Hydrographic Surveying, (2002):
 - a. Chapter 3 – Corps Accuracy Standards, Quality Control and Quality Assurance Requirements.
 - b. Chapter 8 – Manual Depth Measurement Techniques.
 - c. Chapter 9 – Single Beam Acoustic Depth Measurement Techniques.
 - d. Chapter 16 – Real-time Kinematic Differential GPS Survey.

1.6 PROJECT AND SITE CONDITIONS

- A. The Contractor shall carefully examine the site to determine the full extent, nature and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.

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PART 2 PRODUCTS (NOT APPLICABLE)**PART 3 EXECUTION****3.1 GENERAL**

- A. Special survey requirements and deliverables such as GPS, data management formatted drawings and figures, etc., will be stipulated in the technical specifications.
- B. The Contractor shall notify the Engineer at least 2 working days in advance of any record survey activities planned.
- C. The survey shall be sequenced in each designated area as may be appropriate for Work, or as otherwise directed by the Engineer.
- D. Topographic elements shall be collected and reported as three dimensional data within the electronic file surveys as described under Section 01300 - Submittals.
- E. Coordinate systems shall be based on NAD83 datum.
- F. Base elevation shall be referenced to NAVD88.
- G. Protect and maintain all horizontal and vertical control points during construction.
- H. Work done using methods or equipment not agreed to by the Engineer shall be subject to removal and replacement.

3.2 SURVEY CONTROL POINTS

- A. Establish all necessary baselines, horizontal control points, and vertical control benchmarks in order to properly complete construction work and make quantity measurements. Survey control points shall be established such that any point within the job site can accurately be re-established and elevations obtained to the required tolerances at any time during the course of construction. The Surveyor shall tie all baselines, horizontal and vertical control benchmarks into survey information provided on the Contract Drawings.
- B. Establish a minimum of two sets of control lines (e.g., east-west and north-south) by surveying outside the limits of the work. Alternately, a multiple laser grid system or other remote survey device may be used.
- C. Survey Control Point Requirements
 - 1. Establish survey control points prior to starting work.
 - 2. Use appropriate offset staking method for grade markers and other survey control points that interfere with the Work.
 - 3. Protect and preserve survey control points during construction.
 - 4. Survey control points shall not be relocated without prior written approval from the Engineer.
 - 5. Promptly report any dislocated, damaged or destroyed survey control point to the Engineer.
 - 6. Replace dislocated, damaged or destroyed survey control points as per original survey.

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D. Survey Monuments (GPS Specs)

1. Offsite control monuments shall be used as a reference for onsite monuments (when specified), as onsite monuments are expected to settle during construction.
2. Unless otherwise specified, the Control Datum shall be horizontal coordinate grid system as per the Construction Drawings and the National American Vertical Datum (NAVD).
3. Onsite monuments (when specified) shall be checked not less than monthly against offsite monuments until job completion.
4. Reference site survey and reference points to offsite control monuments and record locations of all survey control points, using the Control Datum, on as-built drawings

E. Record Drawing of Benchmarks and Control Points

1. The Contractor shall provide a Record Drawing of Benchmarks and Control Points to be used for the project at the beginning of survey work and whenever they are altered or added, The Record Drawing shall include both pre-existing and newly installed benchmarks and control points. This Record Drawing shall be signed and sealed by a LPS as permitted or required by NYS Education Law Article 145.

3.3 SURVEY DURING CONSTRUCTION

- A. Perform surveys as needed throughout the progress of the work to determine pay quantities and document work that has been performed. Work shall include, but shall not be limited to, surveys of exposed utilities and excavation areas, when excavation is complete and prior to fill placement.
- B. Do not proceed with placement of an overlying layer or with subsequent work phases until the LPS or PE has completed survey measurements and the data have been reviewed by the Engineer.

3.4 FINAL RECORD AS-BUILT SURVEY

- A. As the work progresses, perform a survey to document the condition of the site. The survey shall accurately locate features that are to be shown on the Final Record Survey Drawing. Included in this Final Record Survey will be preparation of as-built sections defining cut and fill limits as well as any known utilities. The Final Record Survey shall be signed and sealed by a LPS or PE as permitted or required by NYS Education Law Article 145.
- B. At a minimum, the following survey data shall be provided:
 1. The bottom and extent of all excavations following the removal of soil and demolition of structures and prior to site regrading.
 2. Topography of restored areas.

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3. Miscellaneous details (e.g., drainage features, pavement, curbs, buildings, etc.).
4. Pay quantities.
5. Final Record Drawings with all improvements shown.
6. Post-excavation sampling grids and/or locations.

END OF SECTION

SPECIFICATION NO: 02085

SPECIFICATION TITLE: GROUNDWATER MONITORING WELL ABANDONMENT

PROJECT NO: 446794

PROJECT TITLE: NINEMILE CREEK

CLIENT: HONEYWELL

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Project No.	446794	Revision:	0
Specification No.	02085	Page:	2 of 10
Specification Title	Groundwater Monitoring Well Abandonment	Date:	6/1/2012

PART 1 GENERAL**1.1. DESCRIPTION**

- A. The Work specified in this Section consists of all labor, equipment, tools, materials, services, supervision and incidentals necessary to perform abandonment of existing groundwater monitoring wells and piezometers as necessary for completion of the Work as described herein, shown on the Contract Drawings, or as directed by the Engineer. Work in this Section includes, but is not limited to:
1. Abandonment of existing groundwater monitoring wells and piezometers as noted in Schedule A.
- B. Related Work specified in other Sections includes, but is not limited to:
1. Section 02200 - Earthwork

1.2. PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.

1.3. REFERENCES

- A. American Society for Testing and Materials (ASTM)
1. ASTM C150 Standard Specification for Portland Cement.
 2. ASTM D5299 Guide for the Decommissioning of Groundwater Wells, Vadose Zone Monitoring Devices, Boreholes and Other Devices for Environmental Activities.
- B. New York State Department of Environmental Conservation (NYSDEC) CP-43: "Ground Water Monitoring Well Decommissioning Policy", November 2009.

1.4. SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:
1. The proposed methods of abandonment including drilling and grouting as required. The Contractor shall be responsible for the adequacy and safety of the methods.
 2. Mixes - Grout mixes, bentonite mixture.
 3. Equipment - Drill rig and related equipment.
 4. Drilling Contractor - Name and address of the proposed well driller and a list of at least five completed projects of similar construction.
 5. Logs for abandoned wells.
 6. Piezometer/Well Field Inspection Log (Attachment A).

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7. Piezometer/Well Decommissioning Record (Attachment B).

1.5. PROJECT AND SITE CONDITIONS

- A. The Contractor shall carefully examine the site to determine the full extent, nature and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.

PART 2 PRODUCTS**2.1 MATERIALS**

A. Grout

1. Provide a standard Portland Cement/bentonite grout mixture consisting of Portland Cement (ASTM C150 Type I), bentonite and water in the proportions of one 94-pound bag of Type I Portland Cement, 3.9 pounds of powdered bentonite, and 7.8 gallons of potable water. Slightly more water may be used in order to penetrate a sand pack when a screen transects multiple flow zones. This mixture results in a grout with a bentonite content of four percent by weight and will be used in all cases except in boreholes where excessive use of grout is anticipated. In these cases refer to NYSDEC CP-43, Section 6.2.

B. Bentonite

1. Provide ½-inch diameter sodium bentonite pellets or equal.
2. Baroid – Ben Seal or equal.

2.2 EQUIPMENT

- A. The Contractor shall use equipment suitable for well abandonment activities.

PART 3 EXECUTION**3.1 PREPARATION**

- A. No abandonment activities shall commence without the prior approval of the Engineer.
- B. Perform abandonment in accordance with the requirements of this Section.
- C. Review available information concerning each well and piezometer to be abandoned, including well construction diagrams and abandonment summary table (Schedule A), prior to commencement of work.
- D. Complete the Well Field Inspection Log (Attachment A) prior to work.

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3.2 ABANDONMENT

- A. The following refers to all monitoring wells and piezometers that are single-cased and do not penetrate into bedrock. All shall be abandoned by one of the following methods:
1. Grouting In-Place.
 2. Perforating the Casing Followed by Grouting In-Place.
 3. Grouting In-Place Followed by Casing Pulling.
 4. Overdrilling and Grouting With or Without a Temporary Casing.
- B. Refer to Schedule A for the selection method for abandonment of each monitoring well.
- C. Methods
1. Grouting In-Place
 - a. For the purposes of these procedures, the well-seal is defined as the bentonite seal above the sand pack.
 - b. If the well-seal is not compromised and there is no confining layer present, grouting in-place is considered a satisfactory abandonment procedure.
 - c. If the seal is compromised, Method 2 may be necessary.
 - d. Grouting in-Place Procedure
 - i. Do not remove the outer protective casing until grouting is complete.
 - ii. Using a tremie, pump the well casing and screen with grout according to the procedures in Section 6.4 of NYSDEC CP-43.
 - iii. The outer protective steel casing should be removed from either a five foot depth or below the frostline, whichever is greater.
 - iv. Cut the well casing at a minimum five foot depth and remove it and any associated well materials.
 - v. The upper five feet of casing and the outer protective casing may be removed in one operation if a casing-cutter is used.
 2. Perforating the Casing Followed by Grouting In-Place
 - a. This is the preferred method for well abandonment if the well annulus was either allowed to be backfilled with cuttings, or the grouting documentation is of poor quality.
 - b. This method involves puncturing, splitting or cutting the well casing and screen, followed by grouting the well as per Section 6.4 of NYSDEC CP-43.

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- c. If required by Schedule A, the Contractor shall submit a method for casing and screen perforation based on site conditions for approval by the Engineer.
 - d. As per ASTM D5299, the following are required:
 - i. A minimum of four rows of perforations several inches long around the circumference of the pipe; and
 - ii. A minimum of five perforations per linear foot of screen and casing.
3. Grouting In-Place Followed by Casing Pulling
- a. This method of abandonment is to be used when the well assembly must be removed to clear the site.
 - b. The well construction and depth must be such that pulling will not break the riser.
 - c. This method is acceptable only when:
 - i. No contamination is present; or
 - ii. If contamination is present, the well does not penetrate or cross a confining layer.
 - d. If contamination is likely to cross a penetrating layer during pulling, a temporary casing may be used. (See 4. Overdrilling and Grouting With or Without a Temporary Casing
 - e. Casing Pulling Procedure:
 - i. If the protective steel casing shall interfere with the down-hole work, it may be removed in a manner that minimizes disturbance to the well casing and surrounding ground.
 - ii. Lower a drill rod down the well and perforate the bottom well-cap.
 - iii. Grout as per Section 6.4 of NYSDEC CP-43.
 - iv. Pull the well by grappling the casing with appropriate devices and pulling the casing and well materials as a single unit.
 - v. Additional grout must be used as the well casing and screen are withdrawn to ensure that the void spaces are adequately filled.
 - vi. If the well is highly contaminated, is installed in a collapsible formation or if the bottom well-cap cannot be punctured, the casing or screen must be perforated prior to pulling.
 - vii. If all of the well materials are not withdrawn during the pulling process, overdrilling of the remaining portions may be required as directed by the Engineer.
4. Overdrilling and Grouting With or Without a Temporary Casing.

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- a. This technique will remove an entire well, its sandpack and old grout column.
- b. This technique is to be used where the assembly is expected to sever or break or the well penetrates a confining layer, and the well materials must be removed.
- c. A temporary casing may be required prior to drilling, pulling and grouting.
- d. The Overdrilling Method should follow the original well borehole, be at least the diameter of the original well borehole, and advance at least 0.5 foot beyond the original well borehole depth.
- e. The Overdrilling Method should remove all construction materials.
- f. In order to keep the augers centered on the original well borehole, fill the well column with grout after perforating the bottom well-cap, prior to proceeding with overdrilling while the grout is not yet dry.
- g. If required by Schedule A, the Contractor shall submit a method for overdrilling based on site conditions for approval by the Engineer.
- h. Refer to Section 2.4 of NYSDEC CP-43 for further details of techniques for the Overdrilling Method.

3.3 COMPLETION

- A. Dispose of well and piezometer materials and associated soil cuttings at the LCP containment area. Removed and abandoned well materials (i.e. well casings, screens, steel casings, and etc.) shall be cut into 15 foot or shorter sections prior to disposal.
- B. Upon completion of grouting, ensure that the final grout level is approximately five feet below land surface. Embed a ferrous metal marker in the top of the grout to indicate the location of the former well. Place a fabric "utility" marking one foot above the grout.
- C. Restore the area in the vicinity of each well location as shown on the Contract Drawings or as directed by the Engineer.
- D. Complete the Well Decommissioning Record (Attachment B) following completion of the Work.
- E. Following drilling activities, decontaminate equipment.

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SECTION 02085**GROUNDWATER MONITORING WELL ABANDONMENT****SCHEDULE A**

Well ID	Northing	Easting	Depth	Abandonment Method
NMC-PZ-02	1121459	914890	13.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-03D	1121334.4	913640.4	33.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-04	1121220.9	913695.4	16.0 ft	Cut Cables as Needed
NMC-PZ-05D	1121147.90	913689.30	27.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-06	1121413.8	914271.0	20.0 ft	Cut Cables as Needed
NMC-PZ-07D	1121428.0	914322.3	26.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-07S	1121425.0	914326.6	10.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-08D	1121704.0	914900.7	37.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-09	1121611.8	914909.2	14.0 ft	Cut Cables as Needed
NMC-PZ-10D	1121537.5	914898.0	21.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-10S	1121537.5	914903.5	13.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-11S	1122342.3	915320.1	23.0 ft	Grouting In-Place Followed by Casing Pulling

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Well ID	Northing	Easting	Depth	Abandonment Method
NMC-SB-24-PZ	1121355.2	914097.2	18.0 ft	Grout In-Place
NMC-SB-25-PZ	1121505.8	914225.9	19.0 ft	Grout In-Place
NMC-PZ-11D	1122336.0	915318.3	31.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-05S	1122342.3	915320.1	23.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-12	1122321.2	915372.9	14.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-13S	1123202.3	915590.6	20.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-13D	1123208.2	915594.9	27.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-14	1123171.0	915665.5	18.0 ft	Cut Cables as Needed
NMC-PZ-15S	1123632.1	916023.8	11.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-15D	1123627.4	916023.6	33.0 ft	Grouting In-Place Followed by Casing Pulling
NMC-PZ-16	1123645.4	915933.2	14.0 ft	Cut Cables as Needed

END OF SECTION

ATTACHMENT A

FIELD INSPECTION LOG

DATE/TIME: _____
 PZ/WELL ID: _____

WELL VISIBLE? (If not, provide directions below)	YES	NO
WELL I.D. VISIBLE?		
WELL LOCATION MATCH SITE MAP? (if not, sketch actual location on back).....		

WELL I.D. AS IT APPEARS ON PROTECTIVE CASING OR WELL:

SURFACE SEAL PRESENT?	YES	NO
SURFACE SEAL COMPETENT? (if cracked, heaved etc.. describe below)		
PROTECTIVE CASING IN GOOD CONDITION? (if damaged, describe below)		

HEADSPACE READING (ppm) AND INSTRUMENT USED.....

TYPE OF PROTECTIVE CASING AND HEIGHT OF STICKUP IN FEET (if applicable)

PROTECTIVE CASING MATERIAL TYPE:

MEASURE PROTECTIVE CASING INSIDE DIAMETER (inches):

LOCK PRESENT?	YES	NO
LOCK FUNCTIONAL?		
DID YOU REPLACE THE LOCK?		
IS THERE EVIDENCE THAT THE WELL IS DOUBLE CASED? (if yes, describe below)		
WELL MEASURING POINT VISIBLE?		

MEASURE WELL DEPTH FROM MEASURING POINT (Feet):

MEASURE DEPTH TO WATER FROM MEASURING POINT (Feet):

MEASURE WELL DIAMETER (Inches):

WELL CASING MATERIAL:

PHYSICAL CONDITION OF VISIBLE WELL CASING:

ATTACH ID MARKER (if well ID is confirmed) and IDENTIFY MARKER TYPE

PROXIMITY TO UNDERGROUND OR OVERHEAD UTILITIES.....

DESCRIBE ACCESS TO WELL: (include accessibility to truck mounted rig, natural obstructions, overhead power lines, proximity to permanent structures, etc.): ADD SKETCH OF LOCATION ON BACK, IF NECESSARY.

DESCRIBE WELL SETTING (For example, located in a field, in a playground, on pavement, in a garden, etc.) AND ASSESS THE TYPE OF RESTORATION REQUIRED.

IDENTIFY ANY NEARBY POTENTIAL SOURCES OF CONTAMINATION, IF PRESENT (e.g. Gas station, salt pile, etc.):

REMARKS:

SPECIFICATION NO: 02100

SPECIFICATION TITLE: CLEARING AND GRUBBING

PROJECT NO: 446794

PROJECT TITLE: NINEMILE CREEK

CLIENT: HONEYWELL

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Specification No.	02100	Page:	2 of 4
Specification Title	Clearing and Grubbing	Date:	6/1/2012

PART 1 GENERAL**1.1 DESCRIPTION**

- A. The Work specified in this Section consists of all labor, equipment, tools, materials, services, supervision and incidentals necessary to remove and manage brush, trees, shrubs, stumps, logs, debris, boulders and other objectionable materials from Work areas as described herein, shown on the Contract Drawings, or as directed by the Engineer. Work in this Section includes, but is not limited to:
1. Clearing and grubbing within the Limits of Excavation shown on the Contract Drawings.
 2. Clearing and grubbing to establish access routes, support areas, and other work areas as necessary to complete the Work, or as directed by the Engineer.
 3. Protection and preservation of trees and vegetation outside the Limits of Clearing and Grubbing.
 4. Cutting, chipping and management of above-grade timber and brush.
 5. Management of below-grade stumps and woody vegetation.
 6. On-site management of all related debris, stumps, roots and other objectionable materials at the LCP Containment Area.
- B. Related Work specified in other Sections includes, but is not limited to:
1. Section 02140 - Construction Water Management
 2. Section 02200 - General Earthwork
 3. Section 02219 - Waste Excavation, Consolidation, and Disposal
 4. Section 02222 – Excavation
 5. Section 02370 - Erosion Control

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.

1.3 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:
1. The Contractor's proposed Limits of Clearing and Grubbing for approval by the Engineer.
 2. The proposed methods for managing brush, trees, shrubs, stumps, logs, debris, boulders and other objectionable material.

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Specification Title	Clearing and Grubbing	Date:	6/1/2012

1.4 PROJECT AND SITE CONDITIONS

- A. The Contractor shall carefully examine the site to determine the full extent, nature and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.

PART 2 PRODUCTS (NOT APPLICABLE)**PART 3 EXECUTION****3.1 CLEARING AND GRUBBING**

- A. Provide erosion control measures prior to and throughout all clearing and grubbing activities, in accordance with Section 02370 - Erosion Control.
- B. Limit clearing and grubbing activities to the Limits of Excavation shown on the Contract Drawings, or as otherwise approved by the Engineer.
- C. Manage construction water in accordance with Section 02140 - Construction Water Management. Sequence and conduct clearing and grubbing activities to limit the generation of construction water as appropriate.
- D. Clear all vegetation and objectionable material to a height of approximately 6 to 12 inches within the Limits of Excavation and as otherwise required to complete the Work within the Limits of Disturbance. Large, woody material should be removed. Phragmites stalks and similar material may be left within the Limits of Excavation to be excavated with the soil/sediment. Manage all removed material at the LCP Containment Area in accordance with Section 02219 - Waste Excavation, Consolidation and Disposal, unless otherwise directed by the Engineer and approved by the DEC.
- E. Backfill holes outside the Limits of Excavation resulting from the removal of materials that extend below finished grade with common fill or re-used on-site soils.
- F. Immediately restore or replace any damaged items.
- G. Cut above-grade timber within 12 inches of grade. Chip above-grade timber on-site and stockpile for use for soil stabilization and/or drainage material for dewatering pads and other purposes, unless otherwise directed by the Engineer and approved by the DEC. Retain logs with a minimum diameter of 8 inches and minimum length of 8 feet for use as woody debris habitat features as directed by the Engineer and approved by the DEC. Following such use, remove and manage materials at the LCP Containment Area in accordance with Section 02219 - Waste Excavation, Consolidation, and Disposal, or at other locations approved by the Engineer and approved by the DEC.
- H. Below-grade woody material from grubbing outside the Limits of Excavation, including, but not limited to roots, stumps and other materials, shall be chipped and

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Specification Title	Clearing and Grubbing	Date:	6/1/2012

ground or otherwise managed and placed at the LCP Containment Area in accordance with Section 02219 - Waste Excavation, Consolidation and Disposal.

- I. Provide a chipper and/or grinder of sufficient size to handle material expected from the cleared and grubbed areas.
- J. Below-grade woody material located inside the Limits of Excavation, including, but not limited to roots, stumps and other materials shall be excavated concurrently with the soils/sediment, chipped and ground or otherwise managed, and placed at the LCP Containment Area in accordance with Section 02219 - Waste Excavation, Consolidation and Disposal.
- K. Do not burn on or off-site.

3.2 TOPSOIL REMOVAL

- A. Topsoil within the excavation limits is assumed contaminated and must be consolidated at the LCP Containment Area in accordance with Section 02219 - Waste Excavation, Consolidation and Disposal. On or off-site re-use of topsoil from within the excavation limits is not permitted.

3.3 GUARANTEE

- A. The Contractor shall guarantee that Work performed under this Section will not permanently damage trees, shrubs, turf or plants designated to remain, or other adjacent work or facilities. If damage resulting from operations appears during a period up to 12 months after completion of the project, the Contractor must replace damaged items.

END OF SECTION

SPECIFICATION NO: 02140

SPECIFICATION TITLE: CONSTRUCTION WATER MANAGEMENT

PROJECT NO: 446794

PROJECT TITLE: NINEMILE CREEK

CLIENT: HONEYWELL

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Project No:	446794	Revision:	0
Specification No.	02140	Page:	2 of 12
Specification Title	Construction Water Management	Date:	6/5/2012

PART 1 GENERAL**1.1 DESCRIPTION**

- A. The Work specified in this Section consists of all labor, equipment, tools, materials, services, supervision and incidentals necessary to collect, handle, store, analyze, treat, transport and dispose of construction water and associated residual solids as described herein, shown on the Contract Drawings, or as directed by the Engineer. Work in this Section includes, but is not limited to:
1. The development of acceptable Construction Water Management Procedures detailing the collection, handling, storage, analysis, treatment, transportation and disposal of all construction water, associated residual solids and storm water generated during construction.
 2. Provision of all labor, equipment, tools, materials, services, supervision and incidentals required for the collection, handling, storage, analysis, treatment, transportation and disposal of all construction water and associated residual solids in accordance with the Engineer-approved Construction Water Management Procedures.
 3. Performance of all specified and necessary sampling and analyses to ensure compliance with the Contract Documents, required permits, applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.
- B. Related Work specified in other Sections includes, but is not limited to:
1. Section 02200 – General Earthwork
 2. Section 02219 – Waste Excavation, Consolidation, and Disposal
 3. Section 02222 – Excavation
 4. Section 02370 – Erosion Control

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.
- B. The Contractor is to obtain and operate within all applicable Local, State, and Federal permits and requirements necessary to implement the proposed Construction Water Management Procedures. Any and all civil, criminal, and monetary penalties associated with non-compliance in any regard shall be the responsibility of the Contractor.

