Weston & Sampson SM

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

Site Plan Application

May 2022

MILLBURY LANDFILL SOLAR PROJECT
207 RIVERLIN STREET MILLBURY, MA

PREPARED FOR:
MILLBURY LANDFILL SOLAR LLC

SUBMITTED TO:
TOWN OF MILLBURY PLANNING BOARD

May 16, 2022

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

Mr. Conor McCormack
Acting Town Planner
Town of Millbury
127 Elm Street
Millbury, MA 01527

Re: **Site Plan Application**
Millbury Landfill Solar Project
Riverlin Street, Millbury, MA 01527

Dear Mr. McCormack:

Weston and Sampson Engineers, Inc. (Weston & Sampson) is requesting approval to submit a Site Plan Review and Stormwater application and plans, to be filed with the Town of Millbury Planning Board, for the above-mentioned project on behalf of Millbury Landfill Solar LLC (the Applicant). The Applicant proposes to develop an approximately 1.28 MW DC ground-mounted solar photovoltaic and 500 kW battery storage project at the Town of Millbury Landfill located at Riverlin Street.

The project will consist of solar panel support racks connected to a ballast block racking system within the landfill parcel limit of waste. The solar arrays will be surrounded by a chain link fence. The electricity generated by the PV modules will be exported to the electric grid in accordance with the utility's interconnection standards and regulations. This Site Plan Permit Application includes the following appendices.

- Appendix A – Application Forms and Checklist
- Appendix B – Project Narrative and Summary of Applicability to Town of Millbury Zoning Bylaws
- Appendix C – Project Drawings – Issued for Permitting
- Appendix D – Electrical One Line Diagram and Equipment Cut Sheets
- Appendix E – Operation and Maintenance Plan
- Appendix F – Proof of Liability Insurance
- Appendix G – Glare Analysis
- Appendix H – Waiver Request Letter
- Appendix I – Development Impact Statement
- Appendix J – Stormwater Permit Application

If you have any further questions or require any additional information, please feel free to contact me by email at bukowski.rob@wseinc.com.

Sincerely,
WESTON & SAMPSON ENGINEERS, INC.

Robert J. Bukowski, P.E.
Project Manager

cc: Steve McDonough, Millbury Landfill Solar LLC

Appendix A – Site Plan Review Forms and Checklist

CHECKLIST
Millbury Planning Board
Submission of Site Plan Review

Plan Name: Millbury Landfill Solar PV Array

Property Address: 207 Riverlin Street Assessor's Map 24, Lot 19

Applicant's Name: Millbury Landfill Solar LLC Address: 111 Speen Street, Framingham, MA 01701 Tel. No. 1-866-263-7372
(If the applicant is not the owner, a notarized statement authorizing the applicant to act on the owner's behalf and disclosing his interest shall be submitted)

Owner's Name: Town of Millbury Address: 127 Elm Street Millbury, MA 01527 Tel. No. 508-865-4710

Engineering Firm: Weston & Sampson Engineers, Inc. Address: 55 Walkers Brook Drive, Suite 100, Reading, MA 01867 Tel. No. 978-532-1900

1 original, 10 full size copies provided separate from binders, 10 11x17 copies provided in application binders

Submission Checklist:

sent to Conor McCormack **1)** Submission Fee of $ N/A and Technical Review Fee of $ 6,000 made payable to the Town of Millbury

X **2)**One original Site Plan (at a scale of 1" = 20'), ten (10) full size copies, and seven (7) 11" x 17" copies thereof showing:

X a. Names, addresses and telephone numbers of the owner, applicant, and person(s) or firm(s) preparing the plan. If the applicant is not the owner, submit a notarized statement authorizing the applicant to act on the owner's behalf and disclosing his interest.

X b. Identification of the plan by name of the project, property address, assessor's map and lot number, the date, datum NAD83 and NAVD 88, north arrow, names of abutters and scale.

X c. Natural features including watercourses, water bodies, wetlands, soil properties, and any other environmental features of the landscape that are important to the site design process.

X d. Location of all existing and proposed easements, rights-of-way and other encumbrances.

X e. All floodplain information, including the contours of the one-hundred (100) year flood elevation based upon the most recent Flood insurance Rate Map for Millbury, or as calculated by a professional land surveyor for unmapped areas.

X f. Location, width, curbing, and paving of all existing and proposed streets, rights-of-way, easements, alleys, driveways, sidewalks, and other public ways.

X g. Location of all pavement markings.

X h. Location of all existing and proposed on-site snow storage areas.

X i. Location and name of all streets and indicate whether the street is a public or private way.

X j. Lot lines with dimensions.

X k. Zoning district lines.

X l. Five (5) signature lines for the Planning Board approval.

X m. Existing and proposed topography contour lines at one (1) foot intervals.

X n. Information on the location, size, type and number of existing and proposed landscaping features.

X o. Information on the location, size and capacity of existing and proposed on-site and abutting utilities (water, sewer, drainage, electrical, cable, etc.)

X p. The location, type and intensity of lighting, the location and dimensions of all signage and any site amenities, the location screening of refuse containers.

X q. The location, dimensions of all existing and proposed buildings and uses on-site and on abutting properties.

NA r. Elevation and façade treatment plans of all proposed buildings.

X s. Information on the location, size, and type of parking, loading, storage and service areas.

X t. Zoning and other applicable setback distances, and zoning parking calculations

X u At least three property boundary marker locations, remotely separated, indicated with Mass Grid Plane Coordinates

NA **3)** A landscape plan at the same scale as the site plan, showing the limits of work, existing tree lines and all proposed landscape features and improvements including planting areas with size and type of stock for each shrub or tree.

NA **4**). An isometric line drawing (projection) at the same scale as the site plan, showing the entire project and its relation to existing areas, building and roads for a distance of one hundred feet from the project boundaries.

X **5**). A locus plan at a scale of one inch equals 100 feet (1" = 100') showing the entire project and its relation to existing areas, buildings and roads for a distance of one hundred (100) feet from the project boundary or such other distances as may be approved or required by the Planning Board.

NA **6**) Building elevation plans at a scale of one-quarter inch equals one foot (1/4" = 1') or one-half inch equals one foot (1/2" = 1') showing all elevations of all proposed buildings and structures and indicating the type and color of materials to be used on all facades.

X **7**). Development impact statements which shall describe potential impacts on the proposed development, compare them to the impacts of uses which are or can be made of the site without a requirement of site plan review, identify all significant positive or adverse impacts, and propose an acceptable program to prevent or mitigate adverse impacts. The development impact statement shall include:

X a. Traffic Impact Assessment

X b. Environmental Impact Assessment

__X___ c. Fiscal Impact Statement
__X___ d. Historic Impact

Note: The Planning Board may waive any of the above listed requirements if it believes that said requirement is not necessary based on the size and scope of the project. The applicant may petition the Planning Board prior to making a formal application to request notification as to which sections (s) of the site plan review by-law requirements are necessary. The Planning Board will then notify the applicant within thirty (30) days as to which sections relate to the proposed project based on the size and scope of the project.

The Millbury Planning Board has accepted the submission of the above Site Plan. This document certifies that, as currently submitted, the Site Plan meets the minimum submission guidelines as set forth by the Town of Millbury. This document certifies that the Site Plan is officially accepted for Planning Board review and consideration. It does not constitute approval of the Site Plan.

Town Planner/Planning Board Clerk Signature _____ Date _____

TOWN OF MILLBURY
APPLICATION FOR SITE PLAN REVIEW

APPLICANT:

NAME Millbury Landfill Solar LLC

STREET 111 Speen Street CITY/TOWN Framingham

STATE MA ZIP 01701 TELEPHONE 1-866-263-7372

NAME OF PROPERTY OWNER (if different from Applicant) Town of Millbury

Deed recorded in the Worcester District Registry of Deeds Book 293 Page 7

SITE INFORMATION:

STREET AND NUMBER 207 Riverlin Street

ZONING DISTRICT I-1 ASSESSOR'S MAP/LOT #(S) 24/19

LOT SIZE 19.99 FRONTAGE 73 FT

CURRENT USE Solid Waste Landfill

PROJECT PLAN INFORMATION:

PLAN TITLE Millbury Landfill Solar PV Array

PREPARED BY (name/address of PE/Architect) Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100, Reading, MA 01867

DATES May 2022

USES FOR WHICH SITE PLAN REVIEW PERMIT IS SOUGHT (refer to the Zoning Bylaw – Use Regulation Table):

Section 51 Large-Scale Ground-Mounted Solar Photovoltaic Installations

CITE ALL APPROPRIATE SECTIONS OF THE ZONING BYLAW WHICH PERTAIN TO THIS APPLICATION; USE AND SITE:

Section 12.4, Section 51

TO THE MILLBURY PLANNING BOARD:

The undersigned, being the Applicant named above, hereby applies for Site Plan Review to be granted by the Planning Board and certifies that, to the best of applicant's knowledge and belief, the information contained herein is correct and complete.

Applicant's Signature Jonathan Mancini

Property Owner's Signature (if not Applicant) see notarized letter attached

TOWN OF MILLBURY *DEPARTMENT OF PLANNING & DEVELOPMENT*

MUNICIPAL OFFICE BUILDING • 127 ELM STREET • MILLBURY, MA 01527-2632 • TEL. 508 / 865-4754

May 5, 2022

Chairman Richard Gosselin
Millbury Planning Board
127 Elm Street
Millbury, MA 01527

Chairman Gosselin,

The Town of Millbury authorizes Ameresco, Inc. to act on behalf of the Town of Millbury relative to applications before the Millbury Planning Board regarding the proposed solar project at 207 Riverlin Street, Millbury, MA.

Sincerely,

Sean Hendricks,
Town Manager

Christine Marden
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
September 2, 2027

Christine Marden
Christine Marden

Worcester County Commonwealth of Massachusetts

On this 5th day of May,5, 2022 before me, the undersigned Notary Public, personally appeared Sean Hendricks who provided to me through satisfactory evidence of identification, **MA License** to be the person whose name is signed on the preceding or attached document, and acknowledged to me that they signed it voluntarily for its stated purpose.

Signature of Notary Public

Appendix B – Project Narrative

APPENDIX B - PROJECT NARRATIVE

Introduction

Millbury Landfill Solar LLC (the Applicant) proposes construction of a ground mounted solar photovoltaic (PV) and battery storage project on the Town's closed landfill encompassing approximately 4.7 acres of the approximately 20 acre site located on Town of Millbury Property (the project). The project site is situated on the north side of Riverlin Street within the I1 industrial zone. The landfill cap is vegetated with grassed berms and swales channeling runoff to a basin at the south of the landfill. The site has an existing paved road off Riverlin Street which connects to a paved area that operates as a transfer station for the Town of Millbury.

The following narrative and documentation are hereby submitted to the Planning Board in accordance with Section 51, and Section 12.4 of the Town of Millbury Zoning Bylaws last revised May 10, 2021 (the "Zoning Bylaw"). The project is designed for use for a minimum of 20 years and has an estimated useful life of 30+ years. At the conclusion of project operation, the system owner will be responsible for decommissioning and removal of the equipment from the property per section 51.8 of the Zoning Bylaw.

Proposed Project

The proposed PV site and associated improvements are located on the capped landfill adjacent to the transfer station at 207 Riverlin Street, Millbury (Parcel ID:24/19). The parcel is 19.99 acres and includes the town of Millbury's closed municipal landfill and active transfer station. As currently designed, the system to be installed has a DC capacity of 1,280 kW and is composed of solar panel support racks connected to ballast block racking system within the landfill parcel limit of waste. A 500 kW battery energy storage system (BESS) will also be installed as part of the project. The system is to be surrounded by chain link fence with an 18 foot (ft) wide access gate. One gravel access road is to be installed on the west side of the landfill up to the equipment pad, which will be installed near the top of the cap. The power generated by the system will be exported to the electric grid in accordance with the local utility's interconnection standards and regulations.

The name of the Project Applicant is:

Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Contact: Steve McDonough
Phone: (866) 263-7372
Email: smcdonough@ameresco.com

The name and contact information of the Engineer authorized to represent the Project Applicant:

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive
Reading, MA 01867
Contact: Rob Bukowski, P.E.
Phone: (978) 532-1900
e-mail: bukowski.rob@wseinc.com

Compliance with Zoning Bylaw

On behalf of the Applicant, Weston & Sampson has developed a set of plans (Appendix C) that are intended to meet requirements set forth in the Zoning Bylaw for the Industrial I-1 zoning district in which the project is proposed.

Provisions of the Zoning Bylaw relative to the project, followed by an analysis of the project's compliance with the applicable provisions (in underlined font), are listed below. The outlined regulations represent an analysis applicable to Section 51.5 of the Zoning Bylaw, and Section 12.45 of the Zoning Bylaw. As referenced in this section, this project qualifies for Site Plan Review by the Planning Board (SPB).

SECTION 51 – Large-Scale Ground-Mounted Solar Photovoltaic Installations

51.5 Application Procedure Applicants are required to submit an application conforming to the requirements of this Bylaw. The application shall include a site plan and associated documents specified under Section 12.4 Site Plan Review, as well as the following additional information:

1. Blueprints or drawings of the solar photovoltaic installation signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts showing the proposed layout of the system and any potential shading from nearby structures.

   Project Drawings are included in Appendix C.

2. One or three-line electrical diagram detailing the solar photovoltaic installation, associated components, and electrical interconnection methods, with all National Electrical Code and National Electrical Safety Code compliant disconnects and over current devices.

   Electrical diagram(s) are included in Appendix D.

3. Manufacturers' specifications and installation manuals (if available) of the major system components to be used, including, but not limited to, the PV modules, mounting system, combiner box, disconnects, inverter(s).

   General specifications and components are included in Attachment D. System components are subject to change based on supply availability during construction.

4. Operation and Maintenance Plan which shall include measures for maintaining safe access to the installation, storm water controls, as well as general procedures for periodic inspections and operational maintenance of the installation.

   An Operation and Maintenance (O&M) Plan for the project is included in Appendix E. Existing stormwater features at the site will be maintained by the Town of Millbury.

5. Emergency shutdown procedures for the solar photovoltaic installation.

   Upon issuance of the interconnection agreement with National Grid, the Applicant will coordinate with the local Police Chief, Fire Chief, Building Inspector, and other local safety officials, as necessary, during and following construction to provide an overview and training of the system's operation and emergency disconnect procedures. It generally involves a gang operated air brake (GOAB) switch on one of the installed poles to allow the system to be shutdown. A 24-hour contact number will be posted to the perimeter fence. This number can be called for general information or emergencies related to the system.

6. Evidence that the utility company that operates the electrical grid where the installation is to be located has been informed of the Applicant's intent to install an interconnected customer-owned generator. Off-grid systems shall be exempt from this requirement.

   The interconnection agreement with National Grid is being finalized and will be submitted to the Planning Board prior to construction and issuance of a Building Permit.

7. Proof of liability insurance.

   A copy of the liability insurance is included in Appendix F.

51.6 Design Standards and Siting Requirements

1. Dimensional Requirements: No part of the large-scale ground-mounted solar photovoltaic installation, including appurtenant structures, shall be located closer to a property line than seventy-five (75) feet. The installation shall be located at least one hundred (100) feet from existing residences. Maximum lot coverage requirements shall be consistent for the district within which the installation is located.

   Acknowledged. The proposed project has been designed to meet these setback requirements.

2. Height Requirements: Freestanding solar panels located on the ground or attached to a framework located on the ground shall not exceed twelve (12) feet in height above finished grade.

   Acknowledged. The solar panel height from finished grade will not exceed twelve feet.

3. Appurtenant Structures: All appurtenant structures to large-scale ground-mounted solar photovoltaic installations, including but not limited to, equipment shelters, storage facilities, transformers, and substations, shall be architecturally compatible with each other. Whenever reasonable, structures should be shielded from view by existing vegetation or plantings and/or joined or clustered to avoid adverse visual impacts.

   Acknowledged. The appurtenant structures for the project are located on the existing landfill cap at the gravel access drive.

4. Fencing: An 8-foot tall, mini-mesh security fence shall be installed around the entire perimeter of the large-scale ground-mounted solar photovoltaic installation.

   The Applicant is requesting a waiver from this requirement. There is an existing chain link fence around the perimeter of the Site that is proposed to be modified by adding a security extension up to 7ft in height to comply with the requirements of the NFPA 70, National Electric Code (NEC) for electrical enclosures. New chain link fence required for the project along the bottom of the western slope is also proposed at 7ft to provide a cohesive look when tying into existing fence locations.

   We are also requesting a waiver from “mini-mesh” material to standard 1-3/4 inch to 2-inch mesh material.

5. Land Clearing: Clearing of natural vegetation shall be limited to what is necessary for the construction, operation and maintenance of the solar photovoltaic installation or otherwise prescribed by applicable laws, regulations and bylaws.

   Acknowledged, there is no tree clearing proposed for the Project. Depending on the final interconnection design by National Grid, minimal tree trimming may be required.

6. Screening: Landscaping shall be required to screen the solar photovoltaic installation and accessory structures from roadways and neighboring residences. The width of the landscaped buffer shall be a minimum of twenty-five (25) feet. The Planning Board may waive this requirement if it determines that there is no public benefit from such screening.

   Acknowledged, there is an existing vegetative buffer between Riverlin Street and the existing landfill cap.

7. Lighting: Lighting shall be limited to that required for safety and operational purposes and shall be reasonably shielded from abutting properties. Where feasible, lighting of the solar photovoltaic installation shall be directed downward and shall incorporate full cut-off fixtures to reduce light pollution.

Not Applicable, lighting is not proposed for the Project.

8. Glare: No solar photovoltaic installation shall produce glare that would constitute a nuisance to occupants of neighboring properties or persons traveling neighboring roads.

   Acknowledged, A glare study was performed for the project and is included in Appendix G. Although the results show glare along Riverlin Street for a limited number of hours per year, the analysis does not factor in screening from existing vegetation. As such, we do not believe that Riverlin Street will be affected by the glare since it will be blocked by existing vegetation.

9. Signs: No signs shall be erected on the solar photovoltaic installation except signs identifying the owner, the operator, the manufacturer, an emergency telephone number, safety signage, and warning signage. Special placards and signs shall be installed on all combiner boxes, inverters, transformers, disconnects, and panel feed breakers. This shall include the following placards:

   WARNING – SOLAR INVERTER OUTPUT DISCONNECT
   DO NOT RELOCATE
   THIS DEVICE

   AC Disconnects located at: (i.e., Rear of maintenance shed)

   A permanent sign shall be installed that shows the peak power, current, and voltages of each inverter, in lettering that is legible from a distance of three (3) feet.

   All signs shall comply with local utility requirements and Section 34 herein.

   Acknowledged, signage will be installed as outlined in this subsection.

10. Network Interconnections and Power Lines: To the extent feasible, all network interconnections and power lines, to and from the facility, shall be located underground. Electrical transformers for utility interconnections may be above ground if required by the utility provider.

    The project is located on a closed landfill cap. To protect the integrity of the cap, electric lines for the solar array on the cap will be run above ground in cable trays or conduit runs to the equipment pad. From the equipment pad, electric lines will be run above ground in cable trays or conduit runs to approximately six (6) new utility poles that will be used to reach the point of interconnection along Riverlin Street.

51.7 Maintenance Requirements and Emergency Shutdown Procedures.

1. At all times the solar photovoltaic installation shall be maintained in good working condition and regular maintenance shall be performed in accordance with the approved maintenance schedule. A record shall be kept of all maintenance performed and said maintenance record shall be provided to Town officials whenever requested to verify maintenance or status.

   Acknowledged, maintenance will be performed and documented in accordance with the Applicant's Operation and Maintenance Manual included in Appendix E.

2. The owner or operator shall provide a copy of the site plan and emergency shutdown procedures to the Emergency Management Director, Police Chief and Fire Chief prior to issuance of an occupancy permit. The owner or operator shall cooperate with local emergency services in developing an emergency response plan.

   Acknowledged, a final site plan and emergency shutdown procedures will be submitted to the necessary

departments prior to issuance of the occupancy permit.

Upon issuance of the interconnection agreement with National Grid, the Applicant will coordinate with the local Police Chief, Fire Chief, Building Inspector, and other local safety officials, as necessary, during and following construction to provide an overview and training of the system's operation and emergency disconnect procedures. It generally involves a gang operated air brake (GOAB) switch on one of the installed poles to allow the system to be shutdown. A 24-hour contact number will be posted to the perimeter fence. This number can be called for general information or emergencies related to the system.

3. The owner or operator shall provide the Building Inspector with the contact information for a person responsible for responding to public inquiries and complaints throughout the life of the project and post this information in a visible location at the installation. This contact information shall be updated as necessary.

   Acknowledged, prior to construction, the Applicant will submit contact information for a person responsible for the Project.

51.8 Removal Requirements.

1. At least thirty (30) days prior to the date of discontinued operations, the owner of the solar photovoltaic installation shall notify the Building Inspector by certified mail of any proposed date of discontinued operations and plans for removal of the solar photovoltaic installation.

2. A solar photovoltaic installation that is not used for twelve (12) successive months, or that has reached the end of its useful life, shall be deemed discontinued, and shall be removed by the owner. Upon issuance of a Notice of Discontinuance by the Building Inspector, the owner shall have thirty (30) days to provide sufficient evidence that the system has not been discontinued. Failure to provide such evidence to the Building Inspector within the time allowed shall be conclusive evidence that the solar photovoltaic installation has been discontinued.

3. The owner shall dismantle and physically remove the solar photovoltaic installation within ninety (90) days from the date of discontinued operations. Removal of the system shall include:

   a. Physical removal of all large-scale ground-mounted solar photovoltaic installation, structures, equipment, security barriers and transmission lines from the site.
   b. Disposal of all solid and hazardous waste in accordance with local, state and federal waste disposal regulations.
   c. Stabilization or re-vegetation of the site as necessary to minimize erosion. The Planning Board may allow the owner or operator to maintain landscaping or designated below-grade foundations in order to minimize erosion and disruption to vegetation.

Acknowledged, the Project will be removed in accordance with the decommissioning requirements as outlined. The Applicant is requesting a waiver to extend the removal timeline from 90 days to 180 days.

51.9 Performance Guarantee. The Planning Board shall require surety, either in the form of a bond or other security, in an amount sufficient to assure satisfactory removal of the system. The cost estimate for removal and re-vegetation shall be prepared by the Planning Board's technical consultant and shall include a twenty-five percent (25%) contingency fee. The Planning Board shall review the amount of the surety at five year intervals to ensure that it is sufficient to guarantee satisfactory removal and re-vegetation. The Planning Board shall have the right, upon determination of discontinuance and failure to remove the installation within the ninety (90) day period identified in Section 51.8(3), but not the obligation, to claim the financial surety, and to the extent duly authorized by law enter the site and remove the facility in accordance with the requirements of this section.

Acknowledged, as outlined above the Applicant will comply with the Performance Guarantee requirements, however, they are requesting a waiver to extend the removal timeline from 90 days to 180 days.

51.10 Waiver Provision. The Planning Board may waive strict compliance with any provision of this bylaw if it deems it in the public interest and determines that the intent of the bylaw has been maintained.

A waiver request letter is included in Appendix H with a short list of waivers requested for the Project.

51.11 Modification. All material modifications to a large-scale solar photovoltaic installation made after issuance of the site plan approval shall require submission of a modified site plan, applied for in accordance with all regulations applicable at the time such application is properly made.

General specifications and components for the project are included in Attachment D. System components are subject to change based on supply availability during construction.

SECTION 12 – Administration

12.44 Contents and Scope of Application. An application for site plan review and approval under this section must be prepared by qualified professionals, including a registered professional engineer and, where required by state law, a registered architect, and/or registered landscape architect, and shall include the following items and information:

(a) A site plan review at a scale of one inch equals twenty feet (1" = 20'), or such other scales as may be approved by the Planning Board. The site plan shall contain the following items and information:

- Names, addresses, and telephone numbers of the owner, applicant, and person(s) or firm(s) preparing the plan. If the applicant is not the owner, a notarized statement authorizing the applicant to act on the owner's behalf and disclosing his interest shall be submitted
- Name of project, property address, assessor's map and lot number, the date, north arrow, datum (NAD 83 and NAVD 88) names of abutters, and scale.
- Natural features including watercourses, water bodies, wetlands, soil properties, and any other environmental features of the landscape that are important to the site design process.
- Location of all existing and proposed easements, rights-of-way and other encumbrances.
- All floodplain information, including the contours of the one-hundred (100) year flood elevation based upon the most recent Flood Insurance Rate Map for Millbury, or as calculated by a professional land surveyor for unmapped areas.
- Location, width, curbing, and paving of all existing and proposed streets, rights-of-way, easements, alleys, driveways, sidewalks, and other public ways.
- Location of all pavement markings.
- Location of all existing and proposed on-site snow storage areas.
- The location and name of all streets and indicate whether the street is a public and private way.

- Lot Lines with dimensions.
- Zoning district lines.
- Five (5) signature lines for the Planning Board approval.
- Existing and proposed topography contour lines at one (1) foot intervals.
- Information on the location, size, type and number of existing and proposed landscaping features.
- Information on the location, size and capacity of existing and proposed on- site and abutting utilities (water, sewer, drainage, electrical, cable, etc.)
- The location, type, style of fixture, and intensity of lighting; the location, structural design and dimensions of all signage and any site amenities; the location and screening of refuse containers
- The location and dimensions of all existing and proposed building and uses on-site and on abutting properties.
- Elevation and facade treatment plans of all proposed buildings.
- Information on the location, size, and type of parking, loading, storage and service areas.
- Zoning and other applicable setback distances; and zoning parking calculations.
- At least three property boundary markers, remotely separated, shall be indicated with Massachusetts Grid Plane Coordinates. The plan shall identify the elevation and coordinates of these boundary markers.

A Site Plan set with the requirements outlined in Section 12.44 (a) is included in Appendix C.

(b) A landscape plan at the same scale as the site plan, showing the limits of work, existing tree lines, and all proposed landscape features and improvements including planting areas with size and type of stock for each shrub or tree.

Landscaping features (existing vegetation) is included in the Site Plan drawings in Appendix C.

(c) An isometric line drawing (projection) at the same scale as the site plan, showing the entire project and its relation to existing areas, building and roads for a distance of one hundred feet from the project boundaries.

Not applicable. As this project is not a building, an isometric line drawing is not included with this application.

(d) A locus plan at a scale of one inch equals l00 feet (1" = 100') showing the entire project and its relation to existing areas, buildings and roads for a distance of one hundred (100) feet from the project boundary, or such other distances as may be approved or required by the Planning Board.

The locus plan is included on the Site Plan Drawings in Appendix C.

(e) Building elevation plans at a scale of one-quarter inch equals one foot (1/4" = 1') or one-half inch equals one foot (1/2" = 1'), showing all elevations of all proposed buildings and structures and indicating the type and color of materials to be used on all facades.

Not applicable. There are no proposed buildings for the project.

(f) Development impact statements which shall describe potential impacts on the proposed development, compare them to the impacts of uses which are or can be made of the site without a requirement of site plan review, identify all significant positive or adverse impacts, and propose an acceptable program to prevent or mitigate adverse impacts.

The Development impact statement shall consist of the following four elements:

1. Traffic Impact Assessment:
2. Environmental Impact Assessment:
3. Fiscal impact assessment:
4. Historic Impact:

A Development Impact Statement for the elements listed above is included in Appendix I.

(g) The Planning Board may waive any of the above listed requirements if it believes that said requirement is not necessary based on the size and scope of the project. The applicant may petition the Planning Board prior to making a formal application to request notification as to which section(s) of the site plan review by-law requirements are necessary. The Planning Board will then notify the applicant within thirty (30) days as to which sections relate to the proposed project based on the size and scope of the project.

A waiver request letter is included in Appendix H.

12.43 Design Standards

All site plan review applicants shall adhere to the following general principles when designing a site plan for land within the Town of Millbury.

(a) Preservation of Landscape: The landscape shall be preserved in its natural state, insofar as practicable by minimizing tree and soil removal, and any grade changes shall be in keeping with the general appearance of the neighboring developed areas. Where tree coverage does not exist or has been removed, new planting may be required. Finished site contours shall depart only minimally from the character of the natural site and the surrounding properties.

Acknowledged. No substantial changes are to be made to landscaping or grading. Trees or similar vegetation cannot be installed due to the underlying landfill.

(b) Relation of Building to Environment: Proposed development shall be related harmoniously to the terrain and to use, scale and siting of existing buildings in the vicinity that have functional or visual relationship to the proposed buildings. All building and other structures shall be sited to minimize disruption of the topography. Strict attention shall be given to proper functional, visual and spatial relationship of all structures, landscaped elements and paved areas.

There are no buildings proposed as part of this project. Panel layout is designed to follow existing site topography.

(c) Open Space: All open space (landscaped and usable) shall be so designed as to add to the visual amenities of the vicinity by maximizing its visibility to persons passing the site or overlooking it from nearby properties.

The project is at the closed municipal landfill, no landscaped open space is included as part of this project.

(d) Surface Water Drainage: There shall be no net increase in the volume of stormwater runoff across the boundaries of the site unless provisions have been made to tie into the public storm drains, where available, with the approval of the appropriate parties or authorities or, the Planning Board has determined that all reasonable provisions have been made to minimize any changes in stormwater runoff at the site. There shall be no adverse impacts to abutting properties from any increase in volume of stormwater runoff including erosion, silting, flooding, sedimentation or impacts to wetlands, ground water levels or wells.

Existing stormwater infrastructure to be used to manage runoff. Runoff from site expected to be de minimis. A stormwater analysis is included Appendix J.

(e) Insofar as possible, low impact development best management practices shall be utilized such that the site's natural features and environmentally sensitive areas, such as wetlands, native vegetation, mature trees, slopes, natural drainage courses, permeable soils, floodplains, woodlands and soils are preserved. Use of stormwater management components that provide filtration, treatment and infiltration such as vegetated areas that slow down runoff, maximize infiltration and reduce contact with pave surfaces are strongly encouraged.

The proposed Project is a redevelopment project at the existing landfill. Low impact development principles have been followed in the development of the design to the maximum extent practicable.

(f) Where the site is not proposed to be covered with gravel, hardscape, or a building or structure, a planting plan to ensure permanent re-vegetation of the site shall be submitted. Areas to be planted shall be loamed with not less than six inches (6") compacted depth of good quality loam and seeded with turf grass seed or other appropriate ground cover in accordance with good planting practice.

The proposed Project will be installed on the existing vegetation of the landfill cover system. Gravel will be added to the site for the proposed access road. All disturbed areas of the project will be reseeded with a low grow solar seed mix following installation of the PV array.

(g) Ground Water Recharge and Quality Preservation: Ground Water Recharge shall be maximized and ground water quality shall be protected. Various techniques may be required to maximize recharge, and create a hydrologically functional lot or site, including the following: vegetated open channel systems along roads, rain gardens, buffer strips, use of amended soils that will store, filter and infiltrate runoff, bioretention areas, use of permeable pavement. In addition, reduction of impervious surfaces where possible, reduction of heat island effects, and use of water quality units such as grease traps or gas/oil separators will be encouraged.

Not Applicable. Groundwater recharge is not applicable at closed landfill sites.

(h) Where ground water elevation is close to the surface, extra site grading precautions may be required to maintain the protective function of the over burden.

Acknowledged. There is no proposed grading for the project, the array and gravel access road will be installed following existing topography.

(i) Utilities: The placement of electric, telephone, or other utility lines and equipment, such as water or sewer shall be underground and so located as to provide no adverse impact on the ground water levels, and to be coordinated with other utilities. The proposed method of sanitary sewage disposal and solid waste disposal from all buildings shall be indicated precisely on the plans.

Electrical connection coming from the equipment pad will be low profile racking running alongside the access road and six utility poles. No other utilities are proposed for the Project.

(j) Advertising: All signs and outdoor advertising features shall be reviewed as an integral element in the design and planning of all development on the site. At a minimum, all signs and advertising devices shall be in conformance with Section 34. Signs.

Required signage will be posted on the perimeter fence. Refer to the detail sheet in the drawing included in Appendix C. This signage will not be for advertisement

(k) Landscaping Within the Setbacks: Site plan applicants are required to landscape the setbacks as part of the site plan approval process. Site plan applicants are expected to maintain the landscaping approved for the site and replace any landscaping that has not fully established itself within two (2) growing seasons, after which all failed landscaping shall be replaced. Front yard setback landscaping shall consist of street trees and low-level plantings.

In accordance with Section 35.7, walls or hedges with in any required front yard area or within twenty feet (20') of the street, whichever is less, shall not exceed six feet (6') in height and fences shall not exceed thirty inches (30") in height except that the special permit granting authority may grant a Special Permit for higher fences where such will not endanger health or safety, or unreasonably impair vision or circulation of air. Landscaping within twenty (20') feet of a driveway shall consist solely of low-level plantings such that vehicular and pedestrian sight lines are not restricted.

The project does not propose landscaping within the setbacks of the property line. There is no proposed clearing associated with the Project, and there is a natural existing buffer at the perimeter of the Site.

As mentioned above, the site will be surrounded by a 7 ft tall chain link fence.

(l) Circulation: With respect to vehicular and pedestrian circulation, including entrances, ramps, walkways, drives and parking, special attention shall be given to location and number of access points to the public streets (especially in relation to existing traffic controls), width of interior drives, and access points, general interior circulation, separation of pedestrian and vehicular traffic, access to community facilities and arrangement of parking areas that are safe and convenient and, insofar as practicable, do not detract from the use and enjoyment of proposed buildings and structures and the neighboring properties. Insofar as practicable, parking should be located on the side or the rear of buildings.

Not applicable. Access to site is controlled and access controls are to be installed per section 51 of the Zoning Bylaws.

(m) To minimize turning movements onto adjacent public ways, developers are encouraged to provide internal circulation systems (service roads) that connect to adjacent development (parking area to parking area). Site plans that propose service roads and /or connection of parking areas shall show on the plan how the connection of parking areas will be achieved.

The Project will use internal temporary access roads at the landfill for construction vehicles and deliveries. The Applicant will work with the Town to find temporary parking, as/if needed, during construction.

(n) All parking and loading areas shall be striped and marked on the ground as a condition of site plan approval. All off-street parking and loading spaces shall be provided with safe and convenient access and shall not located within a public right-of-way or within required setbacks. Access locations shall be designed to encourage unimpeded traffic flow with controlled turning movements and minimum hazards to vehicular and pedestrian traffic. Parking and loading shall be in conformance with Section 33. Parking and Loading Requirements.

Parking areas are not proposed or needed for long term operation or maintenance of the project.

(o) Curbing: Concrete curbs and gutters shall be installed around the perimeter of all driveways and parking

areas. Granite curbs shall be installed in front of sidewalks abutting buildings.

Not applicable. The gravel access drive is proposed to follow existing topography, and there are no parking areas proposed for the project.

(p) Shared Parking: The Planning Board may allow a reduction of the required number of spaces by up to twenty-five percent (25%) if it can be demonstrated that two (2) or more uses within a single development can share parking areas due to different hours of normal activity. When two (2) or more adjacent property owners agree in writing to share parking, the required number of parking spaces may be reduced by as much as twenty-five percent (25%) for each business.

Not applicable. No parking areas required or to be installed for operation of the project.

(q) Parking Area Landscaping: Site plans involving more than nineteen (19) parking spaces shall provide interior landscaping covering not less than five percent (5%) of the total area of the parking lot. In total, there shall be provided one (1) shade tree placed within the parking lot for every five (5) spaces and complemented by shrubs and other planting material. Such trees shall be at least two (2 ½) inches in trunk diameter at the time of planting, and shall be located in planting beds at least six feet (6') in width or diameter. Snow removal activities should be considered when planning for parking area landscaping. In case it can be shown to the Planning board that the planting of trees is impractical, the Planning Board may authorize plantings and shrubbery instead of trees.

Not applicable. No parking areas required or to be installed for operation of the project.

(r) Interior Walkways and Pedestrian Paths: Site plans involving more than thirty (30) parking spaces shall provide walkways and pedestrian paths that safely connect the parking areas to the principal uses they will serve. Such walkways shall be constructed with brick, decorative pavers, or other materials, and may be bordered with fencing or shrubbery to clearly separate pedestrians from automobile traffic. Facilities and access routes for deliveries, service and maintenance shall be separated, where practical, from public access routes and parking areas. Car stops shall be provided to prevent parked cars form damaging trees, shrubs and curbing, and shall not disrupt pedestrian walkways.

Not applicable. The site is not open to the public and does not have pedestrian traffic.

(s) Stormwater Management (Grading and Drainage): All site plan applicants must submit drainage calculations to show compliance with all applicable federal, state and local regulations and guidelines, including but not limited to the Massachusetts Department of Environmental Protection (DEP) Stormwater Management Handbook, as it may be amended.

A stormwater analysis has been performed and is included in Appendix J.

(t) Outdoor Lighting: All exterior lights shall be designed and installed in such a manner as to prevent objectionable light at (and glare across) the property lines. Externally lit signs, display, building and aesthetic lighting must be lit from the top and shine downward. Each outdoor luminaire shall be a full cutoff luminaire, and the use of decorative luminaires with full cutoff optics is desired. A full cutoff luminaire is an outdoor light fixture shielded in such a manner that all light emitted by the fixture, either directly from the lamp or indirectly from the fixture is projected below the horizontal plane. Developments shall eliminate glare onto adjacent properties through the use of lighting shields, earthen berms, or retention of existing natural vegetation. All outdoor lighting fixtures, including display lighting, shall be turned off within one hour after close-of –business, unless needed for safety or security, in which case the lighting shall be reduced to the minimum level necessary.

There is no outdoor lighting included in this project.

(u) Other Site Features: Exposed storage areas, exposed machinery installations, service areas, truck loading areas, utility buildings and structures, and similar accessory areas and structures shall be designed with such setbacks, screen plantings, or other screening methods to prevent their being a hazard or being incongruous with the existing or contemplated environment and the surrounding properties. With respect to personal safety, all open and enclosed spaces shall be designed to facilitate building evacuation and to maximize accessibility by fire, police and other emergency personnel and equipment.

Site support features for this project include a perimeter fence and equipment pad with a transformer and BESS. The perimeter fence will be installed as noted in site plan. The equipment pad will be installed on the top of the landfill as shown in the Project Plans in Appendix C.

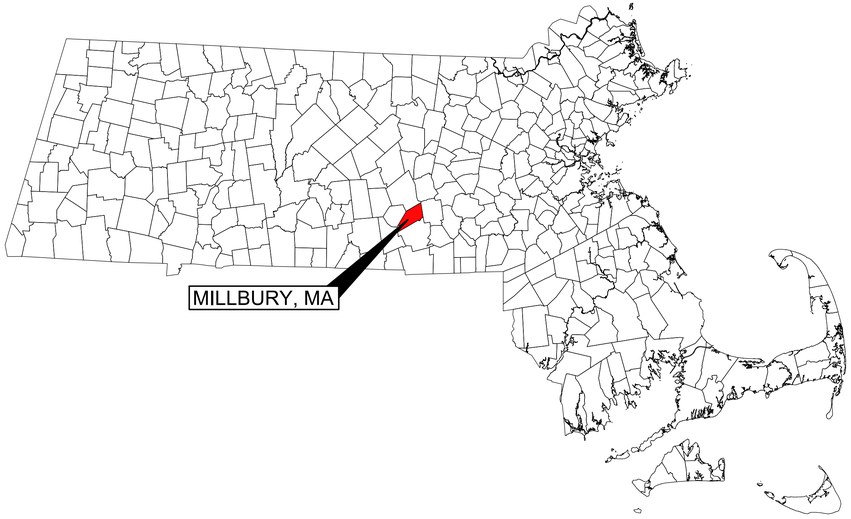
(v) Additional Design Standards for Bramanville Village District.

Not Applicable. This project is outside of the Bramanville Village District.