1.3 REFERENCES

- A. New York State Standards and Specifications for Erosion and Sediment Control, (Latest Version).
- B. New York State Stormwater Management Design Manual, (Latest Version).

Project No:	446794	Revision:	0
Specification No.	02140	Page:	3 of 12
Specification Title	Construction Water Management	Date:	6/5/2012

1.4 DEFINITIONS

- A. Construction Water shall be defined as water/liquids that contact contaminated materials, and includes the following:
1. Water which has come in contact with contaminated soils, sediments, fill or debris that have had the surface disturbed by construction-related activities; with the exception of water classified as stormwater as defined in 1.4.B, floodwater as defined in 1.4.C, dredge water as defined in 1.4.D or water identified in 1.4.E.
 2. Liquids generated during decontamination activities.
 3. Water collected from the sediment stabilization activities.
- B. Stormwater shall be defined as water/liquids that do not contact disturbed contaminated materials, and includes the following:
1. Water incident upon or draining from undisturbed excavation areas. This water shall be diverted from the excavation area as required to prevent contact with the construction operations.
 2. Water associated with the drainage of areas to be excavated (e.g., through the use of drainage ditches or other conveyances) prior to initiation of full-scale removal activities in that area.
 3. Surface or groundwater from areas that have been accepted as meeting remediation goals, provided that the water is then prevented from contacting contaminated disturbed surfaces (e.g., water from dewatering operations).
 4. If disturbed contaminated materials are covered by clean materials (e.g. soil, geotextile, plastic sheeting) or otherwise stabilized, waters that stand on or flow over/from that surface shall be defined as storm water.

Stormwater shall be controlled and managed as described in Section 02370 – Erosion Control.

- C. Floodwater shall be defined as waters that flow onto the site from adjacent surface water bodies at elevations at least 1 ft above the median surface water elevations. Floodwater that drains by gravity from the site, is pumped down to a clean or undisturbed material surface, or to within 6 inches of a disturbed contaminated material, shall be managed as storm water.
- D. Dredge water shall be water which comes into contact with the working dredge surface (e.g., channel bottom or banks in or adjacent to flowing or still water) or dredged material prior to being loaded into containers (e.g., water that contacts bucket or dredged materials as it is extracted through the water column, water draining from the dredge bucket or temporarily staged dredge materials, due to double handling, that are not directly loaded into containers for up to 24 hours unless otherwise approved by NYSDEC) for transport to dewatering pads or the LCP containment area.
- E. Water which passes through a properly installed silt fence at the bottom of a continuously sloped (greater than a 3H:1V) excavation face.

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F. Residual solids shall be defined as solids resulting from the construction water management operations, including sediment accumulated in settling ponds or basins, chemically flocculated sediments, precipitates and filtered suspended solids. Residual sediments generated during dredging operations do not meet this definition.

1.5 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:
1. Construction Water Management Procedures.
 2. Shop drawings and details, including but not limited to:
 - a. Decant Pad (if required)
 - b. Decontamination Pad(s)
 - c. Treatment Equipment and Layout
 - d. Discharge Points and Related Structures
 3. Quality Control Work Plan.
 4. Name and Qualifications of Independent Testing Laboratory.
 5. Test results as specified herein shall be submitted to the Engineer for review immediately upon receipt of results:
 - a. Influent
 - b. Effluent
 - c. Turbidity

1.6 QUALITY CONTROL

- A. The Contractor shall submit a Quality Control (QC) Work Plan for review. Once instituted, the Contractor shall use the QC Work Plan to ensure that the Work meets the requirements of the Contract Documents.
- B. The Contractor shall submit the name of a qualified Independent Testing Laboratory (ITL) to the Engineer for review.

1.7 PROJECT AND SITE CONDITIONS

- A. The Contractor shall carefully examine the site to determine the full extent, nature and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.

PART 2 PRODUCTS**2.1 GENERAL**

- A. Construction Water Management Procedures

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1. The Contractor shall prepare and submit Construction Water Management Procedures for the Engineer's approval. The procedures shall include, but not be limited to, the Contractor's proposed method of collection, handling, storage, analysis, treatment, transportation and disposal of all construction water and associated residual solids generated during construction. Methods of minimizing the generation of construction water shall be identified.
2. The acceptable methods of managing construction water are limited to collection and:
 - a. On-site discharge after appropriate treatment. Appropriate treatment prior to on-site discharging shall result in effluent water quality at levels less than the applicable effluent limits presented in Schedule A.
 - b. Off-site disposal at a permitted treatment facility.
3. The acceptable methods of managing residual solids generated by the Contractor's management of construction water are limited to:
 - a. Collection, dewatering and placement at the LCP Containment Area in accordance with Section 02219 – Waste Excavation, Consolidation and Disposal. On-site placement at the LCP Containment Area shall be conducted in accordance with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards. Residual solids resulting from this method must meet all requirements for placement at the LCP Containment Area.
 - b. If directed by the Engineer, collection, analytical testing, transport and off-site treatment and disposal, which shall be conducted in accordance with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.
- B. Services, Facilities and Personnel: The Contractor shall provide all means, methods, services, facilities, power, equipment, tools, material, consumables, incidentals, labor and supervision necessary to collect, handle, store, analyze, treat, transport, dispose and otherwise manage construction water.
- C. Stormwater shall be diverted to existing drainage features with no further treatment necessary, following the procedures in Section 02370 – Erosion Control. Trapped stormwater may be pumped to existing drainage features with no further treatment necessary, following the procedures in Section 02370 – Erosion Control.

PART 3 EXECUTION**3.1 PREPARATION**

- A. The Contractor shall be responsible for estimating the quantity and quality of construction water and residual solids expected for this project based on the existing site conditions and proposed activities.
- B. It shall be the responsibility of the Contractor to investigate and comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and

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standards governing the collection, handling, storage, analysis, treatment, transportation and disposal of all construction water and associated residual solids generated during the execution and completion of the Work. All construction water shall be disposed of in a manner which meets applicable permit requirements, codes, ordinances, regulations, statutes and standards.

- C. The Contractor shall obtain all required permits, manifests, and approvals required for the collection, handling, storage, analysis, treatment, transportation and disposal of all construction water and associated residual solids generated during the execution and completion of the Work.
- D. Sampling and analyses necessary to protect the health and welfare of the Contractor's employees and/or agents and/or to characterize collected water, treated water or residual solids shall remain the sole responsibility of the Contractor.
- E. Construction water shall be managed using equipment compatible with anticipated contaminants which may be present.

3.2 ON-SITE DISCHARGE

- A. No construction water shall be discharged on-site unless it meets applicable effluent limits and is tested at the frequency as presented in Schedule A.
- B. On-site treatment facilities will include provisions for "batch" treatment during start-up. Treated waters shall be tested (on a per batch basis), to demonstrate compliance with the effluent limits prior to on-site discharge, until it is determined that the treatment facility is effective.
- C. Once the on-site treatment plant is demonstrated to be effective, it may be operated on a batch or continuing basis provided it continues to demonstrate compliance.
- D. Testing required for on-site discharge shall be the responsibility of the Contractor. Test results shall be submitted to the Engineer immediately upon receipt by the Contractor.
- E. At discharge points, including at pump-arounds as described in Subpart 3.5, the Contractor shall construct temporary stone aprons or other suitable means to dissipate flow and reduce turbidity.
- F. Influent Testing shall be conducted on the same schedule as Effluent Testing during start-up and bi-weekly thereafter, or within 2 days of a change in water source.
- G. Effluent Testing shall be conducted as presented in Schedule A.

3.3 ON-SITE DISPOSAL OF RESIDUAL SOLIDS AND OTHER WASTES

- A. The Contractor shall dispose of construction water related waste and associated residuals at the LCP Containment Area in accordance with Section 02219 – Waste Excavation, Consolidation and Disposal.

3.4 OFF-SITE DISPOSAL OF RESIDUAL SOLIDS AND OTHER WASTES

- A. If directed by the Engineer, the Contractor shall characterize construction water related wastes and any associated residuals as necessary for off-site disposal.

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- B. No Contractor-proposed facility for off-site disposal shall be used without prior approval by Honeywell. For all wastes disposed of off-site, the Contractor is responsible for characterizing such material and arranging for proper temporary storage in accordance with all applicable Federal, State and Local regulations at no additional cost to Honeywell. Honeywell will contract off-site transportation and disposal of wastes directly.
- C. The Contractor shall dispose of wastes designated for off-site disposal within 90 days of filling the storage container.
- D. The Contractor shall mark, label, placard, package and manifest wastes in accordance with applicable codes, regulations, and statutes.

3.5 MINIMIZATION OF CONSTRUCTION WATER

- A. The Contractor shall minimize the generation of construction water and associated residual solids. Methods to minimize generation of construction water may include, but are not limited to:
 - 1. Erection of temporary berms or construction of temporary ditches.
 - 2. Use of low permeability tarpaulins, geotextiles, or other suitable means to cover exposed contaminated areas and materials.
 - 3. Use of 6-inches of uncontaminated soil as daily cover to cover exposed contaminated areas and materials.
 - 4. Installation of 6-inch interim uncontaminated soil cover on a temporary basis in areas to be capped.
 - 5. Limiting the amount of exposed contaminated areas.
 - 6. Grading to control run-on and run-off.
 - 7. Engineering controls on construction activities to minimize contact of personnel and equipment with contaminated areas, thus minimizing the amount of decontamination or other methods required.
 - 8. Temporarily dam upstream water flowing in Ninemile Creek and divert or pump around the work area. Discharge water downstream of work areas.

The Contractor will also have the option to use the upstream water from the Geddes Brook or Ninemile Creek upstream of the work areas for dust control or other site operations.

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SCHEDULE A- EFFLUENT LIMITS, LEVELS AND MONITORING:

OUTFALL NUMBER	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING
	Construction Water	West Flume to Geddes Brook to Nine Mile Creek	Treatment System Startup Date (TSSD)	TSSD + 3 years

PARAMETER	MINIMUM	MAXIMUM	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE	FOOTNOTES (FN)
pH	6.0	9.0	SU	Weekly	Grab	

PARAMETER	EFFLUENT LIMIT		PQL	MONITORING ACTION LEVEL		UNITS	SAMPLE FREQUENCY	SAMPLE TYPE	FN
	Monthly Avg.	Daily Max.	Daily Max.	TYPE I	TYPE II				
Flow	Monitor	Monitor				MGD	Continuous	Meter	
Solids, Total Suspended	Monitor	50				mg/l	Weekly	Grab	
Solids, Total Dissolved	Monitor	Monitor				mg/l	Weekly	Grab	
Ammonia (as N)	Monitor	2				mg/l	Weekly	Grab	
Aluminum, Total	Monitor	4				mg/l	Weekly	Grab	
Arsenic, Total	Monitor	0.15				mg/l	Weekly	Grab	
Beryllium, Total	Monitor	0.82				mg/l	Weekly	Grab	
Cadmium, Total	Monitor	0.056				mg/l	Weekly	Grab	
Chromium, Total	Monitor	0.5				mg/l	Weekly	Grab	
Copper, Total	Monitor	0.5				mg/l	Weekly	Grab	
Iron, Total	Monitor	3.0				mg/l	Weekly	Grab	
Lead, Total	Monitor	0.36				mg/l	Weekly	Grab	
Mercury, Total	Monitor	0.0007	0.05			µg/l	Weekly	Grab	5
Nickel, Total	Monitor	1.5				mg/l	Weekly	Grab	
Phosphorus, Total, as P	Monitor	0.5				mg/l	Weekly	Grab	
Selenium, Total	Monitor	0.046				mg/l	Weekly	Grab	
Silver, Total	Monitor	0.1				mg/l	Weekly	Grab	
Thallium, Total	Monitor	0.08				mg/l	Weekly	Grab	
Vanadium, Total	Monitor	0.1				mg/l	Weekly	Grab	
Zinc, Total	Monitor	1.0				mg/l	Weekly	Grab	
Cyanide, Total	Monitor	Monitor				mg/l	Weekly	Grab	
Cyanide, Free	Monitor	0.05				mg/l	Weekly	Grab	
PCB, Aroclor 1248	Monitor	1x10 ⁻⁶	0.2			µg/l	Weekly	Grab	1
PCB, Aroclor 1254	Monitor	1x10 ⁻⁶	0.2			µg/l	Weekly	Grab	1
PCB, Aroclor 1260	Monitor	1x10 ⁻⁶	0.2			µg/l	Weekly	Grab	1
Hexachlorobenzene	Monitor	5				µg/l	Weekly	Grab	
2-Ethylanthraquinone	Monitor	Monitor				µg/l	Weekly	Grab	
2-Octanol	Monitor	Monitor				µg/l	Weekly	Grab	

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PARAMETER	EFFLUENT LIMIT		PQL	MONITORING ACTION LEVEL		UNITS	SAMPLE FREQUENCY	SAMPLE TYPE	FN
	Monthly Avg.	Daily Max.	Daily Max.	TYPE I	TYPE II				
Acetophenone	Monitor	Monitor				µg/l	Weekly	Grab	
Toluene	Monitor	5				µg/l	Weekly	Grab	
Xylenes, Total	Monitor	15				µg/l	Weekly	Grab	

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SCHEDULE A
Special Conditions and Footnotes

A. PCBs:

1. The permittee must monitor this discharge for PCBs using USEPA laboratory Method 608. The laboratory must make all reasonable attempts to achieve the Minimum Detection Levels (MDLs) OF 0.065 µg/l for each of the subject Aroclors. Monitoring requirements may be modified in the future if the Department approves a method different from USEPA Method 608.
 2. Non-detect at the MDL is the discharge goal. The permittee shall report all values above the MDL. If the level of any Aroclor is above its listed MDL, the permittee must evaluate the treatment system and identify the cause of the detectable level of PCBs in the discharge. Following three consecutive months that include analytical results above any MDL, the permittee shall prepare an approvable report identifying the measures undertaken to eliminate the detections and proposed additional steps to be taken to eliminate the recurrence of such detections. This report shall be submitted to the Department within 28 days following receipt of sampling results from the third monitoring period.
 3. If the department determines that effluent monitoring results above the MDLs can be prevented by implementation of additional measures as proposed by the permittee, the permittee shall implement such additional measures.
 4. The treatment technology for this discharge constitutes the maximum feasible treatment technology for treatment of PCBs. As treatment technology improvements become available, the permittee shall, at its own initiative or the department's request, review the available technology and submit for department approval, plans to improve the treatment technology and/or Best Management Practices employed to remove maximum feasible amount of PCBs from the wastewater discharge.
 5. This limit is a phased Total Maximum Daily Loading limit, prepared in accordance with 6 NYCRR 702.16(b).
- B. Discharge is not authorized until such time as an engineering submission showing the method of treatment is approved by the Department. The discharge rate may not exceed the effective or design treatment system capacity. All monitoring data, engineering submissions and modification requests must be submitted to:

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Chief - Operation Maintenance and Support Section
Bureau of Hazardous Site Control, Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, N.Y. 12233-7010

C. With a copy sent to:

Region 7 Regional Water Engineer
NYSDEC
615 Erie Boulevard West
Syracuse, NY 13204

And:

Bureau of Water Permits
625 Broadway
Albany, NY 12233-3505

D. Only site generated wastewater is authorized for treatment and discharge. The site includes all construction water generated areas covered under the LCP OU-1/OU-2 Remedial Action, the Geddes Brook IRM, and the Ninemile Creek Remedial Action.

E. Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.

1. Mercury Limit, Outfall: The calculated permit limit for total mercury is 0.0007 µg/l based on the water quality evaluation at this outfall. In accordance with the Multiple Discharger Variance as described in Division of Water TOGS 1.3.10, this authorization applies 0.05 µg/l (50 ng/l) as the enforcement compliance limit.
2. Analytical Method: All permit-related wastewater and stormwater mercury compliance point (outfall) monitoring shall be performed using EPA Method 1631. Use of EPA Method 1669 during sample collection is recommended. Unless otherwise specified, all samples should be grabs. Monitoring at influent and other locations tributary to compliance points may be performed using either EPA Methods 1631 or 245.7. Monitoring of raw materials, equipment, treatment residuals, and other non-wastewater/non-stormwater substances may be performed using other methods as appropriate.

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3. Treatment System Plans: Honeywell shall submit for DEC approval, a Remedial Program Contingency Plan (“RPCP”) for the CWTP and a Treatability Study Work Plan. These deliverables will be submitted no later than 45 days following entry of the Consent Decree. The RPCP will detail appropriate responses to exceedances of established discharge limits. The RPCP will include a provision whereby DEC may require the installation and operation of additional treatment technologies if the CWTP is not capable of meeting a discharge limit value for mercury (exclusive of an annual two week minimum “shakedown” period, at the start of each construction season. The two week minimum may be extended based on criteria to be defined in the RPCP.), taking into consideration among other factors those set forth in the ROD, *e.g.*, compliance with ARAR’s, remedial action objectives, overall protectiveness of public health and the environment, and cost effectiveness. In addition, the RPCP will detail, among other things, appropriate responses in the event of: (i) two consecutive exceedances of the daily maximum discharge limit for mercury; (ii) six or more exceedances of a specific pollutant discharge limit; or, (iii) four consecutive exceedances of a specific discharge limit (other than mercury). Provisions shall also be included for the recirculation or containerization of effluent that appears turbid or otherwise not indicative of expected effluent quality upon visual inspection to the degree practical.
- F. Both concentration (mg/l or µg/l) and mass loadings (lbs/day) must be reported to the Department for all parameters except flow and pH.
- G. This discharge and administration of this discharge must comply with 6 NYCRR Part 750.

END OF SECTION

SPECIFICATION NO: 02200

SPECIFICATION TITLE: GENERAL EARTHWORK

PROJECT NO: 446794

PROJECT TITLE: NINEMILE CREEK

CLIENT: HONEYWELL

				APPROVALS		
Issue	Date	Pages	Issue Description	Prepared	Checked	Approved
0	6/5/2012	12	Issued for Construction	ERK	SRB/JMO	RDD/TD
<input checked="" type="checkbox"/> Entire Specification Issued this Revision <input type="checkbox"/> Revised Pages Only Issued this Revision			SPECIFICATION ISSUED FOR: <input type="checkbox"/> In-house Review <input type="checkbox"/> Bid <input type="checkbox"/> Client Review/Approval <input checked="" type="checkbox"/> Construction <input type="checkbox"/> Information Only <input type="checkbox"/> <i>Other</i>			

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PART 1 GENERAL**1.1 DESCRIPTION**

- A. The Work specified in this Section consists of all labor, equipment, tools, materials, services, supervision and incidentals necessary to perform all excavation, backfilling and grading necessary for completion of the Work as described herein, shown on the Contract Drawings, or as directed by the Engineer. Work in this Section includes, but is not limited to:
1. Excavating, relocating, screening, stockpiling, preparing and/or hauling soil for proper re-use on-site.
 2. Provision and placement of imported fills.
 3. Compaction and grading.
 4. Appurtenant work in accordance with the Contract Drawings and Specifications and all related work as directed by the Engineer.
- B. Related Work specified in other Sections includes, but is not limited to:
1. Section 02100 – Clearing and Grubbing
 2. Section 02140 – Construction Water Management
 3. Section 02219 – Waste Excavation, Consolidation, and Disposal
 4. Section 02222 – Excavation
 5. Section 02370 – Erosion Control
 6. Section 02990 – Finish Grading, Topsoil and Seeding

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.
- B. All excavation, trenching, sheeting, bracing and related work shall comply with the requirements of Title 29 Code of Federal Regulations, Part 1926.650-652, (Subpart P - Excavations), OSHA Safety and Health Regulations for Construction.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
1. ASTM D422 – Standard Test Method for Particle-Size Analysis of Soils
 2. ASTM D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³)
 3. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³)
 4. ASTM D2216 – Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

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5. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
 6. ASTM D2974 – Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
 7. ASTM D4318 – Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
 8. ASTM D5084 – Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
 9. ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- B. New York Department of Transportation: Standard Specifications (US Customary), 2009.
- C. New York State Department of Environmental Conservation: Draft 6 NYCRR Part 375, Environmental Remediation Programs, 2006.
- D. Title 29 Code of Federal Regulations, Part 1926.650-652, (Subpart P - Excavations), OSHA Safety and Health Regulations for Construction.

1.4 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:
1. The proposed methods of construction including excavation, material handling, backfilling, compaction, grading and erosion control. The Contractor shall be responsible for the adequacy and safety of the methods.
 2. Quality Control Work Plan
 3. Name and Qualifications of Independent Testing Laboratory, (ITL) and/or alternate sampling and testing staff.
- B. Test results as specified herein shall be submitted to the Engineer for review immediately upon receipt of results. The Contractor shall not deliver material to the site prior to submission and approval by the Engineer of the required geotechnical and analytical chemistry test results. Test results include, but are not limited to:
1. Analytical Chemistry Data
 2. Material Property Data
 3. Compaction Data

1.5 QUALITY CONTROL

- A. The Contractor shall submit a Quality Control (QC) Work Plan for review. Once instituted, the Contractor shall use the QC Work Plan to ensure that the Work meets the requirements of the Contract Documents.
- B. The Contractor shall submit the name of a qualified ITL or provide alternate sampling and testing staff qualifications to the Engineer for review.

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1. The Contractor shall submit to the Engineer for approval, the company name, address and qualifications of the selected ITL or alternate sampling and testing staff proposed for use at the project. The Engineer reserves the right to request other information regarding the qualifications of the ITL or sampling and testing staff for use in the evaluation process.

C. Sampling of Imported Materials

1. The Contractor shall be responsible for collecting samples and conducting tests using a qualified ITL or approved sampling and testing staff to certify and document that imported material meets the allowable analytical compound concentrations and properties specified in this Section. These samples will be collected and transported in compliance with the QC Work Plan. These samples will be sent to an Analytical Chemistry Testing Laboratory (ACTL) selected by the Owner. The Engineer reserves the right to observe sampling and testing of the materials. The Contractor shall provide at least 24-hours notice of a sampling event to the Engineer.
2. Representative samples of each specific fill type from each specific fill source will be obtained by compositing at least five randomly selected individual samples of approximately equal weight. The total composite sample mass shall be at least the minimum size required to conduct all of the required material property and analytical chemistry tests for that fill type. Each of the individual samples will be obtained from within the boundaries of the material mass that the composite sample represents. In addition, at least 1 pound of each individual sample will be retained in a separate, sealed clean glass jar for additional duplicate testing, if needed.
3. Contractor quality control samples may be obtained from in-situ samples for pre-approval of a dedicated borrow source area. The sampling methodology and means for assuring the material dedication to the project shall be submitted to the Engineer for approval prior to the commencement of sampling.
4. Contractor quality control samples may also be obtained from dedicated stockpiles or storage/transportation vessels. The sampling methodology and means for assuring the material dedication to the project shall be submitted to the Engineer for approval prior to the commencement of sampling.
5. The Contractor shall submit to the Engineer all data, testing and reports generated by the ITL, ACTL or other sampling and testing entities for the project.
6. No imported fill materials shall be delivered to the project site before the required material property and analytical chemistry testing for that batch has been provided to the Engineer and written acceptance received from the Engineer. Unaccepted material shall be removed from the site at the Contractor's expense.