Appendix C - Project Drawings
Issued for Permitting

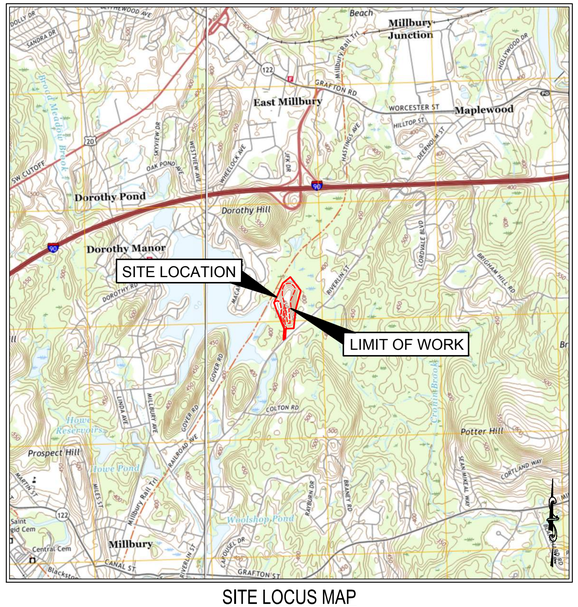
MILLBURY LANDFILL SOLAR PV ARRAY

207 RIVERLIN STREET, MILLBURY MASSACHUSETTS



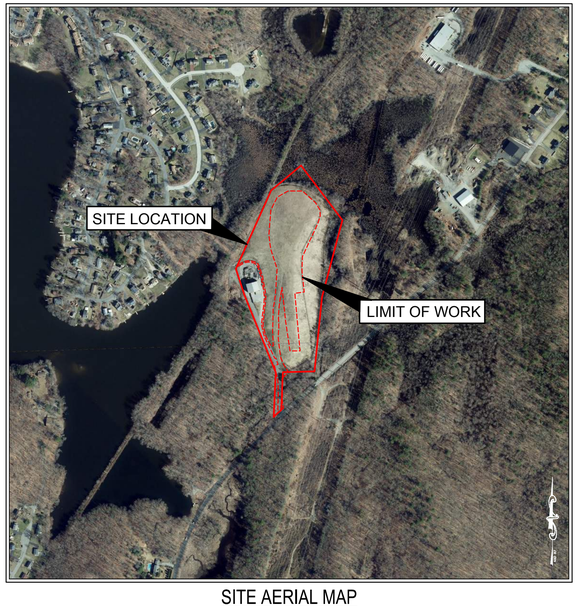
MASSACHUSETTS MUNICIPAL MAP

NOT TO SCALE



SITE LOCUS MAP

1" = 2,000'



SITE AERIAL MAP

1" = 500'

DRAWING INDEX

SHEET NUMBER	SHEET TITLE
GENERAL	
G000	COVER SHEET
SURVEY	
V101	EXISTING CONDITIONS
CIVIL	
C001	NOTES AND SPECIFICATIONS
C101	INDEX PLAN
C102	PROPOSED SITE PLAN SHEET 1
C103	PROPOSED SITE PLAN SHEET 2
C104	PROPOSED SITE PLAN SHEET 3
C105	PROPOSED SITE PLAN SHEET 4
C501	CONSTRUCTION DETAILS SHEET 1
C502	CONSTRUCTION DETAILS SHEET 2

SITE INFORMATION

LAND OWNER:	TOWN OF MILLBURY
BOOK:	293
PAGE:	7
TAX MAP:	24
LOT:	19
PARCEL ID	24/ 19/ / /
PARCEL AREA:	19.99 ACRES

ZONING INFORMATION

ZONE:	INDUSTRIAL I (I-1)
DIMENSIONAL REQUIREMENTS	
MIN. LOT AREA:	80,000 SQUARE FEET
MIN. LOT FRONTAGE:	150 FEET
MIN. FRONT SETBACK:	30 FEET
MIN. SIDE SETBACK:	20 FEET
MIN. REAR SETBACK:	20 FEET
MAX. BUILDING COVERAGE OF AREA:	N/A

Project Developer:

AMERESCO
Green • Clean • Sustainable

Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

Consultants:

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

OWNER:

TOWN OF MILLBURY, MASSACHUSETTS · INCORPORATED 1865 ·

Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

APPROVED MILLBURY PLANNING BOARD DATE

REV #	DESCRIPTION	DATE
0	ISSUED FOR TOWN PERMITTING	05/13/2022

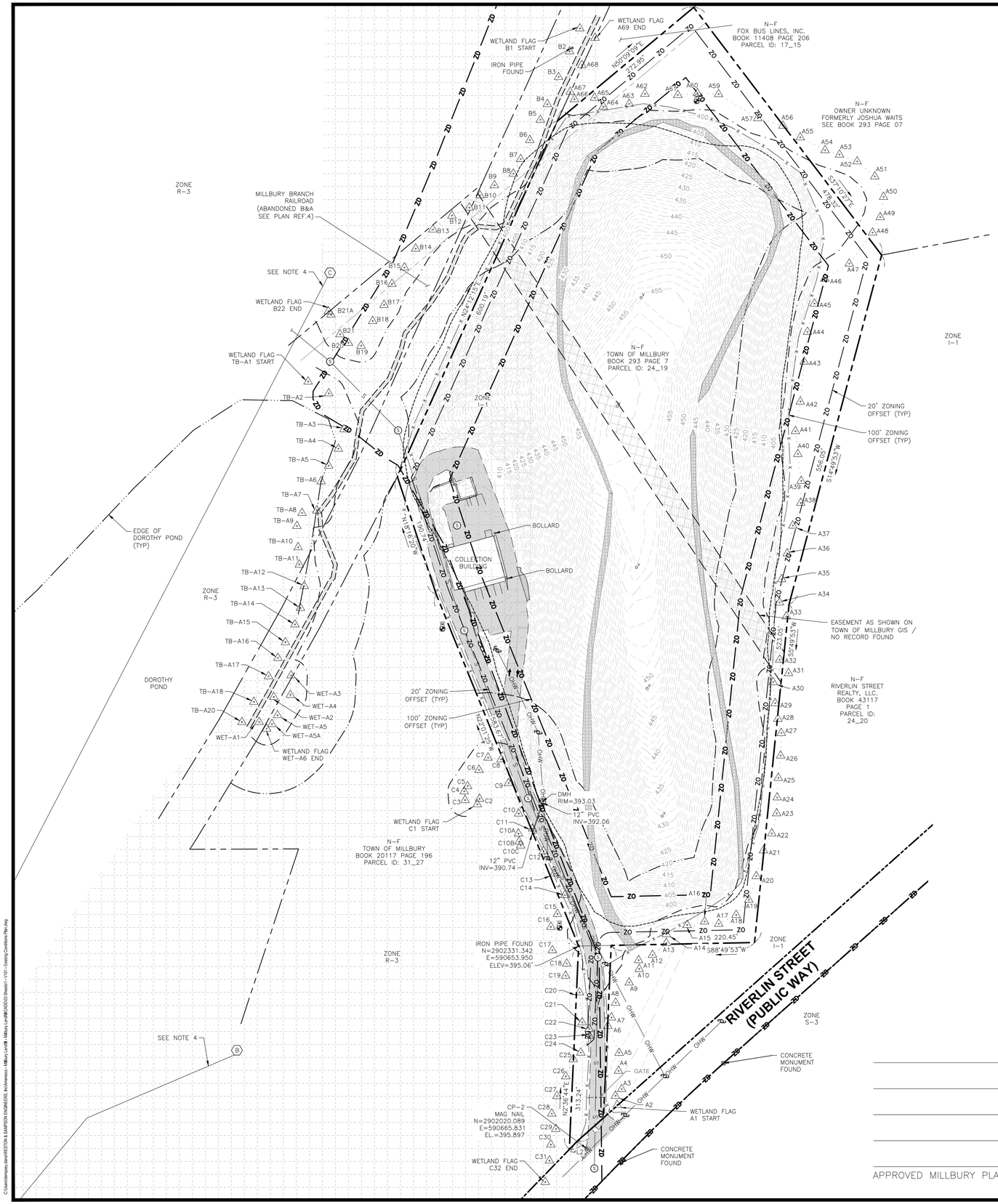
Seal: COMMONWEALTH OF MASSACHUSETTS · ROBERT J. BUKOWSKI · CIVIL · No. 41402 · REGISTERED PROFESSIONAL ENGINEER · 5/13/22

811 Know what's below. Call before you dig.

Issued For:	PERMITTING
Issued Date:	05/13/2022
Drawing Title:	COVER SHEET
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
Job No:	ENG-20-0954
Sheet Number:	G000

COPYRIGHT 2022 WESTON & SAMPSON

C:\Users\dempseyc.dave\WESTON & SAMPSON ENGINEERS, Inc\Ameresco - Millbury Landfill - Millbury Landfill CAD\03 Sheets\01 - G000 Cover Sheet.dwg



APPROVED MILLBURY PLANNING BOARD DATE

GENERAL NOTES:

1. OWNER OF RECORD: TOWN OF MILLBURY, WITH REFERENCE TO WORCESTER COUNTY REGISTRY OF DEEDS IN BOOK 293, PAGE 07 AND BOOK 20177, PAGE 196. FOR FURTHER REFERENCE SEE PARCEL ID NUMBER: 24 - LOT 19 AND MAP AND ID NUMBER 31 - LOT 27. THE TOTAL AREA OF THE LOCUS PARCELS ARE 17.67 ACRES AND 19.99 ACRES, PER TOWN RECORDS.
2. HORIZONTAL DATUM IS BASED ON MASS STATE GRID COORDINATE SYSTEM NAD83 (2011). VERTICAL DATUM IS REFERENCED TO NAVD 88. CONTOUR INTERVAL IS 1 FOOT AND IS BASED ON COMBINING EXISTING ELECTRONIC NGS FILES OF MASS GIS LIDAR WITH GPS SURVEY GROUND SHOTS.
3. THIS PLAN IS THE RESULT OF A FIELD SURVEY CONDUCTED BY SGC ENGINEERING, LLC IN NOVEMBER 2020.
4. WETLANDS DELINEATED BY WESTON & SAMPSON ENGINEERS, INC. ON NOVEMBER 5, 2020.
5. PROPERTY IS LOCATED IN FLOOD ZONE "X" AS SHOWN ON FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY PANEL NUMBER 250318 - 828E / PANEL 828 OF 1075, FOR THE TOWN OF MILLBURY, WORCESTER COUNTY, MASS, WITH EFFECTIVE DATE JULY 4, 2011. ZONE "X" IS DESCRIBED AS AN AREA OF MINIMAL FLOODING WITH A POSSIBLE BASE FLOOD ELEVATION OF 395.0 (SEE CROSS SECTIONS B AND C). THE LIMIT OF ZONE AE SHOWN ON THIS SURVEY IS BASED ON A SCANNED IMAGE OF THE FIRM PANEL AND IS SHOWN APPROXIMATELY.
6. SGC AND WESTON & SAMPSON ENGINEERS, INC. HAVE NOT INDEPENDENTLY VERIFIED THE LOCATION, EXISTENCE, AND SERVICEABILITY OF ANY UTILITIES AND MAKE NO GUARANTEE TO THE COMPLETENESS OR THE ACCURACY OF ANY UTILITIES. ADDITIONAL UTILITIES MAY EXIST IN THE FIELD, WHICH ARE NOT SHOWN ON THIS PLAN. ACTUAL LOCATIONS MUST BE DETERMINED IN THE FIELD PRIOR TO EXCAVATION OR OTHER CONSTRUCTION ACTIVITIES. CALL "DIG SAFE" AT 1-888-344-7233 OR DIAL 811. SGC AND WESTON & SAMPSON ENGINEERS, INC. ASSUME NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN.

PLAN REFERENCES:

(WORCESTER COUNTY REGISTRY OF DEEDS)

1. PLAN ENTITLED, "PLAN OF LAND LOCATED AT 211 RIVERLIN STREET - MILLBURY, MASS", DATED JULY 21, 2008, RECORDED IN PLAN BOOK 869, PAGE 28.
2. PLAN ENTITLED, "PLAN OF PROPERTY OWNED BY TOWN OF MILLBURY - RIVERLIN STREET, MILLBURY, MASS", DATED JUNE 25, 1973, RECORDED IN PLAN BOOK 393, PAGE 106.
3. PLAN ENTITLED, "PLAN TO SHOW PROPERTY IN MILLBURY, MASS OWNED BY BUCK BROTHERS, INC", DATED JANUARY 31, 1973, RECORDED IN PLAN BOOK 729, PAGE 110.
4. PLAN ENTITLED, "PLAN AND PROFILE OF A RAILROAD SURVEY FROM MILLBURY TO WEBSTER", NO DATE LISTED AND FILED AS MAP 102.
5. PLAN ENTITLED "MILLBURY - RIVERLIN STREET REDEFINITION" AND REFERENCED AS DECREE 1445 / PLAN H-2991-R SHEETS 6, 7, AND 8 OF 8 TOTAL SHEETS FILED IN PLAN BOOK 147, PAGE 49.
6. PLAN ENTITLED "ROLLIE SHEPARD ACRES SUBDIVISION" DATED JANUARY 11, 1999, RECORDED IN PLAN BOOK 736, PAGE 125.

LEGEND:

- MAJOR CONTOUR
- MINOR CONTOUR
- STONE WALL
- SITE PROPERTY LINE
- ABUTTER PROPERTY LINE
- ADJACENT ROW LINE
- ZO — APPROXIMATE ZONING DISTRICT BOUNDARY
- 6' CHAIN LINK FENCE WITH BARBED WIRE
- OVERHEAD ELECTRIC LINE
- RIP RAP SWALE
- WETLAND LINE
- 25' WETLAND BUFFER
- 100' WETLAND BUFFER
- SEWER LINE
- APPROXIMATE LIMIT OF WASTE
- UTILITY POLE
- GUY WIRE
- WETLAND FLAG
- SEWER MANHOLE
- MONITORING WELL
- VENT
- EDGE OF PAVEMENT
- PAVEMENT
- APPROXIMATE AQUIFER PROTECTION OVERLAY AREA A
- GRAVEL PATH
- BLOCK WALL

CERTIFICATION

I HEREBY CERTIFY THAT THE LINES SHOWN ON THIS PLAN ARE THE LINES DIVIDING EXISTING OWNERSHIPS, AND THE LINES OF THE STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC AND PRIVATE STREETS OR WAYS ALREADY ESTABLISHED, AND THAT NO NEW LINES FOR DIVISION OF EXISTING OWNERSHIP OF NEW WAYS ARE SHOWN.

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS

COMMONWEALTH OF MASSACHUSETTS JEROME B. WATTS #40409 PROFESSIONAL LAND SURVEYOR

JEROME B. WATTS / MASSACHUSETTS PLS 40409 — DATE: 5/13/2022

80 40 0 80 160
SCALE: 1"=80'

Project:

MILLBURY LANDFILL SOLAR PV DEVELOPMENT

207 RIVERLIN STREET MILLBURY, MA 01527

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:

AMERESCO Green • Clean • Sustainable

Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:

Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal: JEROME B. WATTS #40409 PROFESSIONAL LAND SURVEYOR — 5/13/2022

Issued For:

PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/13/2022
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

Drawing Title:

EXISTING CONDITIONS PLAN

Sheet Number:

V101

COPYRIGHT © 2022 WESTON & SAMPSON, INC.

C:\Users\dempsey.dan\WESTON & SAMPSON ENGINEERS, Inc\Ameresco - Millbury Landfill - Millbury Landfill\CAD\03 Sheets\1.1101 - Existing Conditions Plan.dwg

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL CALL DIG SAFE AT 811 OR 1-888-DIG-SAFE AT LEAST 72 HOURS, SATURDAYS, SUNDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO EXCAVATING AT ANY LOCATION. A COPY OF THE DIG SAFE PROJECT REFERENCE NUMBER(S) SHALL BE GIVEN TO THE OWNER PRIOR TO EXCAVATION.
2. LOCATIONS OF EXISTING PIPES, CONDUITS, UTILITIES, FOUNDATIONS AND OTHER UNDERGROUND OBJECTS ARE NOT WARRANTED TO BE CORRECT AND THE CONTRACTOR SHALL HAVE NO CLAIM ON THAT ACCOUNT SHOULD THEY BE OTHER THAN SHOWN.
3. STONE WALLS, FENCES, CURBS, ETC., SHALL BE REMOVED AND REPLACED AS NECESSARY TO PERFORM THE WORK. UNLESS OTHERWISE INDICATED, ALL SUCH WORK SHALL BE INCIDENTAL TO CONSTRUCTION OF THE PROJECT.
4. ALL AREAS DISTURBED BY THE CONTRACTOR BEYOND THE PROJECT AREA SHALL BE RESTORED AT NO ADDITIONAL COST TO THE OWNER.
5. HORIZONTAL CONTROLS REFER TO MASSACHUSETTS STATE PLANE COORDINATE SYSTEM (MAINLAND ZONE) (1983 NORTH AMERICAN DATUM).
6. ELEVATIONS REFER TO THE 1988 NORTH AMERICAN VERTICAL DATUM (NAVD 88).
7. NOTHING SHOWN OR OMITTED FROM THE DOCUMENTS PROVIDED SHALL RELIEVE THE CONTRACTOR FROM FULL COMPLIANCE WITH ALL APPLICABLE CODES, REGULATIONS, BYLAWS, AND ORDINANCES.

FROST PROTECTION AND SNOW REMOVAL:

1. THE CONTRACTOR SHALL, AT ITS OWN EXPENSE, KEEP EARTHWORK OPERATIONS CLEAR AND FREE OF ACCUMULATIONS OF SNOW AS REQUIRED TO CARRY OUT THE WORK.
2. THE CONTRACTOR SHALL PROTECT THE SUBGRADE BENEATH NEW STRUCTURES AND PIPES FROM FROST PENETRATION WHEN FREEZING TEMPERATURES ARE EXPECTED.

MATERIAL SPECIFICATIONS:

GEOSYNTHETICS:

1. GENERAL:

INSTALLATION OF GEOTEXTILE FABRICS SHALL BE IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND SPECIFIC LAYOUT PLANS AND DETAILS REVIEWED BY ENGINEER.

2. WOVEN GEOTEXTILE:

THE WOVEN GEOTEXTILE SHALL BE MIRAFI HP 770 FABRIC, BY MIRAFI INC., OR APPROVED EQUIVALENT. THE WOVEN GEOTEXTILE SHALL BE COMPOSED OF POLYPROPYLENE STABILIZED WITH CARBON BLACK TO RESIST ULTRAVIOLET DEGRADATION AND BE RESISTANT TO BIOLOGICAL AND CHEMICAL DEGRADATION DUE TO ALL NATURALLY OCCURRING ORGANISMS OR REAGENTS NORMALLY ENCOUNTERED IN NATURAL SOIL ENVIRONMENTS.

3. NON-WOVEN GEOTEXTILE:

THE NON-WOVEN GEOTEXTILE SHALL BE MIRAFI 140N FABRIC, BY MIRAFI INC., OR APPROVED EQUIVALENT. THE NON-WOVEN GEOTEXTILE SHALL BE COMPOSED OF POLYPROPYLENE FIBERS AND SHALL BE INERT TO BIOLOGICAL DEGRADATION AND RESISTANT TO NATURALLY ENCOUNTERED CHEMICALS, ALKALIS, AND ACIDS.

4. GEOGRID

THE GEOGRID SHALL BE MIRAFI BXG110, BY MIRAFI INC., OR APPROVED EQUIVALENT.

EARTHWORK MATERIALS:

1. MODIFIED ROCK FILL

MODIFIED ROCK FILL SHALL BE USED FOR THE CONSTRUCTION ENTRANCE/EXIT AS SHOWN ON THE DRAWINGS, AND SHALL MEET THE REQUIREMENTS LISTED IN MASSDOT SPECIFICATION SECTION M2.02.4.

U.S. STANDARD SIEVE	PERCENT PASSING
8 INCH	95-100
4 INCH	0-25
2 1/2 INCH	0-5

2. GRAVEL BORROW

GRAVEL BORROW SHALL SATISFY THE REQUIREMENTS LISTED IN MASSDOT SPECIFICATION SECTION M1.03.0, TYPE B.

U.S. STANDARD SIEVE	PERCENT PASSING
1/2 INCH	50-85
NO. 4	40-75
NO. 50	8-28
NO. 200	0-10

WITH NO STONE GREATER THAN 3 INCHES.

3. DENSE GRADED CRUSHED STONE:

CRUSHED STONE SHALL SATISFY THE REQUIREMENTS LISTED IN MASSDOT SPECIFICATION SECTION M2.01.7.

U.S. STANDARD SIEVE	PERCENT PASSING
2 INCH	100
1 1/2 INCH	70-100
3/4 INCH	50-85
NO. 4	30-55
NO. 50	8-24
NO. 200	3-10

DRAINAGE PIPE:

1. HIGH DENSITY POLYETHLENE (HDPE) CORRUGATED PIPE WITH SMOOTH INTERIOR AND MITERED EDGE MEETING AASHTO M252, TYPE C.

BACKFILL MATERIALS:

1. ORDINARY BORROW:
   ORDINARY BORROW SHALL BE GRANULAR, WELL GRADED FRIABLE SOIL; FREE OF DEBRIS, RUBBISH, ICE, SNOW, TREE STUMPS, ROOTS, CLAY AND ORGANIC MATTER; WITH 30 PERCENT OR LESS PASSING THE NO. 200 SIEVE; NO STONE GREATER THAN TWO-THIRD (2/3) LOOSE LIFT THICKNESS, OR SIX INCHES, WHICHEVER IS SMALLER.

BACKFILL PLACEMENT AND COMPACTION:

1. PRIOR TO BACKFILLING, THE CONTRACTOR SHALL COMPACT THE EXPOSED NATURAL SUBGRADE TO THE DENSITIES AS SPECIFIED HEREIN.
2. AFTER APPROVAL OF SUBGRADE BY THE ENGINEER, THE CONTRACTOR SHALL BACKFILL AREAS TO REQUIRED CONTOURS AND ELEVATIONS WITH SPECIFIED MATERIALS.
3. THE CONTRACTOR SHALL PLACE AND COMPACT MATERIALS IN CONTINUOUS HORIZONTAL LAYERS UNTIL FIRM. LIFT THICKNESS SHALL NOT EXCEED THE FOLLOWING THICKNESS:
   3.1. GRAVEL ACCESS ROADS - 8 INCHES
   3.2. BALLAST BLOCKS, CONDUIT SUPPORTS, AND EQUIPMENT PADS - 6 INCHES.
4. IF THE MATERIAL REMOVED FROM THE EXCAVATION IS SUITABLE FOR BACKFILL WITH THE EXCEPTION THAT IT CONTAINS STONES LARGER THAN PERMITTED, THE CONTRACTOR HAS THE OPTION TO REMOVE THE OVERSIZED STONES AND USE THE MATERIAL FOR BACKFILL OR TO PROVIDE REPLACEMENT BACKFILL AT NO ADDITIONAL COST TO THE OWNER.
4. ALL MATERIAL AND BALLAST BLOCK PLACEMENT ON THE SURFACE OF THE LANDFILL (BEYOND THE ACCESS ROAD) SHALL BE PERFORMED USING LOW GROUND PRESSURE EQUIPMENT.

SOIL STABILIZATION NOTES:

1. THE MAXIMUM ALLOWABLE SLOPE IS 3:1. ALL 3:1 SLOPES SHALL BE STABILIZED WITH A TEMPORARY EROSION CONTROL BLANKET (SEE SHEET C502).
2. ALL DISTURBED AREAS SHALL HAVE A MINIMUM OF 4-INCHES OF LOAM AND SEED AND STABILIZED WITH GRASS COVER (SEE SHEET C502).
3. IF SUFFICIENT STABILIZATION CANNOT BE ACCOMPLISHED AFTER SEEDING, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADDING THE NECESSARY SOIL AMENDMENTS AND/OR LOAM UNTIL STABILIZATION IS ACHIEVED IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).

TYPICAL SEQUENCE OF CONSTRUCTION:

PRIOR TO THE DEVELOPMENT OF THE SITE, EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS. SITE DEVELOPMENT SCHEDULING SHALL TAKE INTO CONSIDERATION THE GROWING SEASON, SUCH THAT BULK OF THE EARTHWORK IS NOT INITIATED DURING A PERIOD WHEN VEGETATIVE STABILIZATION CANNOT BE ACHIEVED WITHIN 14 DAYS OF COMPLETING THE EARTHWORK IN A GIVEN AREA. A TYPICAL SEQUENCE OF CONSTRUCTION IS:

1. PRIOR TO STARTING ANY WORK ON THE SITE, THE CONTRACTOR SHALL NOTIFY APPROPRIATE AGENCIES AND SHALL INSTALL EROSION AND SEDIMENTATION CONTROL MEASURES AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL OBTAIN ALL PERMITS, NOTIFY APPROPRIATE OFFICIALS OF CONSTRUCTION COMMENCEMENT, AND SUBMIT CONSTRUCTION TIMETABLE.
2. ON-SITE CONSTRUCTION SHALL START WITH INSTALLATION OF EROSION AND SEDIMENTATION CONTROL MEASURES AS SHOWN ON SHEET C101. THIS INCLUDES STRAW WATTLES, CONSTRUCTION ENTRANCE/EXIT, AND OTHER MEASURES NOTED ON THE PLAN. NO WORK SHALL TAKE PLACE UNTIL THE ENGINEER HAS INSPECTED AND APPROVED INSTALLED MEASURES. NO EROSION/SEDIMENTATION CONTROL DEVICE SHALL PENETRATE THE EXISTING LANDFILL COVER MATERIALS WITHIN THE LIMITS OF WASTE.
3. STOCKPILED TOPSOIL SHALL BE SEEDED AND MULCHED WHEN IT IS TO BE STORED MORE THAN 30 DAYS FROM TIME OF STOCKPILING. STOCKPILES SHALL NOT BE PLACED WITHIN THE LIMITS OF THE LANDFILL OR WITHIN THE 100' WETLAND BUFFER ZONE. SEE SHEET C502 FOR A TYPICAL TEMPORARY STOCKPILE DETAIL.
4. CONSTRUCT GRAVEL ACCESS ROADS. INSTALL ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES AS REQUIRED TO PREVENT EROSION OF GRAVEL SURFACE.
5. PROCEED WITH SOLAR PHOTOVOLTAIC (PV) SYSTEM INSTALLATION/CONSTRUCTION WORK.
6. REPAIR ALL DISTURBED AREAS, AND REAPPLY LOAM AND SEED WHERE NECESSARY.
7. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL AFTER THE SITE IS STABILIZED IN ACCORDANCE WITH THE SWPPP, AND FINAL ACCEPTANCE IS GIVEN BY THE ENGINEER.

DUST CONTROL:

1. CONSTRUCTION ACTIVITIES SHALL BE SCHEDULED TO MINIMIZE AREAS OF DISTURBED SOIL EXPOSED AT ONE TIME.
2. DUST SHALL BE CONTROLLED ON CONSTRUCTION ROUTES AND OTHER DISTURBED AREAS SUBJECT TO SURFACE DUST MOVEMENT AND DUST BLOWING.
3. MAINTAIN DUST CONTROL MEASURES PROPERLY THROUGH DRY WEATHER PERIODS UNTIL ALL DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.
4. DUST CONTROL METHODS SHALL INCLUDE VEGETATIVE COVER, MULCH (INCLUDING GRAVEL MULCH), WATER SPRINKLING, STONE, AND BARRIERS.

GENERAL MAINTENANCE PLAN (DURING CONSTRUCTION):

1. ALL EROSION AND SEDIMENTATION CONTROL PRACTICES SHALL BE INSPECTED AT LEAST ONCE EVERY 7 CALENDAR DAYS, OR EVERY 14 CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.25 INCHES OR GREATER, IN ACCORDANCE WITH THE SWPPP.
2. ACCUMULATED SEDIMENT SHALL BE REMOVED FROM BEHIND STRAW WATTLES WHEN IT BECOMES 4 INCHES DEEP OR WHEN ACCUMULATIONS HAVE ADVERSELY AFFECTED IT'S FUNCTION. STRAW WATTLES SHALL BE REPAIRED BY REMOVING SILT AND SEDIMENTS AND THEN TAMPING LOOSE SOIL ALONG BASE, REPLACING DAMAGED OR WEAKENED SAND BAGS, OR AS NECESSARY TO MAINTAIN A BARRIER.
3. ALL DISTURBED AREAS SHALL BE STABILIZED PER THESE SPECIFICATIONS TO MAINTAIN VIGOROUS, DENSE VEGETATION. REPAIR ANY ERODED SLOPES, REAPPLY TOPSOIL, RESEED AND STABILIZE REPAIR AREA AS REQUIRED FOR PERMANENT OR TEMPORARY MEANS. REPAIR SOIL AREAS DAMAGED BY EROSION OR CONSTRUCTION EQUIPMENT.
4. IMMEDIATELY REPAIR ANY DAMAGE CAUSED BY CONSTRUCTION EQUIPMENT, MAINTENANCE OR OTHER ACTIVITY TO ANY EROSION AND SEDIMENTATION CONTROL MEASURE, OR BEST MANAGEMENT PRACTICE (BMP) OR DEVICE.
5. THE PRIME CONTRACTOR IS RESPONSIBLE FOR THE PERFORMANCE AND COMPLIANCE OF IT'S SUBCONTRACTOR'S ACTIVITIES RELATING TO THE SWPPP. THEY SHALL MAKE FREQUENT INSPECTIONS OF THEIR WORK AND COORDINATE APPROPRIATE INSTALLATION AND MAINTENANCE OF EROSION AND SEDIMENTATION CONTROL AND WATER QUALITY DEVICES.
6. EMPLOY POLLUTION PREVENTION MEASURES TO CONTROL LITTER, CONSTRUCTION CHEMICALS, SEDIMENT, AND CONSTRUCTION DEBRIS INCLUDING, BUT NOT LIMITED TO THE FOLLOWING: SALVAGE AND REUSE OF MATERIALS, MINIMIZING PACKAGING WASTE, RECYCLING, PROPER DISPOSAL AT FREQUENT INTERVALS IN ACCORDANCE WITH PREVAILING LAWS, ONSITE INSTRUCTION REGARDING APPROPRIATE SEPARATION/HANDLING/RECYCLING, PERIODIC DEBRIS REMOVAL AT DRAINAGE STRUCTURES (GRATES AND SUMPS)/SEDIMENT TRAPS/ FOREBAY AND OTHER BMPS, PROPER MAINTENANCE OF SEDIMENT/ EROSION CONTROL SYSTEMS, ROUTINE AND EVENT RELATED INSPECTIONS OF DRAINAGE AND BMP SYSTEMS PER PERMIT REQUIREMENTS, PROVIDE APPROPRIATE SANITARY FACILITIES FOR ONSITE PERSONNEL, PICK UP TRASH AND DEBRIS FREQUENTLY AND USE WATER MIST, CALCIUM CHLORIDE, OR OTHER LEGAL MEANS TO LIMIT THE SPREAD OF DUST AND SOIL PARTICLES.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP):

1. THE FOLLOWING NOTES ARE PROVIDED AS A SUMMARY REFERENCE FOR THE CONTRACTOR ONLY. THE REQUIREMENTS IN THE FULL SWPPP FOR THE PROJECT SHALL BE FOLLOWED BY THE CONTRACTOR. IN THE EVENT OF A CONFLICT BETWEEN THE DRAWINGS AND THE SWPPP, THE ENGINEER SHALL DETERMINE THE CORRECT REQUIREMENTS.
2. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE PERFORMED IN ACCORDANCE WITH THE MASSACHUSETTS EROSION AND SEDIMENTATION CONTROL GUIDELINES. THE CONTRACTOR SHALL OWN AND MAINTAIN A COPY OF THE GUIDELINES ON-SITE DURING CONSTRUCTION.
3. NO EROSION AND SEDIMENTATION CONTROL DEVICE SHALL PENETRATE THE EXISTING LANDFILL COVER MATERIALS WITHIN THE LIMITS OF WASTE.
4. ALL DISTURBED AREAS SHALL BE KEPT TO A MINIMUM. FINAL GRADING AND RESTORATION SHALL BE ACCOMPLISHED AS SOON AS PRACTICAL.
5. EROSION AND SEDIMENTATION CONTROL STRUCTURES SHALL BE INSTALLED PRIOR TO SITE WORK.
6. ALL CONTROL STRUCTURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND REMOVED WHEN STABILIZATION HAS BEEN ATTAINED. IF THE PROPOSED CONTROL MEASURES ARE NOT SATISFACTORY TO THE ENGINEER, ADDITIONAL CONTROL MEASURES SHALL BE TAKEN.
7. ALL RUNOFF FROM THE DISTURBED AREA SHALL BE CONTROLLED AND FILTERED. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS.
8. A NPDES CONSTRUCTION GENERAL PERMIT WILL BE REQUIRED FOR THE PROPOSED PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMPLEMENTATION AND COMPLIANCE WITH THE APPROVED NPDES NOTICE OF INTENT (NOI) AND SWPPP.
9. THE CONTRACTOR MUST OBTAIN COPIES OF THE PLANNING BOARD, WETLANDS, POST CLOSURE USE PERMIT, AND STORMWATER PERMITS PRIOR TO THE START OF WORK.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTATION OF EROSION AND SEDIMENTATION CONTROL MEASURES. THIS RESPONSIBILITY INCLUDES THE ACQUISITION OF MATERIALS, INSTALLATION, AND MAINTENANCE OF EROSION AND SEDIMENTATION STRUCTURES, THE COMMUNICATION AND DETAILED EXPLANATION TO ALL PEOPLE INVOLVED IN THE SITE WORK OF THE REQUIREMENTS AND OBJECTIVE OF THE EROSION AND SEDIMENTATION CONTROL MEASURES.
11. TWO (2) WEEKS PRIOR TO THE START OF WORK, THE CONTRACTOR SHALL PROVIDE THE NAME AND PHONE NUMBER OF THE INDIVIDUAL RESPONSIBLE FOR IMPLEMENTATION OF THE EROSION & SEDIMENTATION CONTROL PLAN.
12. THE ENGINEER SHALL BE NOTIFIED OF ANY PROPOSED ALTERATION TO THE EROSION AND SEDIMENTATION CONTROL PLAN, PRIOR TO ALTERING, IN ORDER TO ENSURE THE FEASIBILITY OF THE ADDITION, SUBTRACTION, OR CHANGE IN THE PLAN.

SHADE MIX SEEDING (WITHIN PV DEVELOPMENT AREAS):

ALL DISTURBED AREAS WITHIN THE PHOTOVOLTAIC DEVELOPMENT AREA SHALL BE HYDROMULCHED IN ACCORDANCE WITH THE FOLLOWING CONSTRUCTION METHODS:

1. THE LIMING, FERTILIZING, AND SEEDING TO BE ACCOMPLISHED UNDER THIS SECTION SHALL BE DONE DURING A PERIOD OF TIME TO BE APPROVED BY THE ENGINEER OR LANDSCAPE ARCHITECT. CONTRACTOR SHALL NOTIFY THE ENGINEER OR ARCHITECT 30 DAYS PRIOR TO THE TIME THAT HE/SHE INTENDS TO BEGIN THIS WORK.
2. HEAVILY SCARIFYING THE EXISTING TURF GRASS AND OVER SEEDING WITH ADDITIONAL SEED MIX MAY BE NECESSARY IN SOME AREAS.
3. AREAS OF BARE SOIL SHALL RECEIVE 4-INCHES OF LOAM PRIOR TO SEEDING. THE EXISTING TURF SHALL BE TOP DRESSED WITH ONE TO TWO INCHES OF LOAM BEFORE SEED IS APPLIED.
4. AFTER ALL SURFACES TO BE SEEDED HAVE BEEN BROUGHT TO FINISHED GRADE, THE CONTRACTOR SHALL FURNISH AND APPLY LIMESTONE AS HEREIN SPECIFIED.
5. LIMESTONE SHALL BE APPLIED AT A RATE UP TO A MAXIMUM OF 100 POUNDS PER 1000 SQUARE FEET, OR AS DETERMINED BY THE RESULTS OF LABORATORY TESTS CONDUCTED BY AN APPROVED TESTING LABORATORY.
   5.1. IT IS RECOMMENDED THAT THE CONTRACTOR COLLECT TOPSOIL SAMPLES FOR LABORATORY ANALYSIS. A MINIMUM OF 4 SUB-SAMPLES, TAKEN TO THE PROPOSED DEPTH OF TOPSOIL, SHALL BE TAKEN PER ACRE OF AREA TO BE LIMED. THESE SAMPLES SHALL BE PLACED IN A SUITABLE CONTAINER OBTAINED FROM THE TESTING LABORATORY AND MARKED SO AS TO CLEARLY INDICATE THE ACRE AREA FROM WHICH THEY WERE TAKEN.
   5.2. THE SAMPLE SHALL BE DELIVERED BY THE CONTRACTOR TO THE TESTING LABORATORY FOR CHEMICAL AND MECHANICAL ANALYSIS. THE TESTING LABORATORY SHALL BE DIRECTED BY THE CONTRACTOR TO FURNISH TEST RESULTS AND RECOMMENDATIONS FOR LIMING AND FERTILIZING TO THE ENGINEER OR ARCHITECT FOR APPROVAL.
6. LIME SHALL BE MECHANICALLY SPREAD IN TWO APPLICATIONS UP TO 50 POUNDS PER 1000 SQUARE FEET, ON ALL AREAS. THE LIME SHALL BE DISTRIBUTED UNIFORMLY.
7. FERTILIZER SHALL BE MECHANICALLY SPREAD SO AS TO OBTAIN UP TO A MINIMUM SOWN FERTILIZER COVERAGE YIELD OF 16 POUNDS PER 1000 SQUARE FEET. THE ACTUAL AMOUNTS AND TYPE OF FERTILIZER APPLIED SHALL BE AS DETERMINED BY THE RESULTS OF LABORATORY TESTS CONDUCTED ABOVE. AT SLOPES EXCEEDING 25% GRADE, THE FERTILIZER SHALL BE APPLIED MANUALLY IN AN APPROVED MANNER.
8. SEED SHALL BE INCORPORATED WITH THE MULCHING MATERIAL SO AS TO OBTAIN A MINIMUM SOWN COVERAGE OF 200 POUNDS OF THE SPECIFIED MIX PER ACRE. SEED SUBSTITUTIONS MAY REQUIRE RATE ADJUSTMENTS AS RECOMMENDED BY THE SEED SUPPLIERS, IF APPROVED BY THE ENGINEER OR LANDSCAPE ARCHITECT.
9. AT AREAS TO BE SEEDED BY HYDROMULCHING, CONTRACTOR SHALL REMOVE AND APPROPRIATELY DISPOSE OF ALL STONES OVER 2 INCHES IN SIZE OR OTHER UNSUITABLE MATERIAL OFF SITE.
10. AFTER THE FINE GRADING AND PREPARATIONS FOR HYDROMULCH SEEDING ARE APPROVED BY THE ENGINEER OR LANDSCAPE ARCHITECT, THE CONTRACTOR SHALL SEED THE AREA INDICATED, AS SPECIFIED HEREIN. THE SEED SHALL BE INCORPORATED WITH MULCHING MATERIALS COMPOSED OF WOOD CELLULOSE FIBERS THAT WILL READILY DISPERSE IN WATER TO FORM A UNIFORM AND HOMOGENEOUS MIXTURE WHEN AGITATED.
11. THE SLURRY SO FORMED SHALL BE OF SUCH CONSISTENCY THAT IT CAN BE SPRAYED UPON THE PREPARED SOIL SURFACES FROM A HYDROSEED GUN OR THROUGH AT LEAST 200 FEET OF ONE AND ONE-HALF INCH DIAMETER CANVAS HOSE. THE MULCHING MATERIAL SHALL BE USED AT THE RATE OF 1000 POUNDS PER ACRE ON FLAT SURFACES AND 1400 POUNDS PER ACRE ON SLOPES EXCEEDING FOUR PERCENT.
12. SPRAYING EQUIPMENT SPECIFICATIONS SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO SITE ENTRY TO ASSESS GROUND PRESSURE.

_____

_____

_____

_____

_____

APPROVED MILLBURY PLANNING BOARD DATE

SEEDING MATERIALS:

LIME:

1. LIME SHALL BE STANDARD COMMERCIAL GROUND LIMESTONE CONTAINING AT LEAST 50% TOTAL OXIDES (CALCIUM OXIDE AND MAGNESIUM OXIDE) AND 50% PERCENT OF THE MATERIAL MUST PASS THROUGH A #100 MESH SIEVE, WITH 98% PASSING A #20 MESH SIEVE.

FERTILIZER:

1. FERTILIZER SHALL BE COMMERCIAL FERTILIZER 10-6-4 U.F. FERTILIZER MIXTURE CONTAINING AT LEAST 60% OF ORGANIC MATERIAL OR TYPE DETERMINED BY CHEMICAL SOIL ANALYSIS AS TESTED BY AN APPROVED LABORATORY. IT SHALL BE DELIVERED AT THE SITE IN THE ORIGINAL SEALED CONTAINERS WITH CONTENTS CLEARLY DESCRIBED.

SEED:

1. THE SEED MIX WITHIN THE LIMITS OF THE FENCE SHALL BE ERNST SOLAR FARM SEED MIX (ERNMX-186), OR APPROVED EQUAL. SUBMIT SUPPLIER'S SEED BLEND SPECIFICATIONS TO THE ENGINEER OR LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO COMMENCING WITH THE HYDROSEEDING OPERATIONS. SEEDING SHALL BE APPLIED AT A RATE OF 6 LB PER 1,000 SQFT.

COMMON NAME	WEIGHT
CREEPING RED FESCUE	45.5%
HARD FESCUE, 'BEACON'	15%
HARD FESCUE, 'GLADIATOR'	15%
CHEWINGS FESCUE	10%
KENTUCKY BLUEGRASS, 'SELWAY'	5%
KENTUCKY BLUEGRASS, APPALACHIAN	5%
WHITE CLOVER, DUTCH	4.5%

MULCH:

1. MULCH MATERIAL SHALL BE A MANUFACTURED PRODUCT OF NATURAL WOOD CELLULOSE FIBERS. MATERIAL SHALL BE INTERNATIONAL PAPER COMPANY'S "TURFIBER;" WEYERHAEUSER COMPANY'S "SILVA-FIBER," OR APPROVED EQUAL AND CLEARLY PACKED IN ORIGINAL CONTAINERS, SEALED AND CLEARLY LABELED WITH BRAND NAME AND MANUFACTURER. IT SHALL HAVE A DELIVERED MOISTURE CONTENT OF NOT OVER 12%.

MAINTENANCE OF SEEDED AREAS:

1. CONTRACTOR SHALL MAINTAIN THE ENTIRE SEEDED AREAS UNTIL FINAL ACCEPTANCE AT THE COMPLETION OF THE PROJECT OR FOR 90 DAYS, WHICHEVER IS LONGER. MAINTENANCE SHALL INCLUDE WATERING AS SPECIFIED, WEEDING, REMOVAL OF STONES WHICH MAY APPEAR AND REGULAR CUTTINGS OF THE GRASS NO CLOSER THAN 10 DAYS APART. THE FIRST CUTTING SHALL BE ACCOMPLISHED WHEN THE GRASS IS FROM 2-1/2 TO 3 INCHES HIGH. WEEKLY WATERING SHALL PROVIDE THE SEEDED AREAS WITH THE EQUIVALENT OF 1 INCH OF RAINFALL PER WEEK. IF THE SEEDED AREAS ARE WATERED BY NORMAL RAINFALL OR THE NORMAL WATERING IS INADEQUATE DUE TO WEATHER, THE CONTRACTOR MAY AT HIS/HER DISCRETION ELIMINATE OR INCREASE RESPECTIVELY, THE WATERING DURING A GIVEN WEEK. HOWEVER, SUCH ACTION BY THE CONTRACTOR SHALL IN NO WAY WAIVE THE CONTRACTOR'S RESPONSIBILITY FOR THE GROWTH AND HEALTH OF THE GRASS UNTIL FINAL ACCEPTANCE. CONTRACTOR SHALL FURNISH ALL TEMPORARY PIPE AND CONNECTIONS FOR SPRINKLING. CONTRACTOR SHALL FURNISH ALL REQUIRED WATER AT NO EXPENSE TO THE OWNER. GARDEN HOSE AND HAND SPRINKLING SHALL BE PERMITTED ONLY IN SPECIAL INSTANCES BY THE ENGINEER OR LANDSCAPE ARCHITECT.
2. ALL BARE SPOTS, WHICH BECOME APPARENT AS THE GRASS GERMINATES, SHALL BE RESEEDED BY THE CONTRACTOR AT HIS/HER OWN EXPENSE AS MANY TIMES AS NECESSARY TO SECURE AN ADEQUATE GROWTH, AND THE ENTIRE AREA SHALL BE MAINTAINED AND CUT UNTIL ALL WORK HAS BEEN COMPLETED AND FINAL ACCEPTANCE HAS OCCURRED. RESEEDING MAY BE ACCOMPLISHED BY HYDROMULCHING OR BY MECHANICAL MEANS AS DETERMINED BY THE AREA OF RESEEDING TO BE ACCOMPLISHED.
3. AT ALL AREAS TO BE SEEDED WHERE HYDROMULCHING CANNOT BE ACCOMPLISHED, I.E., ADJACENT TO NARROW OR IRREGULARLY SHAPED AREAS, PERFORM THE WORK MANUALLY AND PROTECT THE SEEDED AREAS WITH STRAW, OR WOOD FIBER MULCH SPRINKLED TO COVER THE AREA.
4. CONTRACTOR SHALL TAKE WHATEVER MEASURES ARE NECESSARY TO PROTECT THE GRASS WHILE IT IS GERMINATING. THESE MEASURES SHALL INCLUDE FURNISHING OF WARNING SIGNS, BARRIERS, TEMPORARY FENCE OR ANY OTHER NECESSARY MEASURES OF PROTECTION.
5. CONTRACTOR SHALL FURNISH, PROTECT, AND MAINTAIN ALL TEMPORARY BARRIERS UNTIL FINAL ACCEPTANCE OF THE SEEDED AREAS BY THE OWNER AND SHALL REMOVE THEM UPON SUCH FINAL ACCEPTANCE, THE BARRIERS SHALL REMAIN THE PROPERTY OF CONTRACTOR AT ALL TIMES.

SPECIFICATIONS FOR WORK ON LANDFILL:

1. THE CONTRACTOR SHALL BE AWARE THAT THE WORK IS LOCATED ON A LANDFILL AND IS SUBJECT TO THE MASSACHUSETTS SOLID WASTE REGULATIONS (310 CMR 19.000).
2. THE CONTRACTOR SHALL BE AWARE THAT THE WORK IS TO TAKE PLACE ABOVE A LANDFILL COVER SYSTEM. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO NOT DISRUPT THE LANDFILL CAP PROFILE.
3. WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION'S POST CLOSURE USE PERMIT APPROVAL.
4. THE CONTRACTOR SHALL HAVE A HEALTH AND SAFETY PLAN WHILE WORKING ON THE LANDFILL.
5. THE CONTRACTOR SHALL MAINTAIN A 10 FOOT PROTECTION RADIUS AROUND ALL LANDFILL GAS VENTS FOR THE DURATION OF THE PROJECT.

EQUIPMENT

1. THE CONTRACTOR SHALL PROVIDE A LIST OF ALL EQUIPMENT PROPOSED TO BE WORKING ON THE LANDFILL. THE LIST SHALL INCLUDE THE EQUIPMENT WEIGHT, GROUND PRESSURE, AND ANY RESTRICTIONS THAT WILL BE IMPOSED ON THE VEHICLE (I.E., LIMITED TO TEMPORARY ACCESS ROADS, LIMITED TO CARRYING 1/2 LOADS, ETC.).
2. ALL EQUIPMENT IS SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. AS A GENERAL RULE, EQUIPMENT SHALL HAVE A MAXIMUM GROUND PRESSURE OF LESS THAN 7 PSI ON THE EXISTING LANDFILL SYSTEM (OFF THE PROPOSED ACCESS ROAD).

Project:

MILLBURY LANDFILL
SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:

AMERESCO
Green • Clean • Sustainable

Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:

Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:

COMMONWEALTH OF MASSACHUSETTS
ROBERT J. BUKOWSKI
CIVIL
No. 41402
REGISTERED
PROFESSIONAL ENGINEER
5/13/22

Issued For:

PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/13/2022
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

Drawing Title:

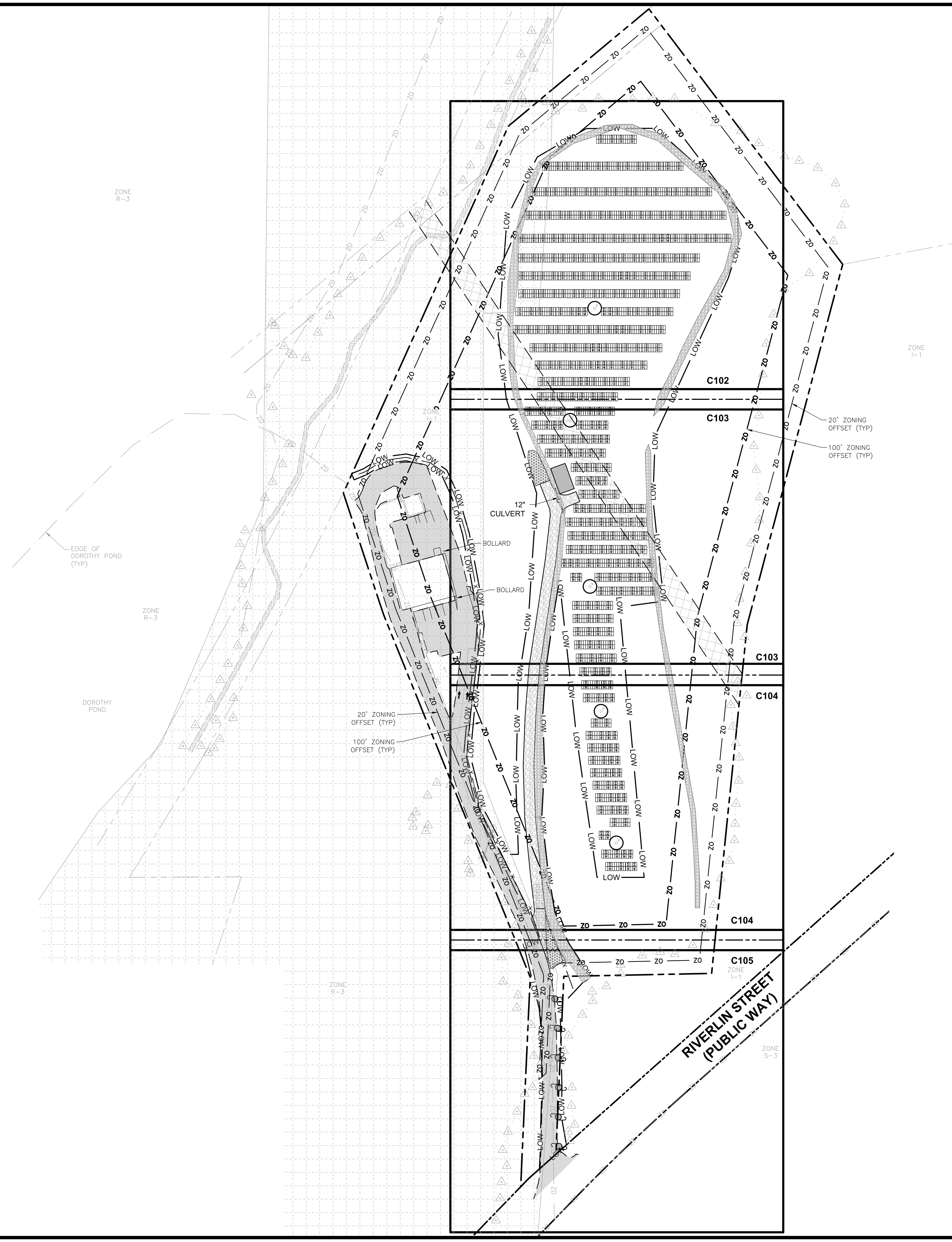
NOTES AND SPECIFICATIONS

Sheet Number:

C001

C:\Users\dempsey.dave\WESTON & SAMPSON ENGINEERS, Inc\Ameresco - Millbury Landfill - Millbury Landfill\CAD\03 Sheets\2 - C001 Notes and Specifications.dwg

COPYRIGHT © 2022 WESTON & SAMPSON, INC.



NAD 83

GENERAL NOTES:

1. FOUNDATION LOCATIONS AND ARRAY ORIENTATION SUBJECT TO CHANGE BASED ON FINAL DESIGN.
2. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM INFORMATION.

LEGEND:

EXISTING

- MAJOR CONTOUR (430)
- MINOR CONTOUR
- STONE WALL
- SITE PROPERTY LINE
- ABUTTER PROPERTY LINE
- ADJACENT ROW LINE
- APPROXIMATE ZONING DISTRICT BOUNDARY (ZO)
- 6' CHAIN LINK FENCE WITH BARBED WIRE (x)
- OVERHEAD ELECTRIC LINE (OHW)
- RIP RAP SWALE
- WETLAND LINE
- 25' WETLAND BUFFER
- 100' WETLAND BUFFER
- SEWER LINE (S)
- APPROXIMATE LIMIT OF WASTE
- UTILITY POLE
- GUY WIRE
- WETLAND FLAG
- SEWER MANHOLE
- MONITORING WELL
- VENT
- EDGE OF PAVEMENT
- PAVEMENT
- APPROXIMATE AQUIFER PROTECTION OVERLAY AREA
- GRAVEL PATH
- BLOCK WALL

PROPOSED

- OVERHEAD ELECTRIC LINE (OHE)
- ELECTRIC CONDUIT (EC)
- LIMIT OF WORK (LOW)
- FENCE (x) 9/C502
- SEDIMENT BARRIER (SB) 3/C501
- SOLAR PV RACK WITH BALLAST BLOCKS 6/C502
- GRAVEL ACCESS ROAD 8/C502
- CONCRETE EQUIPMENT PAD 7/C502
- 10' DIAMETER BUFFER AROUND VENT

80 40 0 80 160
SCALE: 1"=80'

APPROVED MILLBURY PLANNING BOARD DATE

Project:
MILLBURY LANDFILL
SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:
AMERESCO
Green • Clean • Sustainable
Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:
Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:
COMMONWEALTH OF MASSACHUSETTS
ROBERT J. BUKOWSKI
CIVIL
No. 41492
REGISTERED PROFESSIONAL ENGINEER
5/13/22

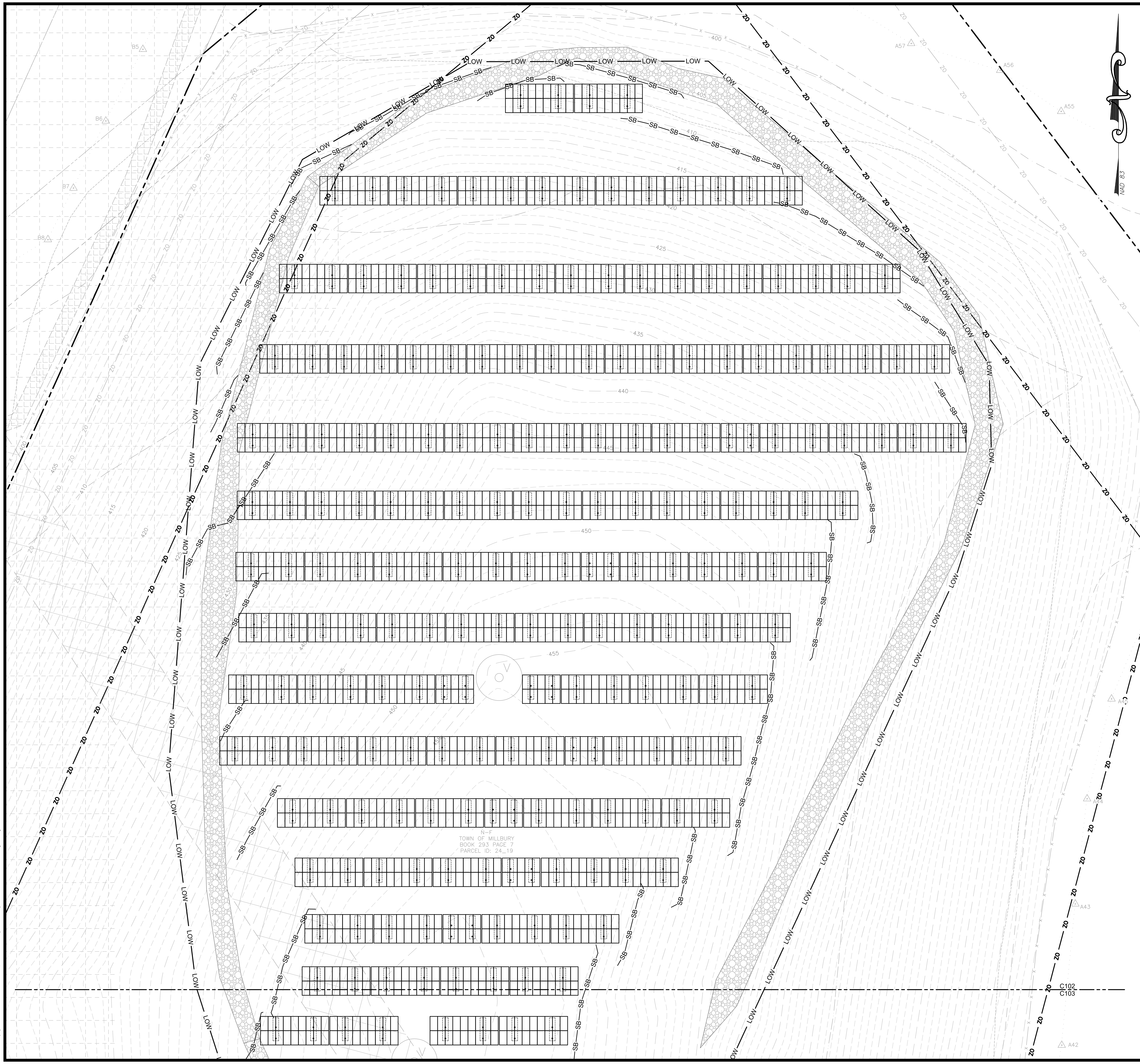
Issued For:
PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/13/2022
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

Drawing Title:
INDEX PLAN

Sheet Number:
C101

COPYRIGHT © 2022 WESTON & SAMPSON, INC.



GENERAL NOTES:

1. FOUNDATION LOCATIONS AND ARRAY ORIENTATION SUBJECT TO CHANGE BASED ON FINAL DESIGN.
2. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM INFORMATION.

LEGEND:

EXISTING

- MAJOR CONTOUR (430)
- MINOR CONTOUR
- STONE WALL
- SITE PROPERTY LINE
- ABUTTER PROPERTY LINE
- ADJACENT ROW LINE
- APPROXIMATE ZONING DISTRICT BOUNDARY (ZD)
- 6' CHAIN LINK FENCE WITH BARBED WIRE (x)
- OVERHEAD ELECTRIC LINE (OHW)
- RIP RAP SWALE
- WETLAND LINE
- 25' WETLAND BUFFER
- 100' WETLAND BUFFER
- SEWER LINE (S)
- APPROXIMATE LIMIT OF WASTE
- UTILITY POLE
- GUY WIRE
- WETLAND FLAG
- SEWER MANHOLE
- MONITORING WELL
- VENT
- EDGE OF PAVEMENT
- PAVEMENT
- APPROXIMATE AQUIFER PROTECTION OVERLAY AREA
- GRAVEL PATH
- BLOCK WALL

PROPOSED

- OHE — OVERHEAD ELECTRIC LINE
- EC — ELECTRIC CONDUIT
- LOW — LIMIT OF WORK
- x — FENCE (9/C502)
- SB—SB — SEDIMENT BARRIER (3/C501)
- SOLAR PV RACK WITH BALLAST BLOCKS (6/C502)
- GRAVEL ACCESS ROAD (8/C502)
- CONCRETE EQUIPMENT PAD (7/C502)
- 10' DIAMETER BUFFER AROUND VENT

20 10 0 20 40
SCALE: 1"=20'

APPROVED MILLBURY PLANNING BOARD DATE

Project:

MILLBURY LANDFILL SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:

AMERESCO
Green • Clean • Sustainable

Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:

Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:

COMMONWEALTH OF MASSACHUSETTS
ROBERT J. BUKOWSKI
CIVIL
No. 41492
REGISTERED PROFESSIONAL ENGINEER
5/13/22

Issued For:

PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/13/2022
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

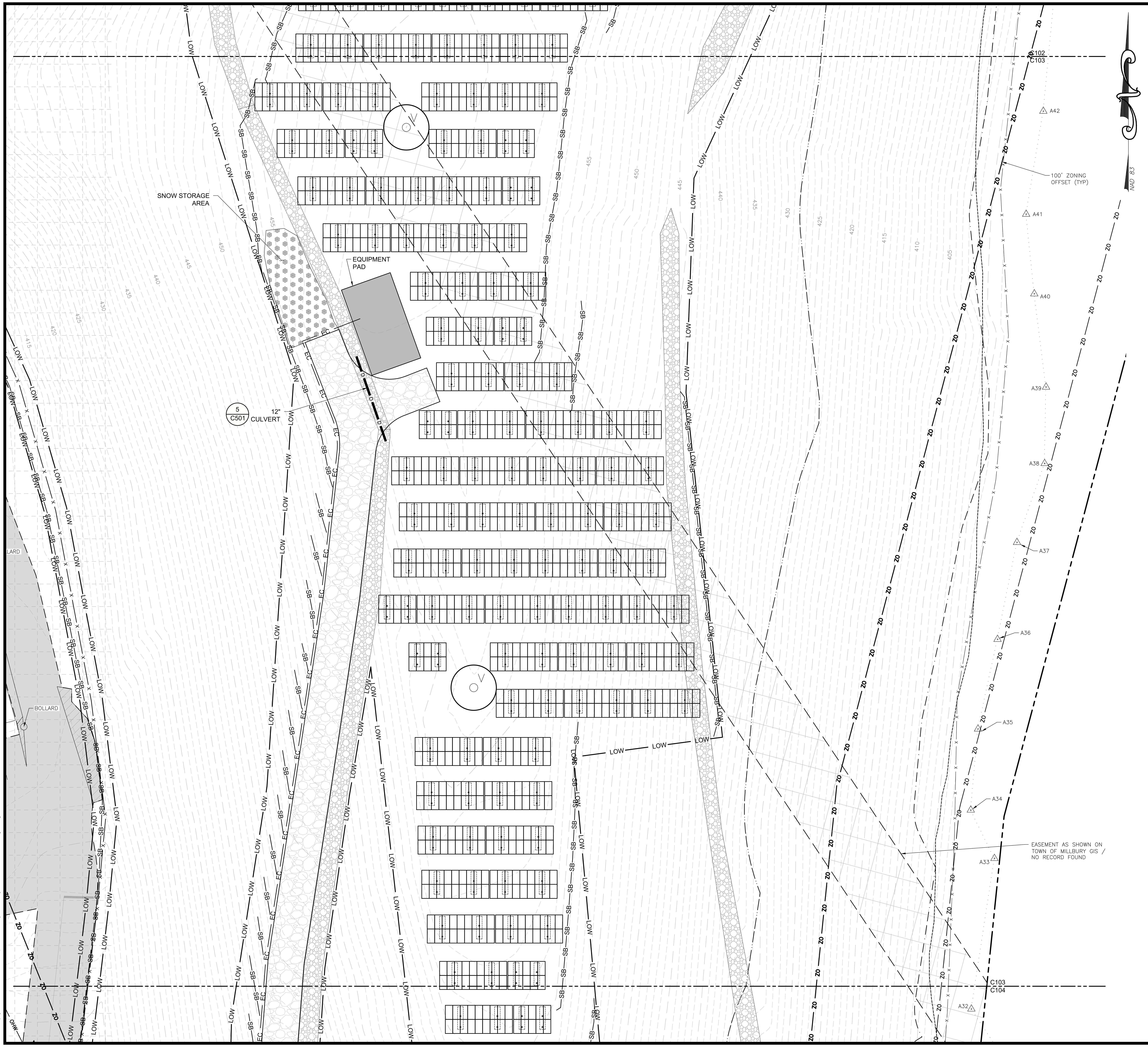
Drawing Title:

PROPOSED SITE PLAN SHEET 1

Sheet Number:

C102

COPYRIGHT © 2022 WESTON & SAMPSON, INC.



GENERAL NOTES:

1. FOUNDATION LOCATIONS AND ARRAY ORIENTATION SUBJECT TO CHANGE BASED ON FINAL DESIGN.
2. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM INFORMATION.

LEGEND:

EXISTING

- 430 — MAJOR CONTOUR
- MINOR CONTOUR
- STONE WALL
- SITE PROPERTY LINE
- ABUTTER PROPERTY LINE
- ADJACENT ROW LINE
- ZD — APPROXIMATE ZONING DISTRICT BOUNDARY
- x — 6' CHAIN LINK FENCE WITH BARBED WIRE
- OHW — OVERHEAD ELECTRIC LINE
- RIP RAP SWALE
- WETLAND LINE
- 25' WETLAND BUFFER
- 100' WETLAND BUFFER
- S — SEWER LINE
- APPROXIMATE LIMIT OF WASTE
- UTILITY POLE
- GUY WIRE
- WETLAND FLAG
- SEWER MANHOLE
- MONITORING WELL
- VENT
- EDGE OF PAVEMENT
- PAVEMENT
- APPROXIMATE AQUIFER PROTECTION OVERLAY AREA
- GRAVEL PATH
- BLOCK WALL

PROPOSED

- OHE — OVERHEAD ELECTRIC LINE
- EC — ELECTRIC CONDUIT
- LOW — LIMIT OF WORK
- x — FENCE (9 / C502)
- SB — SB — SEDIMENT BARRIER (3 / C501)
- SOLAR PV RACK WITH BALLAST BLOCKS (6 / C502)
- GRAVEL ACCESS ROAD (8 / C502)
- CONCRETE EQUIPMENT PAD (7 / C502)
- 10' DIAMETER BUFFER AROUND VENT

20 10 0 20 40

SCALE: 1"=20'

APPROVED MILLBURY PLANNING BOARD DATE

Project:

MILLBURY LANDFILL SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:

AMERESCO
Green • Clean • Sustainable

Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:

TOWN OF MILLBURY, MASSACHUSETTS INCORPORATED 1813

Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:

COMMONWEALTH OF MASSACHUSETTS
ROBERT J. BUKOWSKI
CIVIL
No. 41492
REGISTERED PROFESSIONAL ENGINEER
5/13/22

Issued For:

PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/13/2022
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

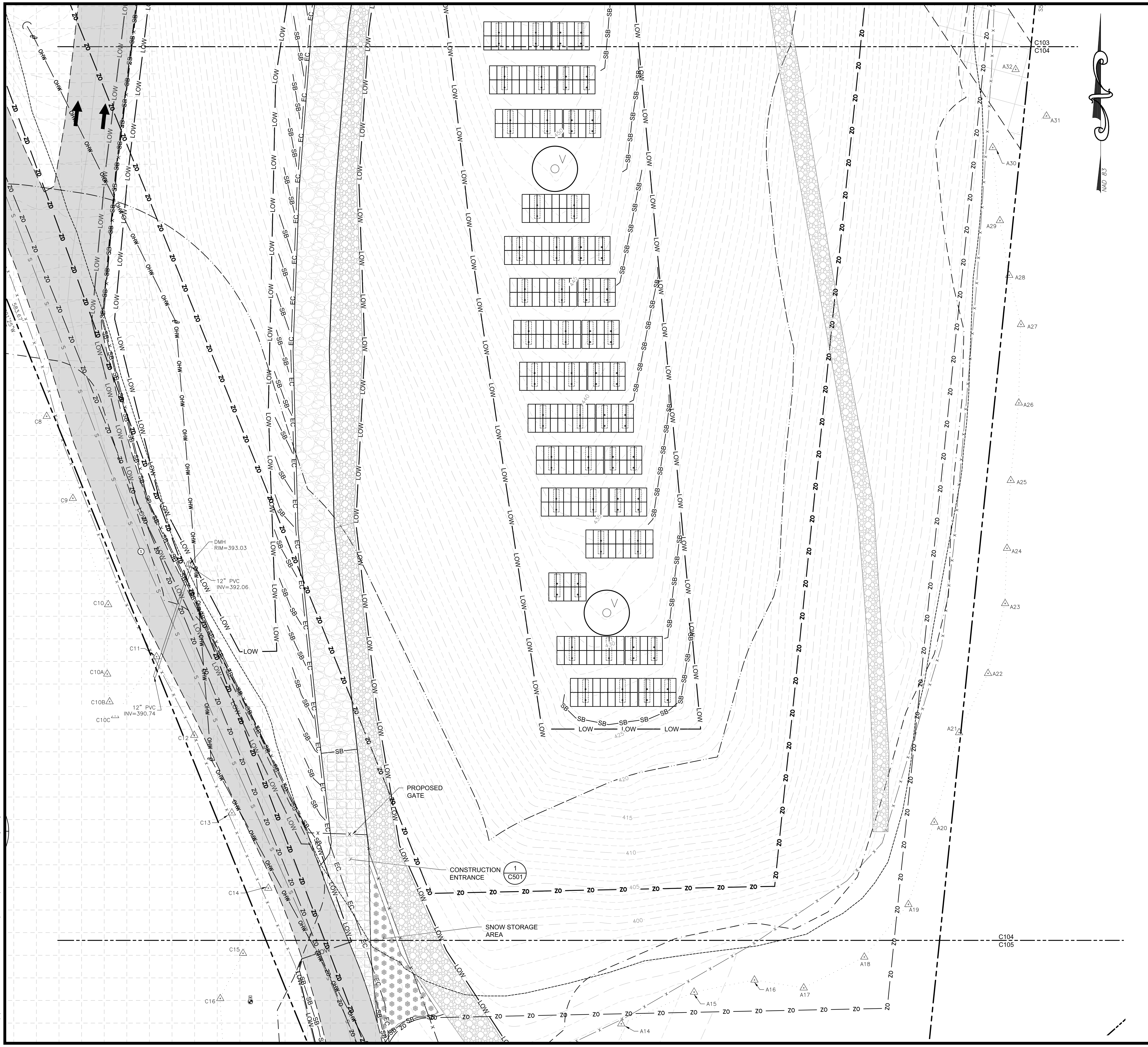
Drawing Title:

PROPOSED SITE PLAN SHEET 2

Sheet Number:

C103

COPYRIGHT © 2022 WESTON & SAMPSON, INC.



GENERAL NOTES:

1. FOUNDATION LOCATIONS AND ARRAY ORIENTATION SUBJECT TO CHANGE BASED ON FINAL DESIGN.
2. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM INFORMATION.

LEGEND:

EXISTING

- 430 MAJOR CONTOUR
- MINOR CONTOUR
- STONE WALL
- SITE PROPERTY LINE
- ABUTTER PROPERTY LINE
- ADJACENT ROW LINE
- ZD APPROXIMATE ZONING DISTRICT BOUNDARY
- x 6' CHAIN LINK FENCE WITH BARBED WIRE
- OHW OVERHEAD ELECTRIC LINE
- RIP RAP SWALE
- WETLAND LINE
- 25' WETLAND BUFFER
- 100' WETLAND BUFFER
- S SEWER LINE
- APPROXIMATE LIMIT OF WASTE
- UTILITY POLE
- GUY WIRE
- WETLAND FLAG
- SEWER MANHOLE
- MONITORING WELL
- VENT
- EDGE OF PAVEMENT
- PAVEMENT
- APPROXIMATE AQUIFER PROTECTION OVERLAY AREA
- GRAVEL PATH
- BLOCK WALL

PROPOSED

- OHE OVERHEAD ELECTRIC LINE
- EC ELECTRIC CONDUIT
- LOW LIMIT OF WORK
- x FENCE (9 / C502)
- SB SEDIMENT BARRIER (3 / C501)
- SOLAR PV RACK WITH BALLAST BLOCKS (6 / C502)
- GRAVEL ACCESS ROAD (8 / C502)
- CONCRETE EQUIPMENT PAD (7 / C502)
- 10' DIAMETER BUFFER AROUND VENT

20 10 0 20 40
SCALE: 1"=20'

APPROVED MILLBURY PLANNING BOARD DATE

Project:
MILLBURY LANDFILL
SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:
AMERESCO
Green • Clean • Sustainable
Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:
Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:
COMMONWEALTH OF MASSACHUSETTS
ROBERT J. BUKOWSKI
CIVIL
No. 41492
REGISTERED PROFESSIONAL ENGINEER
5/13/22

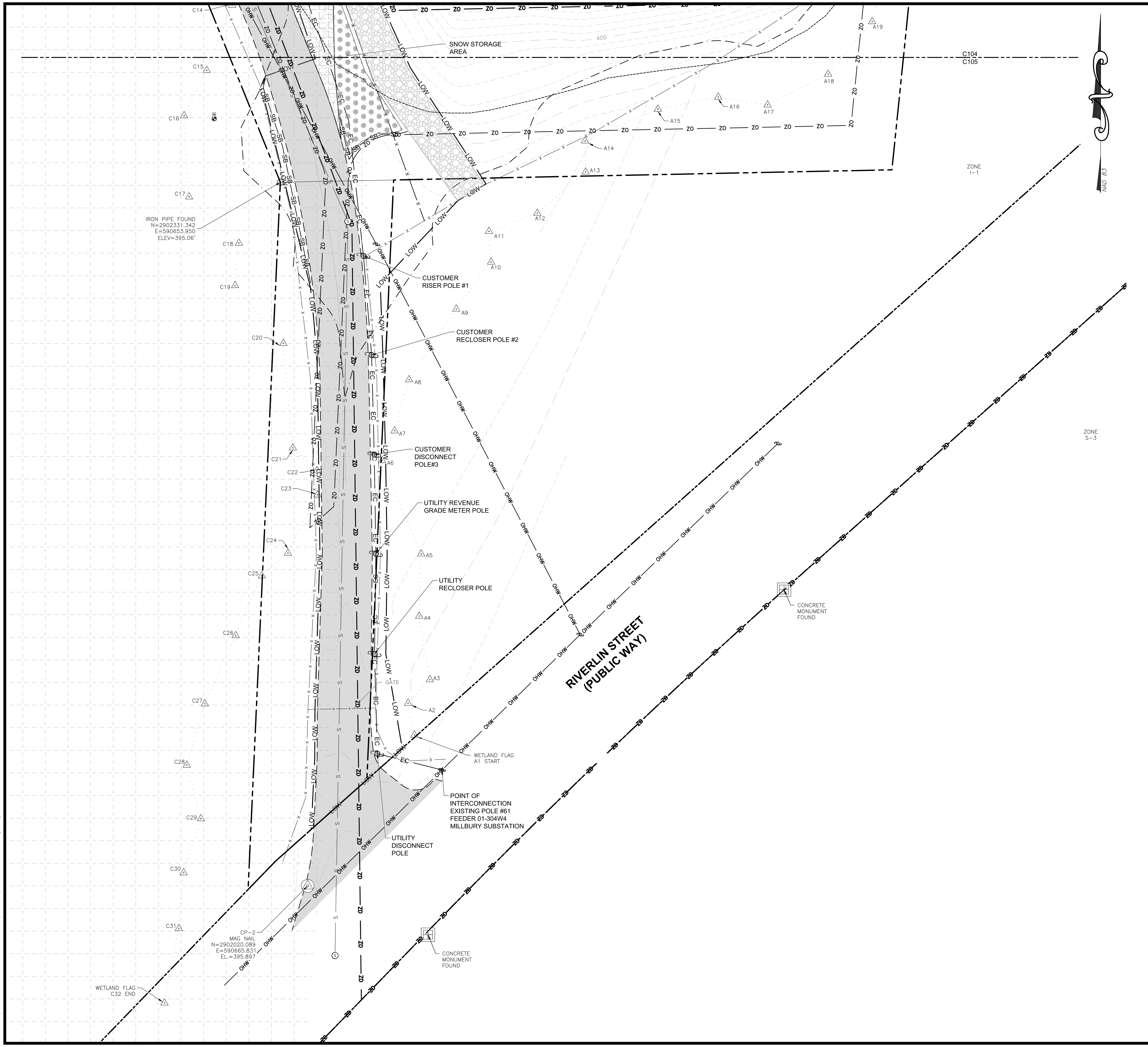
Issued For:
PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/13/2022
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

Drawing Title:
PROPOSED SITE PLAN SHEET 3

Sheet Number:
C104

COPYRIGHT © 2022 WESTON & SAMPSON, INC.



GENERAL NOTES:

1. FOUNDATION LOCATIONS AND ARRAY ORIENTATION SUBJECT TO CHANGE BASED ON FINAL DESIGN.
2. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM INFORMATION.

LEGEND:

EXISTING

- MAJOR CONTOUR
- MINOR CONTOUR
- STONE WALL
- SITE PROPERTY LINE
- ABUTTER PROPERTY LINE
- ADJACENT ROW LINE
- APPROXIMATE ZONING DISTRICT BOUNDARY
- 6' CHAIN LINK FENCE WITH BARBED WIRE
- OVERHEAD ELECTRIC LINE
- RIP RAP SWALE
- WETLAND LINE
- 25' WETLAND BUFFER
- 100' WETLAND BUFFER
- SEWER LINE
- APPROXIMATE LIMIT OF WASTE
- UTILITY POLE
- GUY WIRE
- WETLAND FLAG
- SEWER MANHOLE
- MONITORING WELL
- VENT
- EDGE OF PAVEMENT
- PAVEMENT
- APPROXIMATE AQUIFER PROTECTION OVERLAY AREA
- GRAVEL PATH
- BLOCK WALL

PROPOSED

- OHE — OVERHEAD ELECTRIC LINE
- EC — ELECTRIC CONDUIT
- LOW — LIMIT OF WORK
- FENCE (9/C502)
- SB — SEDIMENT BARRIER (3/C501)
- SOLAR PV RACK WITH BALLAST BLOCKS (6/C502)
- GRAVEL ACCESS ROAD (8/C502)
- CONCRETE EQUIPMENT PAD (7/C502)
- 10' DIAMETER BUFFER AROUND VENT

20 10 0 20 40
SCALE: 1"=20'

APPROVED MILLBURY PLANNING BOARD DATE

Project:
MILLBURY LANDFILL SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:
AMERESCO Green • Clean • Sustainable
Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:
Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal: COMMONWEALTH OF MASSACHUSETTS ROBERT J. BUKOWSKI CIVIL No. 41492 REGISTERED PROFESSIONAL ENGINEER 5/13/22

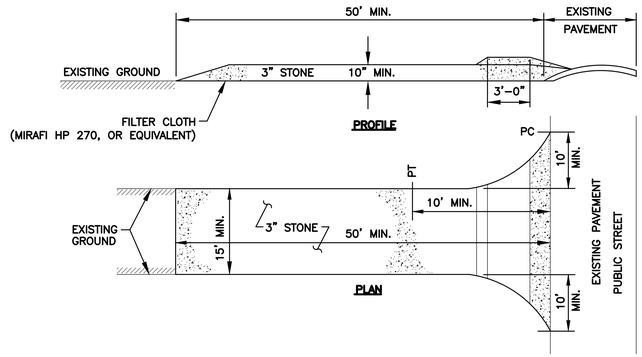
Issued For:
PERMITTING/NOT FOR CONSTRUCTION

Scale: AS SHOWN
Date: 05/13/2022
Drawn By: DED
Reviewed By: MRC
Approved By: RJB
W&S Project No.: ENG20-0952
W&S File No.: Ameresco Millbury

Drawing Title:
PROPOSED SITE PLAN SHEET 4

Sheet Number:
C105

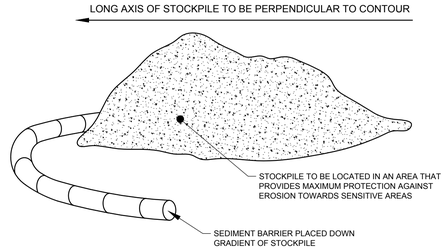
COPYRIGHT © 2022 WESTON & SAMPSON, INC.



STABILIZED CONSTRUCTION ENTRANCE NOTES:

1. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA FOLLOWING GRADING (AS NEEDED) TO LEVEL PAD PRIOR TO PLACING OF STONE.
2. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
3. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED BY THE CONTRACTOR IMMEDIATELY.
4. WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
5. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.
6. AT THE CONCLUSION OF PROJECT, ANY ACCUMULATED SEDIMENT SHALL BE DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS. REMOVAL OF ANTI-TRACKING PAD SHALL BE AT NO ADDITIONAL COST TO THE OWNER.
7. P.C. = POINT OF CURVATURE
8. P.T. = POINT OF TANGENCY

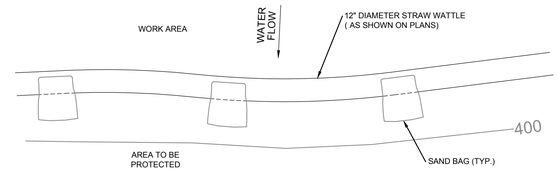
1 STABILIZED CONSTRUCTION ENTRANCE
SCALE: N.T.S.

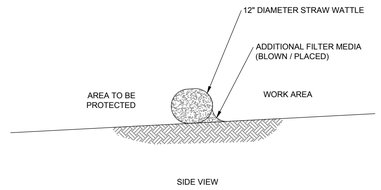


NOTES:

1. STOCKPILE AREAS SHALL BE LOCATED OUTSIDE OF WETLANDS AND 100FT WETLAND BUFFERS.

2 TEMPORARY STOCKPILE
SCALE: N.T.S.

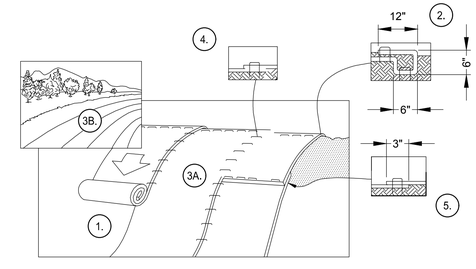




NOTES:

1. SUPPORT POSTS OR STAKES ARE PROHIBITED FOR USE TO SECURE SEDIMENT BARRIER OVER THE EXISTING LANDFILL CAP. NO EROSION/SEDIMENTATION CONTROL DEVICE SHALL PENETRATE THE EXISTING LANDFILL CAP MATERIAL.
2. SAND BAGS TO BE SPACED EQUALLY TO SECURE COMPOST SOCKS IN PLACE, IF REQUIRED.
3. UPON COMPLETION, COMPOST MATERIAL TO BE DISPERSED ON SITE AS DETERMINED BY ENGINEER.