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7. Additional quality control tests may be required at each visual or textural change in source material, as directed by the Engineer. Test results shall be submitted to the Engineer immediately upon receipt.
8. The Contractor shall be responsible for repairing or reconstructing the deficiencies at its own expense to meet this Specification and other Contract Documents.

D. Sample Frequency

1. Each imported fill material type shall be tested at the following batch sizes:
 - a. For the first 25,000 cubic yards of each fill type from a specific fill source, a representative composite sample will be obtained from each 2,500 cubic yards (in-place volume) batch or part thereof.
 - b. If ten consecutive acceptable test results have been obtained on samples representing the first 25,000 cubic yards or greater of each fill type and the material continues to be from the same fill source with consistent appearance and source area or process, then the batch size can be increased to 5,000 cubic yards for the subsequent material deliveries.
 - c. If ten consecutive test results have been obtained on samples representing the next 50,000 cubic yards or greater of each fill type and the material continues to be from the same fill source with consistent appearance and source area or process, then the batch size can be increased to 10,000 cubic yards for the subsequent material deliveries.

E. Analytical Chemistry Testing

1. Rip Rap (Section 02275 – Rip-Rap), originating from NYSDOT-approved virgin borrow sources, are exempt from the analytical chemistry testing requirements.
2. Each other fill material shall either:
 - a. Have composite samples tested for the compounds in Table 375-6.8(a) “Unrestricted Use Soil Cleanup Objectives” in NYSDEC Subpart 375. All test results shall be below the cleanup objective concentrations provided in this table, with the exception of mercury, which shall be below 0.15 mg/kg. Failure of a single compound test result shall mean that the entire material batch will be rejected unless specifically accepted on a test-by-test basis in writing by the Engineer; or
 - b. Originate from a borrow site that has been otherwise verified as having no compounds exceeding the limits in Table 375-6.8(a) “Unrestricted Use Soil Cleanup Objectives” in NYSDEC Subpart 375, including but not limited to borrow sources approved for the Onondaga Lake remediation.

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F. Material Property Testing

1. Each composite sample shall be tested for material properties as defined in the specific Specification Section or Subpart for that material type.

1.6 QUALITY ASSURANCE

- A. The Engineer shall conduct quality assurance sampling on materials delivered to the site.
 1. The Contractor shall provide access and support to the delivered materials in order for representative sampling and testing to be conducted.
 2. The Engineer shall have the right to visit the borrow source at any time during borrow pit working hours to observe mining, manufacturing, stockpiling or loading operations.

1.7 PROJECT AND SITE CONDITIONS

- A. Prior to the start of the Work, the Contractor shall carefully examine the site to determine the full extent, nature and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.
- B. Field Measurements
 1. Verify that survey benchmark, monuments and intended elevations for the work are as shown on the Contract Drawings or as provided by the Engineer.
 2. Identify required lines, levels, contours and datum. Review subsurface investigation reports and other available site information.

PART 2 PRODUCTS**2.1 MATERIALS****A. Common Fill**

1. Common Fill shall consist of natural mineral soil substantially free of organic materials, topsoil, wood, trash, debris, frozen materials, and other objectionable materials that may be compressible or cannot be properly compacted.
2. Granular Common Fill shall have the following gradation:

Sieve Size	Percent Finer by Weight
12-in	100
4-in	40 to 100
1/4-in	10 to 75
No. 40 (0.0167 in)	3 to 60
No. 200 (0.0029 in)	Less than or equal to 25 with a plasticity index of less than 7

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B. Habitat Subgrade Material

- Habitat Subgrade Material shall consist of natural mineral soil substantially free of wood, trash, debris, frozen materials, and other objectionable materials. Habitat Subgrade Material shall have the following gradation:

Sieve Size	Percent Finer by Weight
8-in	100
4-in	80 to 100
1/4-in	30 to 75
No. 40 (0.0167 in)	15 to 60
No. 200 (0.0029 in)	Less than than or equal to 25

- Type A Habitat Subgrade Material shall contain greater than 0.5 percent and less than 6 percent organic content determined using ASTM D2974.
- Habitat Subgrade Material shall have a pH between 5.5 and 7.6.

C. Structural Fill

- Structural Fill shall meet the requirements of NYSDOT 304-2 Type 2 or 4.

D. Channel Habitat/Erosion Protection Material

- Channel Habitat and Erosion Protection Material shall be a non-angular natural mineral soil substantially free of wood, trash, debris, frozen materials, and other objectionable materials sourced from a glacio-fluvial deposit approved by the Engineer. Channel Habitat and Erosion Protection Material shall have the following gradation:

Sieve Size	Percent Finer by Weight
12-in	100
6-in	50 to 92
2-in	40 to 76
No. 4 (0.187 in)	10 to 33
No. 40 (0.0167 in)	3 to 13
No. 200 (0.0029 in)	Less than than or equal to 7

E. Base Layer:

- Base Layer Material shall consist of natural mineral soil substantially free of organic materials, topsoil, wood, trash, debris, frozen materials, and other objectionable materials. Base Layer Material shall have the following gradation:

Sieve Size	Percent Finer by Weight
5/8-in	100
No. 10 (0.078 in)	40 to 100
No. 200 (0.0029 in)	Less than or equal to 10

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F. Fine Grained Material

1. Fine grained material for use in retaining water in the area shown on the drawings shall be a natural mineral soil substantially free of wood, trash, debris, frozen materials, and other objectionable materials. On-site re-use soils meeting the following technical requirements may be used. The fine-grained material shall be a plastic soil with at least 25% passing the No. 200 sieve that can be expected to have an average hydraulic conductivity of 1×10^{-5} cm/sec or less. The plasticity of the soil should be such that the moist soil can be rolled by hand into a ¼ -inch diameter thread without cracking. On-site re-use soils placed in the top two feet of backfill shall meet Unrestricted Use Soil Cleanup Objectives in NYSDEC Subpart 375 with the exception of mercury, which shall be below 0.15 mg/kg, unless otherwise agreed to by NYSDEC.

G. Borrow Source and Quality Control Testing

1. Conduct borrow source and quality control testing prior to delivery to the site as required in Subpart 1.5 of this Section, including, but not limited to the following specific testing, at the frequency specified in Subpart 1.5 of this Section:

Material Property	Test Method
Particle Size Analysis	ASTM D422
Moisture Content	ASTM D2216
Modified Proctor	ASTM D1557
Atterberg Limits (if plastic material)	ASTM D4318
Soil pH (for Habitat Subgrade Material)	ASTM D4972
Organic Content	ASTM D2974

Analytical Chemistry Testing as per Subpart 1.5E of this Section

2. Additional Quality Control tests may be required at each visual or textural change in source material, as directed by the Engineer. Test results shall be submitted to the Engineer immediately upon receipt of results.
- H. Re-Use of On-Site Soils: On-site soils may be re-used in re-grading and re-shaping operations in areas where contaminated soils have been removed in accordance with Section 02219 - Waste Excavation, Consolidation and Disposal and the Contract Drawings. On-site soils may only be excavated for re-use from areas that have been approved by the Engineer and may only be placed in areas that have been approved by the Engineer. On-site re-use soils placed in the top two feet of backfill shall meet Unrestricted Use Soil Cleanup Objectives in NYSDEC Subpart 375 with the exception of mercury, which shall be below 0.15 mg/kg, unless otherwise agreed to by NYSDEC. On-site soils that may be re-used subject to the approval of the Engineer include the following:

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1. Clay and silt
2. Granular Soils
3. Topsoil outside the Limits of Excavation (must be returned to its original location unless otherwise approved by the Engineer).

2.2 EQUIPMENT

- A. The Contractor shall use equipment suitable for excavating, hauling, placing, spreading, and compacting backfill materials to the thicknesses and densities indicated on the Contract Drawings to the tolerances provided below.

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Provide erosion control prior to and throughout all earthwork operations in accordance with Section 02370 - Erosion Control.
- B. Manage construction water in accordance with Section 02140 – Construction Water Management. Sequence and conduct earthwork activities to limit the generation of construction water as appropriate.
- C. The site shall be cleared and grubbed in accordance with Section 02100 - Clearing and Grubbing.
- D. Protect plants, lawns, wetlands and other features that have been designated on the Contract Drawings to remain.
- E. Protect control points, benchmarks, existing structures, features, fences, sidewalks, paving and curbs from excavation equipment and vehicular traffic. Repair or replace damaged items.
- F. Prior to the start of construction, notify the appropriate organizations and have underground utilities staked or marked. Utilities include, but are not limited to water, gas, electric, telephone, cable, storm sewer, sanitary sewers, laterals and services. If utility locations indicate a possible interference, or points of connection to existing facilities need to be identified, perform exploratory excavations to determine the utility's location and elevation. Provide the utility owner with results from exploratory excavations for review. Allow the Engineer sufficient time to review exploratory excavation results and evaluate if changes are required to the Contract Drawings prior to start of construction in the vicinity of the identified utility.
- G. Identify above-grade and overhead utilities. Protect overhead utilities against damage. Where equipment will be operating below overhead lines, relocate or provide insulation of electrical lines for worker protection as necessary.
- H. Maintain existing manholes, catch basins, culverts and other utility structures above and below grade in their pre-work condition unless shown in the Contract Drawings to be removed or altered. Promptly remove any material or debris entering such structures.

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3.2 EXCAVATION

- A. Refer to Section 02219 - Waste Excavation, Consolidation and Disposal and Section 02222 - Excavation.

3.3 BACKFILL

- A. Verify that fill materials are acceptable. Remove and re-mix materials which have undergone excessive particle segregation, prior to backfilling.
- B. Verify subsurface installations for the project have been inspected and are ready for backfilling.
- C. Compact subgrade to density requirements for subsequent backfill materials. Cut out soft areas of subgrade not capable of in-situ compaction.
- D. Inspect areas to be backfilled prior to backfilling operations. Remove unsuitable materials including water, snow, ice and debris from surfaces to accept backfill material unless otherwise approved by the Engineer. Remove sheeting, bracing, forms and debris.
- E. Roughen seal-rolled surfaces by tracking with a bulldozer immediately before placement of backfill materials.
- F. Unless otherwise approved by the Engineer start backfilling as soon as practicable after: excavation of soil and/or waste materials is completed and approved by the Engineer; structures or pipe installations have been completed and approved by the Engineer; concrete has acquired 70 percent of design strength; and/or subgrade waterproofing materials have been in place for at least 48 hours. Execute backfilling expeditiously thereafter.
- G. Do not place backfill against foundation walls of structural members unless they are properly shored and braced or of sufficient strength to withstand lateral soil pressures.
- H. Do not place backfill material on frozen ground or when the material itself is frozen or contains frozen soil fragments unless approved by the Engineer. Do not add calcium chloride or other chemicals to prevent freezing. Material incorporated in the backfilling operation that is not in satisfactory condition is subject to rejection and removal at the Contractor's expense.
- I. Do not place backfill material when the moisture content is too high to allow equipment to operate or perform proper compaction. In order to allow for root penetration in restoration areas above the water table that will receive little or no compaction, plastic soils with too high a water content shall not be placed. When material is too dry for adequate compaction, add water during placement to the extent necessary. Maintain optimum moisture content of backfill materials to attain required compaction density.
- J. Do not obstruct natural drainage at any time unless required to direct water flows away from contaminated areas. Do not backfill in such a manner that water flows across contaminated areas unless approved by the Engineer.

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- K. Backfill areas to required contours, grades and elevations with the following tolerances within the channel and the adjacent floodplain below the 100-year flood elevation:
1. At least 95 percent of the fill layer and finished grade surface elevation survey points and/or surface area shall be constructed within the range of 3 inches above (+3") and 15 inches below (-15") the elevations shown on the Contract Drawings unless otherwise noted on the Contract Drawings or approved by the Engineer.
 2. Cross-section areas of the channel and adjacent floodplain below the 100-year flood elevation shall be equal to or exceed the cross-sectional area shown on the Contract Drawings unless otherwise noted on the Contract Drawings or approved by the Engineer.
 3. At least 95 percent of the individual layer survey points and/or surface area shall be constructed to the minimum thickness shown on the Contract Drawings unless otherwise noted on the Contract Drawings or approved by the Engineer.
 4. The total backfill thickness of all of the individual layer thicknesses combined together shall achieve the total minimum thickness shown on the Contract Drawings unless otherwise noted on the Contract Drawings or approved by the Engineer.
- L. Backfill to finished grade shall be in accordance with Section 02990 – Finish Grading, Topsoil and Seeding.
- M. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be roughened to a depth of not less than 2 inches before the next layer is placed.
- N. Backfill with material specified in Subpart 2 and as shown on the Contract Drawings, and compact to density requirements for subsequent backfill material.
- O. Hydraulic compaction by ponding or jetting will not be permitted except in very unusual conditions and then only upon written request and demonstration of its effectiveness by the Contractor and written approval by the Engineer.
- P. Rough grade backfilled and filled areas to meet subsequent topsoiling or paving requirements. Make grade changes gradual. Blend slopes into level areas unless indicated otherwise in the Contract Documents.
- Q. Repair or replace settlement in the finished work in accordance with this Section if the settlement interferes with the intended performance of the fill in the opinion of the Engineer.
- R. Remove surplus backfill materials from site and place in an area approved by the Engineer.
- S. Base and mixing layers shall not be place through stagnant dredge water for a minimum of 12 hours after completion of dredging in that area.
- T. Backfill placed in flowing water shall have less than 10% passing the #200 sieve.

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3.4 COMPACTION

- A. Common fill for areas indicated on the Contract Drawings specifically designated as requiring compaction to a density specified on the Contract Drawings shall be placed in layers having a maximum thickness of 12 inches measured before compaction. Common fill shall be compacted to at least the required percentage of the maximum dry density as determined by ASTM D1557 except as discussed in this paragraph. One out of five test results will be permitted to fall below the specified percentage of the maximum dry density, but no test results will be accepted if they are more than 5% below the specified percentage. No soft spots or uncompacted areas will be allowed in the work. The Engineer will perform compaction testing. Any areas not achieving the compaction criteria, exhibiting pumping, excessive wetness or other signs of distress under loading shall be removed or reworked by the Contractor at their own expense.
- B. Vibratory compactors shall not be used on material that is too wet either from rain or from excess application of water. At such times, the Contractor may attempt to use the compactor in static (non-vibratory mode) to achieve the required compaction. If the Contractor cannot achieve the required compaction, the fill material shall be removed, reworked and/or replaced.
- C. Fills placed in restoration areas shown as uncompacted on the Contract Drawings shall be lightly tamped with a backhoe bucket or tracked with a bulldozer to break down large clods (typically larger than 8-in), but shall not be compacted to greater than 85% of the maximum dry density of the material as determined using ASTM D1557.

3.5 TEMPORARY STOCKPILES

- A. Grade stockpiles to minimize erosion and ensure positive drainage.
- B. Cover exposed stockpiles with plastic sheeting, tarps, mulch or other coverings to minimize erosion and dust.
- C. Track-walk completed stockpile surfaces. Operate machinery up and down the slope (perpendicular to the contours) when track-walking.
- D. Prevent erosion from stockpiles in accordance with Section 02370 - Erosion Control.

END OF SECTION

SPECIFICATION NO: 02219

SPECIFICATION TITLE: WASTE EXCAVATION, DREDGING, CONSOLIDATION AND DISPOSAL

PROJECT NO: 446794

PROJECT TITLE: NINEMILE CREEK

CLIENT: HONEYWELL

				APPROVALS		
Issue	Date	Pages	Issue Description	Prepared	Checked	Approved
0	5/23/2012	7	Issued for Construction	ERK	SRB/JMO	RDD/TD
<input checked="" type="checkbox"/> Entire Specification Issued this Revision <input type="checkbox"/> Revised Pages Only Issued this Revision			SPECIFICATION ISSUED FOR: <input type="checkbox"/> In-house Review <input type="checkbox"/> Bid <input type="checkbox"/> Client Review/Approval <input checked="" type="checkbox"/> Construction <input type="checkbox"/> Information Only <input type="checkbox"/> <i>Other</i>			

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Specification Title	Waste Excavation, Dredging, Consolidation and Disposal	Date:	5/23/2012

PART 1 GENERAL**1.1 DESCRIPTION**

- A. The Work specified in this Section consists of the labor, equipment, tools, materials, services, supervision and incidentals necessary to perform the excavation, re-location, consolidation and disposal of waste (e.g., contaminated or potentially contaminated sediments, soils, waste and debris) necessary for completion of the Work as described herein, shown on the Contract Drawings, or directed by the Engineer. Work in this Section includes, but is not limited to:
1. Excavating, relocating, screening (if necessary), stockpiling, preparing and/or hauling soil/sediment and other waste.
 2. Consolidation at the LCP Containment Area.
 3. Off-site disposal if required.
- B. Related Work specified in other Sections includes, but is not limited to:
1. Section 02100 – Clearing and Grubbing
 2. Section 02140 – Construction Water Management
 3. Section 02200 – General Earthwork
 4. Section 02222 – Excavation
 5. Section 02370 – Erosion Control
 6. Section 02910 – Wetland and Streambed Restoration
 7. Section 02990 – Finish Grading, Topsoil and Seeding

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State, and Local codes, ordinances, regulations, statutes, and standards.
- B. All excavation, trenching, sheeting, bracing and related work shall comply with the requirements of Title 29 Code of Federal Regulations, Part 1926.650-652, (Subpart P - Excavations), OSHA Safety and Health Regulations for Construction.

1.3 REFERENCES

- A. United States Environmental Protection Agency (EPA Method 9095, SW-846; USEPA 1991h) – Paint Filter Test.
- B. Title 29 Code of Federal Regulations, Part 1926.650-652, (Subpart P - Excavations), OSHA Safety and Health Regulations for Construction Employment.

1.4 DEFINITIONS

- A. Waste is defined as contaminated or potentially contaminated soil, sediment, or other material that is excavated on-site. Materials that come into contact with spilled or

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tracked waste such that they require removal shall also be considered waste. Refer to Section 3.3 F for examples of materials deemed unsuitable.

- B. On-site is defined as work occurring within the limits of the Onondaga Lake Superfund Site, including but not limited to Ninemile Creek and its associated floodplains from Onondaga Lake to 200 feet upstream of the confluence with Geddes Brook. For the purposes of execution of the work, the LCP Containment Area shall also be considered as on-site for the purposes of transporting and consolidation of waste materials from the Ninemile Creek Remedial Action.
- C. Off-site is defined as areas outside the boundaries of the Onondaga Lake Superfund Site, including but not limited to outside of Ninemile Creek and its associated floodplains or the LCP Containment Area.
- D. Waste excavation is defined as removals of materials considered to be waste above the water surface.
- E. Waste dredging is defined as removals of materials considered to be waste below the water surface.

1.5 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 - Submittal Procedures and as elsewhere specified in this Section:
 - 1. Name, location, and a copy of the operating permit for off-site disposal facilities to be used. Statement of acceptability from disposal facilities for each waste to be received and copies submitted to the Engineer prior to shipping of waste.
 - 2. Procedures, materials and equipment to be used for the excavation, dredging, dewatering, relocation, transportation, consolidation and disposal of waste materials. Include a spill contingency plan as part of this submittal. This submittal may incorporate or reference the Water Quality Management Plan (WQMP) described below. Do not begin waste excavation or dredging work until the Engineer has approved this submittal.
 - 3. Submit as part of the Health and Safety Plan (HASP), a contingency plan in the event hazardous materials (e.g., drums, etc.) are encountered during excavation.
 - 4. Water Quality Management Plan (WQMP). Provide a Contractor's WQMP describing anticipated measures to protect and monitor surface water quality during dredging. Do not begin dredging work until the Engineer has approved this submittal.

1.6 QUALITY CONTROL

- A. The Contractor shall submit a Quality Control (QC) Work Plan for review. Once instituted, the Contractor shall use the QC Work Plan to ensure that the Work meets the requirements of the Contract Documents.

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1.7 PROJECT AND SITE CONDITIONS

- A. The Contractor shall carefully examine the site to determine the full extent, nature and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.

PART 2 PRODUCTS (NOT APPLICABLE)**PART 3 EXECUTION****3.1 GENERAL**

- A. Establish exclusion zones for work areas in accordance with the HASP.
- B. Apply herbicide to invasive species (full or partial plants) as directed by the Engineer. Invasive species are likely to include, but are not limited to, common reed (*Phragmites australis*) and common buckthorn (*Rhamnus cathartica*). Herbicides containing glyphosate or other chemicals known to be effective against the targeted invasive species shall be applied in accordance with the manufacturer's instructions. Herbicides shall not be applied when wind is greater than 5 miles per hour or rain is forecast within the next 24 hours.
- C. Excavate to the lines and grades or as otherwise shown on the Contract Drawings. Do not over-excavate or over-dredge any area laterally or vertically without prior approval from the Engineer.
- D. When structural fill or armoring stone is encountered, excavate material overlying structural fill or armoring stone and associated joints to a hand shovel clean condition.
- E. Perform final cut to expected clean surface with a cutting pass, using equipment that is free of mud and loose soils. Back-blading of the final cut surface is not permitted until directed by the Engineer. Back-blading of the final cut surface shall only be performed using equipment that has been cleaned to remove contaminated soil and mud.
- F. The Engineer will perform confirmatory or post-construction sampling as shown on the Contract Drawings to evaluate the extent of excavations. Test results shall be made available to the Contractor within 5 working days of the sampling for review and direction regarding further excavation or backfilling.
- G. Perform excavation, dredging, and on-site transportation in a manner that prevents migration of contaminants to clean areas. Keep varying contaminant types and concentrations segregated as necessary for consolidation or disposal. Remove and consolidate or dispose of waste that spreads beyond the existing contamination limits in accordance with this Section.

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- H. Conduct excavation operations to provide continuous drainage and to prevent ponding. Direct surface water away from excavation areas. Remove and handle surface water and groundwater seepage that collect in disturbed excavation areas.
- I. Dredging shall be conducted such that at least 95 percent of the dredged surface elevation survey points and/or surface area shall be constructed within the range of 0 inches above (+0") and 15 inches below (-15") the elevations shown on the Contract Drawings unless otherwise noted on the Contract Drawings or approved by the Engineer.
- J. Excavation shall be conducted such that at least 95% of the excavated surface elevation surface points and/or surface area shall be constructed within the range of 0 inches above (+0") and 6 inches below (-6") the elevations shown on the Contract Drawings unless otherwise noted on the Contract Drawings or approved by the Engineer.
- K. Manage construction water in accordance with Section 02140 - Construction Water Management. Sequence and conduct excavation, consolidation and disposal activities to limit the generation of construction water as appropriate.
- L. Provide storm water and erosion control measures prior to and throughout all excavation, dredging, consolidation and disposal activities in accordance with Section 02370 - Erosion Control.
- M. Provide oil absorbent pads and/or booms as needed to contain and collect oil sheens that may emanate from the excavation and dredging areas.
- N. Conduct dredging operations in accordance with approved Water Quality Management Plan, including providing turbidity curtains or other measures to manage turbidity in surface water caused by dredging. Monitor surface water quality in accordance with approved Water Quality Management Plan.
- O. Stop work immediately and notify the Engineer at anytime during the completion of works if separate phase mercury, non-aqueous phase liquid (NAPL), drums, tanks or other unanticipated sources of contamination are encountered. Do not proceed with removal of such materials without prior approval from the Engineer, unless an emergency situation requiring immediate action exists.
- P. Decontaminate equipment used for excavation of waste materials prior to re-use on clean material. Decontaminate equipment between distinct areas of contamination regardless of the type of contamination.