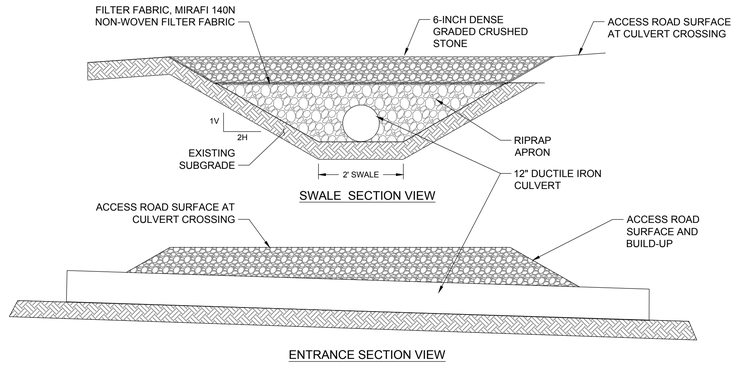
3 COMPOST SOCK SEDIMENT CONTROL BARRIER
SCALE: N.T.S.



NOTES:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH.
6. ALL 3H:1V SLOPES SHALL BE STABILIZED WITH EROSION CONTROL BLANKETING. BLANKETING SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
7. ALL SLOPES STEEPER THAN 3H:1V SHALL BE STABILIZED WITH PERMANENT TURF REINFORCEMENT MATTING OR RIPRAP.

4 TEMPORARY EROSION CONTROL BLANKET
SCALE: N.T.S.



5 CULVERT CROSSING
SCALE: N.T.S.

APPROVED MILLBURY PLANNING BOARD DATE

Project:

MILLBURY LANDFILL
SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:

AMERESCO
Green • Clean • Sustainable
Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:

Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:

COMMONWEALTH OF MASSACHUSETTS
ROBERT J. BUKOWSKI
CIVIL
No. 41402
REGISTERED PROFESSIONAL ENGINEER
5/13/22

Issued For:

PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/13/2022
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

Drawing Title:

CONSTRUCTION DETAILS SHEET 1

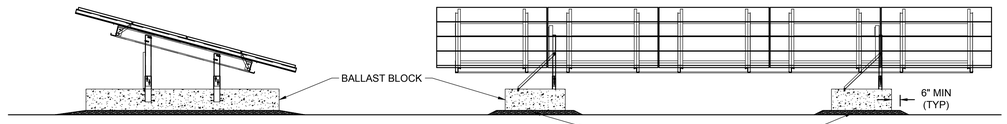
Sheet Number:

C501

COPYRIGHT © 2022 WESTON & SAMPSON, INC.

C:\Users\dempsey.dave\WESTON & SAMPSON ENGINEERS, Inc\Ameresco - Millbury Landfill - Millbury Landfill\CAD\03 Sheets\8 - C501 Construction Details.dwg

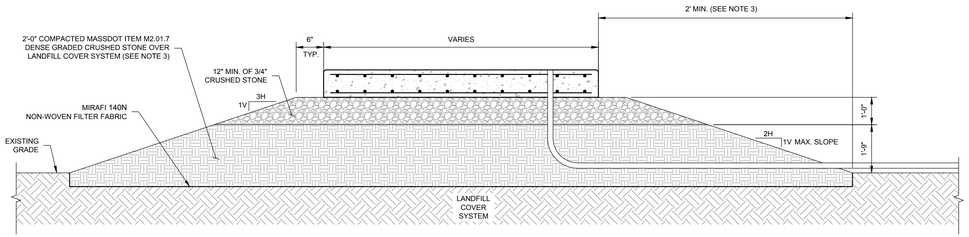
1 CONTRACTOR INFORMATION SIGN
SCALE: N.T.S.



NOTES:

1. DESIGN FOR FOUNDATIONS, RACKING, AND MODULES BY OTHERS. DETAILS SHOWN FOR ILLUSTRATION PURPOSES ONLY.

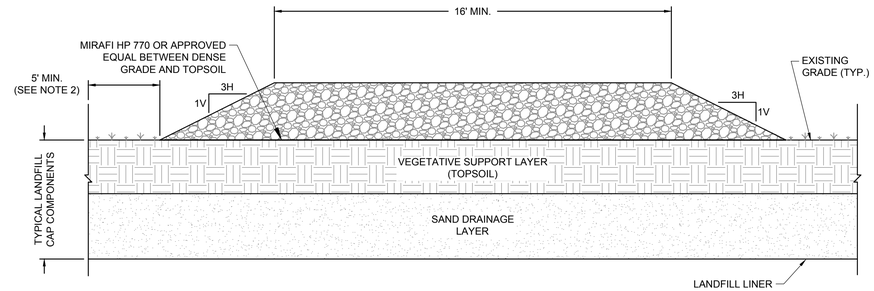
2 BALLAST MOUNTED SOLAR PV ARRAY
SCALE: N.T.S.



NOTES:

1. SLAB DIMENSIONS AND DESIGN IS SUBJECT TO CHANGE BASED ON FINAL STRUCTURAL ENGINEERED DESIGN.
2. DETAIL IS SHOWN FOR REPRESENTATIVE PURPOSES ONLY.
3. THE VEGETATIVE SUPPORT LAYER SHALL BE REMOVED BELOW AND A MINIMUM OF 2' AROUND THE LIMITS OF THE PAD LOCATIONS.
4. COMPACT UNTIL A FIRM AND STABLE CONDITIONS IS ACHIEVED, AS APPROVED BY THE ENGINEER.

3 TYPICAL CONCRETE EQUIPMENT PAD
SCALE: N.T.S.



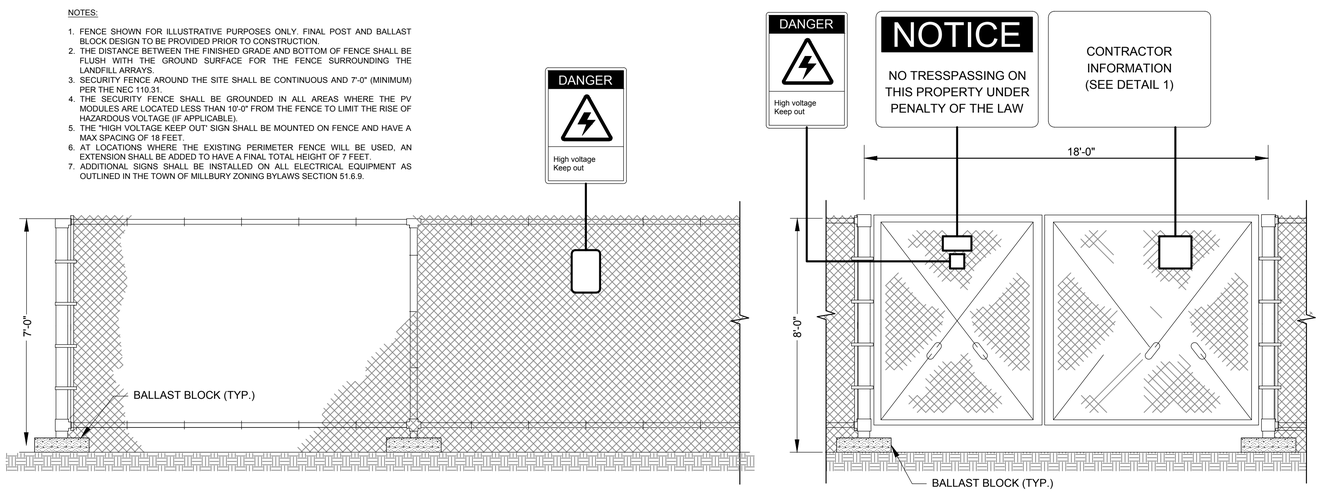
NOTES:

1. SEE DRAWING C001 FOR ACCESS ROAD AND FABRIC MATERIAL REQUIREMENTS.
2. ALL VEGETATION SHALL BE CUT AS SHORT AS POSSIBLE BELOW THE ACCESS ROAD INCLUDING AT LEAST 5 FEET BEYOND THE EDGES OF ROAD. THE SUBGRADE SHALL BE COMPACTED WITH MULTIPLE PASSES OF TRACKED CONSTRUCTION EQUIPMENT.

4 TYPICAL ACCESS ROAD DETAIL
SCALE: N.T.S.

NOTES:

1. FENCE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. FINAL POST AND BALLAST BLOCK DESIGN TO BE PROVIDED PRIOR TO CONSTRUCTION.
2. THE DISTANCE BETWEEN THE FINISHED GRADE AND BOTTOM OF FENCE SHALL BE FLUSH WITH THE GROUND SURFACE FOR THE FENCE SURROUNDING THE LANDFILL ARRAYS.
3. SECURITY FENCE AROUND THE SITE SHALL BE CONTINUOUS AND 7'-0" (MINIMUM) PER THE NEC 110.31.
4. THE SECURITY FENCE SHALL BE GROUNDED IN ALL AREAS WHERE THE PV MODULES ARE LOCATED LESS THAN 10'-0" FROM THE FENCE TO LIMIT THE RISE OF HAZARDOUS VOLTAGE (IF APPLICABLE).
5. THE "HIGH VOLTAGE KEEP OUT' SIGN SHALL BE MOUNTED ON FENCE AND HAVE A MAX SPACING OF 18 FEET.
6. AT LOCATIONS WHERE THE EXISTING PERIMETER FENCE WILL BE USED, AN EXTENSION SHALL BE ADDED TO HAVE A FINAL TOTAL HEIGHT OF 7 FEET.
7. ADDITIONAL SIGNS SHALL BE INSTALLED ON ALL ELECTRICAL EQUIPMENT AS OUTLINED IN THE TOWN OF MILLBURY ZONING BYLAWS SECTION 51.6.9.



5 BALLAST CHAIN LINK FENCE AND GATE
SCALE: N.T.S.

APPROVED MILLBURY PLANNING BOARD DATE

Project:
MILLBURY LANDFILL
SOLAR PV DEVELOPMENT
207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:
AMERESCO
Green • Clean • Sustainable
Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:
Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:
COMMONWEALTH OF MASSACHUSETTS
ROBERT J. BUKOWSKI
CIVIL
No. 41402
REGISTERED PROFESSIONAL ENGINEER
5/13/22

Issued For:
PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/13/2022
Drawn By:	DED
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

Drawing Title:
CONSTRUCTION DETAILS SHEET 2

Sheet Number:
C502

COPYRIGHT © 2022 WESTON & SAMPSON, INC.

C:\Users\dbenway.dev\WESTON & SAMPSON ENGINEERS, Inc\Ameresco - Millbury Landfill - Millbury Landfill\CAD\03 Sheets\9 - C502 Construction Details.dwg

Appendix D – Electrical One Line Diagram and Equipment Cut Sheet

NOTES:
1. THIS DRAWING IS ISSUED FOR UTILITY INTERCONNECTION REVIEW ONLY AND SHALL NOT BE USED FOR CONSTRUCTION.
2. INSTALLATION SHALL COMPLY WITH THE LATEST VERSION OF THE NATIONAL ELECTRICAL CODE, ALL APPLICABLE STATE/LOCAL CODES, AND AUTHORITY HAVING JURISDICTION APPROVAL.
3. ALL CONTROL POWER WIRING (CIRCUIT ID "CP") SHALL BE (2) #12 CU & (1) #12 CU GND IN 3/4" EMT UNLESS OTHERWISE NOTED.

PV MODULE SCHEDULE

MANUFACTURER	MODEL	QUANTITY	POWER AT STC (W)	Vmp (V)	Voc (V)	Imp (A)	Isc (A)
JA SOLAR	JAM72S10-410MR	3,172	410	41.88	50.12	9.79	10.45

DC WIRING AND CONDUIT SCHEDULE

ITEM	DESCRIPTION	ID	QUANTITY	POWER (W)	Vmp (V)	Voc (V)	Imp (A)	Isc (A)	MAX CURRENT (A)	MAX CURRENT X 125% (A)	OCP (A)	CONDUCTOR QUANTITY PER POLARITY	CONDUCTOR SIZE	CONDUCTOR MATERIAL	GROUND SIZE	GROUND MATERIAL	INSULATION TYPE	MULTIPLE CONDUCTOR DERATE	TEMPERATURE DERATE	90C CONDUCTOR AMPACITY (A)	DERATED 90C CONDUCTOR AMPACITY (A)	75C TERMINAL AMPACITY (A)	MAX ONE WAY LENGTH (FT)	VOLTAGE DROP	CONDUIT
STRING	MODULES TO CB	A	122	10,660	1088.9	1303.1	9.79	10.45	13.1	16.3	20	1	#10 AWG	CU	#6 AWG	CU	2KV PV WIRE	0.70	0.96	40.0	26.9	35.0	350	0.76%	EMT SIZED PER NEC
COMBINER	CB TO INV	B1	4	213,200	1088.9	1303.1	195.8	209.0	261.3	326.6	350	1	600 KCMIL	AL	#1 AWG	AL	2KV PV WIRE	1.00	0.96	385.0	369.6	340.0	350	0.48%	(1) 3" EMT
COMBINER	CB TO INV	B2	2	223,860	1088.9	1303.1	205.6	219.5	274.3	342.9	350	2	4/0 AWG	AL	#1 AWG	AL	2KV PV WIRE	1.00	0.96	410.0	393.6	360.0	350	0.66%	(2) 2" EMT
BESS	BESS TO INV	B3	1	500,000	-	-	-	-	500.0	625.0	700	2	400 KCMIL	CU	1/0 AWG	CU	2KV PV WIRE	1.00	0.96	760.0	729.6	670.0	20	0.00%	(2) 3" PVC SCH 40

AC WIRING AND CONDUIT SCHEDULE

ITEM	DESCRIPTION	ID	QUANTITY	REAL POWER (W)	RATED APPARENT POWER (VA)	NOMINAL VOLTAGE (V)	MAX CURRENT (A)	MAX CURRENT X 125% (A)	OCP (A)	CONDUCTOR QUANTITY PER PHASE	CONDUCTOR SIZE	CONDUCTOR MATERIAL	NEUTRAL SIZE	NEUTRAL MATERIAL	GROUND SIZE	GROUND MATERIAL	INSULATION TYPE	MULTIPLE CONDUCTOR DERATE	TEMPERATURE DERATE	90C CONDUCTOR AMPACITY (A)	DERATED 90C CONDUCTOR AMPACITY (A)	75C TERMINAL AMPACITY (A)	MAX ONE WAY LENGTH (FT)	VOLTAGE DROP	CONDUIT
INVERTER	INV TO XFMR	C	1	996,000	996,000	600	958.4	1198.0	1200	4	500 KCMIL	AL	250 KCMIL	AL	250 KCMIL	AL	THWN-2	1.00	0.96	1400.0	1344.0	1240.0	20	0.06%	(4) 4" PVC SCH 40
AUX POWER	AUX PANEL TO NGRID XFMR	D	1	13,200	13,200	480	15.8	19.8	100	1	#1 AWG	AL	#6 AWG	AL	#6 AWG	AL	THWN-2	1.00	0.96	115.0	110.4	100.0	100	0.14%	(1) 1-1/2" EMT

RECLOSER PROTECTIVE SETTINGS

PROTECTIVE FUNCTIONS	VOLTAGE SETTING			FREQUENCY SETTING	RELAY OPERATING TIME		CURRENT SETTING	
	SEC	PRI	PU	HZ	CYC	SEC	SEC	PRI
27P1 - UNDERVOLTAGE	0.78	6,900	50%	-	66	1.10	-	-
27P2 - UNDERVOLTAGE	1.38	12,144	88%	-	120	2.00	-	-
59P1 - OVERVOLTAGE	1.73	15,180	110%	-	120	2.00	-	-
59P2 - OVERVOLTAGE	1.88	16,560	120%	-	9.6	0.16	-	-
81UP1 - UNDERFREQUENCY	-	-	-	56.5	9.6	0.16	-	-
81UP2 - UNDERFREQUENCY	-	-	-	58.5	18,000	300	-	-
81OP1 - OVERFREQUENCY	-	-	-	61.2	18,000	300	-	-
81OP2 - OVERFREQUENCY	-	-	-	62.0	9.6	0.16	-	-
51 - TIME OVERCURRENT	-	-	-	-	CURVE U4, T.M. 2.0		0.35	52.09
79 - AUTO RESTORE	1.49	13,110	95%	-	5 MIN DELAY TO RESTORE		-	-
	1.65	14,490	105%	-				
	TRIP OUTPUTS		PICKUP (KW)		FREQUENCY SETTING (HZ)		TIME DELAY (SEC)	
32 - REVERSE POWER (3PWR1P)	X		-996		-		2	
ALARM - HARDWARE FAILURE, POWER SUPPLY FAILURE, LOSS OF DC VIA VBAT	-		-		-		-	
ALARM - HARDWARE FAILURE, POWER SUPPLY FAILURE, LOSS OF AC	-		-		-		-	

* SETTINGS ARE BASED ON IEEE-1547A-2014 TABLE 1 AND 2, ANSI C84.1, AND NPCC DIRECTIVE 12 FIGURE 1 CURVE.
* 79 FUNCTION IS ONLY ENABLED ON VOLTAGE AND FREQUENCY DISTURBANCES. A 5 MN DELAY WILL BE SET FOR RECLOSING UPON GOOD QUALITY VOLTAGE. THE 5 MN TIME INTERVAL WILL RESTART IF THE UTILITY VOLTAGE OR FREQUENCY FALLS OUTSIDE OF THE WINDOW IDENTIFIED IN THE CHART ABOVE. RECLOSER WILL LOCKOUT ON OVERCURRENT OPERATION.
* RECLOSER WILL ONLY BE ALLOWED TO CLOSE WHEN THE VOLTAGE AND FREQUENCY ARE IN COMPLIANCE WITH IEEE-1547, ANSI C84.1, TABLE 1. VOLTAGE RANGE 95% TO 105% OF NOMINAL. VOLTAGE IS BASED ON LINE TO LINE VOLTAGE. FREQUENCY BETWEEN 59.5 AND 60.5 HZ.
* RECLOSER WILL AUTOMATICALLY TRIP AND BLOCK CLOSE IF THERE IS A HARDWARE FAILURE OR POWER SUPPLY FAILURE.
* OPERATING TIME INCLUDES RECLOSER OPERATING TIME (AN ADDITIONAL 3.0 CYCLES).

MV CABLE SCHEDULE

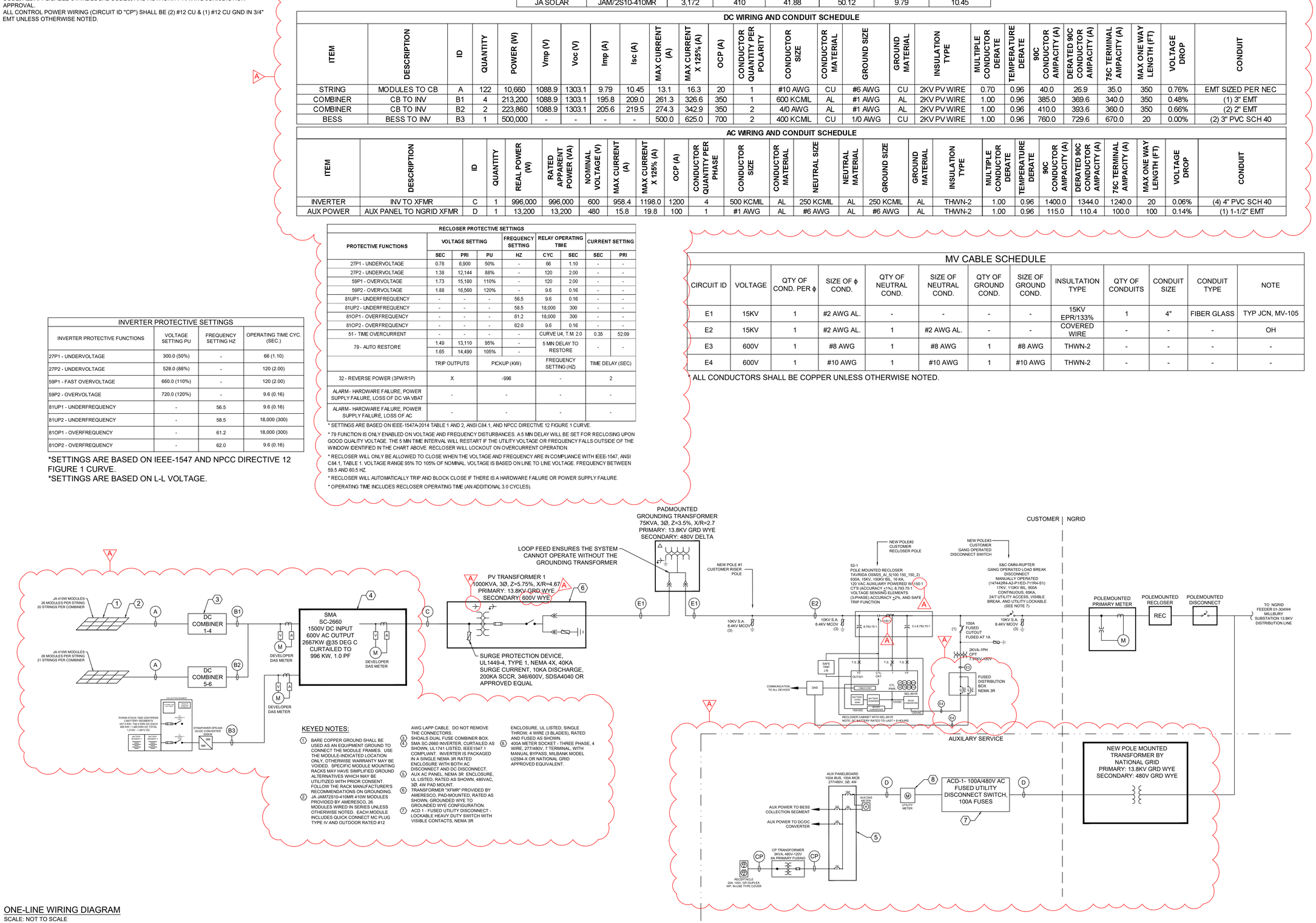
CIRCUIT ID	VOLTAGE	QTY OF COND. PER ϕ	SIZE OF ϕ COND.	QTY OF NEUTRAL COND.	SIZE OF NEUTRAL COND.	QTY OF GROUND COND.	SIZE OF GROUND COND.	INSULTATION TYPE	QTY OF CONDUITS	CONDUIT SIZE	CONDUIT TYPE	NOTE
E1	15KV	1	#2 AWG AL.	-	-	-	-	15KV EPR/133% COVERED WIRE	1	4"	FIBER GLASS	TYP JCN, MV-105
E2	15KV	1	#2 AWG AL.	1	#2 AWG AL.	-	-		-	-	-	OH
E3	600V	1	#8 AWG	1	#8 AWG	1	#8 AWG	THWN-2	-	-	-	-
E4	600V	1	#10 AWG	1	#10 AWG	1	#10 AWG	THWN-2	-	-	-	-

* ALL CONDUCTORS SHALL BE COPPER UNLESS OTHERWISE NOTED.

INVERTER PROTECTIVE SETTINGS

INVERTER PROTECTIVE FUNCTIONS	VOLTAGE SETTING PU	FREQUENCY SETTING HZ	OPERATING TIME CYC. (SEC.)
27P1 - UNDERVOLTAGE	300.0 (50%)	-	66 (1.10)
27P2 - UNDERVOLTAGE	528.0 (88%)	-	120 (2.00)
59P1 - FAST OVERVOLTAGE	660.0 (110%)	-	120 (2.00)
59P2 - OVERVOLTAGE	720.0 (120%)	-	9.6 (0.16)
81UP1 - UNDERFREQUENCY	-	56.5	9.6 (0.16)
81UP2 - UNDERFREQUENCY	-	58.5	18,000 (300)
81OP1 - OVERFREQUENCY	-	61.2	18,000 (300)
81OP2 - OVERFREQUENCY	-	62.0	9.6 (0.16)

*SETTINGS ARE BASED ON IEEE-1547 AND NPCC DIRECTIVE 12 FIGURE 1 CURVE.
*SETTINGS ARE BASED ON L-L VOLTAGE.



KEYED NOTES:

1. BARE COPPER GROUND SHALL BE USED AS AN EQUIPMENT GROUND TO CONNECT THE MODULE FRAMES. USE THE MODULE-INDICATED LOCATION ONLY. OTHERWISE WARRANTY MAY BE VOIDED. SPECIFIC MODULE MOUNTING RACKS MAY HAVE SIMPLIFIED GROUND ALTERNATIVES WHICH MAY BE UTILIZED WITH PRIOR CONSENT. FOLLOW THE RACK MANUFACTURER'S RECOMMENDATIONS ON GROUNDING.
2. JA JAM72S10-410MR 410W MODULES PROVIDED BY AMERESCO, 26 MODULES WIRED IN SERIES UNLESS OTHERWISE NOTED. EACH MODULE INCLUDES QUICK CONNECT MC PLUG TYPE IV AND OUTDOOR RATED #12 AWG LAPP CABLE. DO NOT REMOVE THE CONNECTORS.
3. SHOALS DUAL FUSE COMBINER BOX.
4. SMA SC-2660 INVERTER, CURTAILED AS SHOWN, UL1741 LISTED, IEEE1547.1 COMPLIANT. INVERTER IS PACKAGED IN A SINGLE NEMA 3R RATED ENCLOSURE WITH BOTH AC DISCONNECT AND DC DISCONNECT.
5. AUX AC PANEL, NEMA 3R ENCLOSURE, UL LISTED, RATED AS SHOWN, 480VAC, 3Ø, 4W PAD MOUNT.
6. TRANSFORMER "XFMR" PROVIDED BY AMERESCO, PAD-MOUNTED, RATED AS SHOWN, GROUNDED WYE TO GROUNDED WYE CONFIGURATION.
7. ACD 1 - FUSED UTILITY DISCONNECT - LOCKABLE HEAVY DUTY SWITCH WITH VISIBLE CONTACTS, NEMA 3R ENCLOSURE, UL LISTED, SINGLE THROW, 4 WIRE (3 BLADES), RATED AND FUSED AS SHOWN.
8. 400A METER SOCKET - THREE PHASE, 4 WIRE, 277/480V, 7 TERMINAL, WITH MANUAL BYPASS, MILBANK MODEL U2594-X OR NATIONAL GRID APPROVED EQUIVALENT.

ONE-LINE WIRING DIAGRAM
SCALE: NOT TO SCALE

SCALE: AS SHOWN
SHEET SIZE: ARCH D (24" X 36")
DRAWN BY: SMC
CHECKED BY:
DATE: 02/18/2022
REVISIONS:
A - CHANGED FROM AC COUPLED TO DC COUPLED

MILLBURY MA LANDFILL SOLAR
207 RIVERLIN STREET
MILLBURY, MA 01844

SOLAR PV & BATTERY ENERGY STORAGE SYSTEM
PV: 1,300.52 KWDC (996 KW AC)
BESS: 500 KW DC, 1,485 KWH - DC COUPLED
ONE LINE FOR UTILITY INTERCONNECTION

COMMONWEALTH OF MASSACHUSETTS
BRIAN R. PITREAU
ELECTRICAL
No. 54102
REGISTERED PROFESSIONAL ENGINEER
Brian R Pitreau
Digitally signed by Brian R Pitreau
DN: CN=Brian R Pitreau, O=AMERESCO, OU=Engineering, E=bpitreau@ameresco.com, C=US
Date: 2022.02.18 14:26:52 -05'00'

AMERESCO
111 Speen Street, Suite 410
Framingham, Massachusetts 01701
(508) 661-2200

Copyright 2005 Ameresco. The above drawings, specifications, ideas, designs, and arrangements are and shall remain the property of Ameresco and no part thereof shall be copied, disclosed to others, or used in connection with any work or project other than the specified project for which they have been prepared and developed without the written consent of Ameresco. Visual contact with these documents shall constitute prima facie evidence of the acceptance of these restrictions. Contractors shall verify and be responsible for all dimensions and conditions on the job and this office must be notified of any variations from the dimensions and conditions shown by these drawings.

E-200

Harvest the Sunshine

Mono

420W MBB Half-Cell Module
JAM72S10 400-420/MR Series

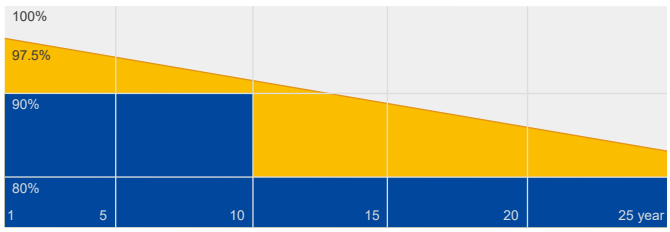
Introduction

Assembled with multi-busbar PERC cells, the half-cell configuration of the modules offers the advantages of higher power output, better temperature-dependent performance, reduced shading effect on the energy generation, lower risk of hot spot, as well as enhanced tolerance for mechanical loading.

- Higher output power
- Lower LCOE
- Less shading and lower resistive loss
- Better mechanical loading tolerance

Superior Warranty

- 12-year product warranty
- 25-year linear power output warranty



JA Linear Power Warranty ■ Industry Warranty

Comprehensive Certificates

- IEC 61215, IEC 61730
- ISO 9001: 2015 Quality management systems
- ISO 14001: 2015 Environmental management systems
- OHSAS 18001: 2007 Occupational health and safety management systems
- IEC TS 62941: 2016 Terrestrial photovoltaic (PV) modules – Guidelines for increased confidence in PV module design qualification and type approval

JA SOLAR

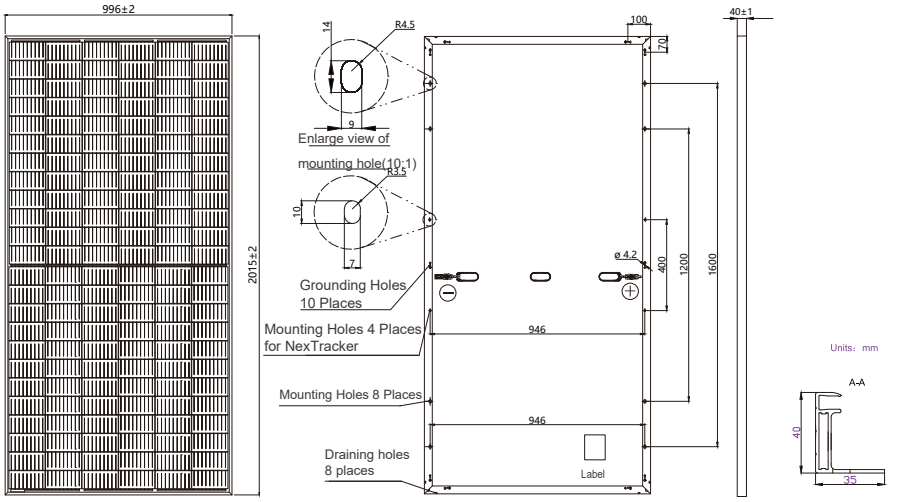
www.jasolar.com

Specifications subject to technical changes and tests.
JA Solar reserves the right of final interpretation.

JA SOLAR

JAM72S10 400-420/MR Series

MECHANICAL DIAGRAMS



Remark: customized frame color and cable length available upon request

SPECIFICATIONS

Cell	Mono
Weight	22.7kg±3%
Dimensions	2015±2mm×996±2mm×40±1mm
Cable Cross Section Size	4mm²
No. of cells	144（6×24）
Junction Box	IP68, 3 diodes
Connector	QC 4.10(1000V) QC 4.10-35(1500V)
Cable Length (Including Connector)	Portrait: 300mm(+)/400mm(-); Landscape: 1200mm(+)/1200mm(-)
Packaging Configuration	27 Per Pallet

ELECTRICAL PARAMETERS AT STC

TYPE	JAM72S10 -400/MR	JAM72S10 -405/MR	JAM72S10 -410/MR	JAM72S10 -415/MR	JAM72S10 -420/MR
Rated Maximum Power(Pmax) [W]	400	405	410	415	420
Open Circuit Voltage(Voc) [V]	49.58	49.86	50.12	50.41	50.70
Maximum Power Voltage(Vmp) [V]	41.33	41.60	41.88	42.18	42.47
Short Circuit Current(Isc) [A]	10.33	10.39	10.45	10.51	10.56
Maximum Power Current(Imp) [A]	9.68	9.74	9.79	9.84	9.89
Module Efficiency [%]	19.9	20.2	20.4	20.7	20.9
Power Tolerance	0~+5W				
Temperature Coefficient of Isc(α_Isc)	+0.044%/℃				
Temperature Coefficient of Voc(β_Voc)	-0.272%/℃				
Temperature Coefficient of Pmax(γ_Pmp)	-0.350%/℃				
STC	Irradiance 1000W/m², cell temperature 25℃, AM1.5G				

Remark: Electrical data in this catalog do not refer to a single module and they are not part of the offer.They only serve for comparison among different module types.
*For NexTracker installations static loading performance: front load measures 2400Pa, while back load measures 2400Pa.

ELECTRICAL PARAMETERS AT NOCT

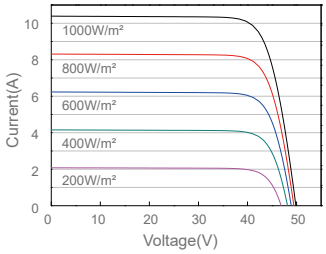
TYPE	JAM72S10 -400/MR	JAM72S10 -405/MR	JAM72S10 -410/MR	JAM72S10 -415/MR	JAM72S10 -420/MR
Rated Max Power(Pmax) [W]	302	306	310	314	318
Open Circuit Voltage(Voc) [V]	46.41	46.66	46.91	47.16	47.38
Max Power Voltage(Vmp) [V]	38.65	38.90	39.16	39.41	39.60
Short Circuit Current(Isc) [A]	8.25	8.31	8.36	8.41	8.46
Max Power Current(Imp) [A]	7.81	7.87	7.92	7.97	8.03
NOCT	Irradiance 800W/m², ambient temperature 20℃, wind speed 1m/s, AM1.5G				

OPERATING CONDITIONS

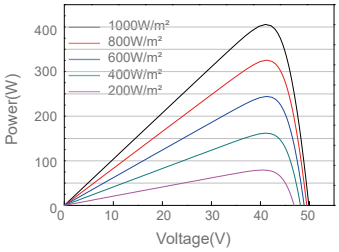
Maximum System Voltage	1000V/1500V DC(IEC)
Operating Temperature	-40℃~+85℃
Maximum Series Fuse	20A
Maximum Static Load,Front*	5400Pa
Maximum Static Load,Back*	2400Pa
NOCT	45±2℃
Application Class	Class A

CHARACTERISTICS

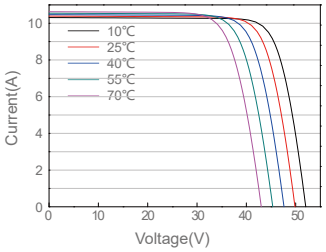
Current-Voltage Curve JAM72S10-405/MR



Power-Voltage Curve JAM72S10-405/MR



Current-Voltage Curve JAM72S10-405/MR



POWIN

PRODUCT: Stack750E PLATFORM: Centipede

Centipede is Powin's modular battery energy storage platform, purpose-built for the most grueling environments and use cases. Designed to dramatically increase site energy density, decrease installation times and simplify capacity augmentation, Centipede is ready to perform a diverse set of market applications including Frequency Response/Regulation, T&D Deferral, Flexible Peaking Capacity, Renewable Integration and more.

Modular, Scalable and Configurable

Centipede's modular design allows you to easily scale up your project size from a single standalone unit to gigawatt-hours per project site. Centipede utilizes Powin's field-proven Stack hardware and StackOS software platform to ensure continuity and familiarity between Powin's product lines to perform a variety of simple and advanced market applications.

Enhanced Safety and Quality

Centipede combines Powin's safest-in-class LFP Stack hardware and integrated enclosures into one standardized, factory-built, outdoor product to ensure maximum quality control. Each Centipede unit includes a comprehensive package of explosion prevention and fire safety features, such as hydrogen detection and active ventilation, fire detection, fireproof insulation, and optional clean agent fire suppression.

End to End Cost Savings

Centipede's factory-built and tested design allows for units to be installed on site in a fraction of the time it takes for traditional enclosure-based systems to be installed. The increased energy density also reduces the amount of land that is required to install a system per MWh. The highly serviceable design includes field-swappable, redundant components that minimizes downtime and service costs. These advantages, paired with Powin's diverse supply chain and Tier 1 cell procurement strategy give Powin's customers continual cost advantages upfront and over the lifespan of a system.

POWIN STACK750 TECHNICAL SPECIFICATIONS

		STACK750E		
Electrical	DC Voltage	1,210 - 1,491 V		
	Duration	2+ hrs		
	Maximum Energy Capacity[1]	750 kWh DC per segment & 250 MWh AC per acre		
	Rated Duration of Discharge	2 hrs	3 hrs	4 hrs
	DC Power @ Rated Duration	369.5 kW	247.5 kW	186.5 kW
	DC Energy Capacity @ Rated Duration[2]	739 kWh	742.5 kWh	746 kWh
	Aux Load per Stack (Standby/Peak)[3]	0.25 kW / 5.6 kW	0.24 kW / 5.5 kW	0.23 kW / 5.4 kW
	Daily Aux Energy per Stack[3]	29 - 31 kWh	21 - 23 kWh	17 - 19 kWh
	Auxiliary Power Input	3-Phase 480V AC / 60Hz or 400V AC / 50Hz		
Performance & Safety	DC Round Trip Efficiency	93%	94%	95%
	Cycle Life[4,5]	7,300 cycles		
	Calendar Life[5]	20 years		
	Cell Manufacturers	CATL & EVE		
	Cell Chemistry	Lithium Iron Phosphate (LFP)		
	Depth of Discharge	100%		
	Explosion Prevention & Mitigation	Off-gas detection with dedicated, fail-safe active & passive ventilation systems		
	Fire Suppression	Addressable fire panel, smoke & heat detectors, heat activated sprinkler system with remote FDC dry standpipe connection, fire rated insulation, strobes, and horn; optional clean agent fire suppression		
	Heating & Cooling[6]	Redundant, field-swappable, high efficiency HVAC with humidity control		
	Codes & Compliance	UL 9540A, UL 1642, UL 1973, UL 9540, NFPA 1, NFPA 69, NFPA 855, IFC, IEC 62619, IEC 6100-6-2, IEC 62477, UN3480, UN38.3		
Mechanical	Weight (Approximate)	20,000 lbs (9,074 kg)		
	Battery Segment Dimensions	8'1" D x 5'2" L x 10'8" H (2,443mm x 1,572mm x 3,282mm)		
	Enclosure Type / Rating[7]	NEMA 4/IP 56 standard; NEMA 4X available		
	Ambient Operating Temperature Range[8]	-30° C to +50° C		
Software	BMS + EMS + Solar + Environmental Controls	StackOS™		
	Analytics + Optimization + Data Warehouse	StackOS+™		
	First Responder HMI	Powin for First Responders™		
	Communications Interface	Modbus TCP (MESA/Sunspec) & REST API		

Note: Specifications in the above table are design estimates only and are not guaranteed. Contact Powin for a project-specific estimate as final values depend on system design, location, and use case.

1 Per acre energy capacity represents fully installed AC BESS, including inverters, transformers, and auxilaries; excludes augmentation

2 Energy capacity is recorded at the DC bus and assumes near-symmetric cycle; capacity will be ~1-2% lower for symmetric cycle use case

3 Assumes 1 full cycle per day at rated power in a temperate climate; active cell balancing contribution de minimous

4 Assumes 1 full cycle per day and includes calendar aging for the day

5 End of life depends both on BESS age and usage; actual lifetime may be less than 20 years for high cycle use cases

6 Degree of HVAC redundancy (partial or full) depends on location and use case

7 IP rating applicable only for the compartments containing batteries and electronics

8 StackOS may automatically derate power at high/low ambient temperatures or after extended operation to mantain proper cell temperatures

DYNAPOWER

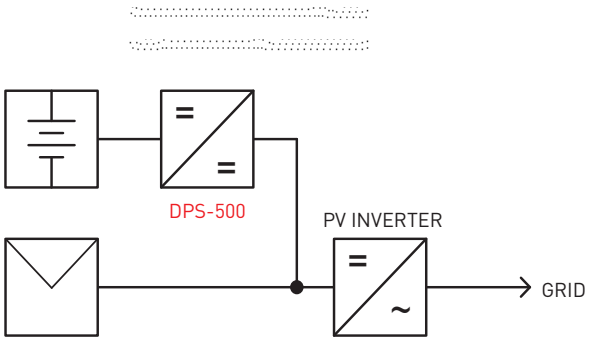
DPS-500 500 kW BIDIRECTIONAL DC-TO-DC CONVERTER FOR UTILITY-SCALE SOLAR PLUS STORAGE

Scalable from 500kW to 3MW

The patent pending **DPS-500** is a bidirectional DC-to-DC converter. The intended end application for this converter is to interface battery energy storage with new and existing 1000V and 1500V central inverter based PV power plants.