3.2 TRANSPORTATION

- A. Construct and use dewatering and staging pads as necessary for excavated and dredged waste materials that could require transport on Local and State roads.
- B. Transport excavated and dredged waste on Local and State roads in accordance with Federal, State and Local codes, regulations, statutes, and standards and in a manner that prevents spills and the spread of contamination.

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- C. Provide lined or sealed trucks to prevent spillage of liquids, or dewater/amend excavated and dredged waste as required to prevent leakage and spills of free water or slurry.
- D. Excavated and dredged waste loaded into trucks which are not lined or sealed for transport on Local and State roads shall pass the Paint Filter Test (EPA Method 9095, SW-846; USEPA 1991h).
- E. Construct decontamination pads to clean trucks moving between contaminated and non-contaminated areas.
- F. Do not exceed legal load limits for truck weight.

3.3 ON-SITE CONSOLIDATION AT THE LCP CONTAINMENT AREA

- A. Relocate excavated and dredged waste to within the limits of the LCP Containment Area.
- B. Compact relocated waste with at least three passes of a self-propelled roller compactor so that it will meet the required proof-rolling standard of less than 3-inches of deflection at the seam between passes for the LCP Containment Area.
- C. Dispose of debris from waste areas with the relocated waste unless specifically instructed otherwise. Place debris that could potentially damage the geomembrane of the LCP Containment Area cap under a minimum of one foot of soil or sediment wastes.
- D. Ground and Chipped Organic Materials: Spread in lifts less than 6 inches thick and do not form large pockets that could cause large voids in the future. Place chipped and ground materials in fill areas with a final grade of less than 20 percent. Where or when possible, blend chipped and ground materials with other soil or sediment wastes prior to placement in the cap area. Place a minimum of 18 inches of soil or sediment waste between lifts of chipped and ground materials.
- E. Stumps and Roots: Stumps and roots that are not chipped or ground shall be buried at the LCP Containment Area at a depth that is at least three times the largest dimension of the object. The depth shall be measured from the top of the waste mass.
- F. Materials deemed unsuitable: Unknown substances (e.g., drums containing unidentified materials) and objects that would create significant voids (e.g., a truck body).

3.4 OFF-SITE DISPOSAL

- A. No Contractor-proposed facility for off-site disposal shall be used without prior approval by Honeywell. For all wastes disposed of off-site, the Contractor is responsible for characterizing such material and arranging for proper temporary storage in accordance with all applicable Federal, State and Local regulations at no additional cost to Honeywell. Honeywell will contract off-site transportation and disposal of wastes directly.

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- B. The Contractor shall dispose of wastes designated for off-site disposal within 90 days of filling the container.
- C. The Contractor shall mark, label, placard, package and manifest wastes in accordance with applicable codes, regulations, and statutes.

3.5 BACKFILLING

- A. Backfill excavation and dredged areas as shown on the Contract Drawings, as specified, or as directed by the Engineer. Do not backfill the waste excavation and dredged areas until the Engineer determines waste excavation and dredging is complete for each area.
- B. Backfill in accordance with 02200 - General Earthwork, Section 02910 - Wetland and Streambed Restoration, and 02990 - Finish Grading, Topsoil, and Seeding.

END OF SECTION

SPECIFICATION NO: 02222
SPECIFICATION TITLE: EXCAVATION
PROJECT NO: 446794
PROJECT TITLE: NINEMILE CREEK
CLIENT: HONEYWELL

				APPROVALS		
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0	5/23/2012	6	Issued for Construction	ERK	SRB/JMO	RDD/TD
<input checked="" type="checkbox"/> Entire Specification Issued this Revision <input type="checkbox"/> Revised Pages Only Issued this Revision			SPECIFICATION ISSUED FOR: <input type="checkbox"/> In-house Review <input type="checkbox"/> Bid <input type="checkbox"/> Client Review/Approval <input checked="" type="checkbox"/> Construction <input type="checkbox"/> Information Only <input type="checkbox"/> Other			

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Specification Title	Excavation	Date:	5/23/2012

PART 1 GENERAL**1.1 DESCRIPTION**

- A. The Work specified in this Section consists of the labor, equipment, tools, materials, services, supervision, and incidentals necessary to perform all excavation necessary for completion of the Work as described herein, shown on the Contract Drawings, or directed by the Engineer. Work in this Section includes, but is not limited to:
1. Excavation of uncontaminated soil materials.
 2. Excavation of contaminated soils, sediments, wastes and debris.
 3. Excavation for drainage ditches, culverts, piping and trenches.
 4. Excavation for site structures.
- B. Related Work specified in other Sections includes, but is not limited to:
1. Section 02100 - Clearing and Grubbing
 2. Section 02219 - Waste Excavation, Consolidation and Disposal
 3. Section 02200 – General Earthwork
 4. Section 02370 - Erosion Control
 5. Section 02501 - Gravel Access Road
 6. Section 02727 - Drainage Piping
 7. Section 02990 - Finish Grading, Topsoil, and Seeding

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State, and Local codes, ordinances, regulations, statutes, and standards
- B. All excavation, trenching, sheeting, bracing and related work shall comply with the requirements of Title 29 Code of Federal Regulations, Part 1926.650-652, (Subpart P - Excavations), OSHA Safety and Health Regulations for Construction.
- C. Make excavations in accordance with the Contractor's HASP.

1.3 REFERENCES

- A. Title 29 Code of Federal Regulations, Part 1926.650-652, (Subpart P - Excavations), OSHA Safety and Health Regulations for Construction.

1.4 PROJECT AND SITE CONDITIONS

- A. The Contractor shall carefully examine the site to determine the full extent, nature, and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.

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B. Field Measurements

1. Verify that survey benchmarks, monuments and intended elevations for the work are as shown on the Contract Drawings or as provided by the Engineer.
2. Identify required lines, levels, contours, and datum. Review subsurface investigation reports and other available site information.

- C. Prior to the start of construction, Contractor shall notify the appropriate organizations, and have staked or marked underground, above-grade and overhead utilities. Utilities include, but are not limited to water, gas, electric, telephone, cable, storm sewer, sanitary sewers, laterals, and services. If utility locations indicate a possible interference, or points of connection to existing facilities need to be identified, perform exploratory excavations to determine the utilities' location and elevation. Provide the utility owner with results from exploratory excavations for review. Allow the Engineer sufficient time to review exploratory excavation results and evaluate if changes are required to the design prior to start of construction.

PART 2 - PRODUCTS (NOT APPLICABLE)**PART 3 - EXECUTION****3.1 PREPARATION**

- A. Protect plants, lawns, wetlands and other features that have been designated on the Contract Drawings to remain.
- B. Protect control points, benchmarks, existing structures, features, fences, sidewalks, paving and curbs from excavation equipment and vehicular traffic. Repair or replace damaged items.
- C. Provide protection of utilities, equipment and personnel for all underground, above-grade and overhead utilities.
- D. Maintain existing manholes, catch basins, culverts and other utility structures above and below grade in their pre-work condition unless shown in design to be removed. Promptly remove any material or debris entering mentioned above structures due to the operation.
- E. Grade areas to receive fill to prevent surface water runoff and ponding.

3.2 CLASSIFICATION OF EXCAVATED MATERIAL

- A. Classifications of excavated materials are as follows:
 1. Common Excavation: Excavation above the water surface except "rock excavation." Unconsolidated and non-indurated material, rippable rock, loose rock, soft mineral matter, weathered rock or saprolite, and soft or friable shale which is removable with normal earth excavation equipment. Boulders and detached pieces of solid rock, concrete, or masonry less than 1 cubic yard in volume.

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2. Dredging: Excavation of unconsolidated and non-indurated materials within a defined stream channel or lake below the water surface, or as otherwise indicated on the Contract Drawings.
 3. Floodplain Soil/Sediment Excavation: Excavation of unconsolidated and non-indurated materials within a defined floodplain or wetland boundary or as otherwise indicated on the Contract Drawings.
 4. Rock Excavation: Sound solid masses, layers and ledges of consolidated and indurated rock or mineral matter of such hardness, durability and/or texture that it is not rippable or cannot be excavated with normal earth excavation equipment.
- B. These material categories may be classified as contaminated or uncontaminated. Contaminated material excavations are also referenced in Section 02219 – Waste Excavation, Consolidation and Disposal.

3.3 EXCAVATION

- A. Protect adjacent structures that may be damaged by excavation work, including but not limited to utilities, monitoring wells, existing infrastructure and pipe chases. Repair or replace any structure damaged as a result of operations.
- B. Excavate subsoil required to accommodate access roads, construction operations, culverts, ditching, site structures and piping.
- C. Shore or machine-slope banks to an angle that is safe for the material in which the excavation is made, including appropriate offset or protection for nearby wastebed or landfill stability and other site structures.
- D. Excavations shall not interfere with the normal 45-degree bearing splay of foundations. Do not undercut excavation faces.
- E. Grade the excavation perimeter to prevent surface water drainage into the excavation. Grade excavations to minimize directing runoff over contaminated areas.
- F. Dredging shall be conducted such that at least 95% of the dredged surface elevation survey points and/or surface area shall be constructed within the range of 0 inches above (+0”) and 15 inches below (-15”) the elevations shown on the Contract Drawings unless otherwise noted on the Contract Drawings or approved by the Engineer.
- G. Excavation shall be conducted such that at least 95% of the excavated surface elevation survey points and/or surface area shall be constructed within the range of 0 inches above (+0”) and 6 inches below (-6”) the elevations shown on the Contract Drawings unless otherwise noted on the Contract Drawings or approved by the Engineer.
- H. Remove lumped subsoil, boulders and rock under 1 cubic yard in size.
- I. Notify the Engineer of unexpected subsurface conditions, or of questionable soils encountered at required subgrade elevations, and discontinue work in the area until notified to resume work.

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- J. Stockpile excavated material in areas designated by the Engineer.
- K. Install sheeting and bracing and use mobile shields in accordance with details of applicable codes, rules and regulations including applicable Local, State and Federal regulations including the Occupational Safety and Health Administration (OSHA).

3.4 TRENCH EXCAVATION

- A. Excavate and maintain trenches for underground drainage, utilities, piping as shown on the Contract Drawings. Hold trench widths within the minimum and maximum limits shown on the Contract Drawings. If a prefabricated, mobile shield is utilized in lieu of conventional sheeting and bracing in pipe trenches, maintain the bottom of the shield as high as possible (preferably above the spring line of the pipe) to prevent disturbance of the pipe foundation material and to avoid forces which could pull pipe joints apart when the shield is dragged forward. Fill gouged openings or troughs left by the shield with additional pipe foundation material and thoroughly compact. Install sheeting and bracing and use mobile shields in accordance with details of applicable codes, rules and regulations including applicable Local, State and Federal regulations including the Occupational Safety and Health Administration (OSHA).
- B. Excavate flat bottom trenches, of allowable width, at the required subgrade elevation for subsequent installation of pipe foundation material.
- C. If indicated on the Contract Drawings or required by unsuitable soil conditions, carry trench excavations below the required subgrade and install a special pipe foundation in conformance with the Contract Documents.
- D. Trim back or remove bedrock, boulders and cobbles greater than 6 inches on each side of the trench so no rock protrudes within 6 inches of the installed pipe. Trim back rock across the bottom of the trench so no rock, boulder or cobble protrudes within 4 inches of the installed pipe.
- E. Do not open trenches more than 50 feet in advance of installed pipe unless approved by the Engineer. Complete excavation of the trench at least 5 feet in advance of pipe laying operations. Do not leave more than 40 feet of trench open overnight unless properly shored as approved by the Engineer.

3.5 MATERIAL MANAGEMENT

- A. Classify excavated material removed from areas that have been remediated and approved by the Engineer as surplus material waste material, and stockpile or dispose of at an on-site location approved by the Engineer.
- B. Surplus excavated material to be used as on-site fill shall conform to Section 02200 - Earthwork and be approved by the Engineer. Whenever possible, the material shall be excavated, moved, placed, and compacted as a single, continuous operation. Do not excavate and stockpile material for future use as on-site fill without approval by the Engineer.

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- C. Consolidate or dispose of waste materials as specified in Section 02219 - Waste Excavation, Consolidation and Disposal. Classify materials based on Contract Drawings, visual observations and material testing.

3.6 FIELD QUALITY CONTROL

- A. Perform field inspections.
- B. Provide for visual inspection of bearing surfaces.

3.7 PROTECTION OF EXCAVATIONS

- A. Prevent cave-ins or loose soil from falling into excavations.
- B. Maintain excavations while they are open and exposed in accordance with all applicable Federal, State, and Local codes, ordinances, regulations, statutes, and standards. Install and maintain sufficient and suitable barricades, warning lights, flood lights, signs, etc., to protect life and property until the excavation has been backfilled and graded to a safe and satisfactory condition.
- C. Protect sealed surfaces from unnecessary vehicle traffic and other construction activities to protect the excavation surface from disturbance prior to commencement of backfilling operations.
- D. Protect the bottom of excavations, soil beneath and soil adjacent to foundations from freezing.
- E. Exposed subgrade surfaces for foundations or roads shall remain undisturbed, drained and maintained as uniform areas shaped to receive the foundation components of the structure.

END OF SECTION

SPECIFICATION NO: 02275
SPECIFICATION TITLE: STONE MATERIALS
PROJECT NO: 446794
PROJECT TITLE: NINEMILE CREEK
CLIENT: HONEYWELL

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Specification Title	Stone Materials	Date:	5/23/2012

PART 1 GENERAL**1.1 DESCRIPTION**

- A. The Work specified in this Section consists of the labor, equipment, tools, materials, services, supervision, and incidentals necessary to provide and place all rip-rap, stone filling, and rounded stone necessary for completion of the Work as described herein, shown on the Contract Drawings, or as directed by the Engineer. Work in this Section includes, but is not limited to:
1. Procurement of rip-rap, stone filling, rounded stone or boulders.
 2. Placement of rip-rap, stone filling, rounded stone or boulders.
- B. Related Work specified in other Sections includes, but is not limited to:
1. Section 02100 - Clearing and Grubbing
 2. Section 02200 - General Earthwork
 3. Section 02222 – Excavation
 4. Section 02421 – Geotextiles

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
1. ASTM C33 - Standard Specification for Concrete Aggregates
 2. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils
 3. ASTM D5240 - Standard Test Method for Testing Rock Slabs to Evaluate Soundness of Riprap by Use of Sodium Sulfate or Magnesium Sulfate
 4. ASTM D5312 - Standard Test Method for Evaluation of Durability of Rock for Erosion Control Under Freezing and Thawing Conditions
- B. New York Department of Transportation - Standard Specifications (US Customary), 2009.

1.4 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:
1. Name and location of the rip-rap, stone filling, and rounded stone source used.
 2. Test reports on the materials including, but not limited to the following:
 - a. Grain Size (ASTM D422)
 - b. Freeze-Thaw (ASTM 5312)
 - c. Magnesium Sulfate Soundness (ASTM D5240)

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3. Proof that the material is New York State Department of Transportation (NYSDOT) approved.
4. Proof that the stone filling and rounded stone material meets ASTM C33 durability requirements.

1.5 PROJECT AND SITE CONDITIONS

- A. The Contractor shall carefully examine the site to determine the full extent, nature and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.

PART 2 PRODUCTS**2.1 GENERAL**

- A. Clean, hard, durable, rip-rap, stone filling, rounded stone, and boulders as delivered from an off-site source.
- B. Free from organic matter, trash, debris, shale, snow, ice and other frozen or mechanically deleterious materials.
- C. Hard enough to withstand exposure to air, water, freezing, and thawing.

2.2 RIP-RAP AND STONE FILLING

- A. Meet the gradation and properties requirements for NYSDOT Standard Specifications: 620-2.02. Rip-Rap and Stone Filling shall have the following gradation:

Rip-rap Item	See Notes	Stone Size ¹	Percent of Total by Weight
Fine	2, 3, 4	Smaller than 8 inch	90 – 100
		Larger than 3 inch	50 – 100
		Smaller than No. 10 Sieve	0 – 10
Light	2, 3, 4	Lighter than 100 pounds	90 – 100
		Larger than 6 inch	50 – 100
		Smaller than 1/2 inch	0 - 10
Medium	2, 3, 4	Heavier than 100 pounds	50 - 100
		Smaller than 6 inch	0 - 10
Heavy	2, 4, 5, 6	Heavier than 600 pounds	50 - 100
		Smaller than 6 inch	0 - 10

Notes:

1. Stone sizes, other than weights, refer to the average of the maximum and minimum dimensions of a stone particle as estimated by the Engineer.

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2. Materials shall contain less than 20 percent of stones with a ratio of maximum to minimum dimension greater than three.
3. Rip-rap is defined as material with at least one fractured face per particle. It is generally expected to be derived from crushing or blasting suitable aggregate.
4. Stone filling is defined as material that is rounded to sub-angular in shape. It is generally not expected to be derived from crushing or blasting.
5. Materials shall contain a sufficient amount of stones smaller than the average stone size to fill the spaces between the larger stones.
6. Heavier gradings of this item may be required, in which case the requirements will be stated on the Contract Drawings.

2.3 ROUNDED STONE

A. Rounded stone shall have the following gradations:

Rounded Stone Item	See Notes	Sieve Size⁵	Percent Passing by Weight⁴
1/4" D50 ¹	2, 3, 4	No. 14	10-20
		1/4"	45-55
		1/2"	80-40
		1"	100
4" D50 ¹	2, 3, 4	1-1/4"	10-20
		4"	45-55
		10"	80-40
		12"	100
6" D50 ¹	2, 3,4	2"	10-20
		6"	45-55
		15"	80-40
		24"	100

Notes:

1. D50 is the design median grain size for the rounded stone item.
2. Materials shall contain less than 20 percent of stones with a ratio of maximum to minimum dimension greater than three.
3. Stone shall be sub-angular to rounded.
4. Materials placed underwater shall contain no more than 2% fines passing the #200 sieve
5. Sieve sizes refer to US standard sieve sizes.
6. The rounded stone shall meet the soundness and quality requirements of ASTM C33 unless approved by the Engineer.

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- B. Provide material well-graded between the limits shown. Perform at least one test on each rounded stone item and source, or one test per 100 tons to be delivered to the project site, whichever results in a greater number of tests, for each specified gradation in accordance with ASTM C136. All points on individual grading curves obtained from representative samples of rounded stone shall lie between the boundary limits as defined by smooth curves drawn through the tabulated gradation limits plotted on ENG FORM 2087 or similar form. The individual gradation curves within these limits shall not exhibit abrupt changes in slope denoting either gap grading or scalping of certain sizes or other irregularities which would be detrimental to the proper functioning of the rounded stone.

2.4 BOULDERS

- A. Shall have a minimum size of 18 inches and a maximum size of 30 inches.
- B. Boulder size refers to the average of the maximum and minimum dimensions of a boulder as estimated by the Engineer.
- C. Boulders shall be predominantly rounded and equidimensional.
- D. Dry decontamination of boulders will be conducted prior to use as habitat features.

PART 3 EXECUTION**3.1. PLACEMENT**

- A. Place rip-rap, stone filling, or rounded stone at the locations shown on the Contract Drawings. Cut or fill, grade, and compact the subgrade surface to the lines and grades shown on the Contract Drawings and as necessary to provide a level surface.
- B. Place rip-rap, stone filling, or rounded stone on surfaces that are free of brush, trees, stumps, other objectionable material, and are dressed to a smooth surface. Clearing and grubbing shall be performed in accordance with Section 02100 - Clearing and Grubbing. Do not place rip-rap, stone filling, or rounded stone over frozen or spongy subgrade surfaces.
- C. Place rip-rap and stone filling in a manner that will minimize damage to underlying geotextile and produce a reasonable well-graded mass of stone with smaller stone fragments filling the space between the larger ones, resulting in the minimum practicable void space. The rip-rap and stone filling should provide continuous pressure across the geotextile so that the geotextile is in intimate contact with the underlying subgrade. Rip-rap and stone filling should be placed so that pieces nest together without bridging over voids.
- D. The rip-rap, stone filling, or rounded stone layer thickness shall be at least the diameter of the largest stone, except for Newbury riffles and wetland connection channels. Details for layer thickness for Newberry riffles and wetland connection channels are included in the Contract Drawings.

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- E. The layer thickness shall be at least 1.5 times the D50 of the material for all applications.
- F. Rounded stone should be placed so that the surface grain size distribution is no finer than the bulk grain size distribution.
- G. Rip-rap, stone filling, or rounded stone shall conform to the lines, grades, and thicknesses shown on the Contract Drawings. Place rip-rap, stone filling or rounded stone used for bank or channel protection to its full course thickness in one operation, unless otherwise directed by the Engineer or shown on the Contract Drawings, in such a manner that the underlying material will not be displaced or worked into the layer of rip-rap, stone filling, or rounded stone.
- H. The surface of the rip-rap, stone filling, or rounded stone should not have protruding stones.
- I. Carefully control placement of rip-rap, stone filling, or rounded stone upon finished bedding material, when used, to avoid disruption and damage to the layer of bedding material. Place and distribute the rip-rap, stone filling, or rounded stone so that there are no pockets of uniform size material.
- J. Obtain and place the desired distribution of various rip-rap, stone filling, or rounded stone sizes by selectively loading material at the quarry or other source, by controlled dumping of loads during final placing, and/or by other methods of placement which will produce the specified results. Rearrange individual stones by mechanical equipment or hand to secure the specified results, if necessary.
- K. When rip-rap, stone filling, or rounded stone is dumped under water, use methods that will minimize segregation.
- L. Place rip-rap, stone filling, or rounded stone starting at the bottom of the placement areas and proceed to the top, or in such a manner that stones will not slide or roll down during their placement. On slopes, place the largest stones at the bottom of the slope.
- M. Place boulders at the aerial density specified in the drawings and as directed by the Engineer.
- N. Boulders shall be placed to provide resistance to rolling or displacement. No more than 1/3 of the nominal diameter shall be placed below the finished grade surface.

END OF SECTION

SPECIFICATION NO: 02370
SPECIFICATION TITLE: EROSION CONTROL
PROJECT NO: 446794
PROJECT TITLE: NINEMILE CREEK
CLIENT: HONEYWELL

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Specification Title	Erosion Control	Date:	5/23/2012

PART 1 GENERAL**1.1 DESCRIPTION**

- A. The Work specified in this Section consists of the labor, equipment, tools, materials and services needed to manage stormwater and provide and maintain erosion control measures prior to and throughout construction as described herein, shown on the Contract Drawings or as directed by the Engineer. Work in this Section includes, but is not limited to:
1. Preparation of a Contractor's Storm Water Pollution Prevention Plan (SWPPP).
 2. Coordination with the Engineer regarding USEPA and NYSDEC requests pertaining to erosion and sedimentation control.
 3. Installation and maintenance of temporary and permanent sedimentation and erosion control measures.
 4. Control of erosion from stockpiles.
 5. Inspection of erosion control measures during and after rainfall.
 6. Repair of failed sedimentation and erosion control measures.
 7. Removal and disposal of sediment deposits in a manner that does not result in additional erosion or pollution.
 8. Removal of temporary erosion control measures once construction and permanent stabilization is complete.
- B. Related Work specified in other Sections includes, but is not limited to:
1. Section 02140 – Construction Water Management
 2. Section 02200 – General Earthwork
 3. Section 02219 – Waste Excavation, Transportation and Disposal
 4. Section 02222 – Excavation
 5. Section 02421 – Geotextiles and Rolled Erosion Control Products
 6. Section 02910 – Wetland and Streambed Restoration
 7. Section 02990 – Finish Grading, Topsoil and Seeding

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State, and Local codes, ordinances, regulations, statutes and standards.
- B. Observe government policy established by United States Environmental Protection Agency (USEPA).
- C. Conform to all erosion and sedimentation control policies and procedures established by the State of New York.
- D. Install temporary erosion and sediment control measures as one of the first steps of site preparation, before any clearing and grubbing or earthwork occurs. Temporary

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erosion and sediment control measures shall be maintained throughout the construction, and shall not be removed until permanent cover is completely established and stabilized, with no visible unstable rills or erosion, subject to the approval of the Engineer.

- E. Temporary erosion and sediment control measures are a dynamic project element. The Contractor shall install, maintain, and modify control measures as required by changing remedial construction needs over time.
- F. The Contractor shall plan and execute the Work to minimize routing of storm or flood water over disturbed areas in order to minimize erosion and sedimentation to the extent practicable. Similarly, the control measures shall minimize, to the extent practicable, the flow of stormwater over ground such that rills or unplanned ditches are not formed.

1.3 REFERENCES

- A. New York Department of Transportation. Standard Specifications (US Customary), 2009.
- B. New York State Standards and Specifications for Erosion and Sediment Control, (Latest Version).

1.4 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:
 - 1. Product Data - Provide product data for each component to be used in erosion and sediment control prior to their delivery and implementation at the Site.
 - 2. Methods - Provide a Contractor's SWPPP with a description of and illustration showing anticipated stormwater control and erosion control measures to be implemented during construction. This shall be submitted prior to mobilization to the Site.
- B. Taking into account specific constraints or other criteria outlined herein, the Contractor shall prepare and incorporate a schedule into the overall construction schedule, which sets forth the program of operations to effectively control erosion and sediment runoff. The schedule shall be arranged to include:
 - 1. Chronological completion dates for temporary and permanent measures for controlling erosion and sediment.
 - 2. Location, type, and purpose for each temporary measure to be undertaken.
 - 3. Dates when those temporary measures will be removed.

1.5 PROJECT AND SITE CONDITIONS

- A. The Contractor shall carefully examine the site to determine the full extent, nature, and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between

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the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.

PART 2 PRODUCTS**2.1 MATERIALS****A. Strawbales:**

1. Straw for strawbales shall meet the requirements of NYSDOT 713-19 – Straw. The use of hay is not permitted.
2. Stakes for strawbale use shall be re-bar, steel pickets or 2 inch by 2 inch hardwood.

B. Silt Fences shall meet the requirements of NYSDOT 209-2.08 Silt Fence and Table 737-01G, and the following:

1. Fence posts shall be 5 ft minimum length and be of wood or steel. Softwood posts shall be at least 1-1/2 inch by 3-1/2 inch; hardwood posts shall be at least 1-1/4 inch by 1-1/4 inch; steel posts shall be of T or U cross-section, with a minimum weight of 1.3lb/ft.
2. Fasteners shall be heavy duty staples, hog rings, tie wires or other fasteners compatible with the fence post material.
3. Silt Fence geotextile shall have a minimum permittivity of 0.05 sec-1 and a maximum Apparent Opening Size of 0.0236 inch or sieve designation of #30.
4. Type I Silt Fence:
 - a. Reinforced support shall be minimum 14 gauge welded wire mesh with 6 inch openings or polymeric mesh.
 - b. Silt Fence geotextile shall have a minimum Grab Strength of 90 lbf in both the Machine and Cross-Machine directions.
5. Type II Silt Fence:
 - a. Silt Fence geotextile shall have a minimum Grab Strength of 124 lbf in the Machine and 101 lbf in the Cross-Machine direction.

C. Temporary Check Dams:

1. The primary purpose of a check dam is to reduce flow velocity in a channel, thereby reducing erosion in the channel. A check dam will capture sediment that falls out of suspension behind it due to decreased velocity. A check dam is not intended to and generally does not filter sediment from turbid water.
2. The maximum drainage area for any temporary check dam shall be 2 acres.

D. Sand bags shall meet the requirements of NYSDOT 209-2.10 - Sand Bag.**E. Rolled Erosion Control Products (RECPs) shall meet the requirements of Section 02421 – Geotextiles and Rolled Erosion Control Products and shall meet the Type as shown on the Contract Drawings or required in the Specifications for that location.**

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F. Oil Sorbents.

1. Booms – New Pig Spaghetti Boom or equal shall be used.
2. Socks – New Pig Skimmer Socks or equal shall be used.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. The Contractor shall provide all means, methods, services, facilities, power, equipment, tools, material, consumables, incidentals, labor and supervision necessary to manage stormwater and implement and maintain erosion and sedimentation control measures to effectively minimize erosion and sedimentation.
- B. Construction, including but not limited to clearing, grubbing, earthwork and excavations shall be conducted in such a manner as to minimize erosion and sedimentation.
- C. Install erosion and sedimentation control products in accordance with manufacturers' recommendations.
- D. Erosion and sedimentation control measures shall be inspected by the Contractor daily. Repairs shall be made as soon as practical.
- E. Cover staged soil piles with temporary liners when precipitation is expected in order to minimize soil erosion.
- F. Employ, construct and maintain all temporary erosion and sediment control measures in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, (Latest Version).

3.2 COMPONENTS

- A. Sediment Barriers – Sediment barriers shall be strawbales, stone, silt fences, ecoberms or other approved materials that will prevent migration of silts and sediment to receiving waters.
 1. Strawbales:
 - a. Strawbale sediment barriers are only to be used when:
 - i. No other practice is feasible.
 - ii. Erosion would occur in the form of sheet erosion.
 - iii. The length of slope above the bales does not exceed the following limits for a one-inch rainfall event:

2:1 slope	25 ft slope length
3:1 slope	50 ft slope length
4:1 slope	75 ft slope length
 - b. Bales shall be placed at the toe of a slope or along a contour with each vertical end tightly abutting the adjacent bale. Loose straw shall be wedged between bales as required.

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- c. Each bale shall be embedded a minimum of 4 inches and placed so bindings are horizontal.
- d. Two stakes shall securely anchor each bale in place. Stakes must be driven a minimum of 18 inches into the ground and driven flush with the top of the bale. The first stake in each bale shall be driven at an angle toward the previously laid bale, in order to force the bales together.

2. Silt Fences:

- a. Silt fences shall be placed within 2 ft of the area under consideration, but at least 10 ft from the toe of a slope to allow for maintenance and roll down of larger materials from the slope.
- b. The geotextile shall be embedded to a minimum of 6 inches with native material tamped in place so that no flow can pass under the fence.
- c. The geotextile shall be placed on the upslope side of the fence posts.
- d. Where ends of the geotextile join each other, they shall be overlapped by a minimum of 6 inches, folded and stapled or sewn.
- e. Type I Silt Fence:
 - i. Fence posts shall be driven a minimum of 2 ft into the ground.
 - ii. Maximum center to center fence post spacing shall be 4 ft.
 - iii. Reinforced support shall be a minimum 30 inches high and tied to fence posts.
 - iv. Geotextile shall be securely fastened to reinforced support with ties spaced every 24 inches at the top and mid-section.
- f. Type II Silt Fence:
 - i. Maximum center to center post spacing shall be 4 ft in filter fabric which has an elongation greater or equal to 50%. If the filter fabric has an elongation of less than 50%, maximum fence post spacing shall be increased to 6 ft. Elongation is measured in accordance with ASTM D4362.
 - ii. Fence posts shall be driven a minimum of 1 ft into the ground.
 - iii. Geotextile shall be securely fastened to fence posts at the top and mid-section.

B. Run-off control shall be implemented by the Contractor to control surface water and minimize construction water.

1. Perimeter Dike/Swale:

- a. The drainage area for a temporary dike/swale shall be less than 2 acres.
- b. The evenly divided minimum height from the bottom of the swale to the top of dike shall be 18 inches.

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- c. The bottom width of the dike shall be a minimum of 2 feet.
 - d. The top width of the swale shall be a minimum of 2 feet.
 - e. The perimeter dike/swale shall have positive drainage to an adequate stabilized outlet with a maximum allowable grade of 8 percent.
 - f. Erosion control products shall be installed within the ditches to minimize soil erosion.
 - g. Diverted runoff from a disturbed area shall convey to a sediment trapping device or an area protected by a sediment trapping device.
 - h. Periodic inspection and maintenance must be carried out following any rain event at a minimum.
3. Temporary Check Dams:
- a. Stone fill core material shall meet the gradation requirements for Light Stone Fill of Section 02275 – Rip-Rap.
 - b. Aggregate facing material shall meet the gradation requirements for Size Designation #1 or #2 from NYSDOT Table 703-4.
 - c. Check dams shall be keyed into the channel by a cutoff trench 1.5ft wide and 0.5ft deep.
 - d. Sand/gravel bags may be substituted for stone. Bags must be filled with clean sand/gravel to prevent receiving waters from becoming turbid.
 - e. If sand/gravel bags are used, they must be individually tied, double bagged and inversely inserted. Bags shall lap the joints between the bags in the layer below.
 - f. If stone check dams are constructed, the stone shall be placed on a geotextile to prevent soil migration. The geotextile shall meet the requirements for Permanent Erosion Control Geotextile in Section 02421 – Geotextiles and Rolled Erosion Control Products.
 - g. Maintenance Requirements:
 - i. Inspect channel every 7 days, after each rainfall event of minimum 0.5 inches over a 24 hour period, or daily during prolonged rainfall. Clean and repair as required.
 - ii. If significant erosion occurs between check dam structures, a stone liner or RECP should be installed in that portion of the channel.
 - iii. Remove sediment when accumulation reached 0.5 of the channel height. Removed sediment shall be managed such that it does not create erosion and sediment issues. If it is considered to be a contaminated material, then it shall be disposed of as per Section 02219 – Waste Excavation, Consolidation and Disposal.

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- iv. Replace stones, sand/gravel bags as required to maintain the design cross-section of the check dams.
- C. Stabilization including slope protection to reduce erosion and rock protection to reduce depth, velocity and energy of discharge at a receiving reach.
1. RECP shall be installed as per the Contract Drawings and Section 02421 – Geotextiles and Rolled Erosion Control Products.
 2. Other RECP should be installed per the procedures in NYSDOT 209-3.12.
 3. Temporary Rock Outlet Protection shall be implemented at treated water discharge outlets and at creek diversion outlets.
 - a. Separation geotextile as per Section 02421 – Geotextiles and Rolled Erosion Control Products shall be placed over the entire area before rock placement.
 - b. Outlets shall be designed as per the latest version of the New York State Standards and Specifications for Erosion and Sediment Control.
 4. Construction Road Stabilization:
 - a. Surface drainage will be provided and excess runoff shall be diverted to stabilized areas. Roadside ditch capacity shall be the 10 yr. peak runoff.
 - b. A 6 inch layer of Structural Fill as per Section 02200 – General Earthwork shall be placed evenly over the full width of the roads.
 - c. Construction Roads shall be top-dressed with new gravel as required.
 5. Stabilized Construction Entrance:
 - a. The length of the stabilized construction entrance shall be a minimum of 50 feet.
 - b. The width shall be 12 foot minimum, but not less than the full width where ingress or egress occurs. For a single site entrance, this shall be a minimum of 24 feet.
 - c. A stabilization geotextile, as per Section 02421 – Geotextiles and Rolled Erosion Control Products, shall be placed over the entire area before gravel placement. This will also serve as a suitable separation fabric.
 - d. A minimum of 6 inches of ¼ inch washed gravel shall be placed over the geotextile.
 - e. The entrance shall be maintained in a condition which will prevent tracking of sediment onto public streets, including top-dressing as required.
- D. Oil Sorbent Booms/Socks – Oil sorbent booms/socks shall be installed to contain oil sheens emanating from waste materials. The Contractor shall maintain a supply of clean oil sorbent booms/socks on-site at all times and install within one hour after discovery of a sheen.

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3.3 SPECIAL CONDITIONS

- A. Prohibited construction practices include, but are not limited to the following:
1. Dumping of spoil material into any stream corridor, wetland, surface water, unspecified locations or any location not expressly approved by the Engineer.
 2. Indiscriminate, arbitrary or capricious operation of equipment in any stream corridor, wetland, surface water or other location. All equipment operation in water bodies or wetlands shall be in accordance with the Contract Documents.
 3. Pumping of silt-laden water from trenches or other excavations into any stream corridor, wetland or surface waters, or location not expressly approved by the Engineer.
 4. Disposal of trees, brush and other debris in any stream corridor, wetland, surface water, or location not expressly approved by the Engineer.
 5. Permanent or unspecified alteration of the flowpath of any stream not shown on the Contract Drawings or expressly approved by the Engineer.
 6. On or off-site burning of construction project debris.

3.4 ADJUSTMENT OF PRACTICES

- A. If the planned measures do not result in effective control of erosion and sediment runoff, the Contractor shall immediately adjust the program and/or institute additional measures in order to eliminate excessive erosion and sediment runoff.
- B. If the Contractor fails or refuses to comply promptly, the Engineer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor.

END OF SECTION

SPECIFICATION NO: 02421

SPECIFICATION TITLE: GEOTEXTILES AND ROLLED EROSION CONTROL PRODUCTS

PROJECT NO: 446794

PROJECT TITLE: NINEMILE CREEK

CLIENT: HONEYWELL

				APPROVALS		
Issue	Date	Pages	Issue Description	Prepared	Checked	Approved
0	5/23/2012	8	Issued for Construction	ERK	SRB/JMO	RDD/TD
<input checked="" type="checkbox"/> Entire Specification Issued this Revision <input type="checkbox"/> Revised Pages Only Issued this Revision			SPECIFICATION ISSUED FOR: <input type="checkbox"/> In-house Review <input type="checkbox"/> Bid <input type="checkbox"/> Client Review/Approval <input checked="" type="checkbox"/> Construction <input type="checkbox"/> Information Only <input type="checkbox"/> <i>Other</i>			

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Specification Title	Geotextiles and Rolled Erosion Control Products	Date:	5/23/2012

PART 1 GENERAL**1.1 DESCRIPTION**

- A. The Work specified in this Section consists of all labor, equipment, tools, materials, services, supervision and incidentals necessary to install geotextile fabrics and rolled erosion control products (RECPs) necessary for completion of the Work as described herein, shown on the Contract Drawings, or as directed by the Engineer.
- B. Related Work specified in other Sections includes, but is not limited to:
 - 1. Section 02275 – Rip-Rap
 - 2. Section 02370 – Erosion Control

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State, and Local codes, ordinances, regulations, statutes and standards.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM D4355 – Standard Test Method For Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon arc Type Apparatus
 - 2. ASTM D4491 – Standard Test Methods for Water Permeability of Geotextiles by Permittivity
 - 3. ASTM D4533 – Standard Test Method for Trapezoidal Tearing Strength of Geotextiles
 - 4. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
 - 5. ASTM D4751 – Standard Test Method for Determining Apparent Opening Size of a Geotextile
 - 6. ASTM D4873 – Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples
 - 7. ASTM D6241 – Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe
 - 8. ASTM D6475 – Standard Test Method for Measuring Mass Per Unit Area of Erosion Control Blankets
 - 9. ASTM D6525 – Standard Test Method for Measuring Nominal Thickness of Permanent Rolled Erosion Control Products
 - 10. ASTM D6818 – Standard Test Method for Ultimate Tensile Properties of Turf Reinforcement Mats
 - 11. ASTM D7101 - Standard Index Test Method For Determination Of Unvegetated Rolled Erosion Control Product (RECP) Ability To Protect Soil From Rain Splash And Associated Runoff Under Bench-Scale Conditions

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12. ASTM D7207 - Standard Test Method For Determination Of Unvegetated Rolled Erosion Control Product (RECP) Ability To Protect Sand From Hydraulically-Induced Shear Stresses Under Bench-Scale Conditions

- B. American Association of State Highway and Transportation Officials (AASHTO)
1. National Transportation Product Evaluation Program Report (NTPEPR)
 2. M288 - Geotextile Specification for Highway Applications, (2009)

1.4 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:
1. Manufacturers’ technical data, samples, installation instructions and proof of current AASHTO NTPEP or NYSDOT approval (or project specific testing of the specified properties).
 2. Samples of sewn seams as per Subpart 3.2.

1.5 PROJECT AND SITE CONDITIONS

- A. The Contractor shall carefully examine the site to determine the full extent, nature and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer’s attention in order to clarify the exact nature of the Work to be performed.

1.6 QUALITY CONTROL

- A. Inspect all geotextiles and RECPs upon delivery and verify that the proper materials and quantities have been supplied.
- B. Inspect the subgrade prior to installation of geotextiles and RECPs. The subgrade shall be free of organic matter, irregularities, protrusions, abrupt changes in grade, or other unacceptable conditions that could damage the geotextile/RECP. Maintain the subgrade in a smooth and uniform condition during installation of the geotextile/RECP. The subgrade shall be inspected and accepted by the Engineer prior to placement of the geotextile/RECP.
- C. Continuously inspect needle-punched geotextiles during deployment for broken needles remaining from needlepunching operations.
- D. Continuously inspect geotextiles/RECP for damage. Reject the geotextile if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation, or storage. Repair or replace geotextiles/RECP damaged during installation.

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PART 2 PRODUCTS

2.1 MATERIALS

A. Permanent Erosion Control Geotextile:

1. Needle-punched, nonwoven geotextile
2. Meets or exceeds the values listed in Table 02421-1.

B. Stabilization Geotextile

1. Woven, slit-film or monofilament geotextile
2. Meets or exceeds the values listed in Table 02421-1.

C. Type A Bio-degradable Rolled Erosion Control Product

1. Bio-degradable RECP shall be a machine-produced 100 percent biodegradable mat with a 70 percent herbaceous straw and 30 percent coconut fiber blend matrix. The blanket shall be of consistent thickness with the straw and coconut fiber evenly distributed over the entire area of the mat. Cover the blanket on the top and bottom sides with 100 percent biodegradable woven natural organic fiber netting. The netting shall consist of machine directional strands formed from two intertwined yarns with cross directional strands interwoven through the twisted machine strands (commonly referred to as a Leno weave) to form an approximate 1/2 inch by 1/2 inch mesh. Sew the blanket together with biodegradable thread on 1.5 inch centers.
2. The matrix shall consist of 70 percent straw fiber with approximately 0.35 lb/yd weight with 30 percent coconut fiber cured in fresh water with approximately 0.15 lb/yd weight.
3. The netting shall cover both sides and consist of woven 100% biodegradable natural organic fiber with approximately 9.3 lbs/1,000 ft² weight.
4. Thread shall be biodegradable.
5. Meets or exceeds the values listed in Table 02421-1.

D. Type B Bio-degradable Rolled Erosion Control Product

1. Bio-degradable RECP shall be a machine-produced 100 percent biodegradable mat with a 100 percent biodegradable netting and thread. No synthetic components are acceptable.
2. Meets or exceeds the values listed in Table 02421-1.

E. Staking (for Bio-degradable Rolled Erosion Control Product)

1. Stakes shall be non-treated wood and shall be designed to safely and effectively secure erosion control product for temporary or permanent applications.
2. The stake shall meet the erosion control blanket manufacturer recommendations for the intended application. Stake length shall be 6 inches or longer as recommended by the manufacturer.
3. Serrate the stake on the leg to increase resistance to pull-out from the soil.

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- F. All geotextiles and RECP must be on the approved list of geotextiles and RECP in the current AASHTO NTPEPR or on the current NYSDOT approved list of geotextiles and RECP. Alternatively, project specific testing of the specified properties may be submitted in lieu of AASHTO or NYSDOT approval.

PART 3 EXECUTION

3.1 LABELING, DELIVERY, STORAGE AND HANDLING

A. Labeling

1. Each roll of geotextile/RECP delivered to the site shall be wrapped in protective covers and labeled by the manufacturer with the manufacturer's name, product identification, length, width and roll number.

B. Delivery

1. The geotextile/RECP rolls shall be shipped by appropriate means to prevent damage to the material and to facilitate off-loading. Materials shall not be delivered to the site until the appropriate submittals of Subpart 1.4 have been approved by the Engineer. At such time, the geotextile/RECP may be delivered to the site, unloaded and stored at an area approved by the Engineer.

C. Storage and Handling

1. Store and handle materials as per ASTM D4873 and the manufacturers' recommendations in such a manner as to prevent damage or deterioration to any part of the geotextile/RECP.
2. Maintain the protective wrapping on geotextile/RECP rolls at all times until the geotextile/RECP is deployed for immediate placement.
3. Protect the geotextile/RECP from punctures, abrasions, dirt, dust, grease, mud, moisture, excessive heat, sunlight, cutting, or other damage or deleterious conditions. Protect the geotextile/RECP rolls from theft and vandalism and store away from high traffic areas. Repair any damage to protective wrapping immediately. The Contractor is responsible for the on-site storage and handling of all geotextile/RECP. Damaged geotextile/RECP shall be replaced at the Contractor's expense.

3.2 INSTALLATION

- A. Ensure the geotextile/RECP is not damaged in any way during handling.
- B. Position geotextile/RECP rolls as required and unroll.
- C. Overlap geotextile/RECP rolls in the direction of backfill placement so that the geotextile/RECP at the beginning of backfill placement is overlapped on top of the geotextile/RECP at the end of backfill placement.
- D. Geotextile/RECP may be held in place with sand bags or anchor pins prior to backfill placement. When geotextile/RECP is on slopes steeper than 1V:5H and will have rip-rap placed on it, anchor pins shall be used on to restrain the geotextile/RECP on 5 foot centers or less.

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- E. When placed on stable subgrades flatter than 1V:5H, sew seams or overlap geotextile/RECPs a minimum of 18 inches on all edges.
- F. When placed on stable subgrades steeper than 1V:5H, sew seams or overlap geotextile/RECPs a minimum of 2 feet.
- G. When geotextile/RECP is placed on unstable subgrades (soil California Bearing Ratio <1), seams must be sewn.
- H. Sewing requirements:
 - 1. Nylon thread shall not be used. For Permanent Erosion Control applications, the thread shall be resistant to ultraviolet radiation. The thread shall be of contrasting color to the geotextile.
 - 2. Employ a thread tension that secures the geotextile without cutting the material.
 - 3. Use a "J" seam secured with a minimum of one row of four-stitch per inch two thread main stitch.
 - 4. Contractor shall provide a sewn seam sample at least 6 feet in length to the Engineer for visual inspection and potential testing prior to installation of the geotextile if sewn seams are used. The sample shall be sewn using the same equipment and materials as that for the production seams.
- I. When nonwoven geotextile is placed in deep trenches where the geotextile width is insufficient to line the trench without a seam, the geotextile shall be placed with the long dimension perpendicular to the centerline of trench, unless otherwise approved by the Engineer. Overlap longitudinal seams between adjacent rolls of material a minimum of 2 feet. Overlap the material a minimum of 1 foot over the top of the trench.
- J. When woven geotextile is placed above the trench, place the geotextile with the long dimension parallel to the line of the trench. Overlap the geotextile a minimum of 2 feet.
- K. Lay geotextile/RECP smooth and free of tension, stress, folds, wrinkles and creases. Unless specifically permitted by the Engineer, geotextile/RECPs shall be placed in continuous intimate contact with the underlying subgrade so that water cannot flow unimpeded between the soil and geotextile/RECP.
- L. If geotextile/RECPs are damaged during any phase of construction or installation, place a new piece of the same type over the damaged area with a 3-foot minimum overlap and sew.
- M. Cover the geotextiles within 10 days after installation. Inspect the geotextile immediately before and during placement of soil or aggregate on the geotextile.
- N. During spreading operations of backfill, maintain a minimum depth of 12 inches of soil or aggregate over the geotextiles. Do not operate construction equipment directly on the geotextile.
- O. Protect the geotextile/RECP from damage due to the placement of materials by limiting the height of drop of the material to less than 1 foot unless otherwise

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approved by the Engineer. Rip-rap weighing more than 200 pounds shall not be permitted to roll on the geotextile/RECP.