The PCS is capable of operating in voltage, current and power control modes with the capability of on-the-fly switching between these modes. Additionally, advanced automatic excess PV energy recapture and time-shift of PV energy may be realized using the DPS-500 in solar-plus-storage installations.

Up to six units can be paralleled together to provide between 500kW and 3MW of storage power.



East Coast/Headquarters **85 Meadowland Drive South Burlington, Vermont 05403**

West Coast **2913 Whipple Road Union City, California 94587**

DYNAPOWER

DPS-500 500 kW BIDIRECTIONAL DC-TO-DC CONVERTER FOR UTILITY-SCALE SOLAR PLUS STORAGE

ELECTRICAL SPECIFICATIONS

DC Input Voltage Range (Battery Port)	**100-1500 V_{DC}**
DC Input Voltage Range (PV Port)	**100-1500 V_{DC}**
Max Continuous Power Rating	**500 kW**
Max Continuous Current Rating	**500 A_{DC}**
Efficiency Average	**98.2%**
Aux/Controls Power	**120V, 1-ph, 60Hz, 1kVA service** **230V, 1-ph, 50Hz, 1kVA service**
Battery Technology	**Compatible with all battery technologies**

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	**-25 to +50°C**
Cooling	**Forced Air Cooled**
Rated Max Elevation	**1000m above sea-level without de-rating**
Enclosure	**Outdoor NEMA 3R**
Weight	**1300 lbs.**
Dimensions (LxWxH)	**33.5" x 39.4" x 80.50"**
Cable Connections	**Bottom or Side Entry**

COMPLIANCE

Safety Certifications **IEC / EN 61000-6-4 ; IEC / EN 61000-6-2 ; CISPR 11 / EN 55011 ; FCC Part 15 Class A ; IEEE Std C37.90.2 ; UL 1741 ; IEC 62109-1 ; IEC 62109-2**

USER INTERFACE

Remote Communication	**Modbus TCP/IP**
Local Indicators	**Lamps on front panel indicating operation mode & alarm/fault status**

EXPERIENCE YOU CAN TRUST

Dynapower is a leader in the design and manufacture of four-quadrant bi-directional energy storage inverters and DC Converters. The MPS™, CPS™ and DPS product lines are IEEE and UL1741 compliant; offer sub-cycle response with zero voltage ride-through; feature a Dynamic Transfer function that allows both grid-tied or stand-alone (grid forming) modes. Dynapower inverters and converters are deployed globally in both grid-tied and microgrid installations, enabling increased penetration of renewable generation resources and grid resiliency.

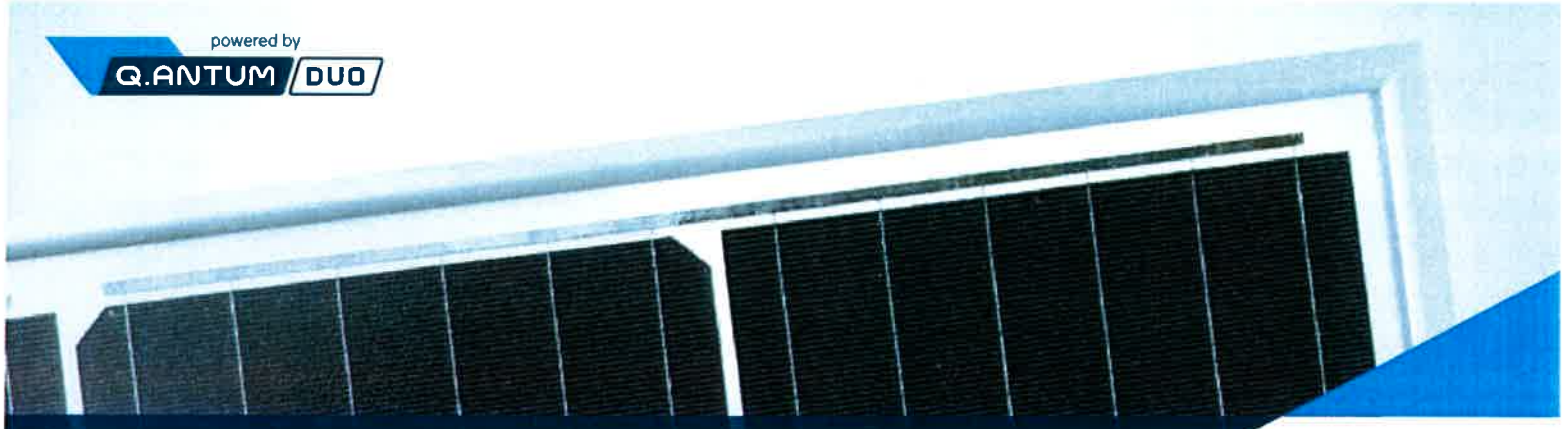
1.800.292.6792

East Coast:
85 Meadowland Drive
South Burlington, Vermont 05403

West Coast:
2913 Whipple Road
Union City, California 94587

DYNAPOWER.COM

powered by Q.ANTUM DUO



Q.PEAK DUO L-G5.2

380-405

ENDURING HIGH PERFORMANCE

Q.ANTUM TECHNOLOGY: LOW LEVELISED COST OF ELECTRICITY

Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 20.3%.

INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.

ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING

High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (2400 Pa).

A RELIABLE INVESTMENT

Inclusive 12-year product warranty and 25-year linear performance warranty[2].

STATE OF THE ART MODULE TECHNOLOGY

Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

[1] APT test conditions according to IEC/TS 62804-1:2015, method B (–1500 V, 168 h)
[2] See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

Rooftop arrays on commercial / industrial buildings

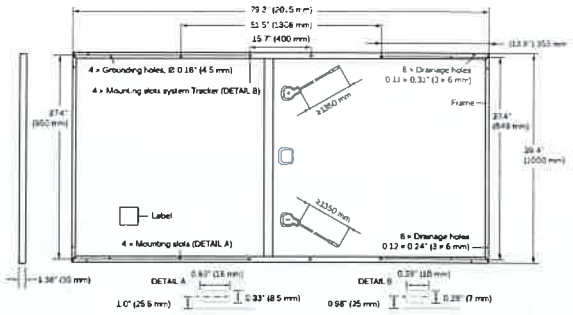
Ground-mounted solar power plants

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	79.3 in × 39.4 in × 1.38 in (including frame) (2015 mm × 1000 mm × 35 mm)
Weight	51.8 lbs (23.5 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Anodized aluminum
Cell	6 × 24 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09-3.98 × 1.26-2.36 × 0.59-0.71 in (53-101 × 32-60 × 15-18 mm), Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥53.1 in (1350 mm), (−) ≥53.1 in (1350 mm)
Connector	Stäubli MC4, Stäubli MC4-Evo2, Amphenol UTX, Renhe 05-8, Tonglin TL-Cable01S-F; IP68 or Friends PV2e; IP67

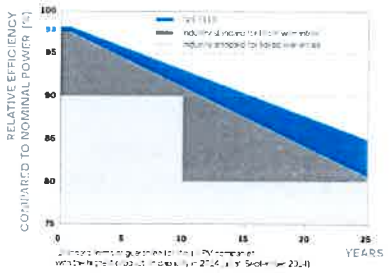


ELECTRICAL CHARACTERISTICS

POWER CLASS				380	385	390	395	400	405
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / −0 W)									
Minimum	Power at MPP[1]	P_{MPP}	[W]	380	385	390	395	400	405
	Short Circuit Current[1]	I_{SC}	[A]	10.05	10.10	10.14	10.19	10.24	10.28
	Open Circuit Voltage[1]	V_{OC}	[V]	47.95	48.21	48.48	48.74	49.00	49.26
	Current at MPP	I_{MPP}	[A]	9.57	9.61	9.66	9.70	9.75	9.79
	Voltage at MPP	V_{MPP}	[V]	39.71	40.05	40.38	40.71	41.04	41.36
	Efficiency[1]	η	[%]	≥18.9	≥19.1	≥19.4	≥19.6	≥19.9	≥20.1
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]									
Minimum	Power at MPP	P_{MPP}	[W]	284.4	288.2	291.9	295.6	299.4	303.1
	Short Circuit Current	I_{SC}	[A]	8.10	8.14	8.17	8.21	8.25	8.28
	Open Circuit Voltage	V_{OC}	[V]	45.21	45.46	45.71	45.96	46.21	46.45
	Current at MPP	I_{MPP}	[A]	7.53	7.57	7.60	7.64	7.67	7.71
	Voltage at MPP	V_{MPP}	[V]	37.77	38.08	38.40	38.71	39.02	39.33

[1] Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC: 1000 W/m², 25±2°C, AM 1.5G according to IEC 60904-3 • [2] 800 W/m², NMOT, spectrum AM 1.5G

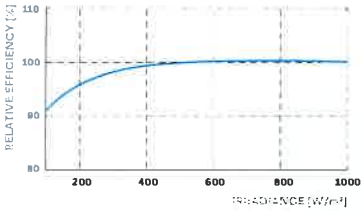
Q CELLS PERFORMANCE WARRANTY



At least 98 % of nominal power during first year. Thereafter max. 0.54 % degradation per year. At least 93.1 % of nominal power up to 10 years. At least 85 % of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.36	Normal Module Operating Temperature	NMOT	[°F]	109±5.4 (43±3 °C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V_{SYS}	[V]	1500 (IEC) / 1500 (UL)	Safety Class	II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating	C / TYPE 1
Max. Design Load, Push / Pull[3]	[lbs / ft²]	75 (3600 Pa) / 33 (1600 Pa)	Permitted Module Temperature on Continuous Duty	−40 °F up to +185 °F (−40 °C up to +85 °C)
Max. Test Load, Push / Pull[3]	[lbs / ft²]	113 (5400 Pa) / 50 (2400 Pa)		

[3] See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 1703, CE-compliant, IEC 61215:2016, IEC 61730:2016, Application Class II, U.S. Patent No. 9,893,215 (solar cells)

PACKAGING INFORMATION

Number of Modules per Pallet	29
Number of Pallets per 53' Trailer	27
Number of Pallets per 40' HC-Container	22
Pallet Dimensions (L × W × H)	81.9 × 45.3 × 46.9 in (2080 × 1150 × 1190 mm)
Pallet Weight	1635 lbs (742 kg)

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | **TEL** +1 949 748-5996 | **EMAIL** inquiry@us.q-cells.com | **WEB** www.q-cells.com/na

Specifications subject to technical changes © **Q CELLS** Q.PEAK DUO L-G5.2_380-405_2019-03_Rev02_NA

Appendix E – Operation and Maintenance Plan

Solar PV Operation and Maintenance

To date, Ameresco, as a solar PV system owner, has maintained the majority of our solar PV projects with in-house personnel. Ameresco works diligently to ensure that any concerns are addressed quickly to minimize any downtime of the systems. For each project, an Operations Project Manager will be assigned responsibility for all operations and maintenance activities required at that site. This person will be the main point of contact to ensure safe and continuous operation of the system.

It will be critical to maintain solar PV system operations without inference or disruption of the normal operations of the host facility. At construction completion, Ameresco will provide sets of record drawings for the completed installation. Although Ameresco will be responsible for ongoing operations of the equipment, we will train interested stakeholders on the equipment that has been installed, where it is located and how it interfaces with the utility grid. We will also train staff on the actions to take in the event of an emergency.

Continuous monitoring and analytics as well as the annual preventive maintenance program are the tools that will be used in the effort to maintain complete functionality of the system. Included in these services are the following:

- Ongoing operational monitoring of the system, alarm analysis and appropriate service response as and when required.
- Perform an Annual Preventative Maintenance (PM) Inspection
- Record inspection results on Maintenance Checklist documents highlighting any deficiencies.
- Review PM inspection documents and develop a corrective action plan for any deficiencies noted during the PM inspection and perform any required repairs in a timely manner.
- Utilize monitoring and PM program to ensure that the system/equipment is functioning correctly and operating as intended.
- Perform regular reviews of current O&M practices to ensure efficient procedures are in place and program is in compliance with all safety, electrical code and contractual requirements.
- Regularly review current, past, and/or reoccurring problems with equipment/system especially those affecting system production. Perform root cause analysis and develop corrective action plan(s).
- Twice annual lawn and vegetative maintenance in solar array area as well as review of site access, fencing, road conditions, and other site specific criteria.

"Page content is subject to Confidentiality Restrictions"

SOLAR O&M SCOPE OF SERVICES

SERVICE SCHEDULE	
Service Description	**Frequency**
Active Daily Monitoring and Alert Management	
o **Production analytics***	
o Power Generation	Daily
o Predicted Power	Daily
o Irradiance vs. kW	Daily
o PV string level analytics	Daily
o **Plant alert management***	
o Device reporting alarms	Daily
o Inverter fault code alarms	Daily
o Irradiance vs. kW alarms	Daily
o Monthly performance alarms	Monthly
o Weather related alarms	Daily
o **Monthly plant reports***	
o Relevant metrics with preceding month	Monthly
o Relevant metrics with preceding year	Monthly
o Plant alarm summary	Monthly
o Corrective action summary	Monthly
****Analysis, alerts, and reports may vary and are dependent on monitoring system data available at each plant site.***	

Annual Preventative Maintenance Reporting	
REPORT DELIVERY TO SYSTEM OWNER	Frequency
o Overall system analysis	Annual
o Annual Month by Month PV Production Report (a menu of reports available from monitoring system can be provided and included upon request)	Annual
o I-V Curve Trace Report of representative strings throughout system with performance ratios given at the string level (strings analyzed via monitoring system as possibly underperforming will also be tested)	Annual
o System visual inspection	Annual
o Thermal image scans of all readily available electrical gear	Annual
o Thermal image scans of a representative amount of array modules	Annual
o Itemized list of prescribed corrective maintenance items with supporting images	Annual
o Verification of monitoring system function including array sensors and firmware upgrades if necessary	Annual
Annual Preventative Maintenance Site Visit	
INVERTER AREA	Frequency
o Thermal image scans of all readily available PV related gear	Annual
o Voltage readings of AC and DC at inverter	Annual
o Cleaning interior of inverter and cleaning of inverter filters with compressed air	Annual
o All readily available terminations checked for torque	Annual
o Representative Photos	Annual
o Perform Manufacturers Annual Preventive Maintenance Requirements check list	Annual

ELECTRICAL INTERCONNECTION	
○ Visual and thermal image scan of this area where possible without shutdown to building or creating an unsafe work environment	Annual
CONDUIT RUNS	
○ Visual inspection of PV system conduit runs	Annual
○ Spot check conduit coupler, connector, straps, and strut for integrity	Annual
ARRAY LOCATION(S)	
Visual scan of entire array with focus to individual module level noting	
○ Broken module glass	Annual
Racking damage	Annual
○ Loose racking and module clamps	Annual
○ Debris around or under array	Annual
○ Ground bushings	Annual
Racking grounding	Annual
○ Module grounding	Annual
○ Combiner box grounding	Annual
○ Module clamp torques	Annual
○ *DC string level testing*	
○ I-V Curve Trace on representative or suspected problem strings	Annual
String level Predicted vs. Measured	Annual
○ Pmax (W)	Annual
○ Vmp (V)	Annual

○ Imp (A)	Annual
○ Voc (V)	Annual
○ Isc (A)	Annual
○ Fuse continuity	Annual
○ All string terminations checked for torque	Annual
○ All combined output terminations checked for torque	Annual
○ Irradiance and cell temperatures taken during testing	Annual
○ **MONITORING System Components**	
○ Inspect data acquisition components ensure software upgrades if necessary and available are current	Annual
○ Readily accessible array location sensors checked for function and calibration	Annual

Appendix F – Proof of Liability Insurance

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 2/1/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Arthur J Gallagher Risk Management Services
470 Atlantic Avenue
Boston MA 02210

CONTACT NAME:
PHONE (A/C, No, Ext): 617-261-6700 **FAX (A/C, No):** 617-646-0400
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : RSUI Indemnity Company	22314
INSURER B : Endurance American Insurance Company	10641
INSURER C : Steadfast Insurance Company	26387
INSURER D : Westchester Fire Insurance Company	10030
INSURER E : Hartford Casualty Insurance Company	29424
INSURER F :	

INSURED AMERINC-17
Ameresco, Inc.
111 Speen Street
Suite 410
Framingham MA 01701

COVERAGES **CERTIFICATE NUMBER:** 917018856 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
E	X **COMMERCIAL GENERAL LIABILITY** CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT X LOC OTHER:			30 UEL WQ0269	1/31/2022	1/31/2023	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG 	$ 2,000,000 $ 400,000 $ 50,000 $ 2,000,000 $ 4,000,000 $ 4,000,000 $
E	**AUTOMOBILE LIABILITY** X ANY AUTO OWNED AUTOS ONLY SCHEDULED AUTOS X HIRED AUTOS ONLY X NON-OWNED AUTOS ONLY			30 CSF WQ0268	1/31/2022	1/31/2023	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) 	$ 1,000,000 $ $ $ $
E A B D	X **UMBRELLA LIAB** X OCCUR **EXCESS LIAB** CLAIMS-MADE DED RETENTION $			30 HHL WQ0270 NHA096913 EXC30001485402 G72506121002	1/31/2022 1/31/2022 1/31/2022 1/31/2022	1/31/2023 1/31/2023 1/31/2023 1/31/2023	EACH OCCURRENCE AGGREGATE Continued Below	$ 70,000,000 $ 70,000,000 $
E	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? N / A **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		30 WV WQ0267	1/31/2022	1/31/2023	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000
C	Pollution Professional Liability			EOC 6692743-11	1/31/2022	1/31/2023	Per Claim: $15,000,00 Limit: $15,000,000	Agg: $15,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
LXS Policies:
Policy #: 42-XSF-310166-03
Carrier: Berkshire Hathaway
Term: 1/31/2022 TO 1/31/2023

Policy #: EXC 4138125
Carrier: Great American
Term: 1/31/2022 TO 1/31/2023
See Attached...

CERTIFICATE HOLDER

EVIDENCE OF INSURANCE ONLY

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Patrick J. Veale

© 1988-2015 ACORD CORPORATION. All rights reserved.

AGENCY CUSTOMER ID: AMERINC-17

LOC #:

ADDITIONAL REMARKS SCHEDULE

AGENCY Arthur J Gallagher Risk Management Services	NAMED INSURED Ameresco, Inc. 111 Speen Street Suite 410 Framingham MA 01701
POLICY NUMBER	
CARRIER / NAIC CODE	EFFECTIVE DATE:

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,

FORM NUMBER: 25 **FORM TITLE:** CERTIFICATE OF LIABILITY INSURANCE

Policy #: 522-811029-6
Carrier: Crum & Foster
Term: 1/31/2022 TO 1/31/2023

Policy #: CEX09604370-01
Carrier: Berkley National
Term: 1/31/2022 TO 1/31/2023

Additional Coverage:
Crime Policy #02-192-15-95 - effective 12/14/2021-12/14/22- Limit: $5,000,000
Cyber Policy #MTP0000242 03 - effective 12/14/2021- 12/14/22 - Limit: $10,000,000

Installation Floater
$20,000,000 Installation Floater

AXA XL - Policy #UM00131160MA22A – Effective Date 1/31/22 – 1/31/23 | Carrier: XL Specialty Insurance Company
Other terms/conditions may apply as per policy terms/conditions.

© 2008 ACORD CORPORATION. All rights reserved.
The ACORD name and logo are registered marks of ACORD

Appendix G – Glare Analysis

FORGESOLAR GLARE ANALYSIS

Project: **Millbury Landfill Solar**
Site configuration: **Millbury Landfill Solar Rev 1**

Created 28 Apr, 2022
Updated 28 Apr, 2022
Time-step 1 minute
Timezone offset UTC-5
Site ID 68328.12071
Category 1 MW to 5 MW
DNI peaks at 1,000.0 W/m^2
Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
Methodology V2

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	20.0	180.0	3	0.1	1,243	20.7	-

Total annual glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 2	3	0.1	1,243	20.7

Component Data

PV Arrays

Name: PV array 1
Axis tracking: Fixed (no rotation)
Tilt: 20.0°
Orientation: 180.0°
Rated power: -
Panel material: Light textured glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.215386	-71.741278	403.51	5.00	408.51
2	42.215297	-71.741100	407.51	5.00	412.51
3	42.215182	-71.740896	411.24	5.00	416.24
4	42.215069	-71.740758	417.29	5.00	422.29
5	42.214998	-71.740707	418.07	5.00	423.08
6	42.214963	-71.740841	426.97	5.00	431.97
7	42.214646	-71.741006	442.04	5.00	447.04
8	42.214297	-71.741243	453.00	5.00	458.00
9	42.214067	-71.741326	454.68	5.00	459.68
10	42.213922	-71.741364	455.21	5.00	460.21
11	42.213920	-71.741227	446.47	5.00	451.47
12	42.213473	-71.741162	436.32	5.00	441.32
13	42.213463	-71.741364	454.03	5.00	459.03
14	42.212964	-71.741340	447.19	5.00	452.19
15	42.212579	-71.741275	434.61	5.00	439.61
16	42.212364	-71.741235	428.00	5.00	433.01
17	42.212335	-71.741423	427.45	5.00	432.45
18	42.212984	-71.741535	448.04	5.00	453.04
19	42.213491	-71.741613	452.14	5.00	457.14
20	42.213622	-71.741661	454.08	5.00	459.08
21	42.213781	-71.741645	457.50	5.00	462.50
22	42.214025	-71.741758	459.95	5.00	464.95
23	42.214204	-71.741844	456.10	5.00	461.10
24	42.214440	-71.741913	447.41	5.00	452.41
25	42.214717	-71.741924	433.78	5.00	438.78
26	42.214963	-71.741881	423.97	5.00	428.97
27	42.215206	-71.741774	417.62	5.00	422.62
28	42.215317	-71.741565	412.66	5.00	417.66
29	42.215372	-71.741353	405.80	5.00	410.80

Route Receptors

Name: Route 2
Path type: Two-way
Observer view angle: 50.0°

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	42.205398	-71.746036	399.97	5.00	404.97
2	42.205775	-71.745668	398.26	5.00	403.26
3	42.206143	-71.745324	397.50	5.00	402.50
4	42.206580	-71.744958	398.47	5.00	403.47
5	42.206932	-71.744743	396.54	5.00	401.54
6	42.207186	-71.744632	396.52	5.00	401.52
7	42.207559	-71.744536	394.27	5.00	399.27
8	42.208066	-71.744412	392.14	5.00	397.14
9	42.208352	-71.744291	394.51	5.00	399.51
10	42.208696	-71.744119	395.01	5.00	400.01
11	42.208939	-71.743971	393.60	5.00	398.60
12	42.209378	-71.743636	393.56	5.00	398.57
13	42.209689	-71.743352	393.94	5.00	398.95
14	42.210006	-71.743000	393.27	5.00	398.27
15	42.210203	-71.742745	394.52	5.00	399.52
16	42.210302	-71.742621	395.11	5.00	400.11
17	42.210502	-71.742367	396.72	5.00	401.72
18	42.210797	-71.742001	397.74	5.00	402.74
19	42.211030	-71.741706	397.75	5.00	402.75
20	42.211513	-71.741006	397.61	5.00	402.61
21	42.211829	-71.740513	396.77	5.00	401.77
22	42.212216	-71.739931	394.89	5.00	399.89
23	42.212476	-71.739545	396.78	5.00	401.78
24	42.212660	-71.739258	396.23	5.00	401.23
25	42.212922	-71.738896	395.22	5.00	400.22
26	42.213180	-71.738517	397.24	5.00	402.24
27	42.213551	-71.737961	398.09	5.00	403.09
28	42.213861	-71.737494	397.96	5.00	402.96
29	42.214151	-71.737108	397.63	5.00	402.63
30	42.214435	-71.736784	395.90	5.00	400.90
31	42.214794	-71.736441	397.15	5.00	402.15
32	42.215157	-71.736109	397.06	5.00	402.06
33	42.215401	-71.735897	396.83	5.00	401.83
34	42.215617	-71.735706	398.64	5.00	403.64
35	42.215908	-71.735456	402.63	5.00	407.63
36	42.216174	-71.735223	407.65	5.00	412.65
37	42.216389	-71.735007	409.44	5.00	414.44
38	42.216731	-71.734621	411.14	5.00	416.14
39	42.217108	-71.734227	412.84	5.00	417.84

Glare Analysis Results

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	20.0	180.0	3	0.1	1,243	20.7	-

Total annual glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 2	3	0.1	1,243	20.7

PV: PV array 1

potential temporary after-image

Receptor results ordered by category of glare

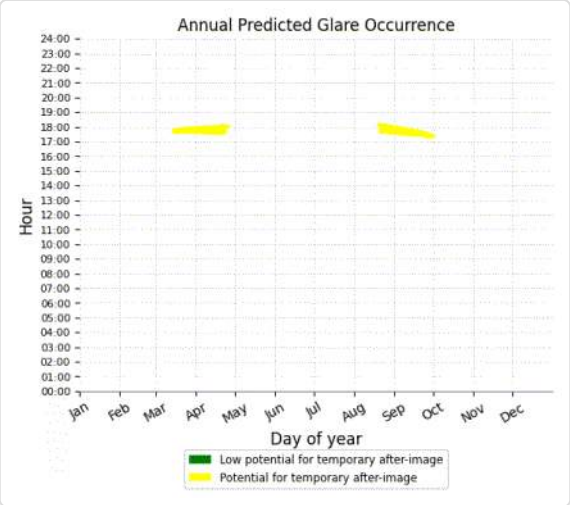
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 2	3	0.1	1,243	20.7

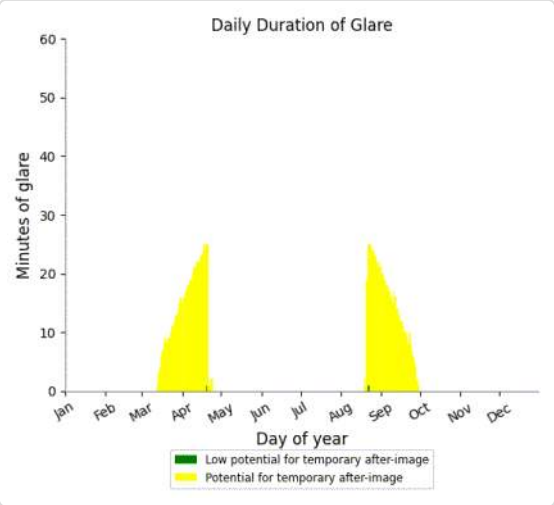
PV array 1 and Route 2

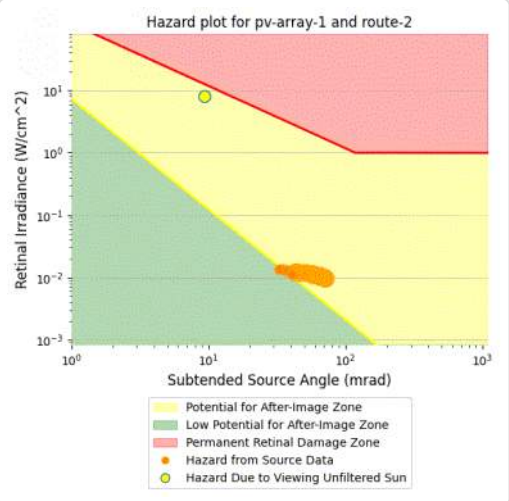
Receptor type: Route

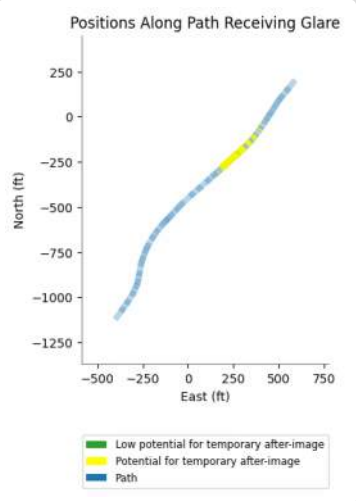
1,243 minutes of yellow glare

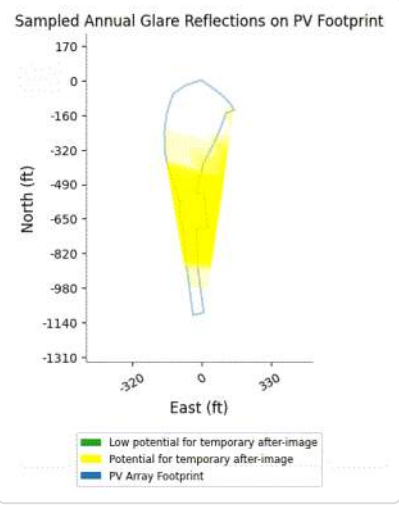
3 minutes of green glare











Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

2016 © Sims Industries d/b/a ForgeSolar, All Rights Reserved.

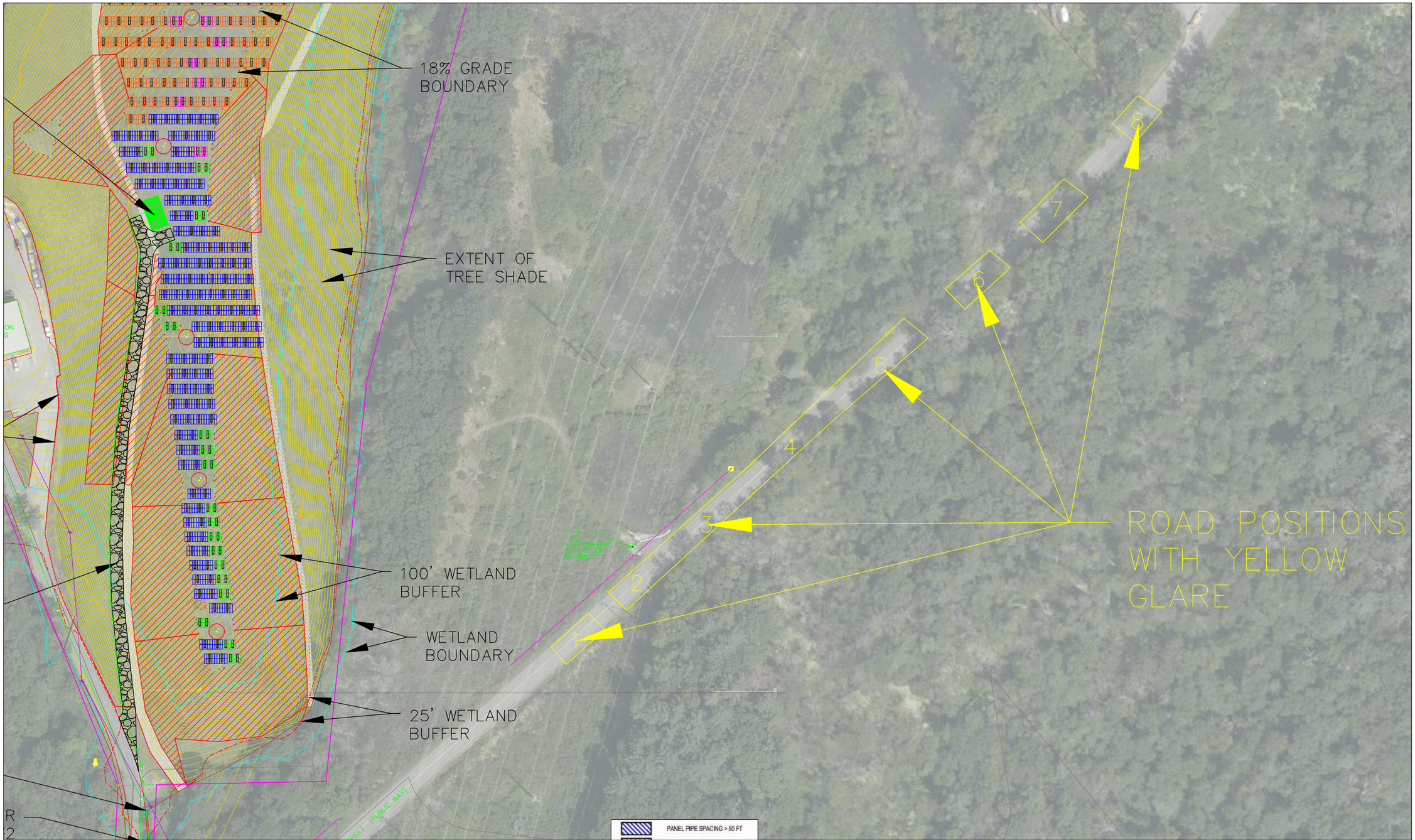
NOT FOR CONSTRUCTION

POWER TABLE

PV ARRAY				PV MOUNT			BATTERY						BATTERY DC/DC CONVERTER				PV & BESS INVERTER				PV TRANSFORMER		
LOCATION	MODULE QTY	MODULE TYPE	KW DC	AZIMUTH	PITCH	TYPE	TYPE	SIZE (KW DC)	QTY	KW DC	HRS	KWH	TYPE	SIZE (KW DC)	QTY	KW DC	TYPE	SIZE (KW AC)	QTY	KW AC	TYPE	QTY	RATING
ARRAY 1	1,432	HANWHA 395W Q.PEAK DUO L-G5.2	565.64	180	20	BALLASTED LANDFILL	POWIN STACK 750E	247.5	2	495.0	3	1,485.0	DYNAPOWER DPS-500	500	1	500.0	SMA SC 2660 UP-US	2,667 (CURTAILTED TO 996)	1	996	PAD MOUNTED	1	1000 KVA, 600V / 13.8 KV
ARRAY 2	1,746	JINKO 410W JAM72S10-410MR	715.86																				
TOTAL	**3,178**		**1,281.50**						**2**	**495**		**1485**			**1**	**500**			**1**	**996**		**1**	

NOTES:

1. SHADING PATTERN IS CALCULATED BASED ON JUNE 21ST FROM 7:30AM TO 4:30PM, FEBRUARY 21ST FROM 9AM TO 3PM, AND DECEMBER 21ST AT NOON, TAKING INTO ACCOUNT SITE LATITUDE AND LONGITUDE.
2. SHADING FOR OBJECTS NOT IMPACTING THE PV SYSTEM IS NOT SHOWN.
3. GROUND SNOW LOAD = 50 PSF, BASIC WIND SPEED = 102 MPH (RISK CATEGORY I - 115 MPH), EXPOSURE TYPE B.



MILLBURY MA LANDFILL - OVERALL ARRAY LAYOUT

SCALE: 1"=60' WHEN PRINTED 36" x 24"

SCALE: 1" = 60' ON 36" x 24"
DRAWN BY: SMC
CHECKED BY:
DATE: 05/03/2022
REVISIONS:

MILLBURY MA SOLAR PV - LANDFILL
RIVERLIN STREET
MILLBURY, MASSACHUSETTS

SOLAR PV & BATTERY ENERGY STORAGE SYSTEM
PV: 1,281.5 KWDC (996 KW AC)
BESS: 500 KW DC, 1,485 KWH - DC COUPLED
PHOTOVOLTAIC ARRAY LAYOUT

AMERESCO
111 Speen Street, Suite 410
Framingham, Massachusetts 01701
(508) 661-2200

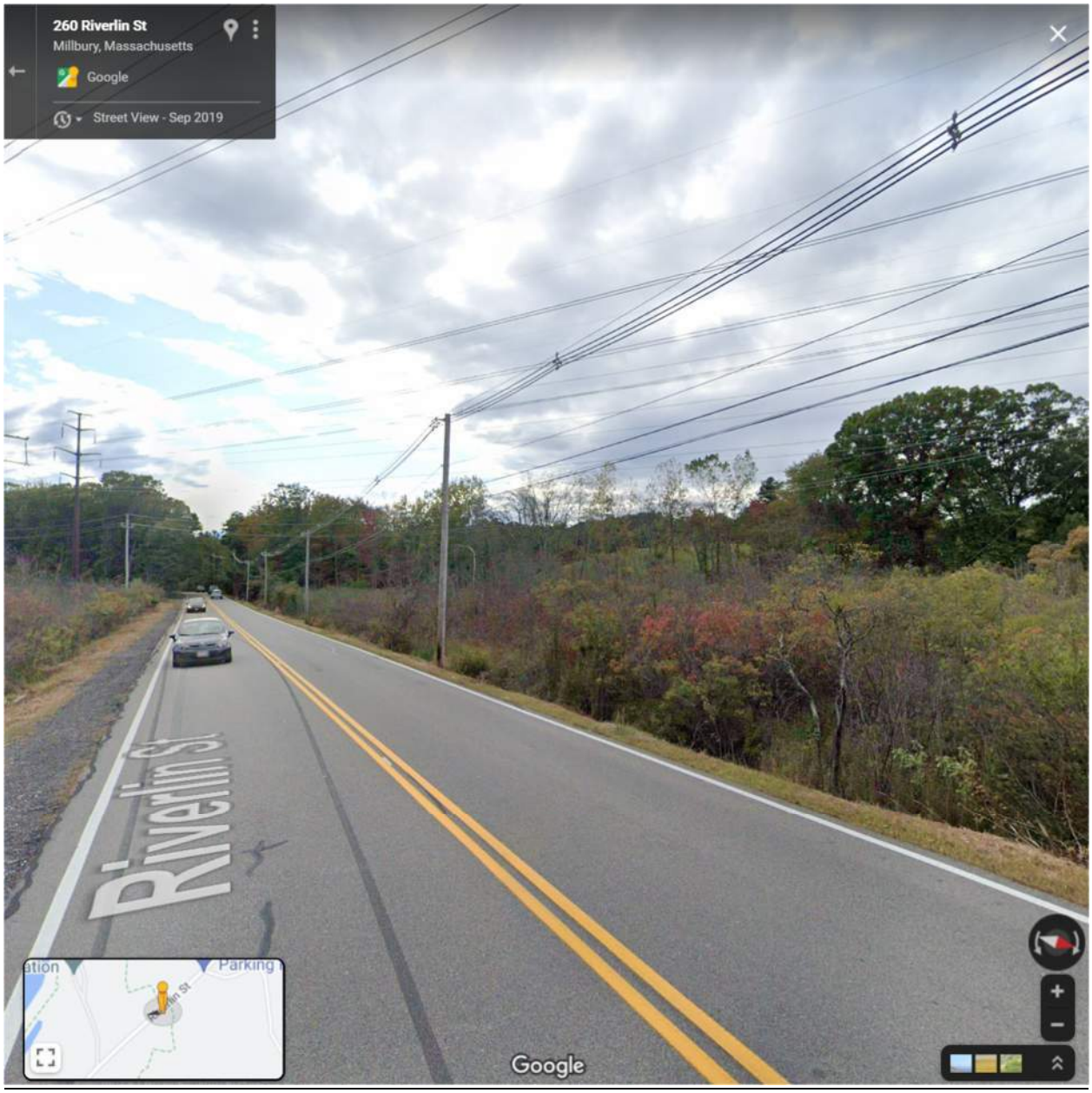
Copyright 2005 Ameresco. The above drawings, specifications, ideas, designs, and arrangements are and shall remain the property of Ameresco and no part thereof shall be copied, disclosed to others, or used in connection with any work or project other than the specified project for which they have been prepared and developed without the written consent of Ameresco. Visual contact with these plans or specifications shall constitute conclusive evidence of acceptance of these restrictions. Written dimensions on these drawings shall have precedence over scaled dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the job and this office must be notified of any variations from the dimensions and conditions shown by these drawings.