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Specification Title	Geotextiles	Date:	5/23/2012

**TABLE 02421-1
MINIMUM ACCEPTANCE CRITERIA FOR GEOTEXTILES**

Minimum Strength Class Requirements							
Geotextile Application	Geotextile Structure	Class	Elongation	Grab Strength	Tear Strength	Puncture Strength	UV Stability ³
		AASHTO M288 Class		ASTM	ASTM	ASTM	ASTM
		#	(%)	D4632	D4533	D6241	D4355
				(lbf)	(lbf)	(lbf)	(%)
Permanent Erosion Control	NP-NW ¹	1	<50	315	112	618	50
		1	>50	202	79	433	50
Stabilization	W, MF ²	1	<50	315	112	618	50
Separation	NP-NW	2	<50	247	90	90	50
		2	>50	157	56	56	50

Separation and Drainage Requirements					
Geotextile Application	Geotextile Structure	In-situ Soil Passing #200 Sieve	Maximum Apparent Opening Size		Minimum Permittivity
		ASTM	ASTM		ASTM
		D422	D4751		D4491
		(%)	Sieve Size	Sieve	(sec ⁻¹)
Permanent Erosion Control	NP-NW ¹	<15	0.0167	No. 40	0.7
		15 - 50	0.00984	No. 60	0.2
		>50	0.0083	No. 70	0.1
Stabilization	W, MF ²	n/a	0.0167	No. 40	0.05
Separation	NP-NW	n/a	0.0236	No. 30	0.02

- 1 NP-NW = Needle Punched, Non-Woven
- 2 W, MF = Woven , Slit-film or Monofilament type
- 3 Strength Retained after 500 hours

Rolled Erosion Control Product (RECP) Requirements		
RECP	RECP Structure	Bench Scale Channel Erosion Test
		ASTM
		D7207
		(psf at 1/2-inch soil loss)
Type A	100% Bio-degradable ¹	>2
Type B	100% Bio-degradable ¹	>1

¹ All components, including matrix, netting, and thread must be 100% bio-degradable, natural materials.

END OF SECTION

SPECIFICATION NO: 02910

SPECIFICATION TITLE: WETLAND AND STREAMBED RESTORATION

PROJECT NO: 446794

PROJECT TITLE: NINEMILE CREEK

CLIENT: HONEYWELL

				APPROVALS		
Issue	Date	Pages	Issue Description	Prepared	Checked	Approved
0	5/23/2012	20	Issued for Construction	RCD	SRB/JMO	RDD/TD
<input checked="" type="checkbox"/> Entire Specification Issued this Revision <input type="checkbox"/> Revised Pages Only Issued this Revision			SPECIFICATION ISSUED FOR: <input type="checkbox"/> In-house Review <input type="checkbox"/> Bid <input type="checkbox"/> Client Review/Approval <input checked="" type="checkbox"/> Construction <input type="checkbox"/> Information Only <input type="checkbox"/> <i>Other</i>			

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Specification Title	Wetland and Streambed Restoration	Date:	5/23/2012

PART 1 GENERAL**1.1 DESCRIPTION**

A. The Work specified in this Section consists of all labor, equipment, tools, materials, services, supervision and incidentals necessary to place topsoil, seed, plant material, mulch and erosion control material at Work areas as described herein, shown on the Contract Drawings, or as directed by the Engineer. Work in this Section includes, but is not limited to:

1. Soil preparation including placing and preparing topsoil within restoration areas.
2. Seeding disturbed uplands and portions of wetland edges with a conservation seed mix.
3. Seeding with a specified wet meadow/emergent marsh seed mixture within designated planting areas.
4. Seeding and planting the riparian zone along channel boundaries.
5. Planting live cuttings and live stakes, shrubs and trees within designated planting areas.
6. Planting emergent wetland vegetation and aquatic wetland vegetation in designated planting areas.
7. Establishment of erosion control material.
8. Placement of wood logs and/or boulders.
9. Maintenance.

B. Related work specified in other Sections includes, but is not limited to:

1. Section 02200 – General Earthwork
2. Section 02219 – Waste Excavation, Consolidation and Disposal
3. Section 02370 – Erosion Control
4. Section 02983 – In-Water Habitat Features
5. Section 02990 – Finish Grading, Topsoil and Seeding

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.
- B. The Contractor shall construct the finished grades as shown on the Contract Drawings and establish and maintain vegetation for one year.

1.3 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:

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1. Topsoil Source: Refer to Section 02990 - Finish Grading, Topsoil and Seeding.
2. Wetland Seed Vendors Certificate: Include name and address of suppliers, common name and scientific name, percentage by weight and percentages of purity and germination of all seed mixes.
3. Plant Stock Supplier Certificate: include name and address of supplier, common name, scientific name, origin and date packaged for all plant stock.
4. Planting Plan: Provide proposed layout for material specified in Tables 02910-2 and 3 based on site conditions and plant material availability to the Engineer at least 60 days prior to planting. Planting Plan shall contain a diverse mix of species. Proposed planting zones shall be staked out in the field by a surveyor and approved by the Engineer prior to planting.
5. Wood logs: Refer to Section 02983 – In-water Habitat Features.

1.4 QUALITY CONTROL

- A. For each bag delivered, submit a Wetland Seed Vendors Certificate to the Engineer and allow time for the Engineer's inspection of the seed prior to use.
- B. Label seed in accordance with USDA Rules and Regulations under the Federal Seed Act and applicable state seed laws. Furnish seed in sealed bags or containers bearing the date of the last germination, which shall be less than 6 months prior to commencement of planting operations. Inspect seeding material upon arrival at the job site. Remove unacceptable material from the job site. Seed shall be from same or previous year's crop. Each variety of seed shall have a purity of more than 85%, a percentage of germination more than 90%, a weed content of less than 1%, and contain no nuisance seed, such as Purple Loosestrife, Phragmites or Japanese Knotweed.
- C. All plant material shall arrive on the job site in original packaging and shall be labeled with common name, scientific name, and the name and address of the supplier. Plant material shall be healthy, vigorous and free from breaks, disease, nutrient deficiencies, infestation and wind burn. Unacceptable material shall be removed from the job site by the close of business on the day it is rejected.
- D. All plant stock shall be stored in aboveground locations in non-construction areas accepted by the Engineer if not directly transplanted. All plant stock shall have soil and mulch placed about roots sufficient to protect from desiccation and to provide nourishment during storage. All plants stored in the field prior to installation shall be kept cool and shall be sheltered from the drying effects of direct sunlight and prevailing winds. Plants should not be subject to freezing or drying. It is the contractor's responsibility to supply adequate water for all plant stock in order to maintain it in a healthy and vigorous state suitable for transplanting.
- E. Live cuttings and live stakes shall be installed within 8 hours of the time the material is harvested, unless properly stored. Soak live cuttings and live stakes continuously in water if not installed within 8 hours of harvesting. Avoid damage to live cuttings

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and live stakes during handling including breakage, and bark abrasion and stripage. Live cuttings and live stakes with damage may be rejected by the Engineer. No leaf buds shall have initiated growth beyond ¼ inch and the cambium layer shall be moist, green and healthy.

- F. Conduct subgrade and finished grade surveys in order to verify an appropriate grade and topsoil thickness has been achieved.

1.5 PROJECT AND SITE CONDITIONS

- A. Prior to the start of Work, the Contractor shall carefully examine the site to determine the full extent, nature, and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.
- B. Restoration Zones:
1. Channel: channel below long-term median (180 cfs) water surface elevation (approximate)
 2. Zone A1a – Upland: bank/sideslopes and floodplain.
 3. Zone A1b – Red Maple/Hardwood Swamp or Woods and Upland Mix as shown on the drawings.
 4. Zone A2 – Riverine Fringing Wetland: channel banks up to 2.5 ft above the long-term median water surface elevation (approximate)
 5. Zone B1e – Emergent Wetlands: - up to 1.5 ft below the long-term median water surface elevation (approximate)
 6. Zone B1f – Forested Wetlands – off channel locations up to 2.5 ft above the long-term median water surface elevation (approximate)
 7. Zone 1: Managed areas. Areas currently maintained or managed by public or private organizations.
- C. Field Measurements
8. Verify that survey benchmark, monuments and intended elevations for the work are as shown on the Contract Drawings or as provided by the Engineer.
 9. Identify required lines, levels, contours, and datum.

PART 2 PRODUCTS**2.1 TOPSOIL**

- A. Refer to Section 02990 - Finish Grading, Topsoil and Seeding

2.2 BACKFILL MATERIAL

- A. Refer to Section 02200 – General Earthwork

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2.3 CONSERVATION SEED MIX

- A. Refer to Section 02990 - Finish Grading, Topsoil and Seeding

2.4 WETLAND SEED MIX

- A. Required wetland seed mix is listed in Tables 02910-1. A minimum of 18 species from the list must be selected. One of the species must be *Panicum virgatum* (Switchgrass).

2.5 PLANT MATERIAL

- A. Plant materials required are listed in Table 02910-2.
1. Size and grade plants following current edition of American Standard for Nursery Stock approved by American Nursery & Landscape Association (ANLA Z60.1). Plant material size requirements are provided in Table 02910-3.
 2. All plants shall have a normal habit of growth and be typically characteristic of their respective kinds.
 3. The specified plant sizes shall be the minimum size allowed and shall include plants from that size up to but not including the next larger size. Plants shall not be pruned at the time of digging or before delivery and no plants shall be cut back from larger sizes to meet the sizes specified.
 4. Plants shall be free from injury, insect damage, infestation and disease.
 5. Plants listed are available from commercial suppliers.
 6. Live cuttings, unless otherwise indicated on the Contract Drawings, shall be ½ to 1 inch in diameter and 1 to 4 feet in length.
 7. Live stakes, unless otherwise indicated on the Contract Drawings, shall be 1 to 4 inches in diameter and 5 to 6 feet in length.
 8. Live cuttings and live stakes shall be from freshly cut dormant plants.
 9. Live cuttings and live stakes shall be obtained from sources approved by the Engineer.
 10. Substitute plant species may be required, depending on seasonal constraints and/or supply shortages, etc. Any substitutes must be native to Central New York and be beneficial as a source of food and/or cover for wildlife or have documented importance to indigenous people.
 11. Appropriate substitutes must be obtained and submitted to the Engineer for approval prior to delivery and use. If a significant portion of substitution plant species are required, the Engineer will need to include notification and consultation with the NYSDEC for approval. Allow time for such approvals.

2.6 MULCH

- A. Refer to Section 02990-Finish Grading, Topsoil and Seeding

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2.7 EROSION CONTROL PRODUCTS

- A. Refer to Section 02370-Erosion Control

2.8 WOODY DEBRIS

- A. Woody Debris: Woody debris shall be logs, branched or unbranched, with a minimum diameter of 12 inches except as noted below. Logs shall have a minimum length of 10 feet. Whole trees are acceptable for areas where their size and branching can be safely placed and not cause an ongoing safety hazard to the public. Smaller diameter and/or shorter woody debris may be used in conjunction with one or more logs meeting the size requirements above when they are placed in a pile with the larger logs weighting down the smaller logs to prevent floating in floods. Unless otherwise directed by the Engineer, root wads will be removed from trees cut down on-site and disposed in accordance with Section 02219.

2.9 BOULDER AND STONE HABITAT FEATURES

- A. Boulders: Individual boulders shall be a minimum of 18 inches in the least dimension unless otherwise directed by the Engineer. The shape of the boulder shall be appropriate for the location and purpose. Boulders with a sub-angular to rounded shape are preferred. Angular, tabular-shaped rock shall be permitted where they can be situated so that wildlife can access the top through stone or soil ramps.
- B. Rock Piles: Rock piles will be constructed using Medium Stone Filling. Rock piles shall have a minimum placed volume of 1 cubic yard.

PART 3 EXECUTION**3.1 GENERAL**

- A. Coordinate work associated with wetland restoration.

3.2 WOODY DEBRIS

- A. Woody debris shall be incorporated into wetland and riparian areas as shown on the Drawings. Locations and elevations will be as shown on the drawings or as directed by the Engineer.
- B. Woody debris shall be partially buried into the adjacent bank or subgrade, weighted down with Light or Medium Stone Filling (Section 02275), or otherwise stabilized to prevent floating in floods as indicated on the Contract Drawings or as directed by the Engineer.
- C. Woody debris, described herein, is intended to be placed in wetland and upland areas as general habitat features and is not related to Wood Logs or Woody Debris described in Section 02983.

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3.3 BOULDER AND STONE HABITAT FEATURES

- A. Boulders shall be incorporated into wetland and riparian areas as shown on the Drawings. Locations and elevations shall be as shown on the Drawings or as directed by the Engineer.
- B. Rock piles will be incorporated into wetland and riparian areas as shown on the Drawings. Locations and elevations will be as shown on the drawings or as directed by the Engineer. Generally, rock piles are intended to be constructed in locations where at least two-thirds of the rock pile will be submerged during median creek flows.

3.4 APPLICATION PROCEDURES

- A. Wetland Areas, Riparian Buffers and Creek Banks (i.e. Areas outside channels)
 - 1. Apply conservation seed mixture specified in Section 02990 to Zone A1.
 - 2. Apply wet meadow seed mixture specified in Table 02910-1 to Zones A-2, B-1e and B-1f as indicated on Contract Drawings C-019 through C-022.
 - 3. Seeding will be conducted as follows:
 - a. Prepare the seeding area by providing a rough surface to topsoil
 - b. Apply seed mixtures at the prescribed rate by mechanical spreader or hand seeding methods.
 - 4. Apply mulch to designated planting areas in accordance with Section 02990 - Finish Grading, Topsoil and Seeding.
 - 5. Install emergent wetland plants by hand in Zones B-1e as specified in Table 02910-2 in the areas designated on Contract Drawings C-036 through C-042.
 - 6. Plant trees and scrub-shrub vegetation as specified in Table 02910-2 in the areas designated on Contract Drawings C-036 though C-042.
 - 7. In areas where existing armor stone is encountered, restore areas as follows and as indicated on the Contract Drawings:
 - a. Fill void spaces between armor stones, not to exceed existing grade of armor stone.
 - b. Install joint plantings as shown on the Contract Drawings and as indicated in the specifications herein.

3.5 TOPSOIL

- A. Prepare surface and apply topsoil in accordance with section 02990 – finish grading, topsoil and seeding.

3.6 SEEDING

- A. Do not use moldy or damaged seed.
- B. If seed materials arrive before sufficient areas are prepared, provide temporary storage areas sheltered from wildlife, vandalism, theft and adverse weather.

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- C. Apply conservation and wetland seed mixtures uniformly on prepared surfaces with a hand or mechanical spreader at the rate specified in Section 02990 and Table 02910-1, respectively. Apply the wetland seed mixture immediately following topsoil placement, unless directed otherwise by the Engineer.
- D. Apply cover crop at the same time as the wetland seed mix at the rate specified in Table 02910-1, or as directed by the Engineer.
- E. Lightly rake seed into the surface.
- F. Apply hydroseed (optional) uniformly on the prepared surface.
- G. An initial watering of seeded areas shall be performed at a rate of 25,000 gallons per acre if at least 0.5 inches of rain does not fall within 3 days of seeding, and repeated after the second and fourth weeks following seeding if natural rainfall is less than 1 inch per week. Avoid creating rills and furrows as a result of watering and repair and reseed any rills and furrows resulting from over watering

3.7 LIVE CUTTING AND LIVE STAKE INSTALLATION

- A. Cut live cuttings and live stakes to a point on the basal end for insertion in the ground. The cut shall be made to a 30 to 45 degree bias, measured perpendicular to the stalk.
- B. Use a dibble, iron bar, or similar tool to make a pilot hole to prevent damaging the live cutting or live stake during installation in firm soils.
- C. Live cuttings and live stakes shall be inserted by hand into pilot holes. A dead blow hammer may be used to drive stakes into the ground if necessary. The hammer head should be filled with shot or sand.
- D. Minimum of 2 to 4 inches and two live buds of the live cuttings and live stakes shall be exposed above the finished grade. At least one-half of the live stake length shall penetrate the soil below the soil surface, including the interface of soil with stone or rip rap.
- E. Tamp soil around live cuttings and live stakes.
- F. Care shall be taken not to damage the live cuttings and live stakes during installation. Those damaged at the top during installation shall be trimmed back to undamaged condition. If after driving at least one-half of the live stake into to the ground, two live buds on at least 2 to 4 inches of undamaged live stake above the surface are not present, then damaged live stakes shall be left in place and supplemented with an intact live-cutting/live stake.

3.8 MULCH AND EROSION CONTROL PRODUCTS

- A. Place mulch or erosion control products to wetland areas immediately after the application of topsoil and seed.
 - 1. Apply straw mulch with a mulch blower at a uniform rate of 1,500 lbs/acre. Anchor with a tackifier.

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2. Install erosion control products as per the manufacturer's recommended procedures.

3.9 PLANTING

- A. Plant emergent vegetation as specified in Table 02910-2 and Contract Drawings C-036 and C-037. Conduct plantings during the spring (May 1 to June 15) following remediation.
- B. Plant shrubs and trees within wetland and bank areas as specified in Table 02910-2 and Contract Drawings C-036 and C-037. Conduct plantings during the fall (September 1 to October 30) or spring (May 1 to June 15) following remediation.
- C. Install live cuttings and live stakes as specified in Table 02910-2 and Contract Drawings C-036 and C-037. Conduct installation during the fall (September 1 to October 30) following remediation.
- D. Plant material size requirements are provided in Table 02910-3.
- E. Plant quantities are provided by area in Attachment A.

3.10 MAINTENANCE

- A. Begin maintenance period immediately after installation of planting materials.
- B. Provide means to prevent geese from foraging on installed plants and negatively impacting water quality.
- C. The seeding establishment period is one year. Re-seed any bare areas in excess of four (4) square feet. Re-inspect seeded areas after establishment.
- D. During the maintenance period, watering of the seeded areas and trees, shrubs and emergent plant material may be required to maintain health and vigor of the plant material.

3.11 WARRANTY

- A. One year warranty period for topsoil, seed, trees, shrubs, and emergent plant material from the date of substantial completion or correction period. Maintain as necessary including repairs, re-seeding, re-mulching so that acceptable vegetation is established. The Engineer will provide approval during the one-year warranty period.
- B. Replace any plant material that does not meet the definition of Acceptable Plant Material below, as determined by the Engineer.
- C. Acceptable Plant Material shall appear healthy and exhibit visible signs of growth; shall not appear chlorotic or exhibit signs of desiccation. Leaf margins are predominantly green with limited areas of spots or blotches.

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**Table 02910-1
Wet Meadow Seed Mix**

<u>Botanical Name</u>	<u>Common Name</u>	<u>oz / ac</u>
<i>Alisma subcordatum</i>	Mud/Water Plantain	27
<i>Asclepias incarnata</i>	Swamp/Marsh Milkweed	2
<i>Angelica atropurpurea</i>	Great Angelica	3
<i>Aster novae-angliae</i>	New England Aster	2
<i>Bidens cernua</i>	Nodding Bur Marigold	5
<i>Boltonia asteroides</i>	False Aster	2
<i>Cassia hebecarpa</i>	Wild Senna	13
<i>Carex hystricina</i>	Bottlebrush/Porcupine Sedge	13
<i>Carex scoparia</i>	Pointed Broom Sedge	13
<i>Carex vulpinoidea</i>	Fox Tail Sedge	13
<i>Elymus virginicus</i>	Virginia Wild Rye	75
<i>Eupatorium maculatum</i>	Spotted Joe Pye Weed	3
<i>Eupatorium perfoliatum</i>	Common Boneset	3
<i>Solidago graminifolia</i>	Grass-Leaved Goldenrod	2
<i>Helenium autumnale</i>	Dogtooth Daisy	2
<i>Heracleum maximum</i>	Cow Parsnip	5
<i>Juncus acuminatus</i>	Sharp-Fruited Rush	2
<i>Juncus effusus</i>	Common/Soft Rush	2
<i>Mentha arvensis</i>	Wild Mint	2
<i>Panicum virgatum</i>	Switchgrass	10
<i>Polygonum pensylvanicum</i>	Pennsylvania Knotweed	13
<i>Rudbeckia laciniata</i>	Green-Headed Coneflower	3
<i>Rumex orbiculatus</i>	Great Water/Marsh Dock	2
<i>Scirpus atrovirens</i>	Dark Green Bulrush	7
<i>Scirpus cyperinus</i>	Wool Grass	7
<i>Scirpus validus</i>	Great/Soft Stem Bulrush	7
<i>Verbena urticifolia</i>	White Vervain	5
	Total oz/ac (lbs/ac)	243 (15)
Cover Crop¹		
<i>Echinochloa crusgalli</i>	Barnyard grass	640
<i>Secale cereale</i>	Winter/Cereal Rye	640
<i>Elymus virginicus</i>	Virginia Wild Rye	96
	Total oz/ac (lbs/ac)	736 (46)

¹Seed application rate may be reduced based on performance of seeding at the Geddes Brook IRM site if agreed to by NYSDEC.

² Barnyard grass shall be used for spring seeding; winter rye for fall seeding

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Table 02910-2 - Vegetation Plantings
Subzone A-1 Bank/Sideslopes and Floodplains (2ft above 180 cfs wsel to top side of slopes)
and Upland Mix

SEED MIX	DETAILS
Conservation Seed Mix (Section 02990)	Evenly spread over entire area
SHRUB SPECIES¹	
Black Chokecherry (<i>Aronia melanocarpa</i>)	Container Class #1/SP5 ²
Gray Dogwood (<i>Cornus racemosa</i>)	Container Class #1/SP5 ²
American Hazelnut (<i>Corylus americana</i>)	Container Class #1/SP5 ²
Beaked Hazelnut (<i>Corylus cornuta</i>)	Container Class #1/SP5 ²
Smooth Hydrangea (<i>Hydrangea arborescens</i>)	Container Class #1/SP5 ²
Virginia Rose (<i>Rosa virginiana</i>)	Container Class #1/SP5 ²
Staghorn Sumac (<i>Rhus hirta</i>)	Container Class #1/SP5 ²
Hawthorn (<i>Crataegus crusgalli</i>)	Container Class #1/SP5 ²
Silky Dogwood (<i>Cornus amomum</i>)	Container Class #1/SP5 ²
Witch Hazel (<i>Hamamelis virginiana</i>)	Container Class #1/SP5 ²
Meadowsweet (<i>Spiraea alba</i>)	Container Class #1/SP5 ²
TREE SPECIES¹	
Pawpaw (<i>Asimina triloba</i>)	Container Class #2
Shellbark Hickory (<i>Carya lacinosa</i>)	Container Class SP5 ² or larger
Hackberry (<i>Celtis occidentalis</i>)	Container Class #2
Eastern Cottonwood (<i>Populus deltoides</i>)	Container Class #2
Eastern Hophornbean (<i>Ostrya virginiana</i>)	Container Class #2
Black Cherry (<i>Prunus serotina</i>)	Container Class #2
Sassafras (<i>Sassafras albidum</i>)	Container Class #2
Northern Red Oak (<i>Quercus rubra</i>)	Container Class #2, #20
Bur Oak (<i>Quercus macrocarpa</i>)	Container Class #2, #20
Trembling Aspen (<i>Populus tremuloides</i>)	Container Class #2

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White Pine (<i>Pinus strobus</i>)	Container Class #2
Kentucky Coffeetree (<i>Gymnocladus dioicus</i>)	Container Class #2
Eastern Red Cedar (<i>Juniperus virginiana</i>)	Container Class #2
American Sycamore (<i>Platanus occidentalis</i>)	Container Class #2, #20

¹ Select from the listed species to plant required quantities in Attachment A in the subzone unless otherwise noted on the drawings. See Table 02910-3 for plant size requirements.