E-100

Position #1


256 Riverlin St
Millbury, Massachusetts
Google
Street View - Sep 2019
Riverlin St
Google

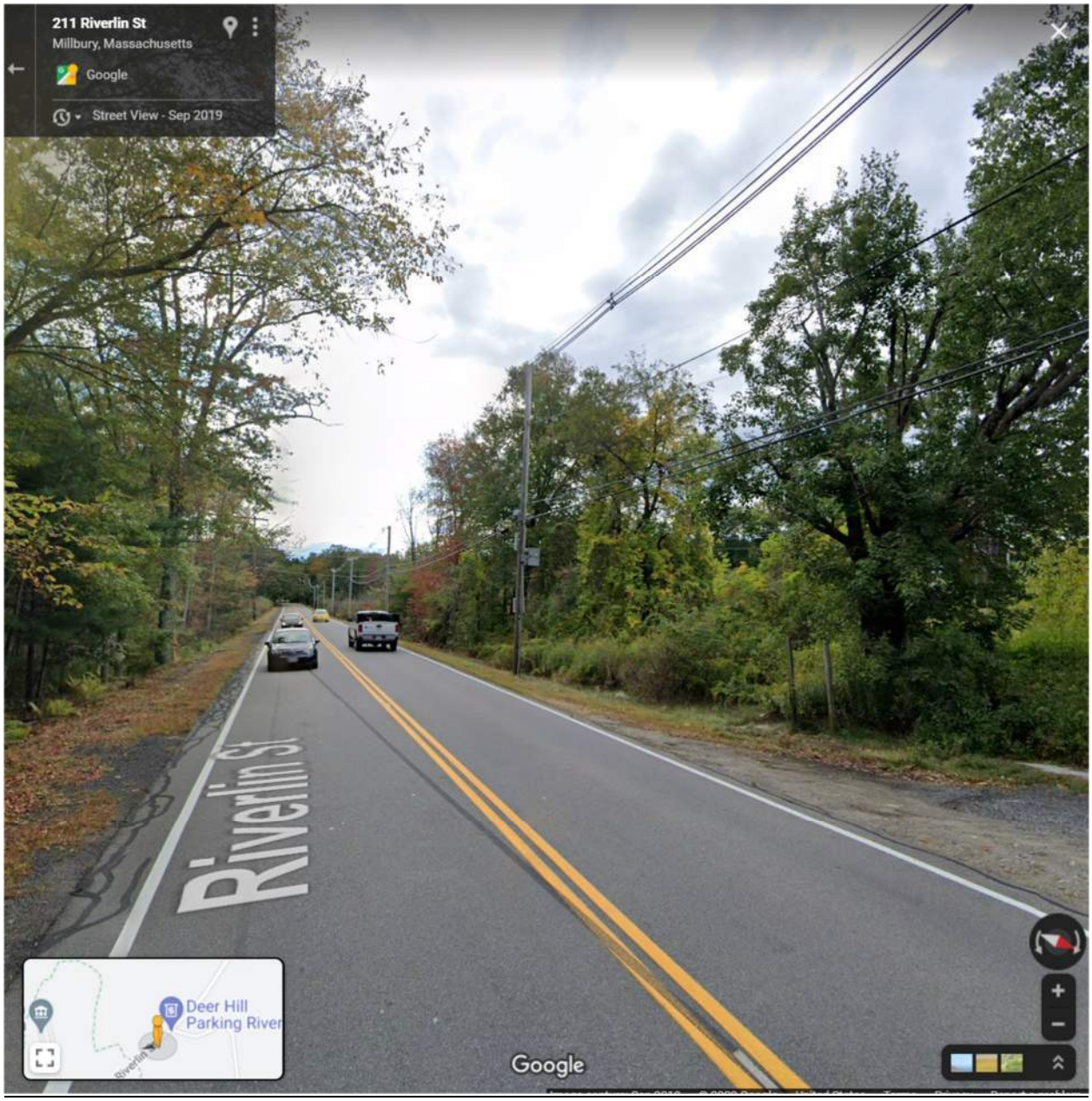
Position #2


260 Riverlin St
Millbury, Massachusetts
Google
Street View - Sep 2019
Riverlin St
Google

Position #3


250 Riverlin St
Millbury, Massachusetts
Google
Street View - Sep 2019
Riverlin St
Parking R
Google

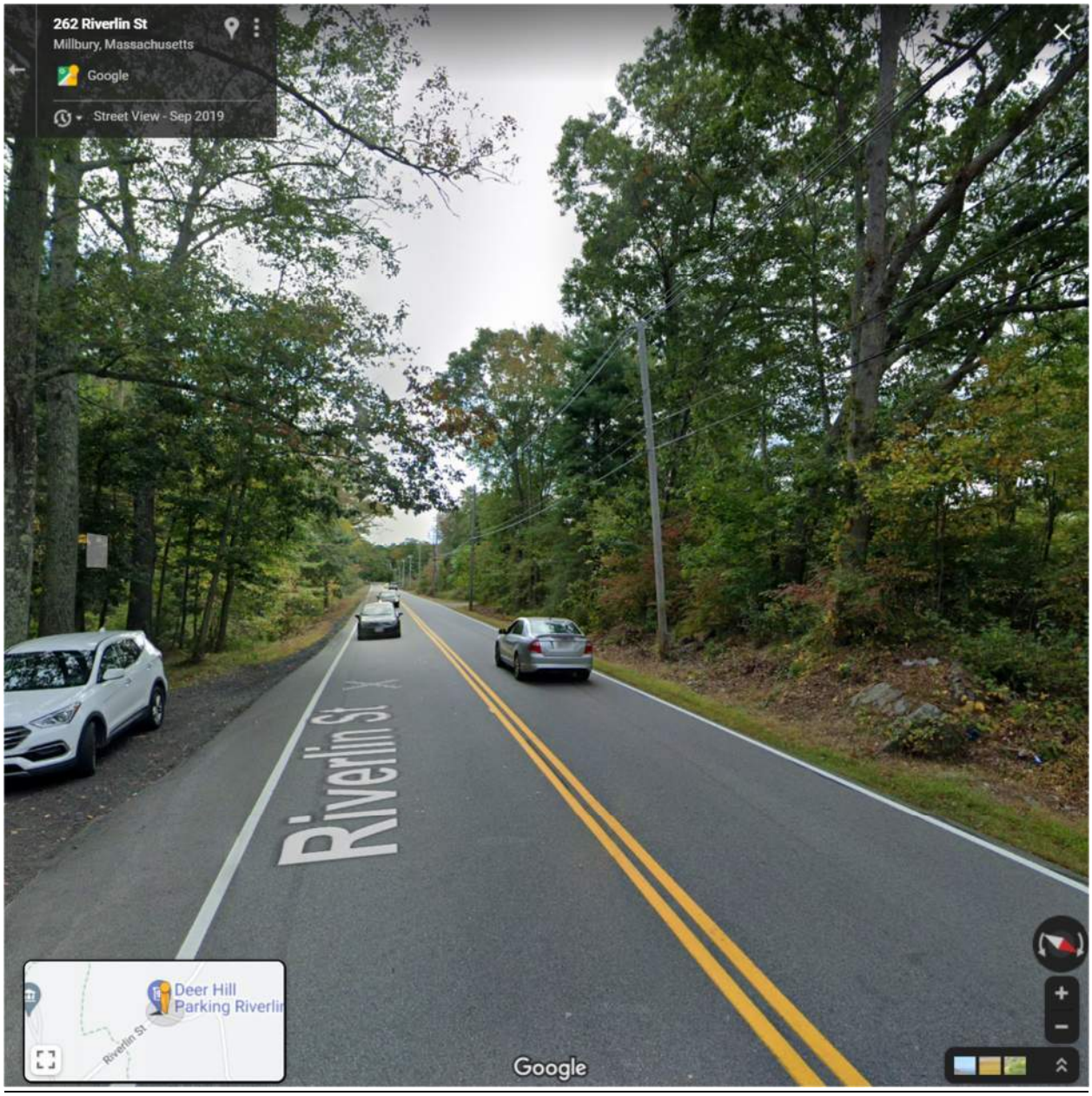
Position #4


211 Riverlin St
Millbury, Massachusetts
Google
Street View - Sep 2019
Riverlin St
Deer Hill
Parking River
Google

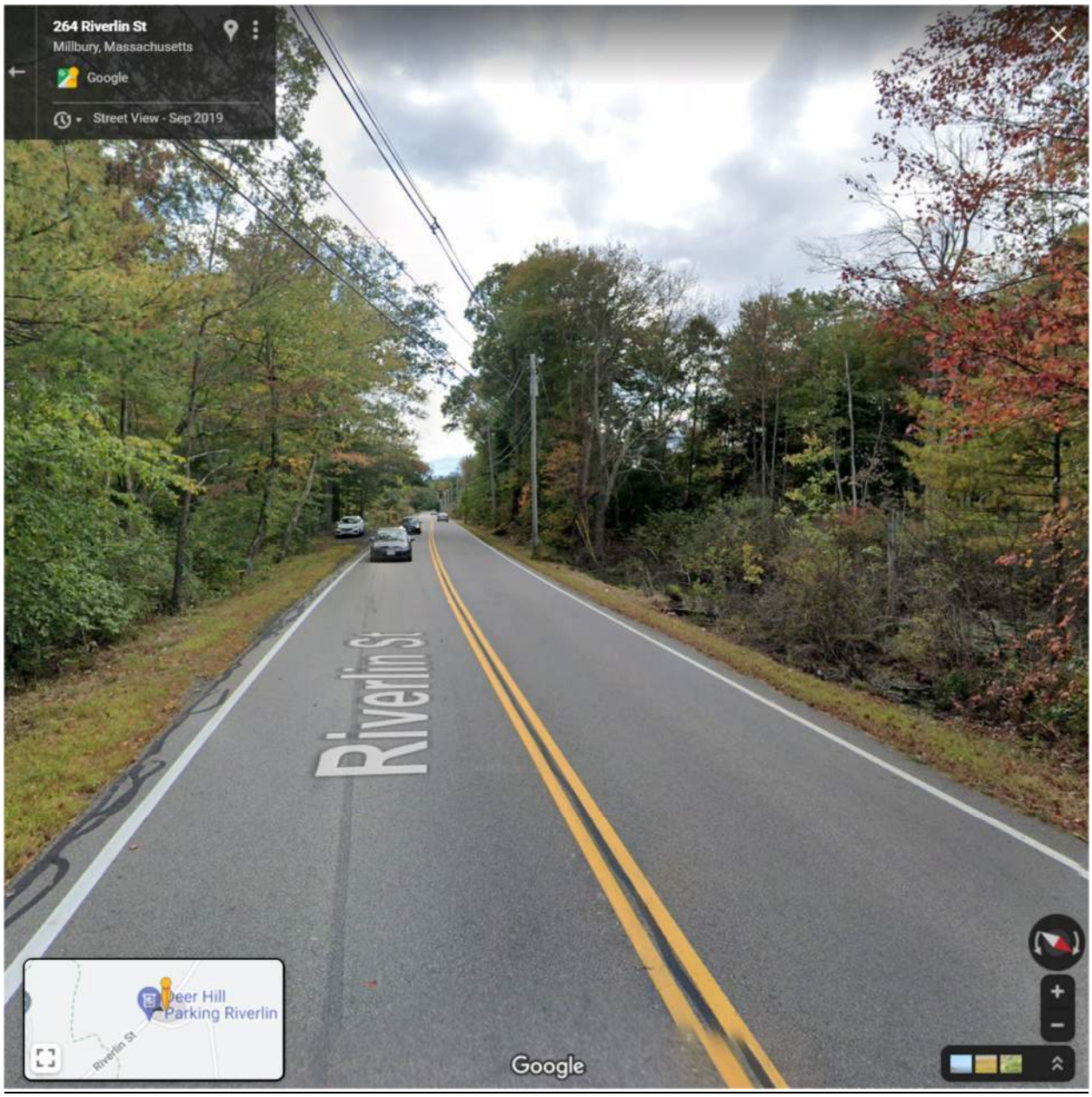
Position #5


260 Riverlin St
Millbury, Massachusetts
Google
Street View - Sep 2019
Riverlin St
Deer Hill
Parking River
Google

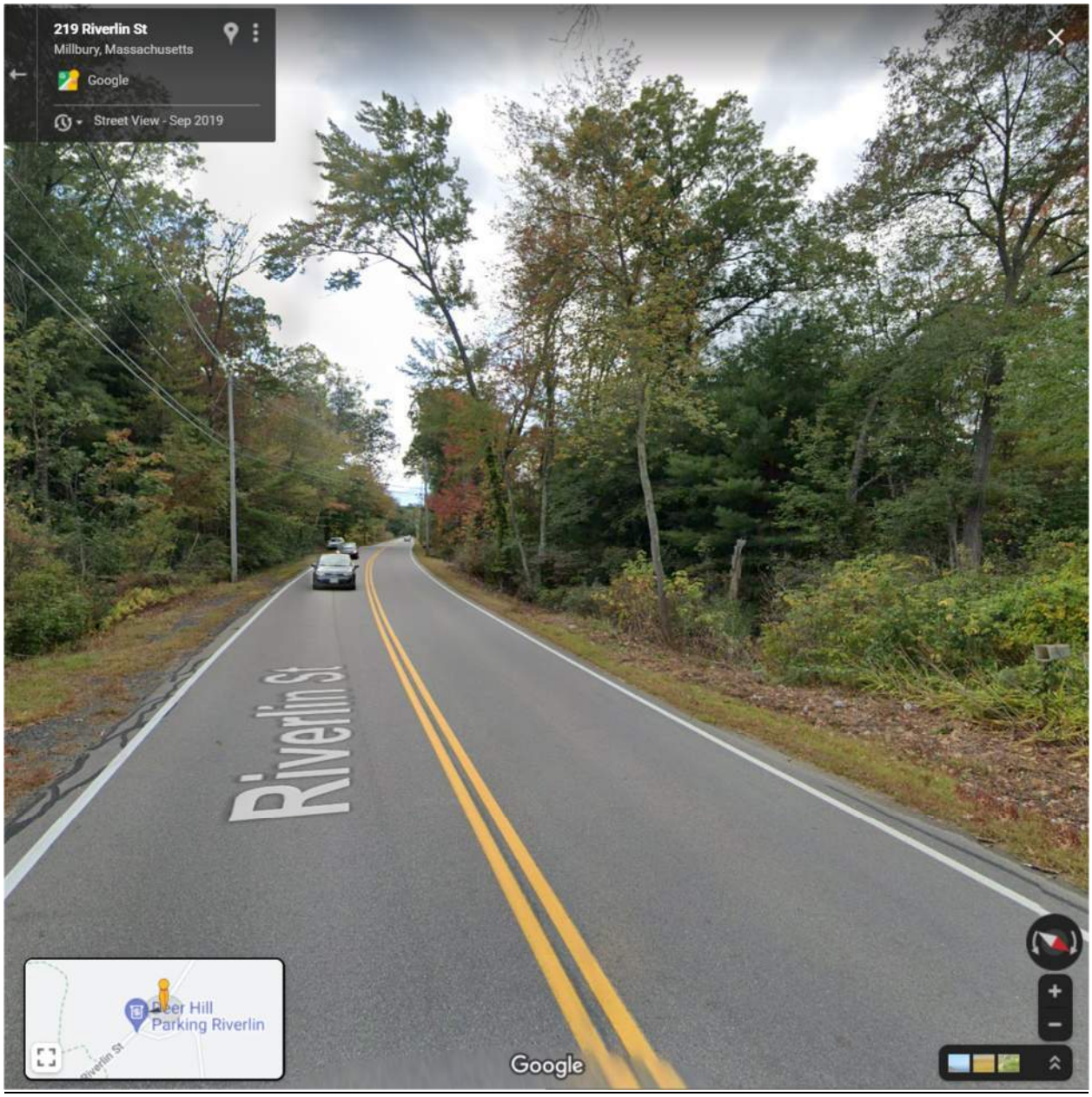
Position #6


262 Riverlin St
Millbury, Massachusetts
Google
Street View - Sep 2019
Riverlin St
Deer Hill
Parking Riverlin
Riverlin St
Google

Position #7


264 Riverlin St
Millbury, Massachusetts
Google
Street View - Sep 2019
Riverlin St
Deer Hill
Parking Riverlin
Riverlin St
Google

Position #8


219 Riverlin St
Millbury, Massachusetts
Google
Street View - Sep 2019
Riverlin St
Google

Appendix H – Waiver Request Letter

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

May 16, 2022

Planning Board
Town of Millbury
127 Elm Street
Millbury, MA 01527

Re: **Zoning Bylaw Waiver Request**
Millbury Landfill Solar Project
Riverlin Street, Millbury, MA 01527

Dear Members of the Planning Board:

Weston and Sampson Engineers, Inc. (Weston & Sampson) is requesting the following waivers to the Town of Millbury Zoning Bylaws to support the combined Site Plan Review and Stormwater Application for the above-mentioned project on behalf of Millbury Landfill Solar LLC (the Applicant). The Applicant proposes to develop an approximately 1.28 MW DC ground-mounted solar photovoltaic and 500 kW battery storage project at the Town of Millbury Landfill located at Riverlin Street.

Town of Millbury Zoning Bylaws
SECTION 51 LARGE-SCALE GROUND-MOUNTED SOLAR PHOTOVOLTAIC INSTALLATIONS

1. 51.6.4 Fencing: An 8-foot tall, mini-mesh security fence shall be installed around the entire perimeter of the large-scale ground-mounted solar photovoltaic installation.

The Applicant is requesting a waiver from this requirement. There is an existing chain link fence around the perimeter of the Site that is proposed to be modified by adding a security extension up to 7ft in height to comply with the requirements of the NFPA 70, National Electric Code (NEC) for electrical enclosures. New chain link fence required for the project is also proposed at 7ft to provide a cohesive look when tying into existing fence locations.

We are also requesting a waiver from "mini-mesh" material to standard 1-3/4 inch to 2-inch mesh material.

2. 51.6.10 Network Interconnections and Power Lines: To the extent feasible, all network interconnections and power lines, to and from the facility, shall be located underground. Electrical transformers for utility interconnections may be above ground if required by the utility provider.

The project is located on a closed landfill cap. To protect the integrity of the cap, electric lines for the solar array on the cap will be run above ground in cable trays or conduit runs to the equipment pad. From the equipment pad there will be approximately six (6) new utility poles that will be used to reach the point of interconnection along Riverlin Street. A waiver is requested to allow the use of overhead power lines.

3. 51.8.3 Removal Requirements. The owner shall dismantle and physically remove the solar photovoltaic installation within ninety (90) days from the date of discontinued operations.

The Applicant is requesting a waiver of this requirement and would like a removal timeline of 180 days.

If you have any questions regarding this waiver request, or require any additional information, please feel free to contact me by email at bukowski.rob@wseinc.com.

Sincerely,
WESTON & SAMPSON ENGINEERS, INC.

Robert J. Bukowski, P.E.
Project Manager

cc: Steve McDonough, Millbury Landfill Solar LLC

Appendix I – Development Impact Statement

DEVELOPMENT IMPACT STATEMENT

In accordance with Section 5.2(4) of the Town of Millbury's Subdivision Rules and Regulations, the Applicant shall submit a Development Impact Statement (DIS).

It is an Applicant's responsibility to prepare and document the DIS insufficient detail to permit an adequate evaluation by the Planning Board; however the Board may request in writing additional data. It is necessary that the Applicant respond to all sections of the DIS form except in the event that the Planning Board grants a written exemption:

The Board may waive any section(s) of the requirements when, in their opinion and submission of evidence from the Applicant, the requirements are not applicable to the proposed project.

The entire cost of the Development Impact Statement shall be the responsibility of the Applicant

---

Name of Project:

1.28 MW DC Solar PV Storage Development And 500kW Battery Energy Storage System

Type of Project:

Large-Scale Ground-Mounted Solar Photovoltaic Installation

Applicant(s):

Millbury Landfill Solar LLC

Project Location:

207 Riverlin Street

Parcel Number(s): *24-19*

Total Acreage: *19.99 acre*

Name of individual(s) preparing this DIS:
Weston & Sampson Engineers, Inc.

I. PROJECT DESCRIPTION

A. Number of Units: *Not Applicable*

___Total

____ Single Family

____Duplex

____Multi-family

B. Number of Bedrooms: *Not Applicable*

___Total

____ Single Family

____Duplex

____Multi-family

C. Approximate Price/Unit: *Not Applicable*

_____ Single Family

___Condominium

___Rental

II. SITE DESCRIPTION

A. Present land uses by percentage of the site. *See Stormwater Narrative*

Land Use	Approximate Acreage Present	Approximate Acreage Future
Meadow or Brushland (non-agriculture)		
Forest		
Agriculture (orchards, farmland, pasture)		
Wetland		
Water Surface Area		
Flood Plain ·		
Unvegetated (rock, earth, fill)		
Roads, Buildings & Other Impervious Surface		
Other (indicate type)		

B. List the zoning districts (including overlay zoning districts) in which the site is located and indicate the percentage of the site in each district.

District	Percentage
Industrial I-1	*100%*
Aquifer Protection Overlay Area A	*~5%*

III. NATURAL ENVIRONMENT

A. Land

1. Describe the potential and probable impacts of the proposed development on the existing geology, topography, and land use of the project site and surrounding area. What is the approximate percentage of the proposed site with slopes between 0-10%, 10-15% and greater than 15%?

The proposed development will be installed following existing topography which ranges in slope between 0-30% on the landfill cap.

Slope Range	***Percentage w/in Limit of Work***
0%-10%	*32*
10%-15%	*16*
>15%	*52*

Temporary erosion and sedimentation controls will be installed during construction around the perimeter limit of work. Disturbances to existing vegetation will be limited to the area of the ballast blocks, and the

gravel access road. Stormwater will be managed through the existing stormwater management system in place at the landfill including a riprap swale and stormwater basin.

2. Describe any unusual or unique features such as bogs, kettle ponds, eskers, drumlins, quarries, distinctive rock formations, or bedrock outcroppings on the site.

   The site has several wetlands surrounding the development. These wetlands will be protected by best management practices. No wetland crossings are required for site development. No impacts on wetland areas are proposed.

3. Describe any limitations on the proposed project caused by subsurface soil and water conditions, and methods to be used to overcome them.

   The proposed project is located on a previously capped solid waste landfill that shall remain protected from excavation; therefore, the proposed development is using a ballasted foundation versus ground mounted posts. Post closure use of a capped landfill falls under the jurisdiction of MassDEP through a SW36 Major Post Closure Use Permit Application.

4. Describe procedures and findings of percolation tests conducted on the site.

   Percolation tests are not applicable for this project since it is at an existing closed landfill.

5. Describe the methods to be used during construction to control erosion and sedimentation and siltation including use of sediment basins and type of mulching, matting, or temporary vegetation; approximate size and location of land to be cleared at any given time and length of time-to exposure; covering of soil stockpiles; and other control methods used. Evaluate effectiveness of proposed methods on the site and the surrounding areas.

   Temporary erosion and sedimentation controls will be installed during construction including a construction exit and sediment barriers following existing topography at the limit of disturbance. Ground disturbances will be limited to the placement of crushed gravel for foundation pads (ballast blocks and equipment pads), installation of a gravel access drive, conduit support blocks and utility poles. Erosion and sedimentation controls and procedures are outlined on the project Drawings included in Appendix C..

6. Describe the permanent methods to control erosion and sedimentation. Include descriptions. of:

   a. Areas subject to flooding or ponding;

   No part of the site being developed is expected to be impacted by flooding or ponding due to site elevation and the topography of the site.

   b. Proposed surface drainage system;

   See Appendix J for the stormwater narrative.

   c. Proposed land grading and permanent vegetation cover;

   Regrading of the areas under the proposed PV arrays is not proposed. Other than the dense graded aggregate that will be used to form the access road and pads under the ballast blocks and equipment pad(s), the site will remain vegetated.

   The access drive is to consist of a minimum 10 inch layer, installed down slope of an existing rip-rap lined swale minimizing hydraulic impacts while the pads are not expected to change the overall flow path of stormwater runoff.

d. Methods to be used to protect existing vegetation;

As discussed previously, existing vegetation at the site is to remain throughout the site except for the area of the access drive, ballast block and equipment pad locations.

e. The relationship of the development to topography;

The proposed development will follow existing topography.

f. Any proposed alterations of shorelines, marshes or seasonal wet areas

No alterations to wetlands around the site are proposed

g. Estimated increase of peak runoff caused by altered surface conditions; and methods to be used to return water to the soils.

There is no increase to peak runoff of stormwater from the site under the proposed development conditions.

B. Air

1. Describe possible sources and duration of significant amounts of odors, smoke and dust during construction.

Dust is not anticipated at the site due minimal disturbance to existing vegetation. Dust may be present during deliveries of gravel and crushed stone at the site but will be limited to small durations. Smoke and odor are not anticipated to occur.

2. Describe the relationship of the location of the subdivision and prevailing wind patterns to nearby residences, business, recreation areas, and other public areas.

The nearest homes are across the railroad and beyond thick vegetation. Access to the site will only be periodic and there will be no long-term impacts on the operation of the adjacent transfer station.

3. Describe precautions to eliminate or minimize the adverse environmental effects of the smoke, dust or odors generated.

During construction, dust will be managed through the use of sprinkling of water as needed.

C. Water and Wetlands

1. Evaluate how and to what extent the project will affect the quality and quantity of any existing or potential public or private water supplies including watersheds, reservoirs, and groundwater.

The proposed project is located on the existing capped landfill and is not expected to affect the quality and quantity of water supplies.

2. Indicate whether the site is located on an aquifer and note its approximate yield.

The site is located adjacent to the Aquifer Protection Overlay Area A.

3. Discuss the project's effects on groundwater supply and efforts to recharge groundwater supplies.

The project will have no effect on groundwater supply as it is located on the existing capped landfill disconnected from groundwater supply.

4. Discuss the effect of the proposed sewage disposal methods on surface and groundwater supplies and quality.

There is no sewage proposed as part of this project.

5. Discuss the probability that the project will increase pollution or turbidity levels within receiving waterways and the precautions to be taken to minimize the effects.

The probability of increased turbidity levels within receiving waterways from the project is low given the minimal impact to existing vegetation and no change to topography at the site. The proposed project will minimize these effects through the use of temporary erosion and sedimentation controls during construction until final stabilization is established.

6. Discuss the project's effect on the waterway's aquatic biota and use as habitats.

The project is located on an existing landfill cap upland of protected habitat areas. Waterway's aquatic biota and use as habitats will be unaffected.

7. Discuss what effect the project will have on increasing the incidence of flooding, including areas outside the subdivision.

The project is not expected to impact the local incidence of flooding.

D. Flora and Fauna

1. Discuss the projects effects on land-based ecosystems, such as the indigenous wildlife, stream bank cover, and vegetated or wooded growth.

There are no expected effects to land-based ecosystems as the site is located on a closed landfill cap.

2. Describe proposed types and amounts of vegetal cover.

No change to vegetal cover is proposed.

3. Discuss the existence of rare or endangered plant, wildlife or fish species in the project area.

No rare or endangered flora or fauna have been identified in the project area.

E. Open Space & Recreation

1. Discuss whether there is any farmland or forest land on the site that is protected under Chapter 61A or 61B of the Massachusetts General Laws.

Not applicable. The project is located on the existing closed landfill cap. There is no protected farm or forest land protected under Chapter 61A or 61B of the Massachusetts General Laws.

2. Discuss whether the site is adjacent to conservation land or recreation area.

Dorothy Pond is west of the existing transfer station on the west side of the project site.

3. Describe existing or proposed recreational facilities including active and passive types, age groups participating, and state whether recreational facilities and open space are available to all residents.

There are no recreational facilities, existing or proposed on the closed landfill.

4. Discuss how the location and construction of the project will affect existing and potential park and recreation areas, open spaces, and natural areas.

The project will not affect existing parks, recreation areas, or natural areas.

5. Discuss whether the site includes scenic views and if the proposed development will cause any scenic vistas to be obstructed from view.

There are no scenic vistas which the project will obstruct.

IV. MAN-MADE ENVIRONMENT

A. Aesthetics and Visual Impact

1. Discuss whether the project contains buildings of historic or archeological significance (consult with the Millbury Historical Commission).

There are no existing buildings of historical significance at the site.

2. Describe the agricultural and landscaping techniques which will be used to blend the structures with the surrounding area.

There are no structures proposed.

3. Discuss the heights of the structures in relation to the surrounding area.

There are no structures proposed.

4. Discuss the projects visual impact and possible interference with scenic views.

There are no scenic vistas which the project will obstruct.

5. Describe type of construction building materials used, location of common areas, location and type of common service facilities (laundry, trash, and garbage disposal).

There are no structures proposed.

6. Describe the type, design, location, function and intensify of all exterior lighting facilities. Attention given to safety, privacy, security, and daytime and nighttime appearance shall be detailed.

There is no proposed lighting associated with the project.

B. Noise

1. Describe the time, duration, and types of noises generated by the project (including traffic generated from the development), both during and after construction.

During the 3-4 month construction period, there may be several trucks per day for delivery of materials. In addition, there will be vehicles from site workers which may be between 10 and 20 on certain days. Following construction, the site will be visited a few times per year for routine maintenance. Once operating, negligible noise will be generated from the electrical equipment and battery enclosure.

2. Describe the controls which will be used to eliminate or minimize the adverse impacts of these noises.

The site is well screened by vegetation and set back far enough that the construction noise and noise generated from the electrical equipment will be negligible.

C. Water Supply

1. Discuss the demands of the project for consumption and fire protection. Estimate the daily average and the summer peak daily average demand for the proposed subdivision when completed.

There is no public water supply proposed for this project.

2. Describe the groundwater and/or surface water supply to be used to supply the subdivision.

There is no public water supply proposed for this project.

D. Solid Waste

1. Estimate the amount and type of solid waste generated by the subdivision per year.

   Solid waste generated during construction will be collected onsite and managed by the Applicant. There will be no solid waste generated by the project after construction is complete.

2. Indicate the most likely means of disposal and probable disposal site(s).

   The contractors performing the work will be responsible for removal and disposal of the waste that they generate.

3. Describe the average and peak daily disposal and the impact of such disposal on the ground water.

   Solid waste generation during construction is not expected to impact ground water conditions.

   Stormwater System

1. Indicate the location of all proposed outfalls.

   No new outfalls are proposed.

2. Describe the effect- of the outfalls and their discharge on the receiving waters, i.e., increased flows, pollution, etc.

   No new outfalls are proposed, the peak runoff rate will be unchanged from existing to proposed, therefore there no effect on the receiving waters is expected.

3. Discuss the quantity of stormwater to be discharged.

   There is no change in ground cover or topography at the site; therefore, no increase in stormwater quantity is expected from the proposed project.

F. Circulation System

1. Discuss existing traffic conditions, including average daily and peak hour volumes, avenge and peak speeds, sight distances, accident data for the _ previous three years, and levels of service (LOS) of intersections and *streets* affected by the proposed development. Generally, such data shall be presented for all streets and intersections adjacent to or within 1000 feet of the project boundaries, and shall be no more than 12 months old at the date of application, unless the Board specifically approves other data.

   There will be no traffic impacts upon project completion. The Applicant will work with the Town transfer station employees to develop delivery schedules and parking locations to minimize impacts on the operation of the facility.

2. Discuss the expected impact of traffic generated by the proposed development on area roadways, including projected peak hour and daily traffic generated by the development on roads and ways in the vicinity of the development, sight lines at the intersections of the proposed street(s), sightlines of existing intersections, condition of existing streets, and projected post development traffic volumes and levels of service of intersections and streets likely to be affected by the proposed development.

   There will be no traffic impacts upon project completion.

   In determining the impact of vehicular traffic generation from a development, the following standards and definitions shall be used (unless the Applicant demonstrates to the Planning Board that given the nature of the proposed project or applicable road systems, other standards are appropriate):

- A registered professional engineer experienced and qualified in traffic engineering shall prepare the traffic analysis:

- Trip generation rates for land uses shall be as contained in the most recent update of Trip Generations, Institute of Transportation Engineers, Washington DC.

3. Describe efforts to minimize traffic and safety impacts through such means as physical design and layout concepts, roadway and intersection improvements, drainage improvements, and pedestrian and bicycle facility improvements.

   There will be no traffic impacts upon project completion.

4. Describe the proposed pedestrian circulation pattern. Identify existing sidewalks within 1,000 feet of the proposed site.

   There will be no pedestrian traffic impacts upon project completion.

V. *COMMUNITY SERVICES*

Schools

Estimate the probable number of students generated by the subdivision. *Not Applicable*

Describe the location of the nearest schools. *Not Applicable*

3. Describe projected schoo1bus routing changes and projections of future school building needs resulting from the proposed project *Not Applicable*

Police

1. Describe the expected impact on police services, time and manpower needed to protect the proposed development and service improvements necessitated by the proposed development.

   There are no anticipated police services required as part of the proposed project.

C. Fire

1. Describe expected fire protection needs.

   There are no anticipated fire services required as part of the proposed project. If there is a fire need, there is an access road with proposed to the transformer pad.

2. Describe on-site firefighting capabilities, fire flow water needs, and source and delivery system needs. In the event of fire, estimate the response time of the fire department (consult with fire department).

   To the best of our knowledge, there are no on-site firefighting capabilities..

3. Describe fire department service improvements necessitated as a result of the proposed project.

   There are no fire service improvements proposed as part of this project.

D. Public Works

1. Calculate the total linear feet of roadway to be publicly maintained and plowed.

   Not applicable, no new proposed public roadways are proposed for the project.

2. Calculate the linear feet of street drains, culverts, sanitary sewers, and waterlines to be publicly maintained.

   Not applicable, there are no new street drains, culverts sewers or waterlines proposed for the project.

3. Analyze projected need, responsibility and costs to the Town of roadway maintenance.

   Not applicable, there will be no change to existing roadways associated with the project.

Appendix J – Stormwater Permit Application

APPENDIX J - STORMWATER NARRATIVE

Applicant/Project Name: Millbury Landfill Solar LLC
Millbury Landfill Solar Development Project

Project Location: 207 Riverlin Street, Millbury, MA

Application Prepared by:
Firm: Weston & Sampson Engineers, Inc.
Registered PE: Rob Bukowski, P.E.

Introduction

Millbury Landfill Solar LLC (the Applicant) proposes construction of a ground mounted solar photovoltaic (PV) array on the Town's closed landfill encompassing approximately 4.7 acres of the approximately 20 acre site located on Town of Millbury Property (the project). The project site is situated on the north side of Riverlin Street within the I1 industrial zone. The landfill cap is vegetated with grassed berms and swales channeling runoff to a basin at the south of the landfill. The site has an existing paved road off Riverlin Street which connects to a paved area that operates as a transfer station for the Town of Millbury.

The following narrative and documentation are hereby submitted to the Planning Board in accordance with Chapter 13.15 "Post-Construction Storm Water Management of New Developments and Redevelopments" of the Millbury Municipal Code last updated May 2, 2018, and modifications to the code documented in the meeting minutes from the Annual Town Meeting Dated April 28, 2022. The proposed project is located on the existing closed Town landfill and qualifies as a redevelopment project and meets the requirements to the maximum extent practicable.

A hydrologic model was prepared using HydroCAD modeling software to compare pre- and post-development stormwater rates. The model assumes a hydrologic soil group (HSG) D for the landfill cap for both existing and proposed models. This is a conservative assumption that is used to account for the limited capacity of the vegetative support layers on top of the FML and impervious clay barrier. Rainfall values used in the models are based on the values listed in the Town of Millbury Annual Town Meeting Notes referenced from the 1998 Cornell University Study, NOAA Atlas 14 Volume 10 Point Precipitation Frequency Estimates for Millbury.

The stormwater application checklist and signed copy of the stormwater application form are included in Attachment A.

Proposed Project

The proposed PV site and associated improvements are located on the capped landfill adjacent to the transfer station at 207 Riverlin Street, Millbury (Parcel ID:24/19). The parcel is 19.99 acres and includes the town of Millbury's closed municipal landfill and active transfer station. As currently designed, the system to be installed has a DC capacity of 1,280 kW and is composed of solar panel support racks connected to ballast block racking system within the landfill parcel limit of waste. A 500 kW battery energy storage system (BESS) will also be installed as part of the project. The system is to be surrounded by chain link fence with a 20 foot (ft) wide access gate. One gravel access road is to be installed on the west side of the landfill up to the equipment pad, to be installed near the top of the cap.

Stormwater Flow (Pre- and Post-Development)

The landfill cap is vegetated with perimeter rip-rap swales that drain to adjacent wetland areas. The stormwater analysis for this project was modeled using the proposed limits of disturbance. Three watersheds were analyzed as shown on the watershed maps included in Attachment B of this appendix which display the limits of each watershed, flow paths, and ground covers for pre- and post-development conditions.

- Drainage Area A1 – Western portion of the landfill cap which drains west of the project limits to Dorothy Pond.
- Drainage Area B1 – Northern portion of the landfill cap which drains to a riprap lined swale ultimately discharging to Wetland B.

- Drainage Area B2 – Central and southern portions of the landfill cap which drain to a riprap lined swale ultimately discharging to Wetland B.

The stormwater analysis assumes the ballast blocks will be considered disconnected impervious areas in the post-development stormwater model. Stormwater flow patterns do not change based on the proposed solar PV layout since there are no proposed grading changes. Based on the increase in disconnected impervious area the curve numbers marginally increase under post-development conditions.

The full HydroCAD stormwater analysis for pre- and post-development conditions are included in Attachment C of this appendix.

Massachusetts Stormwater Management Standards

Below is an explanation describing the Massachusetts Stormwater Management Standards 1-10 as they apply to the Millbury Landfill Solar Development Project:

Standard 1: No New Untreated Discharges

The proposed project is redevelopment at the existing landfill cap. The existing stormwater management system includes perimeter rip rap lined swales discharging to perimeter wetlands. The increase in stormwater runoff from the impervious ballast blocks creates an increase in post-development peak discharge rates from the existing stormwater detention basin, however, the discharge velocities are below permissible scouring velocities.

Standard 2: Peak Rate Attenuation

A summary of the pre- and post-development peak flow rates is summarized below. Due to the small increase in curve number from the disconnected impervious added from the ballast blocks, equipment pad and gravel access drive, there is slight increase in runoff flow for Drainage Area A. The increase for all 24-hour storm events is less than one cubic feet per second (cfs) and is considered de minimis.

Table 1. Stormwater Peak Discharge Flow Rate Summary

Analysis Point	24 Hr Storm	Peak Discharge (cfs)		Difference in Peak Runoff (cfs)
		Pre-	Post-	
A	2yr	9.09	9.52	0.43
	10yr	17.39	17.88	0.49
	25yr	23.40	23.91	0.51
	100yr	35.45	35.94	0.49
B	2yr	12.71	12.71	0
	10yr	26.86	26.86	0
	25yr	37.48	37.48	0
	100yr	59.22	59.22	0

Standard 3: Recharge

Standard 3 does not apply to landfill projects.

Standard 4: Water Quality

Source control and pollution prevention measures are identified in the Long Term Pollution Prevention Plan (Attachment D) and BMPs will be maintained during construction in accordance with the site specific Operation and Maintenance Plan (Attachment E).

Water quality will be provided within the existing stormwater management system. Additional Water quality BMPs are not proposed and are not practicable to be installed for the Project since the site is at an existing closed landfill.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

Not Applicable. There are no LUHPPLs in the work area.

Standard 6: Critical Areas

There will be no new discharges to critical areas.

Standard 7: Redevelopments and Other Projects Subject to the Standards Only to the Maximum Extent Practicable

As mentioned above, this project is subject to the Stormwater Management Standards to the maximum extent practicable for the redevelopment portion of the mix of new and redevelopment proposed.

The proposed project shows a de minimis increase in Peak Rate Attenuation for drainage area A1 due to the conservative modeling approach taken in modeling proposed conditions. The existing landfill cap is an impermeable surface due to the restrictions in recharge and infiltration from the liner cap, however, the ballast blocks that will be used to support the solar racking was modeled as additional impervious surface on top of the landfill cap (modeled as HSG D Meadow surface cover). Using this approach, there is an increase in the post-development peak discharge rates for each storm event less than one cubic feet per second. As discussed above, the discharge velocities are within permissible scouring velocities showing there will be no erosion or scour to wetlands.

Recharge and water quality volume calculations are not applicable for landfill sites since recharge is not practicable in these areas.

Standard 8: Construction Period Pollution Prevention and Erosion and Sediment Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in Attachment E. To ensure that the work incorporates the performance standards recommended in MassDEP's Stormwater Management Policy, necessary erosion and sedimentation control measures will be utilized during construction as shown on the site plans.

Standard 9: Operation and Maintenance Plan

An Operation and Maintenance Plan for the existing stormwater BMPs for the landfill is included with this appendix in Attachment E.

Standard 10: Prohibition of Illicit Discharges

Not applicable - there are no illicit discharges associated with the proposed project.

Additional Stormwater Management Standards for the Town of Millbury

Below is an explanation describing the additional Stormwater Management Standards applicable to redevelopment projects included in the Millbury Municipal Code Stormwater Management Standards as they apply to the proposed project.

Millbury Standard 3: LID

Low impact design practices shall be implemented to the maximum extent feasible. Applicants shall address each of the following LID principles in the project narrative:

(A) Preservation of Natural Areas

The proposed project is located outside of natural areas.

(B) Tree Protection

Tree clearing is not proposed for this project. Some maintenance to the tree line along the main drive of the transfer station may be required for installation of the utility poles and overhead wiring.

(C) Vegetation and Landscaping

The proposed project maintains existing topography and vegetation to the maximum extent practicable. Changes to vegetation are limited to the foundation pads for ballast blocks and equipment pads, and the new proposed access drive.

(D) Riparian Buffer Protection

The project does not include any new riparian buffer protection however, the existing perimeter swales for the landfill stormwater management system are riprap lined. Erosion and sedimentation controls will be in place during construction to manage construction disturbances. The swales will be inspected and maintained during construction in accordance with the Operation and Maintenance Manual included in Attachment E of this appendix.

(E) Limit Land Disturbance During Construction

Changes to vegetation are limited to the foundation pads for ballast blocks and equipment pads, and the new proposed access drive.

(F) Limit New Impervious Surfaces

New impervious surfaces have been limited to the greatest extent feasible with disconnected foundation pads for ballast blocks and equipment pad.

(G) Promote the Use of Vegetative (Green Infrastructure) Stormwater Controls

No changes to the existing stormwater management system are proposed.