² The container size for a shrub or hickory species may be reduced to SP4 in which case the planting density quantity for that species shall be increased by at least 25%.

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Table 02910-2 - Vegetation Plantings CONT'D
Subzone A-2 Riverine Fringing Wetland (180 cfs wsel to 2 ft above water) and Upland Mix

SEED MIX	DETAILS
Wetland Seed Mix (Table 02910-1)	Evenly spread over entire area
SHRUB SPECIES^{1,3}	
Speckled Alder (<i>Alnus rugosa</i>)	Container Class #1/SP5 ²
Gray Dogwood (<i>Cornus racemosa</i>)	Container Class #1/SP5 ²
Silky Dogwood (<i>Cornus amomum</i>)	Container Class #1/SP5 ²
Red-Osier Dogwood (<i>Cornus sericea</i>)	Container Class #1/SP5 ²
Swamp Rose (<i>Rosa palustris</i>)	Container Class #1/SP5 ²
Pussy Willow (<i>Salix discolor</i>)	Container Class #1/SP5 ²
Shiny Willow (<i>Salix lucida</i>)	Container Class #1/SP5 ²
Nannyberry (<i>Viburnum lentago</i>)	Container Class #1/SP5 ²
Arrowwood (<i>Viburnum dentatum</i>)	Container Class #1/SP5 ²
Black Elderberry (<i>Sambucus canadensis</i>)	Container Class #1/SP5 ²
Bladdernut (<i>Staphylea trifolia</i>)	Container Class #1/SP5 ²
Arrowwood (<i>Viburnum dentatum</i>)	Live cutting/stake ⁴
Pussy Willow (<i>Salix discolor</i>)	Live cutting/stake ⁴
Shiny Willow (<i>Salix lucida</i>)	Live cutting/stake ⁴
Gray Dogwood (<i>Cornus racemosa</i>)	Live cutting/stake ⁴
Silky Dogwood (<i>Cornus amomum</i>)	Live cutting/stake ⁴
Red-Osier Dogwood (<i>Cornus sericea</i>)	Live cutting/stake ⁴
Black Willow (<i>Salix nigra</i>)	Live cutting/stake ⁴

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Table 02910-2 - Vegetation Plantings CONT'D
Subzone A-2 Riverine Fringing Wetland (180 cfs wsel to 2 ft above water) and Upland Mix

TREE SPECIES^{1,3}	
Downy Serviceberry (<i>Amelanchier arborea</i>)	Container Class #2
Eastern Serviceberry (<i>Amelanchier canadensis</i>)	Container Class #2
River Birch (<i>Betula nigra</i>)	Container Class #2
Hawthorn (<i>Crataegus crusgalli</i>)	Container Class #2
Eastern Cottonwood (<i>Populus deltoides</i>)	Container Class #2, # 20
Swamp White Oak (<i>Quercus bicolor</i>)	Container Class #2, #20
Black Willow (<i>Salix nigra</i>)	Container Class #2, # 20
Yellow Birch (<i>Betula alleghaniensis</i>)	Container Class #2
Common Hornbeam (<i>Carpinus caroliniana</i>)	Container Class #2
Bitternut Hickory (<i>Carya cordiformis</i>)	Container Class SP5 ² or larger
Pagoda Dogwood (<i>Cornus alternifolia</i>)	Container Class #2
Witherod (<i>Viburnum cassinoides</i>)	Container Class #2
White pine (<i>Pinus strobus</i>)	Container Class #2
Red Maple (<i>Acer rubrum</i>)	Container Class #2, # 20
Silver Maple (<i>Acer saccharinum</i>)	Container Class #2, # 20

¹ Select from the listed species to plant required quantities in Attachment A in the subzone unless otherwise noted on the drawings. See Table 02910-3 for plant size requirements.

² The container size for a shrub or hickory species may be reduced to SP4 in which case the planting density quantity for that species shall be increased by at least 25%.

³ Shrub and tree species shall be planted near the top (higher elevation) of the planting area.

⁴ Live stakes shall be planted on 2 foot centers at the lower elevation of the planting area in a zig-zag pattern with a typical 1 foot vertical offset between stakes.

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Table 02910-2 - Vegetation Plantings CONT'D
Subzone B-1e Emergent Wetland (water 0 to 1 ft deep, including banks)

SEED MIXTURES	DETAILS ¹	
Wet Meadow Seed Mix (Table 02910-2)	Evenly spread over entire area	
EMERGENT SPECIES		
Plug, tuber/root, whole plant		
Fox Sedge (<i>Carex vulpinoidea</i>)		
Creeping Spikerush (<i>Eleocharis obtusa</i>)		
Soft Rush (<i>Juncus effusus</i>)		
Rice Cutgrass (<i>Leersia oryzoides</i>)		
Swamp Smartweed (<i>Polygonum hydropiperoides</i>)		
Arrowhead (<i>Sagittaria latifolia</i>)		
Woolgrass (<i>Scirpus cyperinus</i>)		
Softstem Bulrush (<i>Scirpus tabernaemontani</i>) (synonym <i>Scirpus validus</i>)		
Burreed (<i>Sparganium americanum</i>)		
Sallow Sedge (<i>Carex lurida</i>)		
Fringed Sedge (<i>Carex crinita</i>)		
Porcupine Sedge (<i>Carex comosa</i>)		
Aquatic Sedge (<i>Carex aquatilis</i>)		
Swamp Loosestrife (<i>Decodon verticillatus</i>)		
Water Willow (<i>Justicia americana</i>)		
Water Plantain (<i>Alisma subcordatum</i>)		
Salt Marsh Bulrush (<i>Scirpus robustus</i>)		
Marsh Marigold (<i>Caltha palustris</i>)		
Blue Flag Iris (<i>Iris versicolor</i>)		

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SALT TOLERANT EMERGENT SPECIES²
Plug, tuber/root, whole plant
Rose Mallow (<i>Hibiscus moscheutos</i>)
Black Grass (<i>Juncus gerardii</i>)
Switchgrass (<i>Panicum virgatum</i>)
Saltgrass (<i>Spartina alterniflora</i>)
Chairmakers' Bulrush (<i>Schoenoplectus americanus</i>) (formerly <i>Scirpus americanus</i>)
Common Three-Square (<i>Scirpus pungens</i>)

¹ Select from the listed species to plant required quantities in Attachment A in the subzone unless otherwise noted on the drawings. A minimum of 10 species must be selected. See Table 02910-3 for plant size requirements.

² At least 2 salt tolerant emergent species shall be planted in the Zone B1e wetlands in addition to the 10 emergent species in Note 1 above if approved by the Engineer.

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Table 02910-2 - Vegetation Plantings CONT'D
Subzone Subzone B-1f Forested Wetland (180 cfs wsel to 2 ft above, including banks) and
Red Maple / Hardwood Swamp or Woods

SEED MIX	DETAILS ¹	
Conservation Seed Mix (Section 02990) and Wetland Seed Mix (Table 02910-1)	Evenly spread both seed mixes over entire area	
EMERGENT SPECIES		
Plug, tuber/root, whole plant		
False Nettle (<i>Boehmeria cylindrica</i>)		
Tussock Sedge (<i>Carex stricta</i>)		
Spotted Jewelweed (<i>Impatiens capensis</i>)		
Sensitive Fern (<i>Onoclea sensibilis</i>)		
Cinnamon Fern (<i>Osmunda cinnamomea</i>)		
Royal Fern (<i>Osmunda regalis</i>)		
Skunk Cabbage (<i>Symplocarpus foetidus</i>)		
Tall Meadow-Rue (<i>Thalictrum pubescens</i>)		
Marsh marigold (<i>Caltha palustris</i>)		
White hellbore (<i>Veratrum veride</i>)		
SHRUB SPECIES¹		
Spicebush (<i>Lindera benzoin</i>)	Container Class #1/SP5 ²	
Winterberry (<i>Ilex verticillata</i>)	Container Class #1/SP5 ²	
Black Chokecherry (<i>Aronia melanocarpa</i>)	Container Class #1/SP5 ²	
Red-Osier Dogwood (<i>Cornus sericea</i>)	Container Class #1/SP5 ²	
Highbush Blueberry (<i>Vaccinium corymbosum</i>)	Container Class #1/SP5 ²	
Black Elderberry (<i>Sambucus Canadensis</i>)	Container Class #1/SP5 ²	
Arrowwood (<i>Viburnum dentatum</i>)	Container Class #1/SP5 ²	

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SHRUB SPECIES¹	
Arrowwood (<i>Viburnum dentatum</i>)	Live cutting/stake
Red-Osier Dogwood (<i>Cornus sericea</i>)	Live cutting/stake
TREE SPECIES¹	
Butternut (<i>Juglans cinerea</i>)	Container Class #2, #20
Swamp White Oak (<i>Quercus bicolor</i>)	Container Class #2, # 20
Yellow Birch (<i>Betula alleghaniensis</i>)	Container Class #2
Common Hornbeam (<i>Carpinus caroliniana</i>)	Container Class #2
Bitternut Hickory (<i>Carya cordiformis</i>)	Container Class SP5 ² or larger
White Pine (<i>Pinus strobus</i>)	Container Class #2, #20
Black Gum (<i>Nyssa sylvatica</i>)	Container Class #2
Red Maple (<i>Acer rubrum</i>)	Container Class #2, # 20

¹ Select from the listed species to plant required quantities in Attachment A in the subzone for installation in the area shown on the drawings. See Table 02910-3 for plant size requirements. Red Maple and Black Gum shall comprise 30% - 40% and 20% - 30% of the total quantity respectively.

² The container size for a shrub or hickory species may be reduced to SP4 in which case the planting density quantity for that species shall be increased by at least 25%.

³ The live stakes shall be planted on 4 foot centers through the B-1f area unless otherwise directed by the Engineer.

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Table 02910-3 – Plant Material Size Requirements

Shade and Flowering Trees						
Types 1 & 2 Shade Trees		Types 3 & 4 Small upright and small spreading shade trees		Shrub form and multi-stem shade trees		
Minimum Plant Size (Height/caliper)	Maximum Plant Size (Height/caliper)	Minimum Plant Size (Height/caliper)	Maximum Plant Size (Height/caliper)	Minimum Plant Size (Height)	Maximum Plant Size (Height)	Container Class
2 ft	6 ft	18 inch	4 ft	N/A	N/A	2
1 inch	2 ½ inch	1 ¼ inch	2 ½ inch	7 ft	12 ft	20
Deciduous Shrubs						
Type 0 and 1 (tender, small, or dwarf)		Type 1 (intermediate; 3-7 ft)		Type 2 (large; 7 ft or more)		
Minimum Plant Size	Maximum Plant Size	Minimum Plant Size	Maximum Plant Size	Minimum Plant Size	Maximum Plant Size	Container Class
3 inch	15 inch	6 inch	15 inch	6 inch	15 inch	1
Evergreen Trees						
Types 1, 2, and 3 Measurement designates spread (Types 1 and 2) or height (Type 3)				Types 1, 2, and 3 Measurement designates height		Container Class
9 inch		15 inch		12 inch	24 inch	2
3 ft		8 ft		5 ft	10 ft	25
Live Cuttings and Live Stakes						
	Diameter		Length			
	Min	Max	Min	Max		
Live Cutting	1/2 inch	1 inch	1 ft	4 ft		
Live Stake	1 inch	4 inch	5 ft	6 ft		

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Specification Title.	Wetland and Streambed Restoration	Date:	5/23/2012

Attachment A
Plant Quantities for NMC Reach CD

Restoration Zone	Acres	Spacing (on center)	No. Per Acre	Quantity
Emergent wetland zone Be				
Herbaceous plugs	0.67	3 ft	4840	3243
Forested wetland zone Bf				
Herbaceous plugs	0.28	3 ft	4840	1355
Tree	0.28	10 ft	435	123
Shrub	0.28	8 ft	680	192
Live Stakes (25% of area)	0.28	5 ft	1743	123
Red Maple / Hardwood Swamp				
Herbaceous plugs	0.75	3 ft	4840	3630
Tree	0.75	10 ft	435	326
Shrub	0.75	8 ft	680	510
Live Stakes (25% of area)	0.75	5 ft	1743	327
Riverine fringe wetland Zone A2				
Trees	0.50	10 ft	435	218
Shrubs	0.50	8 ft	680	340
Live Stakes	2543 lf	2 ft	NA	1272
Upland Mix				
Tree	0.83	10 ft	435	361
Shrub	0.83	8 ft	680	564
Upland Zone A1				
Trees	3.35	10 ft	435	1457
Shrub	3.35	8 ft	680	2278
All Zones				
Large (#20) Trees				27
Joint Planting				
Live stakes/whips	0.15	3	4840	726
			TOTAL	17,071

END OF SECTION

SPECIFICATION NO: 02983

SPECIFICATION TITLE: IN-WATER HABITAT FEATURES

PROJECT NO: 446794

PROJECT TITLE: NINEMILE CREEK

CLIENT: HONEYWELL

				APPROVALS		
Issue	Date	Pages	Issue Description	Prepared	Checked	Approved
0	5/23/2012	11	Issued for Construction	RCD	SRB/JMO	RDD/TD
<input checked="" type="checkbox"/> Entire Specification Issued this Revision <input type="checkbox"/> Revised Pages Only Issued this Revision			SPECIFICATION ISSUED FOR: <input type="checkbox"/> In-house Review <input type="checkbox"/> Bid <input type="checkbox"/> Client Review/Approval <input checked="" type="checkbox"/> Construction <input type="checkbox"/> Information Only <input type="checkbox"/> <i>Other</i>			

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Specification No.	02983	Page:	2 of 11
Specification Title	In-Water Habitat Features	Date:	5/23/2012

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Work specified in this Section consists of all labor, equipment, tools, materials, services, supervision, and incidentals necessary to place in-water habitat features at Work areas as described herein, shown on the Contract Drawings, or as directed by the Engineer. Work in this Section includes, but is not limited to:
1. Soil preparation including:
 - a. Excavation of subgrades underlying the features.
 - b. Placing backfill materials underneath, within, or surrounding the features.
 - c. Compaction of backfill materials underneath, within, or surrounding the features, as practicable.
 - d. Finish grading of materials within and surrounding the features.
 2. Placement of wood logs.
 3. Installation of log member connections.
 4. Installation of feature stabilization components (e.g., mechanical soil anchor or other approved method).
 5. Planting live cuttings and live stakes within designated areas of the features.
- B. In-water Habitat Features include:
1. Stone with Joint Plantings
 2. Single Large Woody Debris (LWD) Placements
 3. Multiple Large Woody Debris (LWD) Placements
 4. Live Cribs
- C. Related work specified in other Sections includes, but is not limited to:
1. Section 02140 – Construction Water Management
 2. Section 02200 – General Earthwork
 3. Section 02219 – Waste Excavation, Consolidation and Disposal
 4. Section 02222 – Excavation
 5. Section 02260 – Interim Cover Construction
 6. Section 02275 – Stone Materials
 7. Section 02370 – Erosion Control
 8. Section 02421 – Geotextiles and Rolled Erosion Control Products
 9. Section 02910 – Wetland and Streambed Restoration
 10. Section 02990 – Finish Grading, Topsoil and Seeding

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1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable federal, state, and local codes, ordinances, regulations, statutes, and standards.
- B. The Contractor shall construct the features to the finished grades as shown on the Contract Drawings and establish and maintain vegetation for 1 year.

1.3 REFERENCES

- A. New York State Department of Transportation: Standard Specifications (US Customary), 2009.
- B. New York State Department of Environmental Conservation: Draft 6 NYCRR Part 375, Environmental Remediation Programs, 2006.
- C. Title 29 Code of Federal Regulations,
 1. Part 1926.650-652, (Subpart P - Excavations), OSHA Safety and Health Regulations for Construction.
 2. Part 1926.251, (Subpart H - Rigging Equipment for Material Handling), OSHA Safety and Health Regulations for Construction.

1.4 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:
 1. Stone Filling Source: Refer to Section 02275 – Stone Materials.
 2. Plant Stock Supplier Certificate: Refer to Section 02910 – Wetland and Streambed Restoration.
 3. Planting Plan: Refer to Section 02910 – Wetland and Streambed Restoration.
 4. Mechanical Soil Anchors: Submit a product cut sheet for review and approval by the Engineer at least 2 weeks prior to intended installation. The product cut sheet shall meet the product specifications included in the Contract Drawings and herein.
 5. Precast Concrete Deadman Anchors: Submit shop drawings for review and approval by the Engineer at least 2 weeks prior to installation. The shop drawings shall meet the specifications included in the Contract Drawings and herein.
 6. Wire rope cut sheet that shows compliance with design load, material, and type as indicated on the Contract Drawings and the specifications herein.
 7. Wire rope clip cut sheet that shows compliance with design load, material, and type as indicated on the Contract Drawings and the specifications herein.
 8. Wire rope connection details, consistent with OSHA Construction Standards (1926.251 – Rigging Equipment for Material Handling) and rigging standard practices. Connection details shall include materials used, dimensions, torque applied, load capacity, and other pertinent information. Connections must

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include swaged connections, eyelet connections, and others that may be used for cabling log members.

9. Wood logs:
 - a. Written notification of stock source information and specification compliance.
 - b. The Contractor shall provide a list of wood logs intended for use in construction of the habitat features. The list shall include the number of logs by log type (rootwad log or log pole), species, and dimensions (rootwad diameter, diameter at breast height, and length). The Engineer shall approve the log stock prior to stockpiling the logs in the Work Area.

1.5 QUALITY CONTROL

- A. Live cuttings and live stakes: Refer to Section 02910 – Wetland and Streambed Restoration.
- B. Conduct subgrade and finished grade surveys in order to verify an appropriate grade and backfill thickness has been achieved.
- C. Mechanical Soil Anchors:
 1. Installation, where indicated on the Contract Drawings, shall follow the manufacturer recommendations. Should conflicting installation standards (e.g., depth, design loads, etc.) exist between the Contract Documents and the manufacturer recommendations, the more stringent standards shall govern.
 2. Proofing of mechanical soil anchors to the loads indicated on the Contract Drawings shall be witnessed by the Engineer.
 3. The Engineer shall approve each mechanical soil anchor installation.
 4. Should a mechanical soil anchor installation fail, the Contractor is responsible for the installation of an equivalent replacement mechanical soil anchor, at no extra cost to the Owner. One remedy may include increasing the depth of the mechanical soil anchor.

1.6 PROJECT AND SITE CONDITIONS

- A. Prior to the start of Work, the Contractor shall carefully examine the site to determine the full extent, nature, and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.
- B. Field Measurements
 1. Verify that survey benchmark, monuments, and intended elevations for the work are as shown on the Contract Drawings or as provided by the Engineer.
 2. Identify required lines, levels, contours, and datum.

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PART 2 PRODUCTS

2.1 BACKFILL MATERIAL

A. Refer to Section 02200 – General Earthwork.

2.2 TOPSOIL

A. Refer to Section 02990 – Finish Grading, Topsoil and Seeding.

2.3 MULCH

A. Refer to Section 02990 – Finish Grading, Topsoil and Seeding.

2.4 PLANT MATERIAL

A. Refer to Section 02910 – Wetland and Streambed Restoration.

2.5 EROSION CONTROL PRODUCTS

A. Refer to Section 02370 – Erosion Control.

2.6 ROLLED EROSION CONTROL PRODUCTS

A. Refer to Section 02421 – Geotextiles and Rolled Erosion Control Products.

2.7 WOOD LOGS

- A. The Engineer may reject logs that do not meet the specifications herein and as indicated on the Contract Drawings. Replacement logs shall be furnished by the Contractor at no additional cost to the Owner.
- B. Rootwad logs are logs with an intact rootwad mass. Unless otherwise indicated, the rootwad mass diameter shall be three times the diameter of the bole diameter. The rootwad mass shall be full with roots spreading in all directions.
- C. Log poles are logs without an intact rootwad mass.
- D. Logs shall include (in descending priority): elm, hemlock, hickory, black locust, honeylocust, oak, eastern white cedar, tamarack (larch), maple, ash, beech or other species as approved by the Engineer. Native species that can re-sprout (e.g. black willow) may be used if they have been obtained in accordance with Specification 02910 Part 2.5. Use of non-native species that can re-sprout (e.g. willow) will not be allowed.
- E. Logs shall be free of loose bark and other material.
- F. Limbs shall be cut to protrude no more than 2 inches from the log face.
- G. Individual logs shall be generally straight and uniform in shape so as to not inhibit placement requirements.
- H. Logs shall conform to the dimensions shown on the Contract Drawings. Logs shall have a maximum diameter taper of 1 inch per 5 feet.

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- I. Logs shall be from sound stock and appropriate for structural constructions. Logs exhibiting rot, splitting, holes, pest infestation, and other damages are not allowed for use in construction.
- J. Wood Logs, described herein, is not related to Woody Debris described in Section 02910.

2.8 MECHANICAL SOIL ANCHORS

- A. Mechanical soil anchors shall be of the type, material, and model as indicated on the Contracted Drawings. Equivalent systems may be used with prior approval by the Engineer.
- B. Mechanical soils anchors that include threaded steel rod from the anchor unit to the finish grade surface shall be of adequate strength not less than the design load indicated on the Contract Drawings. Threaded steel rod shall include an eye nut securely attached to the end of the threaded rod for attachment to the wire rope. The eye nut shall be of adequate strength not less than the design load indicated on the Contract Drawings. The eye nut inside diameter shall be sized equal to or larger than the specified wire rope.

2.9 PRECAST CONCRETE DEADMAN ANCHORS

- A. Precast concrete deadman anchors shall be fabricated to the dimensions shown on the Contract Drawings and as approved on the shop drawings described in Submittals.

2.10 WIRE ROPE

- A. Wire rope shall be the diameter, material, and construction as indicated on the Contract Drawings.
- B. Wire rope shall have a nominal breaking strength greater than the load for which it is used.

2.11 WIRE ROPE CLIPS

- A. Wire rope clips shall be the size and material as indicated on the Contract Drawings.
- B. Wire rope clips shall be sized and shaped to accommodate two strands of the specified wire rope. Clips shall include heavy hexagonal nuts.
- C. Clips shall be rated for torque up to 80 pounds per square inch (psi) and, once installed, shall result in the hexagonal nuts fully seated on the clip threads.