(H) Disconnect Flow Paths

Flow patterns for the project have not changed under post-development conditions. New impervious surfaces have been limited to the greatest extent feasible with disconnected foundation pads for ballast blocks and equipment pad.

(I) Promote Infiltration

Not applicable. The project is located at the existing capped landfill where infiltration is not practicable.

(J) Capture and Reuse Stormwater

Not applicable. No facilities for water use are present.

Millbury Standard 13: Isolation of Drainage Systems

To support compliance with the town's MS4 Permit, all new development and redevelopment stormwater management BMPs located on commercial or industrial land must incorporate designs that allow for shutdown and containment to isolate the drainage system in the event of an emergency spill or other unexpected event.

The proposed project is located within the industrial zoning district at the existing closed landfill; however, the project does not include illicit discharges as outlined in Standard 10.

APPENDIX J - STORMWATER NARRATIVE

ATTACHMENT A – Millbury Stormwater Permit Application and Checklist

CHECKLIST
Millbury Planning Board
Submission of Stormwater Plan Review

Plan Name: Millbury Landfill Solar PV Array

Property Address: 207 Riverlin Street Assessor's Map 24, Lot 19

Applicant's Name: Millbury Landfill Solar LLC Address: 111 Speen Street, Framingham, MA 01701 Tel. No. 1-866-263-7372
(If the applicant is not the owner, a notarized statement authorizing the applicant to act on the owner's behalf and disclosing his interest shall be submitted)

Owner's Name: Town of Millbury Address: 127 Elm Street Millbury, MA 01527 Tel. No. 508-865-4710

Engineering Firm: Weston & Sampson Engineers, Inc. Address: 55 Walkers Brook Drive, Suite 100, Reading, MA 01867 Tel. No. 978-532-1900

Submission Checklist:

_____ **1)** Submission Fee of $ N/A and Technical Review Fee of $ N/A made payable to the Town of Millbury
X **2)**One original Stormwater Management Plan and ten (10) copies thereof showing:
X a)Names, addresses and telephone numbers of the owner, applicant and person(s) or firm(s) preparing the plan
X b)Name of project, property address, assessor's map and lot number, the date, north arrow, names of abutters and scale
See Site Plans c)A locus map
X d)The existing zoning, and land use at the site
X e)The proposed land use
X f)The location(s) of existing and proposed easements
X g)The location of existing and proposed utilities
X h)The site's existing & proposed topography with contours at one (1) foot intervals
X I)The existing site hydrology
X j)A description and delineation of existing stormwater conveyances, impoundments, and wetlands on or adjacent to the site or into which stormwater flows
X k)A delineation of 100 year flood plains, if applicable
N/A l)Estimated seasonal high groundwater elevation (November to April) in areas to be used for stormwater retention, detention or infiltration
X m)The existing and proposed vegetation and ground surfaces with runoff coefficient for each
X n)A drainage area map showing pre and post construction watershed boundaries, drainage area and stormwater flow paths
N/A o)A description and drawings of all components of the proposed drainage system, including:
- ____ Locations, cross sections and profiles of all brooks, streams, drainage swales and their method of stabilization
- ____ All measures for the detention, retention or infiltration of water
- ____ All measures for the protection of water quality
- ____ The structural details for all components of the proposed drainage systems and stormwater management facilities
- ____ Notes on drawings specifying materials to be used, construction specifications and typicals
- ____ Expected hydrology with supporting calculations

X p) Proposed improvements including locations of buildings or other structures, impervious surfaces, and drainage facilities if applicable
X q)Timing schedules and sequence of development including clearing, stripping, rough grading, construction, final grading and vegetative stabilization
X r)A maintenance schedule for the period of construction
X **3)**One original Operation and Maintenance Plan and ten (10) copies thereof showing:
X a)The names(s) of the owners(s) for all components of the system
X b)Maintenance agreements that specify:
- X The names and addresses of the person(s)responsible for operation and maintenance
- X The person(s) responsible for financing maintenance and emergency repairs
- X A maintenance schedule for all drainage structures, including swales and ponds
- N/A A list of easements with the purpose and location of each
- refer to lease agreement The signature(s) of the owner(s)

Note: The Planning Board may waive any of the above listed requirements if it believes that said requirement is not necessary based on the size and scope of the project. The applicant may petition the Planning Board prior to making a formal application to request notification as to which sections (s) of the stormwater plan review by-law requirements are necessary. The Planning Board will then notify the applicant within thirty (30) days as to which sections relate to the proposed project based on the size and scope of the project.

The Millbury Planning Board has accepted the submission of the above Stormwater Plan. This document certifies that, as currently submitted, the Stormwater Plan meets the minimum submission guidelines as set forth by the Town of Millbury. This document certifies that the Stormwater Plan is officially accepted for Planning Board review and consideration. It does not constitute approval of the Stormwater Plan.

Town Planner/Planning Board Clerk Signature _____ Date _____

TOWN OF MILLBURY
APPLICATON FOR STORMWATER PERMIT

APPLICANT:

NAME Millbury Landfill Solar LLC

STREET 111 Speen Street CITY/TOWN Framingham

STATE MA ZIP 01701 TELEPHONE 1-866-263-7372

NAME OF PROPERTY OWNER (if different from Applicant) Town of Millbury

Deed recorded in the Worcester District Registry of Deeds Book 293 Page 7

SITE INFORMATION:

STREET AND NUMBER 207 Riverlin Street

ZONING DISTRICT I-1 ASSESSOR'S MAP/LOT #(S) 24/19

LOT SIZE 19.99 FRONTAGE 73 FT

CURRENT USE Solid Waste Landfill

PROJECT PLAN INFORMATION:

PLAN TITLE Millbury Landfill Solar PV Array

PREPARED BY (name/address of PE/Architect) Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100, Reading, MA 01867

DATES May 2022

USES FOR WHICH STORMWATER PERMIT IS SOUGHT
Section 51 Large-Scale Ground-Mounted Solar Photovoltaic Installations

CITE ALL APPROPRIATE SECTIONS OF THE GENERAL BYLAW WHICH PERTAIN TO THIS APPLICATION; USE AND SITE:

Chapter 13.5

TO THE MILLBURY PLANNING BOARD:

The undersigned, being the Applicant named above, hereby applies for a Stormwater Permit to be granted by the Planning Board and certifies that, to the best of applicant's knowledge and belief, the information contained herein is correct and complete.

Applicant's Signature Jonathan Mancini

Property Owner's Signature (if not Applicant) See Notarized Letter attached

TOWN OF MILLBURY *DEPARTMENT OF PLANNING & DEVELOPMENT*

MUNICIPAL OFFICE BUILDING • 127 ELM STREET • MILLBURY, MA 01527-2632 • TEL. 508 / 865-4754

May 5, 2022

Chairman Richard Gosselin
Millbury Planning Board
127 Elm Street
Millbury, MA 01527

Chairman Gosselin,

The Town of Millbury authorizes Ameresco, Inc. to act on behalf of the Town of Millbury relative to applications before the Millbury Planning Board regarding the proposed solar project at 207 Riverlin Street, Millbury, MA.

Sincerely,

Sean Hendricks,
Town Manager

Christine Marden
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires
September 2, 2027

Christine Marden
Christine Marden

Worcester County Commonwealth of Massachusetts

On this 5th day of May,5, 2022 before me, the undersigned Notary Public, personally appeared Sean Hendricks who provided to me through satisfactory evidence of identification, **MA License** to be the person whose name is signed on the preceding or attached document, and acknowledged to me that they signed it voluntarily for its stated purpose.

Signature of Notary Public

APPENDIX J - STORMWATER NARRATIVE

ATTACHMENT B – Watershed Maps

GENERAL NOTES:

1. OWNER OF RECORD: TOWN OF MILLBURY, WITH REFERENCE TO WORCESTER COUNTY REGISTRY OF DEEDS IN BOOK 293, PAGE 07 AND BOOK 20177, PAGE 196. FOR FURTHER REFERENCE SEE PARCEL ID NUMBER: 24 - LOT 19 AND MAP AND ID NUMBER 31 - LOT 27. THE TOTAL AREA OF THE LOCUS PARCELS ARE 17.67 ACRES AND 19.99 ACRES, PER TOWN RECORDS.
2. HORIZONTAL DATUM IS BASED ON MASS STATE GRID COORDINATE SYSTEM NAD83 (2011). VERTICAL DATUM IS REFERENCED TO NAVD 88. CONTOUR INTERVAL IS 1 FOOT AND IS BASED ON COMBINING EXISTING ELECTRONIC NGS FILES OF MASS GIS LiDAR WITH GPS SURVEY GROUND SHOTS.
3. THIS PLAN IS THE RESULT OF A FIELD SURVEY CONDUCTED BY SGC ENGINEERING, LLC IN NOVEMBER 2020.
4. WETLANDS DELINEATED BY WESTON & SAMPSON ENGINEERS, INC. ON NOVEMBER 5, 2020.
5. PROPERTY IS LOCATED IN FLOOD ZONE "X" AS SHOWN ON FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY PANEL NUMBER 250318 - 828E / PANEL 828 OF 1075, FOR THE TOWN OF MILLBURY, WORCESTER COUNTY, MASS, WITH EFFECTIVE DATE JULY 4, 2011. ZONE "X" IS DESCRIBED AS AN AREA OF MINIMAL FLOODING WITH A POSSIBLE BASE FLOOD ELEVATION OF 395.0 (SEE CROSS SECTIONS B AND C). THE LIMIT OF ZONE AE SHOWN ON THIS SURVEY IS BASED ON A SCANNED IMAGE OF THE FIRM PANEL AND IS SHOWN APPROXIMATELY.
6. SGC AND WESTON & SAMPSON ENGINEERS, INC. HAVE NOT INDEPENDENTLY VERIFIED THE LOCATION, EXISTENCE, AND SERVICEABILITY OF ANY UTILITIES AND MAKE NO GUARANTEE TO THE COMPLETENESS OR THE ACCURACY OF ANY UTILITIES. ADDITIONAL UTILITIES MAY EXIST IN THE FIELD, WHICH ARE NOT SHOWN ON THIS PLAN. ACTUAL LOCATIONS MUST BE DETERMINED IN THE FIELD PRIOR TO EXCAVATION OR OTHER CONSTRUCTION ACTIVITIES. CALL "DIG SAFE" AT 1-888-344-7233 OR DIAL 811. SGC AND WESTON & SAMPSON ENGINEERS, INC. ASSUME NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN.

PLAN REFERENCES:

(WORCESTER COUNTY REGISTRY OF DEEDS)

1. PLAN ENTITLED, "PLAN OF LAND LOCATED AT 211 RIVERLIN STREET - MILLBURY, MASS", DATED JULY 21, 2008, RECORDED IN PLAN BOOK 869, PAGE 28.
2. PLAN ENTITLED, "PLAN OF PROPERTY OWNED BY TOWN OF MILLBURY - RIVERLIN STREET, MILLBURY, MASS", DATED JUNE 25, 1973, RECORDED IN PLAN BOOK 393, PAGE 106.
3. PLAN ENTITLED, "PLAN TO SHOW PROPERTY IN MILLBURY, MASS OWNED BY BUCK BROTHERS, INC", DATED JANUARY 31, 1973, RECORDED IN PLAN BOOK 729, PAGE 110.
4. PLAN ENTITLED, "PLAN AND PROFILE OF A RAILROAD SURVEY FROM MILLBURY TO WEBSTER", NO DATE LISTED AND FILED AS MAP 102.
5. PLAN ENTITLED "MILLBURY - RIVERLIN STREET REDEFINITION" AND REFERENCED AS DECREE 1445 / PLAN H-2991-R SHEETS 6, 7, AND 8 OF 8 TOTAL SHEETS FILED IN PLAN BOOK 147, PAGE 49.
6. PLAN ENTITLED "ROLLIE SHEPARD ACRES SUBDIVISION" DATED JANUARY 11, 1999, RECORDED IN PLAN BOOK 736, PAGE 125.

LEGEND:

HYDROLOGY:

- FLOW PATH
- SUBCATCHMENT LABEL
- SWALE BASIN LABEL
- ANALYSIS POINT/POINT OF INTEREST
- GRASS (MEADOW, NON-GRAZED, HSG D CN = 78)
- WOODLAND (WOODS, GOOD, HSG D, CN = 77)
- IMPERVIOUS LANDFILL CAP (MEADOW, NON-GRAZED, HSG D CN = 78)
- IMPERVIOUS (CN = 98)
- WATERSHED BOUNDARY

EXISTING

- MAJOR CONTOUR
- MINOR CONTOUR
- STONE WALL
- SITE PROPERTY LINE
- ABUTTER PROPERTY LINE
- ADJACENT ROW LINE
- APPROXIMATE ZONING DISTRICT BOUNDARY
- 6' CHAIN LINK FENCE WITH BARBED WIRE
- OVERHEAD ELECTRIC LINE
- RIP RAP SWALE
- WETLAND LINE
- 25' WETLAND BUFFER
- 100' WETLAND BUFFER
- SEWER LINE
- APPROXIMATE LIMIT OF WASTE
- UTILITY POLE
- GUY WIRE
- WETLAND FLAG
- SEWER MANHOLE
- MONITORING WELL
- VENT
- EDGE OF PAVEMENT
- PAVEMENT
- APPROXIMATE AQUIFER PROTECTION OVERLAY AREA A
- GRAVEL PATH
- BLOCK WALL
- ZONING OFFSET LINE

80 40 0 80 160

SCALE: 1"=80'

Project:

MILLBURY LANDFILL SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:

AMERESCO
Green • Clean • Sustainable

Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:

Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:

Issued For:

PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/13/2022
Drawn By:	DED/NWA
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

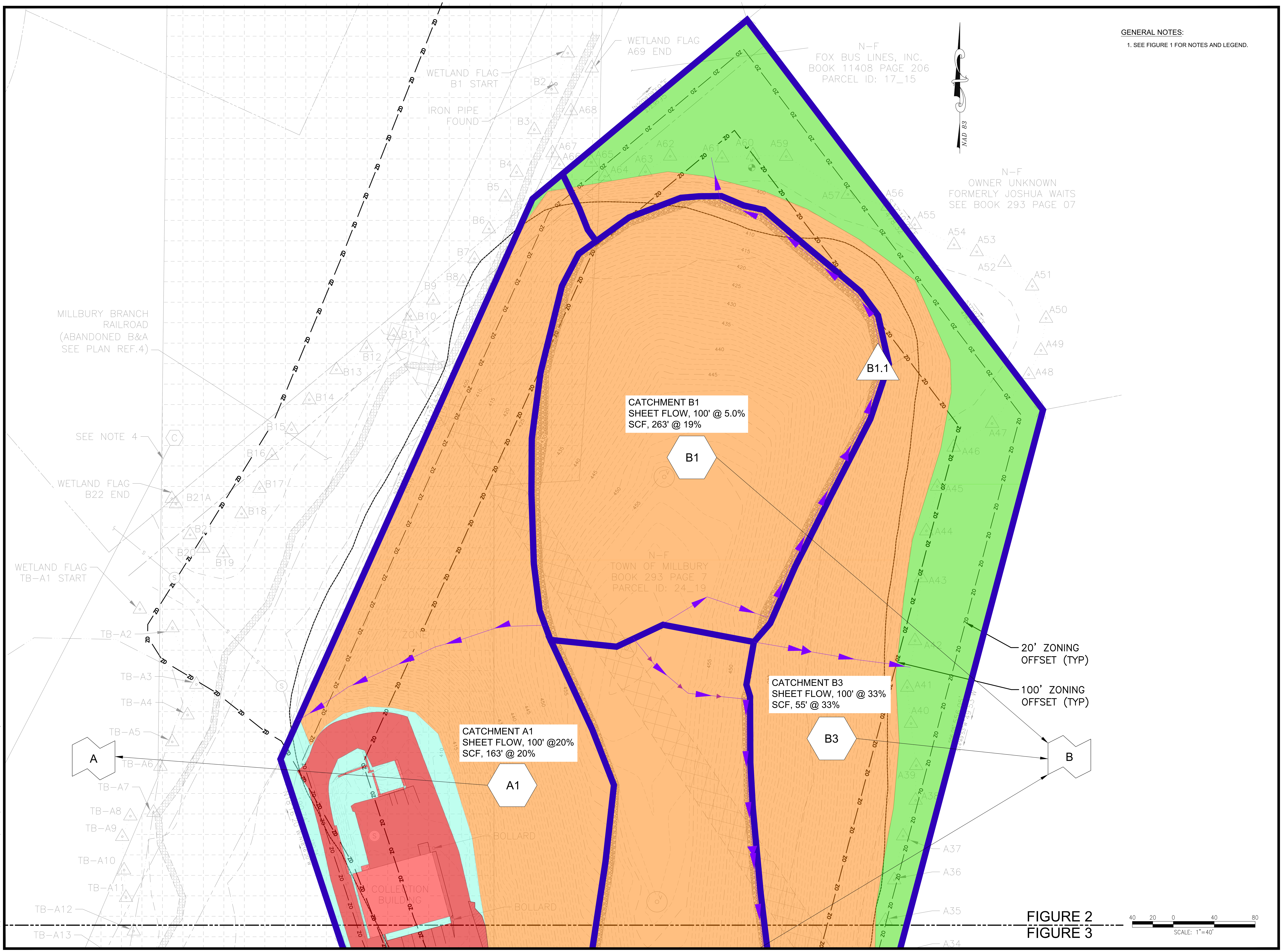
Drawing Title:

EXISTING HYDROLOGIC MAP

Sheet Number:

FIG-1

COPYRIGHT © 2022 WESTON & SAMPSON, INC.



Project:
MILLBURY LANDFILL SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:
AMERESCO
Green • Clean • Sustainable
Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:
Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:

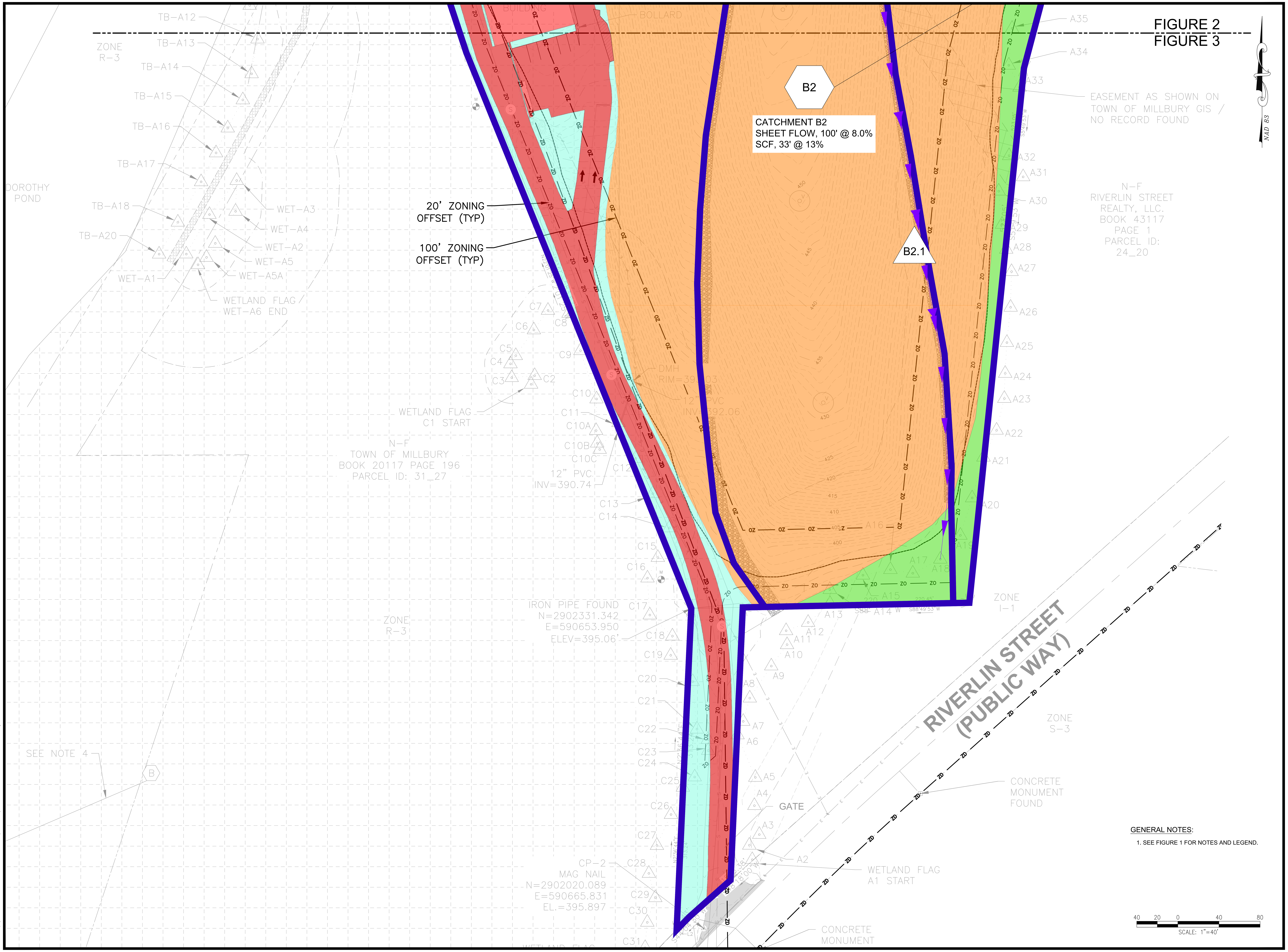
Issued For:
PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/13/2022
Drawn By:	DED/NWA
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

Drawing Title:
EXISTING HYDROLOGIC MAP

Sheet Number:
FIG-2

COPYRIGHT © 2022 WESTON & SAMPSON, INC.



GENERAL NOTES:

1. SEE FIGURE 1 FOR NOTES AND LEGEND.

Project:
MILLBURY LANDFILL
SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:

AMERESCO
Green • Clean • Sustainable
Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:

Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:

Issued For:
PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/13/2022
Drawn By:	DED/NWA
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

Drawing Title:
EXISTING HYDROLOGIC MAP

Sheet Number:
FIG-3

COPYRIGHT © 2022 WESTON & SAMPSON, INC.

GENERAL NOTES:

1. FOUNDATION LOCATIONS AND ARRAY ORIENTATION SUBJECT TO CHANGE BASED ON FINAL DESIGN.
2. ELECTRICAL DESIGN, INCLUDING UTILITY POLES, PERFORMED BY OTHERS. ELECTRICAL EQUIPMENT AND COMPONENTS SHOWN TO ILLUSTRATE LOCATIONS ONLY. REFER TO ELECTRICAL DRAWINGS FOR DETAILED ELECTRICAL SYSTEM INFORMATION.

TYPICAL SEQUENCE OF CONSTRUCTION:

PRIOR TO THE DEVELOPMENT OF THE SITE, EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS. SITE DEVELOPMENT SCHEDULING SHALL TAKE INTO CONSIDERATION THE GROWING SEASON, SUCH THAT BULK OF THE EARTHWORK IS NOT INITIATED DURING A PERIOD WHEN VEGETATIVE STABILIZATION CANNOT BE ACHIEVED WITHIN 14 DAYS OF COMPLETING THE EARTHWORK IN A GIVEN AREA. A TYPICAL SEQUENCE OF CONSTRUCTION IS:

1. PRIOR TO STARTING ANY WORK ON THE SITE, THE CONTRACTOR SHALL NOTIFY APPROPRIATE AGENCIES AND SHALL INSTALL EROSION AND SEDIMENTATION CONTROL MEASURES AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL OBTAIN ALL PERMITS, NOTIFY APPROPRIATE OFFICIALS OF CONSTRUCTION COMMENCEMENT, AND SUBMIT CONSTRUCTION TIMETABLE.
2. ON-SITE CONSTRUCTION SHALL START WITH INSTALLATION OF EROSION AND SEDIMENTATION CONTROL MEASURES AS SHOWN ON SHEET C101. THIS INCLUDES STRAW WATTLES, CONSTRUCTION ENTRANCE/EXIT, AND OTHER MEASURES NOTED ON THE PLAN. NO WORK SHALL TAKE PLACE UNTIL THE ENGINEER HAS INSPECTED AND APPROVED INSTALLED MEASURES. NO EROSION/SEDIMENTATION CONTROL DEVICE SHALL PENETRATE THE EXISTING LANDFILL COVER MATERIALS WITHIN THE LIMITS OF WASTE.
3. STOCKPILED TOPSOIL SHALL BE SEEDED AND MULCHED WHEN IT IS TO BE STORED MORE THAN 30 DAYS FROM TIME OF STOCKPILING. STOCKPILES SHALL NOT BE PLACED WITHIN THE LIMITS OF THE LANDFILL OR WITHIN THE 100' WETLAND BUFFER ZONE. SEE SHEET C502 FOR A TYPICAL TEMPORARY STOCKPILE DETAIL.
4. CONSTRUCT GRAVEL ACCESS ROADS. INSTALL ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES AS REQUIRED TO PREVENT EROSION OF GRAVEL SURFACE.
5. PROCEED WITH SOLAR PHOTOVOLTAIC (PV) SYSTEM INSTALLATION/CONSTRUCTION WORK.
6. REPAIR ALL DISTURBED AREAS, AND REAPPLY LOAM AND SEED WHERE NECESSARY.
7. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL AFTER THE SITE IS STABILIZED IN ACCORDANCE WITH THE SWPPP, AND FINAL ACCEPTANCE IS GIVEN BY THE ENGINEER.
8. DETAILED NOTES AND SPECIFICATIONS FOR THE PROJECT ARE INCLUDED IN THE PROJECT DRAWINGS "MILLBURY LANDFILL SOLAR PV DEVELOPMENT, DATED MAY 13, 2022, PREPARED BY WESTON & SAMPSON ENGINEERS, INC.".

LEGEND:

HYDROLOGY:

- FLOW PATH
- SUBCATCHMENT LABEL
- SWALE BASIN LABEL
- ANALYSIS POINT/POINT OF INTEREST
- GRASS (MEADOW, NON-GRAZED, HSG D CN = 78)
- WOODLAND (WOODS, GOOD, HSG D, CN = 77)
- IMPERVIOUS LANDFILL CAP (MEADOW, NON-GRAZED, HSG D CN = 78)
- IMPERVIOUS (CN = 98)
- WATERSHED BOUNDARY

EXISTING

- MAJOR CONTOUR
- MINOR CONTOUR
- STONE WALL
- SITE PROPERTY LINE
- ABUTTER PROPERTY LINE
- ADJACENT ROW LINE
- APPROXIMATE ZONING DISTRICT BOUNDARY
- 6' CHAIN LINK FENCE WITH BARBED WIRE
- OVERHEAD ELECTRIC LINE
- RIP RAP SWALE
- WETLAND LINE
- 25' WETLAND BUFFER
- 100' WETLAND BUFFER
- SEWER LINE
- APPROXIMATE LIMIT OF WASTE
- UTILITY POLE
- GUY WIRE
- WETLAND FLAG
- SEWER MANHOLE
- MONITORING WELL
- VENT
- EDGE OF PAVEMENT
- PAVEMENT
- APPROXIMATE AQUIFER PROTECTION OVERLAY AREA A
- GRAVEL PATH
- BLOCK WALL
- ZONING OFFSET LINE

PROPOSED

- OVERHEAD ELECTRIC LINE
- ELECTRIC CONDUIT
- FENCE
- SOLAR PV RACK WITH BALLAST BLOCKS
- GRAVEL ACCESS ROAD
- CONCRETE EQUIPMENT PAD
- 10' DIAMETER BUFFER AROUND VENT

80 40 0 80 160
SCALE: 1"=80'

Project:
MILLBURY LANDFILL SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:
AMERESCO
Green • Clean • Sustainable
Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:
Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:

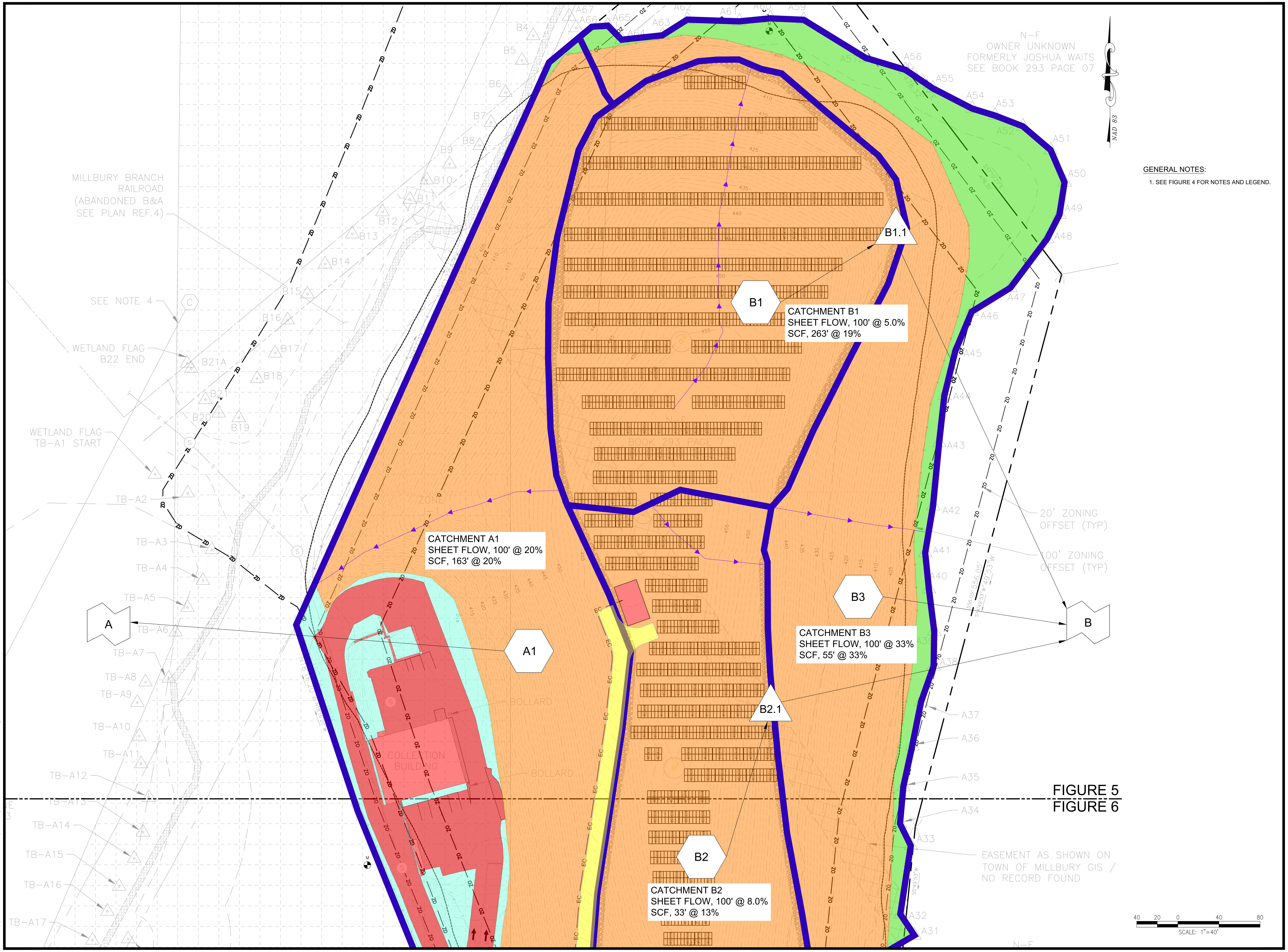
Issued For:
PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/05/2022
Drawn By:	DED/NWA
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

Drawing Title:
PROPOSED HYDROLOGIC MAP

Sheet Number:
FIG-4

COPYRIGHT © 2022 WESTON & SAMPSON, INC.



GENERAL NOTES:

1. SEE FIGURE 4 FOR NOTES AND LEGEND.

Project:
MILLBURY LANDFILL
SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:
AMERESCO
Green • Clean • Sustainable
Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

Owner:
Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:

Issued For:
PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/05/2022
Drawn By:	DED/NWA
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

Drawing Title:
PROPOSED HYDROLOGIC MAP

Sheet Number:
FIG-5

COPYRIGHT © 2022 WESTON & SAMPSON, INC.

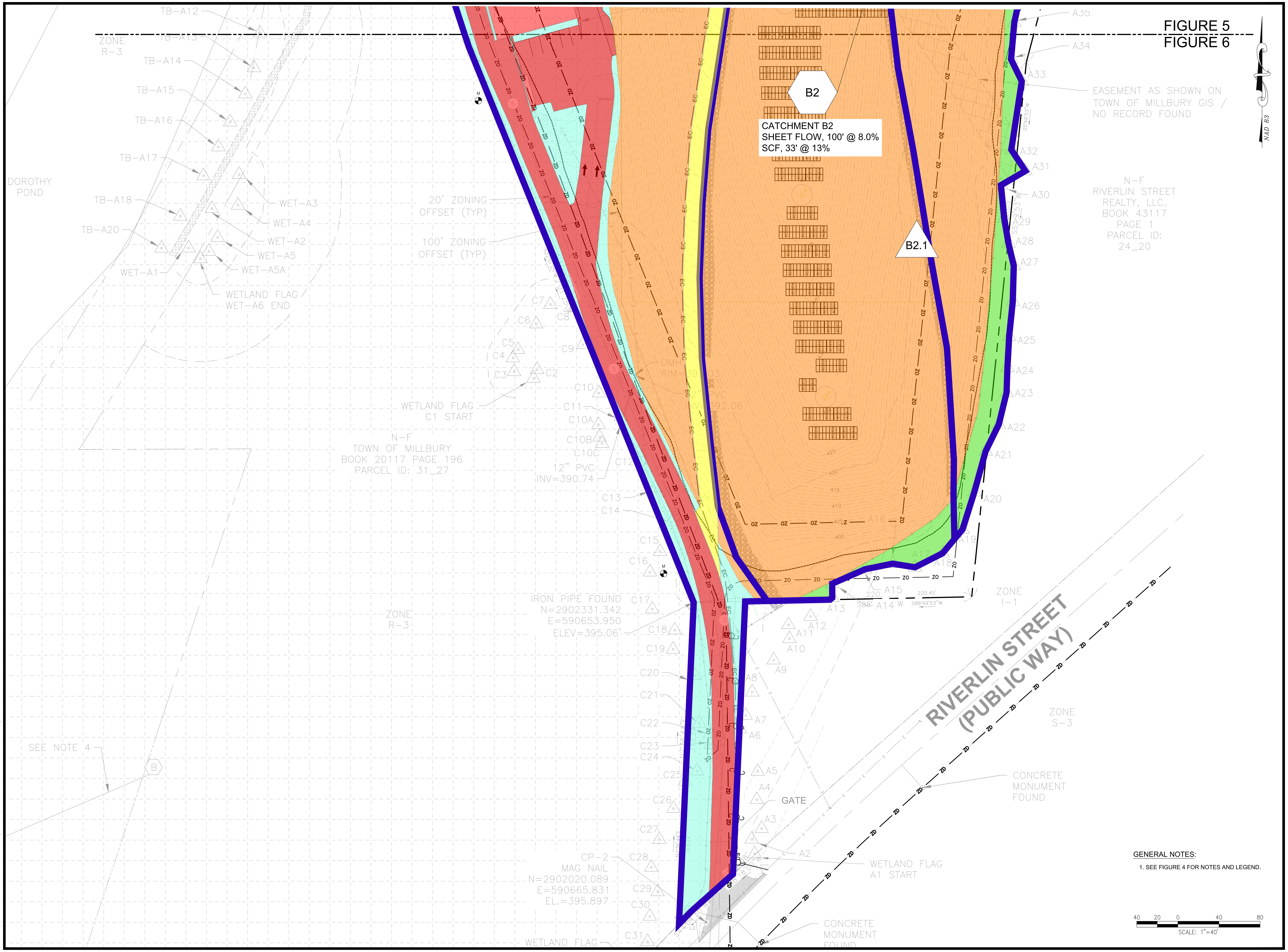


FIGURE 5
FIGURE 6
B2
CATCHMENT B2
SHEET FLOW, 100' @ 8.0%
SCF, 33' @ 13%
B2.1
ZONE R-3
DOROTHY POND
20' ZONING OFFSET (TYP)
100' ZONING OFFSET (TYP)
WETLAND FLAG WET-A6 END
WETLAND FLAG C1 START
N-F
TOWN OF MILLBURY
BOOK 20117 PAGE 196
PARCEL ID: 31_27
12" PVC
INV=390.74
IRON PIPE FOUND
N=2902331.342
E=590653.950
ELEV=395.06'
ZONE R-3
SEE NOTE 4
CP-2
MAG NAIL
N=2902020.089
E=590665.831
EL.=395.897
WETLAND FLAG
EASEMENT AS SHOWN ON TOWN OF MILLBURY GIS / NO RECORD FOUND
N-F
RIVERLIN STREET REALTY, LLC.
BOOK 43117
PAGE 1
PARCEL ID: 24_20
ZONE I-1
RIVERLIN STREET (PUBLIC WAY)
ZONE S-3
CONCRETE MONUMENT FOUND
WETLAND FLAG A1 START
CONCRETE MONUMENT FOUND
GATE
NAD 83
SCALE: 1"=40'

GENERAL NOTES:

1. SEE FIGURE 4 FOR NOTES AND LEGEND.

Project:

MILLBURY LANDFILL SOLAR PV DEVELOPMENT

207 RIVERLIN STREET
MILLBURY, MA 01527

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Applicant:

AMERESCO
Green • Clean • Sustainable
Millbury Landfill Solar LLC
111 Speen Street, Suite 410
Framingham, MA 01701
Tel: (866) 263-7372
www.ameresco.com

OWNER:

Town of Millbury
127 Elm Street
Millbury, MA 01527
Tel: (508) 865-4710

Revisions:

No.	Date	Description
0	05/13/2022	ISSUED FOR PERMITTING

Seal:

Issued For:

PERMITTING/NOT FOR CONSTRUCTION

Scale:	AS SHOWN
Date:	05/05/2022
Drawn By:	DED/NWA
Reviewed By:	MRC
Approved By:	RJB
W&S Project No.:	ENG20-0952
W&S File No.:	Ameresco Millbury

Drawing Title:

PROPOSED HYDROLOGIC MAP

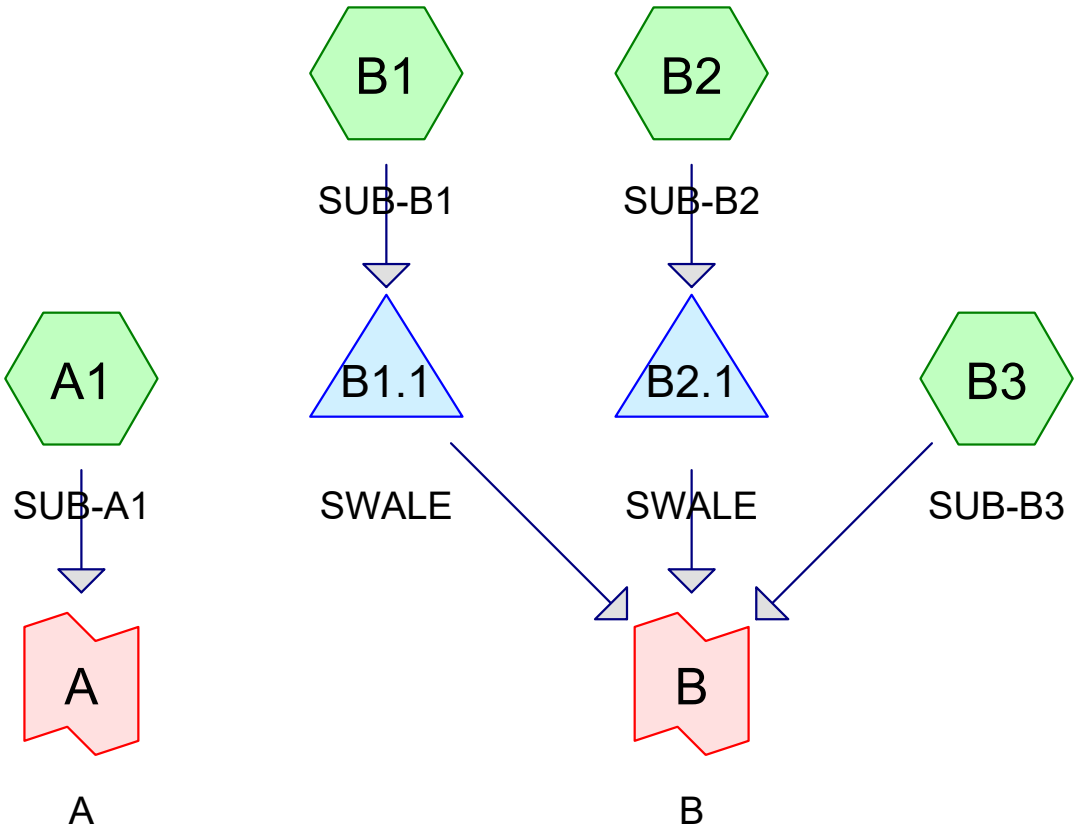
Sheet Number:

FIG-6

COPYRIGHT © 2022 WESTON & SAMPSON, INC.