2.12 STAPLES

- A. Staples shall be the size and material as indicated on the Contract Drawings.
- B. Staples shall be sized to accommodate two strands of the specified wire rope.

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PART 3 EXECUTION

3.1 GENERAL

- A. Coordinate work associated with excavation and backfill along streambed.
- B. Coordinate work associated with streambed restoration.
- C. Coordinate work associated with wetland restoration.

3.2 WOOD LOGS

- A. Log locations and elevations will be as shown on the Contract Drawings or as directed by the Engineer.
- B. Logs shall be placed level unless otherwise noted on the Contract Drawings or directed by the Engineer.
- C. Earthwork required for placement of logs shall occur as described on the Contract Drawings and in Section 02200 – General Earthwork.

3.3 WIRE ROPE CONNECTIONS

- A. Wire rope connections shall be completed at the location and to the elevation and details as shown in the Contract Drawings and as described herein.
- B. General Connection Notes:
 - 1. Connections to log members, unless otherwise shown on the Contract Drawings, include the use of wire rope, wire rope clips, and staples.
 - 2. Logs shown as drilled will be drilled with a hole diameter 0.25 inch to 0.5 inch larger than the specified wire rope diameter. Holes drilled in logs, unless otherwise indicated, shall be located no less than 1 foot from the end of the log. Logs shall be drilled through the center of the log in a vertical alignment as the log will lie in-place, perpendicular to the length of the log.
 - 3. Each connection shall include the use of two wire rope clips as shown on the Contract Drawings, unless otherwise indicated on the Contract Drawings or manufacturer recommendations, whichever is more stringent. Wire rope clips shall be tightened to the torque per manufacturer recommendation for the type of application, factoring in wire rope type and material, number of clips, and load.
 - 4. Loose ends of wire rope beyond a connection (wire rope clips) shall be stapled to the log from which the connection has been completed. Staples shall be spaced to provide no more than 3 inches of loose wire rope and staple spacing shall not exceed 4 inches.
 - 5. Connections are shown as typical in the Contract Drawings. Other connection methods may be used with prior approval from the Engineer.
 - 6. Wire rope splicing is discouraged and shall not be allowed without prior approval from the Engineer. Splicing shall meet all OSHA requirements.

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7. Swaged or eyelet connections on the end of wire rope shall follow standard rigging practices and OSHA Construction Standards, where applicable. The connections shall have adequate strength not less than the design load indicated on the Contract Documents.
- C. Eyelet or swaged connections are required to connect wire rope to anchors. See installation procedures.
- D. Live Cribwall with Rootwads:
1. Interior log member connections include a single rootwad log and four underlying log poles.
 2. Exterior log member connections include a single rootwad log and two underlying log poles.

3.4 INSTALLATION PROCEDURES

- A. Stone with Joint Plantings:
1. Place stone filling to the thickness and elevations shown on the Contract Drawings. Stone Filling shall meet the grain size distribution and requirements indicated in Section 02275 – Stone Materials.
 2. Install live stakes through the stone filling to the elevation and spacing as indicated on the Contract Drawings and in Section 02910 – Wetland and Streambed Restoration. Installation shall occur according to the Planting Plan.
- B. Single LWD Placements with Mechanical Soil Anchors:
1. Limit disturbance to the finish grade underlying and surrounding the log placements as shown in the Contract Drawings. Refer to Section 02990 – Finish Grading, Topsoil and Seeding.
 2. Drill holes through log. Holes shall be located as shown on the Contract Drawings. See Wire Rope Connections, General Connection Notes.
 3. Install mechanical soil anchors to the location and elevation shown on the Contract Drawings. Anchors shall be lock-loaded and proofed according to the manufacturer recommendations to the depth shown on the Contract Drawings. Depth of anchor shall be measured within undisturbed soils.
 4. Connections to mechanical soil anchors that include a threaded steel rod and eye nut require an eyelet or swaged connection on the wire rope end. Thread the wire rope through the eye nut and complete eyelet or swaged connection.
 5. Place log, threading wire rope through hole in log.
 6. Unless otherwise indicated on the Contract Drawings, tightly wrap wire rope one and one-quarter times around the circumference of the log and connect the end of the rope against itself using wire rope clips.
 7. Staple the loose end of the wire rope against the log.
 8. Finish grade surrounding the log placement shall match the elevations and grades shown on the Contract Documents.

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C. Single LWD Placements with Precast Concrete Deadman Anchors:

1. If excavation of the finish grade is necessary for placement of the anchors, conduct excavation at no extra cost to Owner. Anchors may be placed during placement of backfill within the creek.
2. Place precast concrete deadman anchors to the locations and elevations shown on the Contract Drawings.
3. Insert a length of wire rope through each hole in the deadman anchor such that each end of the wire rope has an equal length; a sufficient length of wire rope shall be provided to connect the single log channel placement as shown in the Contract Drawings.
4. Overlap the ends of the wire rope on the top of the log and attach wire rope clips according to the manufacturer recommendations and the specifications, herein. The wire rope connection shall tightly wrap the log against the deadman anchor.
5. Staple the loose ends of the wire rope against the log.
6. Finish grade surrounding the log placement shall match the elevations and grades shown on the Contract Documents.

D. Multiple LWD Placements:

1. Conduct excavation, compaction, and backfill as required for the underlying subgrade for the placement location to the elevations, location, and extents shown on the Contract Drawings. Refer to Section 02200 – General Earthwork.
2. Limit disturbance to the subgrade underlying and finish grading surrounding the placements.
3. Place log members to the location, elevation, and extent as shown on the Contract Drawings.
4. No connection is required between overlapping logs.
5. Backfill the placements to finished grade with materials indicated on the Contract Drawings. Backfill material shall meet the grain size distribution and requirements indicated on the Contract Drawings.

E. Live Cribs:

1. Conduct excavation, compaction, and backfill as required for the underlying subgrade for the cribwall to the elevations, location, and extents shown on the Contract Documents. Refer to Section 02200 – General Earthwork.
2. Limit disturbance to the subgrade underlying and finish grading surrounding the cribwall.
3. Place log members to the location, elevation, and extent as shown on the Contract Drawings. Logs may be cut to fit at connections provided minimum overlap requirements are satisfied.

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4. Connect overlapping log members with the use of wire rope, wire rope clips, and staples as indicated on the Contract Drawings and the specifications herein. See Wire Rope Connections herein.
5. Backfill the cribwall with materials indicated to the thickness and elevations shown on the Contract Drawings. Backfill material shall meet the grain size distribution and requirements indicated on the Contract Drawings.
6. Install live stakes in the upper portion of the live crib to the elevation and spacing as indicated on the Contract Drawings and in Section 02910 – Wetland and Streambed Restoration. Installation shall occur according to the Planting Plan.

F. Rolled Erosion Control Product (RECP) Soil Wraps:

1. Place RECP soil wraps as shown on the Contract Drawings. Backfill material within the soil wrap shall meet the requirements indicated on the Contract Drawings.
2. Install live stakes between each soil wrap along with a 1-2-inch layer of topsoil specified on the Contract Drawings to support rooting. Live stakes shall be installed to the elevation and spacing as indicated on the Contract Drawings and in Section 02910 – Wetland and Streambed Restoration.
3. The soil wraps shall be placed to meet the elevations and grades shown on the Contract Drawings.
4. Install live cuttings through the RECP to the elevation and spacing as indicated on the Contract Drawings and in Section 02910 – Wetland and Streambed Restoration.
5. Where indicated in the Contract Drawings, place backfill atop the soil wraps to achieve the finish grade.

3.5 TOPSOIL

- A. Refer to Section 02990 – Finished Grading, Topsoil and Seeding.

3.6 SEEDING

- A. Refer to Section 02910 – Wetland and Streambed Restoration.

3.7 LIVE CUTTING AND LIVE STAKE INSTALLATION

- A. Install live cuttings/live stakes to the elevation and spacing as indicated on the Contract Drawings and in Section 02910 – Wetland and Streambed Restoration. Installation shall occur according to the Planting Plan.

3.8 MULCH AND EROSION CONTROL PRODUCTS

- A. Refer to Section 02910 – Wetland and Streambed Restoration.

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3.9 PLANTING

- A. Refer to Section 02910 – Wetland and Streambed Restoration.

3.10 MAINTENANCE

- A. Begin maintenance period immediately after installation of planting materials.
- B. Provide means to minimize damage resulting from animals foraging on installed live cuttings/live stakes.

3.11 WARRANTY

- A. Replace any plant material that does not meet the definition of Acceptable Plant Material below, as determined by the Engineer.
- B. Acceptable Plant Material shall appear healthy and exhibit visible signs of growth; it shall not appear chlorotic or exhibit signs of desiccation. Leaf margins are predominantly green with limited areas of spots or blotches

END OF SECTION

SPECIFICATION NO: 02990

SPECIFICATION TITLE: FINISH GRADING, TOPSOIL AND SEEDING

PROJECT NO: 446794

PROJECT TITLE: NINEMILE CREEK

CLIENT: HONEYWELL

				APPROVALS		
Issue	Date	Pages	Issue Description	Prepared	Checked	Approved
0	5/23/2012	8	Issued for Construction	ERK	SRB/JMO	RDD/TD
<input checked="" type="checkbox"/> Entire Specification Issued this Revision <input type="checkbox"/> Revised Pages Only Issued this Revision			SPECIFICATION ISSUED FOR: <input type="checkbox"/> In-house Review <input type="checkbox"/> Bid <input type="checkbox"/> Client Review/Approval <input checked="" type="checkbox"/> Construction <input type="checkbox"/> Information Only <input type="checkbox"/> <i>Other</i>			

PARSONS

Project No:	446794	Revision:	0
Specification No.	02990	Page:	2 of 8
Specification Title	Finish Grading, Topsoil and Seeding	Date:	5/23/2012

PART 1 GENERAL**1.1 DESCRIPTION**

- A. The Work specified in this Section consists of all labor, equipment, tools, materials, services, supervision and incidentals necessary to complete finish grading and install topsoil and seed as necessary for completion of the Work as described herein, shown on the Contract Drawings, or as directed by the Engineer. Work in this Section includes, but is not limited to:
1. Provision and placement of imported topsoil to match indicated thicknesses to the indicated finished grade.
 2. Procurement and placement of fertilizer, seed and mulch or erosion control products.
 3. Repair and restoration of disturbed and/or damaged areas to match indicated thicknesses to the indicated finished grade.
- B. Related Work specified in other Sections includes, but is not limited to:
1. Section 02370 – Erosion Control
 2. Section 02910 – Wetland and Streambed Restoration

1.2 PERFORMANCE REQUIREMENTS

- A. The Contractor shall comply with all applicable Federal, State and Local codes, ordinances, regulations, statutes and standards.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
1. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils
 2. ASTM D2974 – Standard, Test Methods for Moisture, Ash and Organic Matter of Peat and Other Organic Soils
 3. ASTM D4972 – Standard Test Methods for pH of Soils
- B. Rules and Regulations of the Secretary of Agriculture, Part 201 - Federal Seed Act
- C. Soil Texture Classes (USDA)
- D. New York Department of Transportation - Standard Specifications (US Customary), 2009.

1.4 SUBMITTALS

- A. The Contractor shall submit the following in accordance with Section 01300 – Submittal Procedures and as elsewhere specified in this Section:
1. Topsoil Source and Test Results: A written statement giving location and owner of topsoil source and testing results meeting Subpart 2.1.

PARSONS

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2. Seed Vendors Certificate: Seed vendor's certified statement for the seed mixture required, stating common name, scientific name, percentage by weight, percentages of purity and germination, date of last germination and certification of absence of noxious weeds per Subpart 1.5A.
3. Hydroseeding: Data concerning hydroseeding equipment (if used) including material application rates.
4. Fertilizer: Manufacturer's product data showing contents and test results; and a plan describing how the fertilizer and its application complies with the NYS Nutrient Runoff Law – ECL Article 17, Title 21.
5. Mulch Source: A written statement giving location of mulch source.
6. Temporary Erosion Control Matting: Manufacturer's product data.
7. Wetland Seeds and Plants: Refer to Section 02910 - Wetland and Streambed Restoration.
8. Installer: Name of Subcontractors (if used) and Qualification Statements.
9. Manufacturer's Certification: Certify that products meet or exceed specified requirements.
10. Borrow Source and Quality Control testing results per Subpart 2.1B.
11. Rolled Erosion Control Products – Technical product details and proposed installation methods.

1.5 QUALITY CONTROL

- A. Label seed in accordance with USDA Rules and Regulations under the Federal Seed Act and applicable State seed laws. Furnish seed in sealed bags or containers bearing the date of the last germination, which shall be less than 6 months prior to commencement of planting operations. Inspect seeding material upon arrival at the job site. Remove unacceptable material from the job site. Seed shall be from same or previous year's crop. Each variety of seed shall have a purity of more than 85%, a percentage of germination more than 90%, a weed content of less than 1% and contain no noxious weeds such as Purple Loosestrife, Phragmites or Japanese Knotweed.
- B. Conduct subgrade and finished grade surveys in order to verify the required grade and topsoil thickness has been achieved.

1.6 PROJECT AND SITE CONDITIONS

- A. The Contractor shall carefully examine the site to determine the full extent, nature and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Engineer's attention in order to clarify the exact nature of the Work to be performed.
- B. Field Measurements

PARSONS

Project No:	446794	Revision:	0
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Specification Title	Finish Grading, Topsoil and Seeding	Date:	5/23/2012

1. Verify that survey benchmark, monuments and intended elevations for the work are as shown on the Contract Drawings or as provided by the Engineer.
2. Identify required lines, levels, contours and datum.

PART 2 PRODUCTS

2.1 TOPSOIL

A. Topsoil shall be natural or manufactured, friable and fertile soil that meets the USDA basic soil texture classes of loam, silt loam or sandy loam to be recovered from the A horizon of an in-place soil. Topsoil shall be capable of sustaining healthy plant life and be reasonably free of subsoil, heavy or stiff clay, brush, roots, weeds, other objectionable plant matter, foreign material, stones larger than 4 inches in greatest dimension, and any other materials unsuitable or harmful for plant growth. Topsoil as delivered to the site or stockpiled shall meet the following requirements:

1. Well graded with a maximum particle size of 4 inches, 85 to 100 percent passing 1 inch, 65 to 100 percent passing 1/4 inch, and 15 to 80 percent passing a Number 200 sieve. The 2 micron particle size shall not be greater than 20 percent of the total sample mass, as determined by hydrometer analysis.
2. Organic materials used in the manufacture of topsoil shall meet the requirements of NYSDOT 713-05.
3. pH between 5.5 and 7.6.
4. Percent organic matter:
 - a. For non-wetland areas, contains greater than 3 percent and less than 15 percent organic matter as determined by loss of ignition of moisture-free samples dried at 100° to 110° Celsius (ASTM D2974).
 - b. For wetlands, topsoil shall contain greater than 6 percent and less than 15 percent organic matter as determined by loss of ignition of moisture-free samples dried at 100° to 110° Celsius (ASTM D2974).
5. Contains no nuisance weeds including seeds, stems or rhizomes of Purple Loosestrife, Phragmites, Japanese Knotweed or any plants on the Federal Noxious Weeds list.

B. Borrow Source and Quality Control Testing

1. Conduct borrow source testing of proposed topsoil and quality control testing of topsoil prior to delivery to the site as required in Section 02200 – General Earthwork, including, but not limited to, the following topsoil-specific testing at the frequency specified in Section 02200 – General Earthwork:

Material Property	Test Method
Particle Size Analysis	ASTM D422
Soil pH	ASTM D4972
Organic Matter Content	ASTM D2974

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Analytical Chemistry Testing as per Subpart 1.5E of Section 02200 – General Earthwork

2. Submit testing results to the Engineer for approval prior to delivery to the site. If topsoil is placed prior to approval and the results show a failure, topsoil must be removed and replaced at the Contractor’s expense.
3. Additional Quality Control tests may be required at each visual or textural change in source material, as directed by the Engineer. Test results shall be submitted to the Engineer immediately upon receipt.

2.2 FERTILIZER

- A. Fertilizer shall be a starter fertilizer of commercial stock, of neutral character, with elements derived from organic sources. It shall be a complete, prepared and packaged material and shall contain a minimum of 18 percent nitrogen, 24 percent phosphoric acid, and 6 percent potash. Other fertilizer mixes may be acceptable provided the application rate is adjusted to provide equal quantities. Each bag of fertilizer shall bear the manufacturer’s guaranteed statement of analysis.

2.3 CONSERVATION SEED MIX

- A. A seed mixture beneficial to wildlife consisting of at least 14 of the following species in the listed proportions or approved equal:

<u>Botanical Name</u>	<u>Common Name</u>	<u>oz / ac</u>
<i>Andropogon gerardii</i>	Big bluestem grass	107
<i>Anemone cylindrica</i>	Thimbleweed	3
<i>Anemone virginiana</i>	Tall/Virginia anemone	3
<i>Asclepias syriaca</i>	Common milkweed	7
<i>Aster laevis</i>	Smooth blue aster	13
<i>Aster pilosus</i>	Frost aster	7
<i>Bromus pürgans</i>	Hairy wood chess	53
<i>Cassia fasciculata</i>	Partridge pea	13
<i>Elymus canadensis</i>	Canada wild rye	107
<i>Helianthus grosseserratus</i>	Saw tooth sunflower	3
<i>Heliopsis helianthoides</i>	Ox-eye/false sunflower	7
<i>Lespedeza capitata</i>	Round-headed bush clover	7
<i>Monarda fistulosa</i>	Wild bergamot	7
<i>Oenothera biennis</i>	Common evening primrose	10
<i>Panicum virgatum</i>	Switch grass	20
<i>Penstemon digitalis</i>	Foxglove beard tongue	10
<i>Rudbeckia hirta</i>	Black-eyed Susan	27

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<i>Schizachyrium scoparium</i>	Little bluestem	7
<i>Senna (Cassia) hebecarpa</i>	Wild senna	67
<i>Solidago rigida</i>	Stiff goldenrod	107
<i>Sorghastrum nutans</i>	Indian grass	3
	Total oz/ac (lbs/ac)	478 (30)
Cover Crop¹		
<i>Avena sativa</i>	Oats	640
<i>Secale cereale</i>	Winter/cereal rye	640
<i>Elymus virginicus</i>	Virginia wild rye	96
	Total oz/ac (lbs/ac)	736 (46)

¹ Seed application rate may be reduced based on performance of seeding at the Geddes Brook IRM site if agreed to by NYSDEC.

² Oats shall be used for spring seeding; winter rye for fall seeding

2.4 MULCH

- A. Hydromulch shall be Wood Cellulose Fiber Pulp processed to contain no growth or germination inhibitor factors, and dyed an appropriate color to facilitate visual metering of the application of the materials. Hydromulch shall meet the requirements of NYSDOT 713-11 with the exception that hydromulch manufactured from recycled paper products is acceptable. The Contractor shall be responsible for assuring that the application of recycled paper mulch is appropriate for the specific application. Mulch shall be applied based on the slope of the area according to the following:

Slope	Mulch Type	Application Rate (lb/ac)
Flat areas – upland	EcoFibre or equivalent	1500
Flat areas - wetland	EcoFibre or equivalent	1800
Less than 25%	EcoFibre plus tackifier or equivalent	2500
Greater than 25%	FlexTerra FGM or equivalent	3500

2.5 EROSION CONTROL PRODUCTS

- A. Rolled Erosion Control Products (RECPs): Refer to Section 02370 – Erosion Control and Section 02421 – Geotextiles and Rolled Erosion Control Products. A Type B 100% Biodegradable RECP meeting the specifications of Section 02421 and

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installed in accordance with the Contract Drawings and Specifications may be substituted for the mulch products listed in Part 2.4. Notice of the substitution shall be submitted with the technical product details and proposed installation methods to the Engineer, for approval, at least 21 days before its delivery to the Site.

PART 3 EXECUTION**3.1 GENERAL****A. Non-Wetland Areas**

1. Excavated non-wetland areas to be restored with vegetation shall receive 6 inches minimum of topsoil, seed and temporary erosion control product unless otherwise shown on the Contract Drawings.
2. Non-wetland surfaces outside the excavation limits that have been disturbed or damaged during completion of the work shall be re-graded, receive 6 inches of topsoil if not already present, seeded and mulched. The Contractor may select straw mulch, temporary erosion control product and/or hydromulch for these areas.

B. Wetland Areas

1. Wetland areas shall be restored with topsoil and seed as shown on the Contract Drawings and in accordance with Section 02910 – Wetland and Streambed Restoration.

C. Channel Areas

1. Channel areas shall be brought to finish grade as shown on the Contract Drawings and in accordance with Section 02200 – General Earthwork and Section 02910 – Wetland and Streambed Restoration.
2. Finished grades shall be within the neatline tolerances shown on the Contract Drawings.

3.2 TOPSOIL

- A. Till underlying soil parallel to contours to a depth of 2 inches by disking or harrowing before topsoil placement. Do not till when the ground is frozen or excessively wet.
- B. Place topsoil to the depths, lines, grades and elevations indicated on the Contract Drawings to the elevation tolerances provided in Section 02200 – General Earthwork or as otherwise noted on the Contract Drawings. Do not spread topsoil if the ground or the topsoil is frozen or excessively wet.
- C. There are no compaction requirements for topsoil. Develop and maintain a 50-ft by 50-ft survey grid to control thickness. The required topsoil thickness shown on the drawings is defined as the thickness after placement is completed and verified by survey. A rough surface will be required.

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3.3 FERTILIZER

- A. Apply fertilizer to non-wetland areas with a mechanical spreader at a minimum rate of 200 lbs/acre or in accordance with the manufacturer's suggested rate. Do not apply fertilizer to wetland areas or within in-stream channels.
- B. After topsoil has been spread and the fertilizer applied, scarify or harrow to a depth of 2 inches and leave in a roughened condition for seeding. Remove and dispose of stiff clods, lumps, roots, litter and other foreign material.
- C. Application of fertilizer shall be in compliance with the requirements of the Nutrient Runoff Law under New York ECL Article 17, Title 21. Contractor shall provide a plan describing how the fertilizer and its application complies with the NYS Nutrient runoff Law – ECL Article 17, Title 21.

3.4 SEEDING

- A. Refer to Section 02910 – Wetland and Streambed Restoration and the Contract Drawings for wetland and wetland edge seeding requirements.
- B. Apply seed mixture uniformly on the prepared surface with a hand or mechanical spreader at a minimum rates specified in the table in Subpart 2.3. Lightly rake and roll seed into the surface.
- C. Apply hydroseed (optional) uniformly on the prepared surface.

3.5 MULCH AND EROSION CONTROL PRODUCTS

- A. Place mulch or erosion control products immediately after the application of topsoil and seed.
 - 1. Apply straw mulch with a mulch blower at a uniform rate of 1,500 lbs/acre. Anchor with a tackifier.
 - 2. Install erosion control products as per the manufacturer’s recommended procedures.

3.6 WARRANTY

- A. One year warranty period for topsoil and seed from the date of substantial completion or correction period. Maintain as necessary, including repairs, re-seeding and re-mulching of any bare areas in excess of four (4) square feet so that an acceptable grass stand is established.

END OF SECTION