APPENDIX J - STORMWATER NARRATIVE

ATTACHMENT C – HydroCAD Model



Subcat Reach Pond Link

Routing Diagram for HYDRO-EX REV02
Prepared by Weston & Sampson Engineers, Inc., Printed 5/12/2022
HydroCAD® 10.10-3a s/n 00455 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.20	2
2	10-year	Type III 24-hr		Default	24.00	1	4.90	2
3	25-year	Type III 24-hr		Default	24.00	1	6.10	2
4	50-year	Type III 24-hr		Default	24.00	1	7.30	2
5	100-year	Type III 24-hr		Default	24.00	1	8.50	2

Summary for Subcatchment A1: SUB-A1

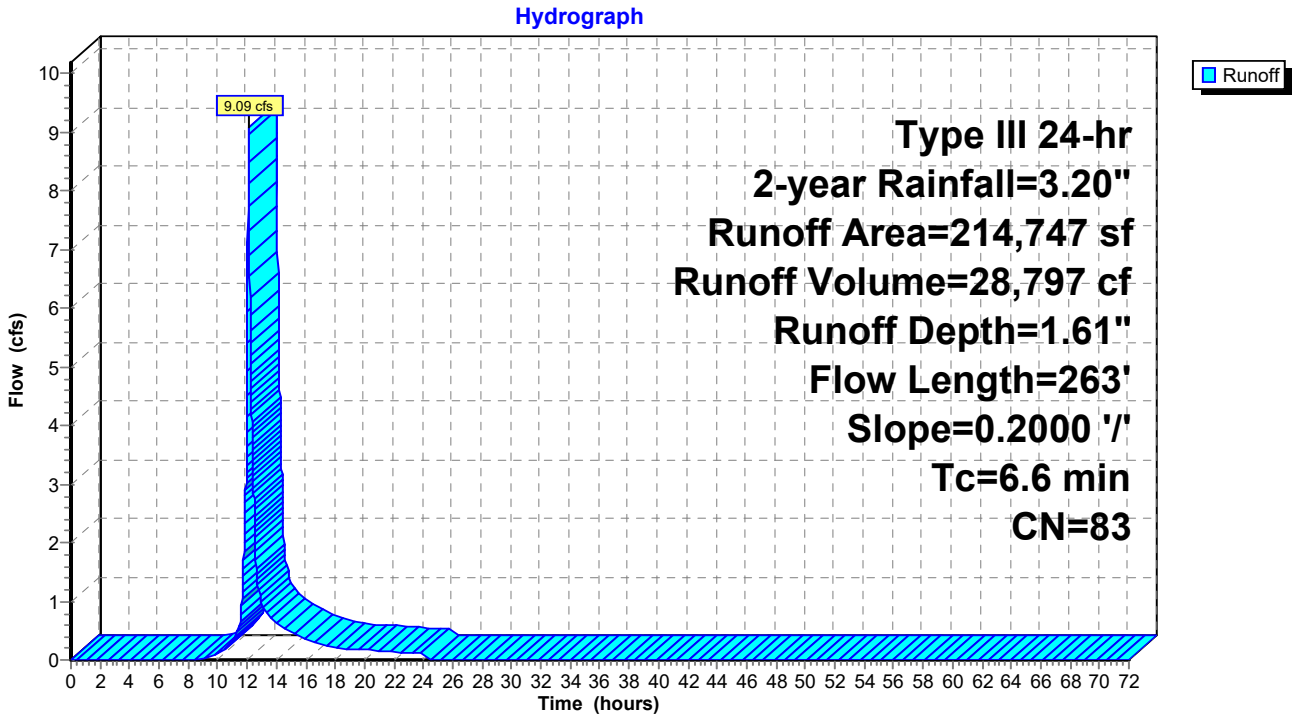
Runoff = 9.09 cfs @ 12.10 hrs, Volume= 28,797 cf, Depth= 1.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	46,532	98	Paved parking, HSG D
	5,228	98	Roofs, HSG D
*	130,649	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	32,338	78	Meadow, non-grazed, HSG D
	214,747	83	Weighted Average
	162,987		75.90% Pervious Area
	51,760		24.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	100	0.2000	0.29		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.9	163	0.2000	3.13		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
6.6	263	Total			

Subcatchment A1: SUB-A1



Summary for Subcatchment B1: SUB-B1

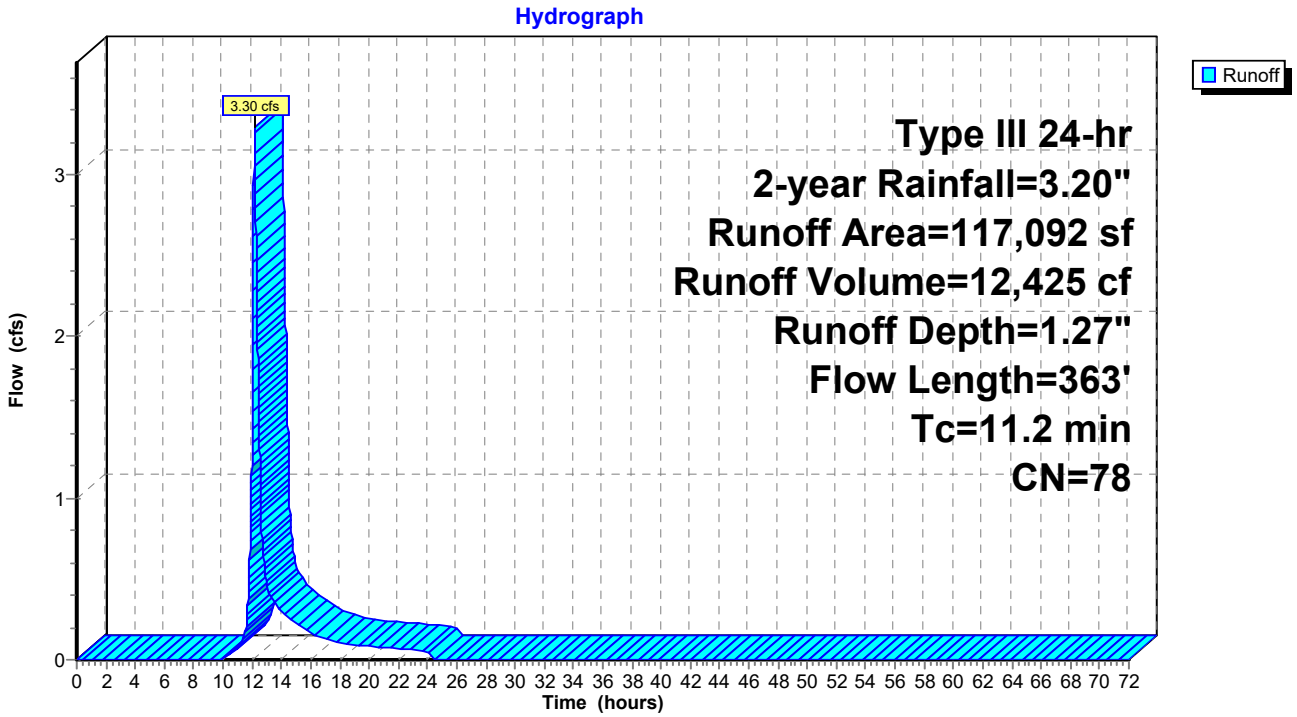
Runoff = 3.30 cfs @ 12.16 hrs, Volume= 12,425 cf, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
*	117,092	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	117,092		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.4	263	0.1900	3.05		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
11.2	363	Total			

Subcatchment B1: SUB-B1



Summary for Subcatchment B2: SUB-B2

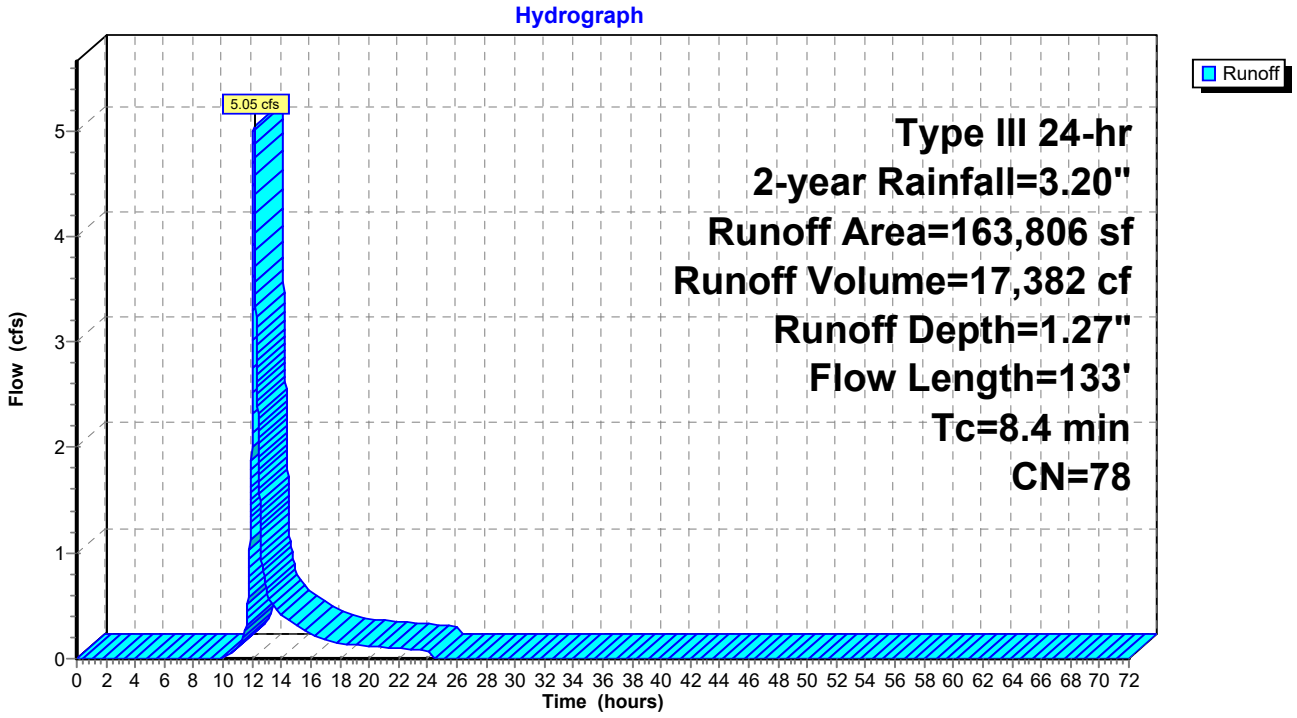
Runoff = 5.05 cfs @ 12.12 hrs, Volume= 17,382 cf, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
*	157,223	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	6,583	77	Woods, Good, HSG D
	163,806	78	Weighted Average
	163,806		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0800	0.20		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
0.2	33	0.1300	2.52		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
8.4	133	Total			

Subcatchment B2: SUB-B2



Summary for Subcatchment B3: SUB-B3

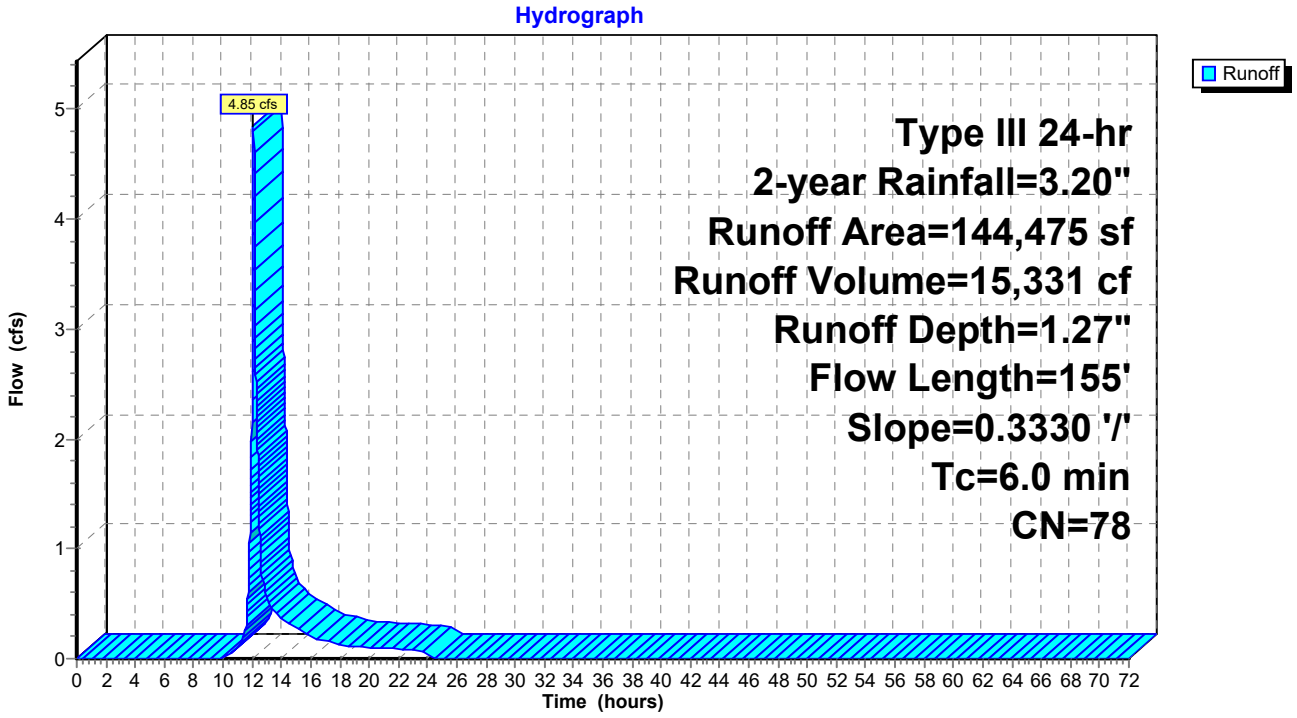
Runoff = 4.85 cfs @ 12.09 hrs, Volume= 15,331 cf, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
*	104,352	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	40,123	77	Woods, Good, HSG D
	144,475	78	Weighted Average
	144,475		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.3330	0.36		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.2	55	0.3330	4.04		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
4.8	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment B3: SUB-B3

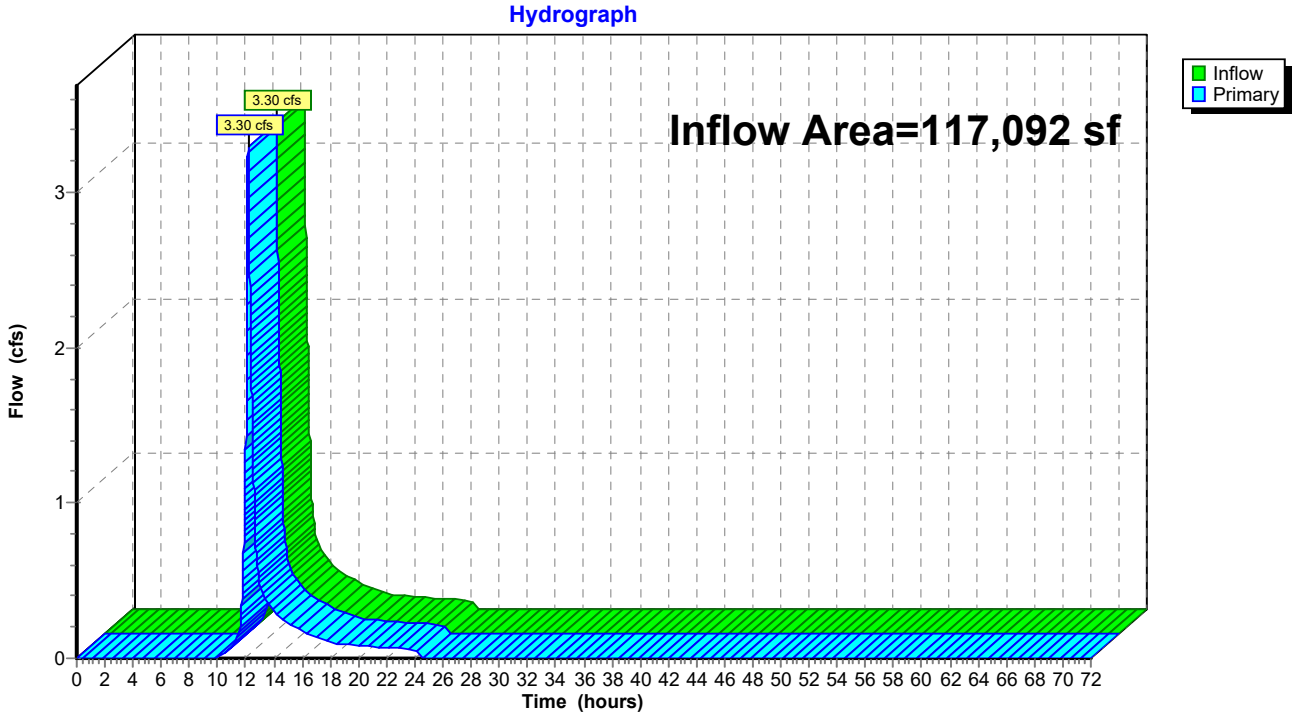


Summary for Pond B1.1: SWALE

Inflow Area = 117,092 sf, 0.00% Impervious, Inflow Depth = 1.27" for 2-year event
Inflow = 3.30 cfs @ 12.16 hrs, Volume= 12,425 cf
Primary = 3.30 cfs @ 12.16 hrs, Volume= 12,425 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B1.1: SWALE

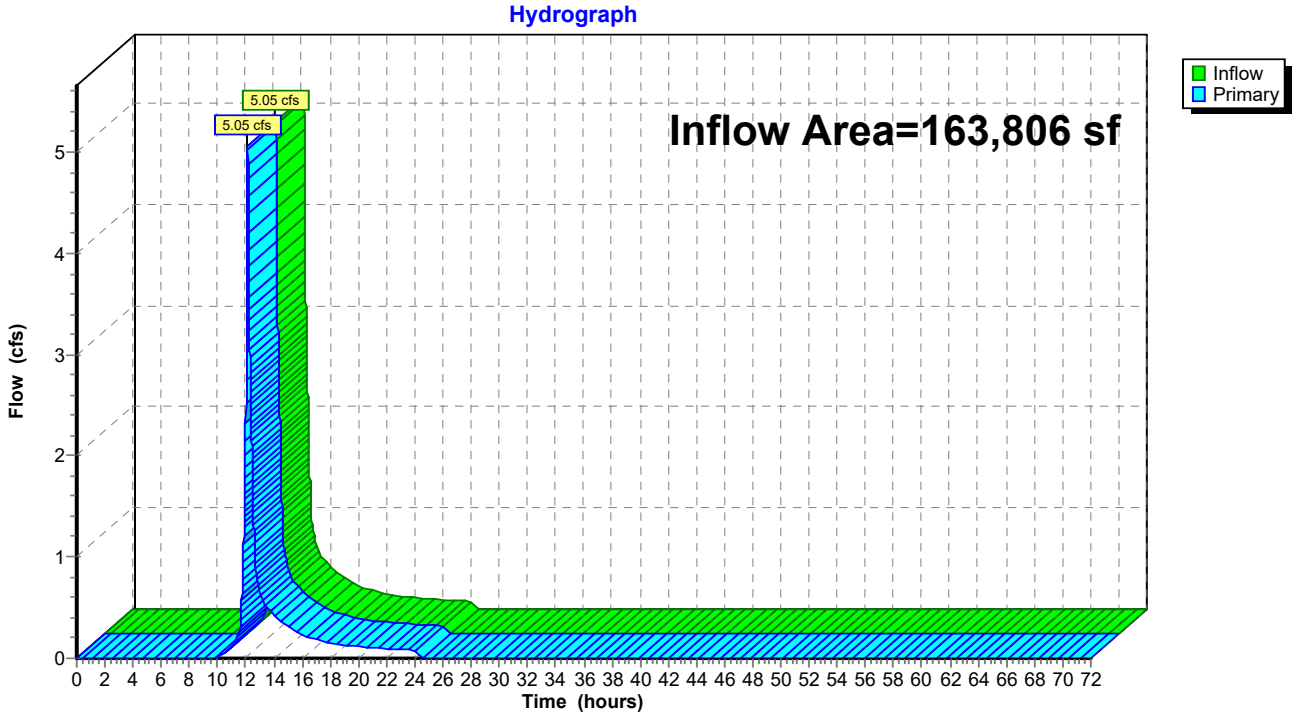


Summary for Pond B2.1: SWALE

Inflow Area = 163,806 sf, 0.00% Impervious, Inflow Depth = 1.27" for 2-year event
Inflow = 5.05 cfs @ 12.12 hrs, Volume= 17,382 cf
Primary = 5.05 cfs @ 12.12 hrs, Volume= 17,382 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B2.1: SWALE

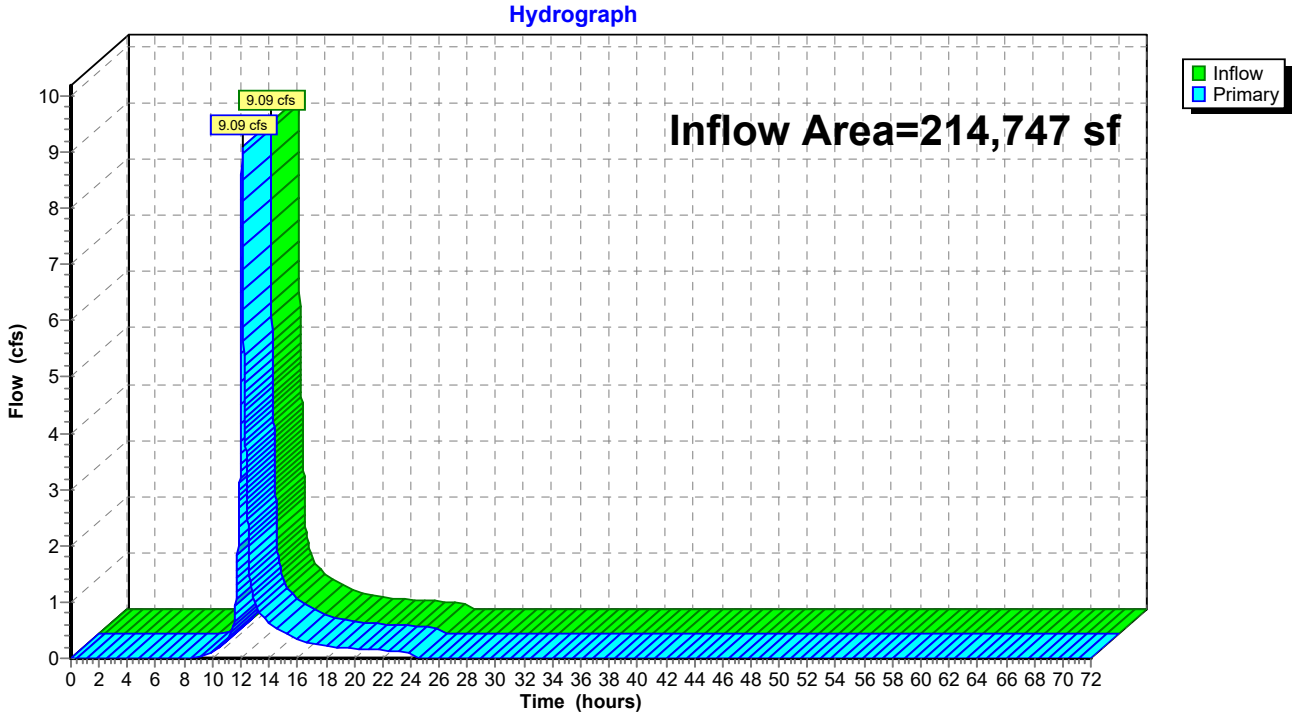


Summary for Link A: A

Inflow Area = 214,747 sf, 24.10% Impervious, Inflow Depth = 1.61" for 2-year event
Inflow = 9.09 cfs @ 12.10 hrs, Volume= 28,797 cf
Primary = 9.09 cfs @ 12.10 hrs, Volume= 28,797 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: A

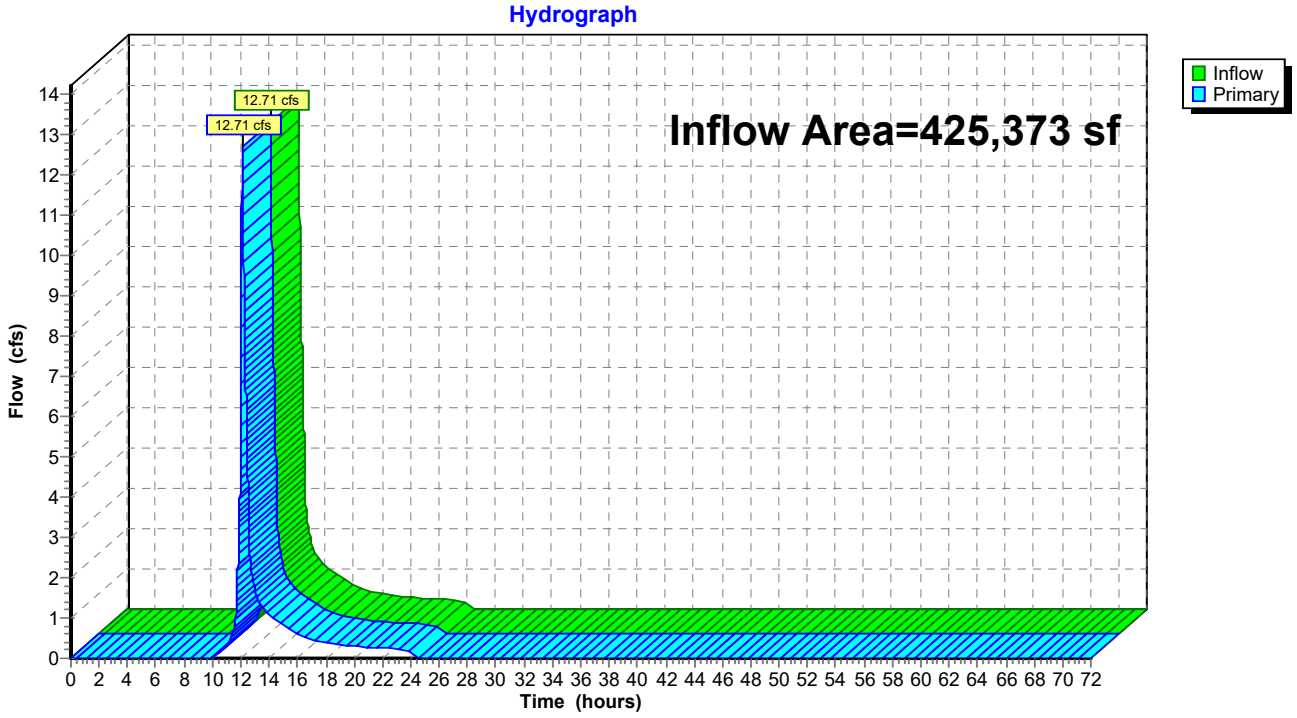


Summary for Link B: B

Inflow Area = 425,373 sf, 0.00% Impervious, Inflow Depth = 1.27" for 2-year event
Inflow = 12.71 cfs @ 12.12 hrs, Volume= 45,138 cf
Primary = 12.71 cfs @ 12.12 hrs, Volume= 45,138 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: B



Summary for Subcatchment A1: SUB-A1

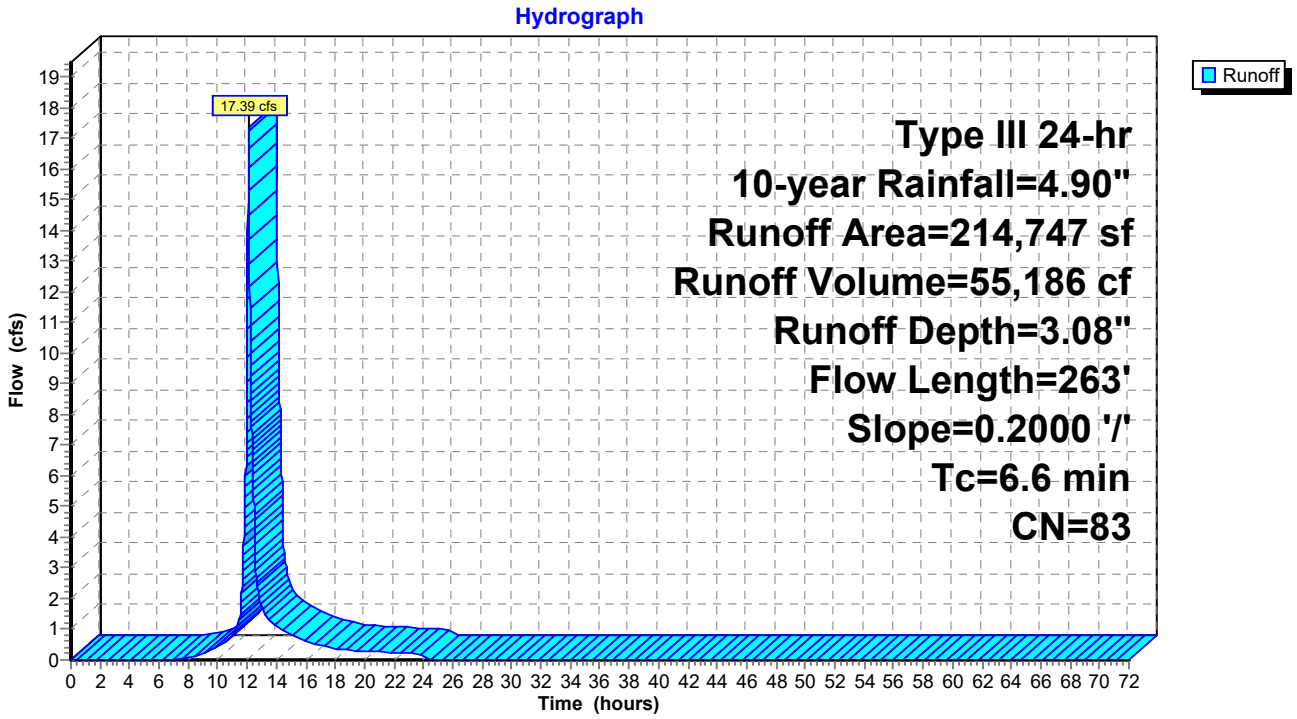
Runoff = 17.39 cfs @ 12.09 hrs, Volume= 55,186 cf, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

	Area (sf)	CN	Description
	46,532	98	Paved parking, HSG D
	5,228	98	Roofs, HSG D
*	130,649	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	32,338	78	Meadow, non-grazed, HSG D
	214,747	83	Weighted Average
	162,987		75.90% Pervious Area
	51,760		24.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	100	0.2000	0.29		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.9	163	0.2000	3.13		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
6.6	263	Total			

Subcatchment A1: SUB-A1



Summary for Subcatchment B1: SUB-B1

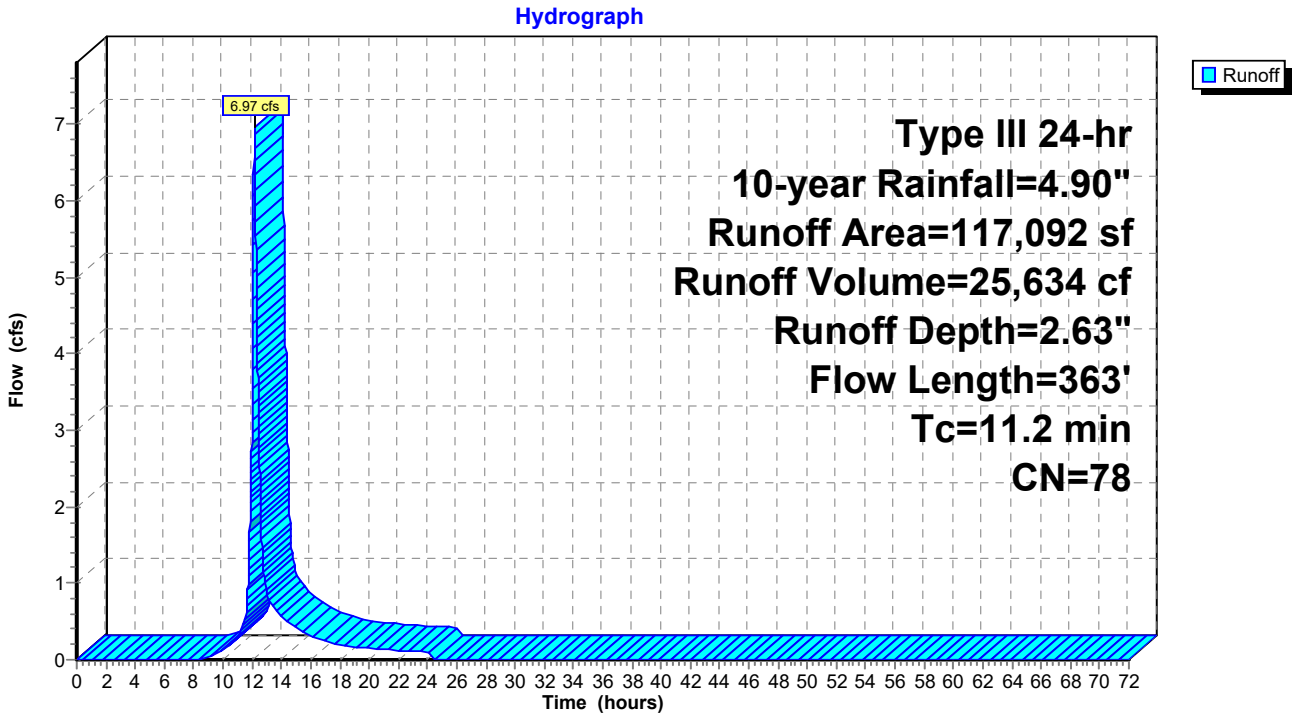
Runoff = 6.97 cfs @ 12.16 hrs, Volume= 25,634 cf, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

	Area (sf)	CN	Description
*	117,092	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	117,092		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.4	263	0.1900	3.05		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
11.2	363	Total			

Subcatchment B1: SUB-B1



Summary for Subcatchment B2: SUB-B2

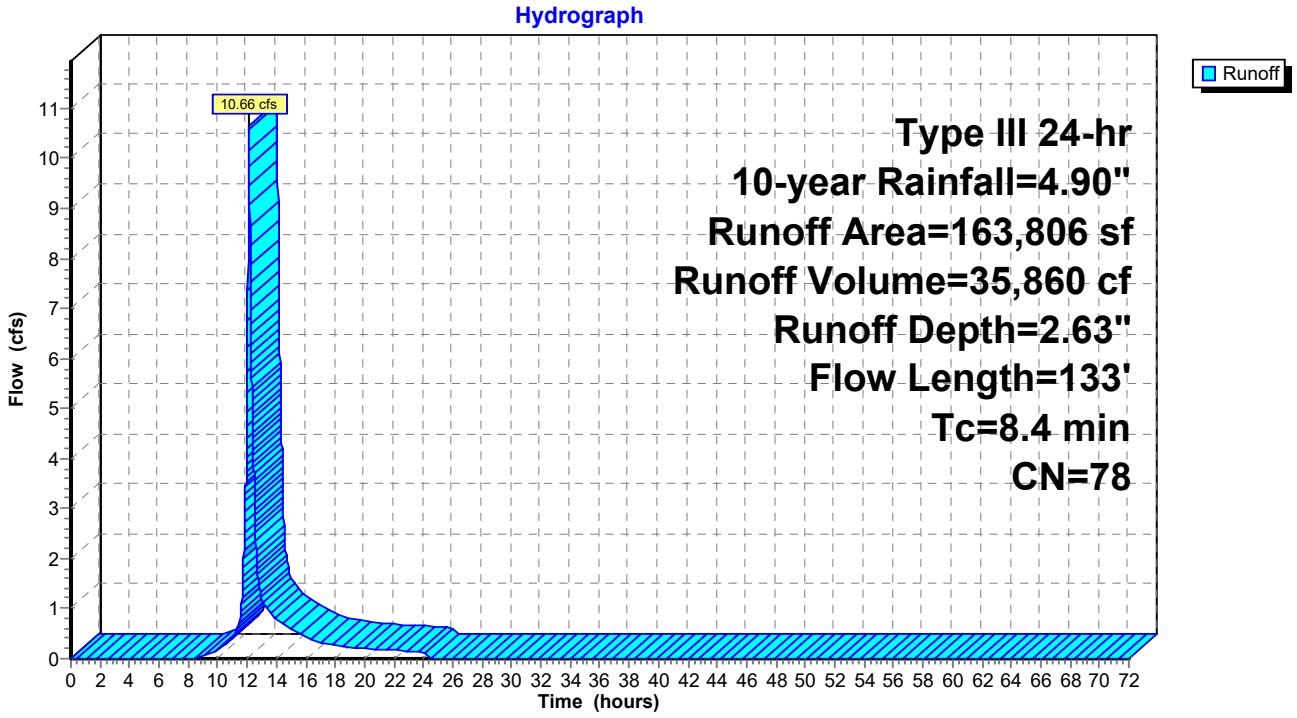
Runoff = 10.66 cfs @ 12.12 hrs, Volume= 35,860 cf, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

	Area (sf)	CN	Description
*	157,223	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	6,583	77	Woods, Good, HSG D
	163,806	78	Weighted Average
	163,806		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0800	0.20		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
0.2	33	0.1300	2.52		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
8.4	133	Total			

Subcatchment B2: SUB-B2



Summary for Subcatchment B3: SUB-B3

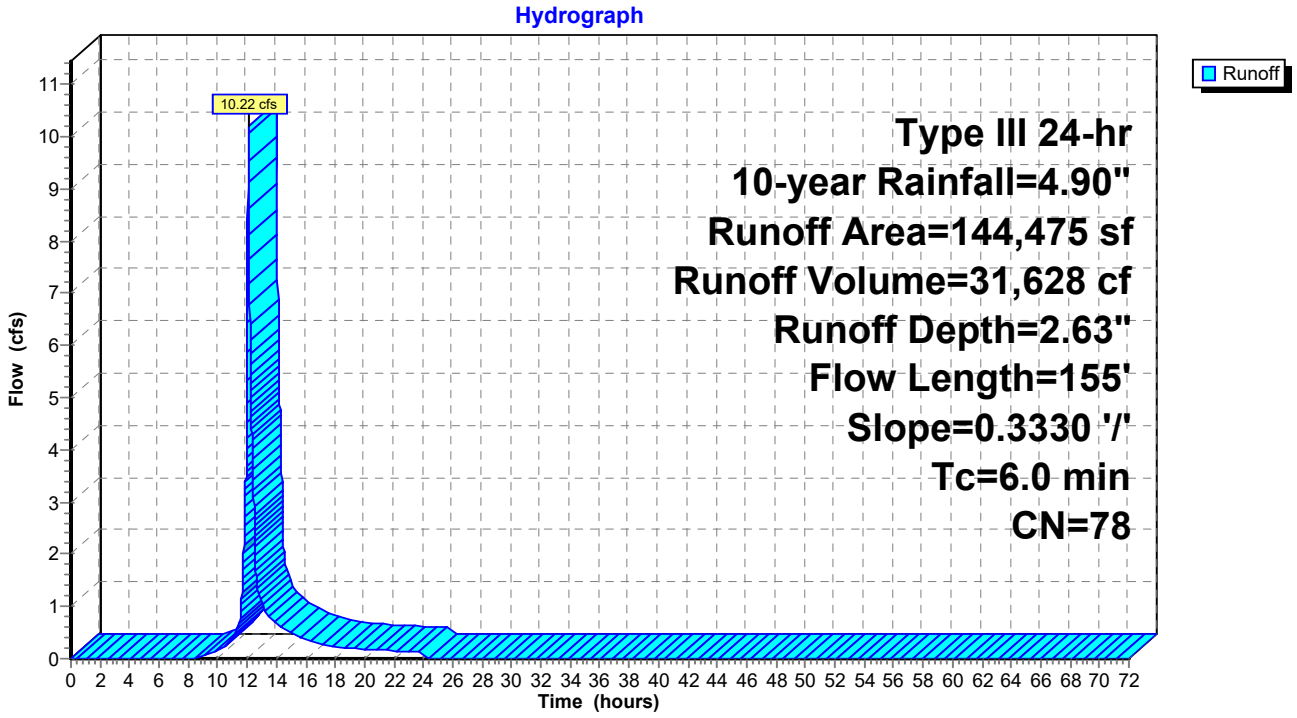
Runoff = 10.22 cfs @ 12.09 hrs, Volume= 31,628 cf, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

	Area (sf)	CN	Description
*	104,352	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	40,123	77	Woods, Good, HSG D
	144,475	78	Weighted Average
	144,475		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.3330	0.36		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.2	55	0.3330	4.04		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
4.8	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment B3: SUB-B3

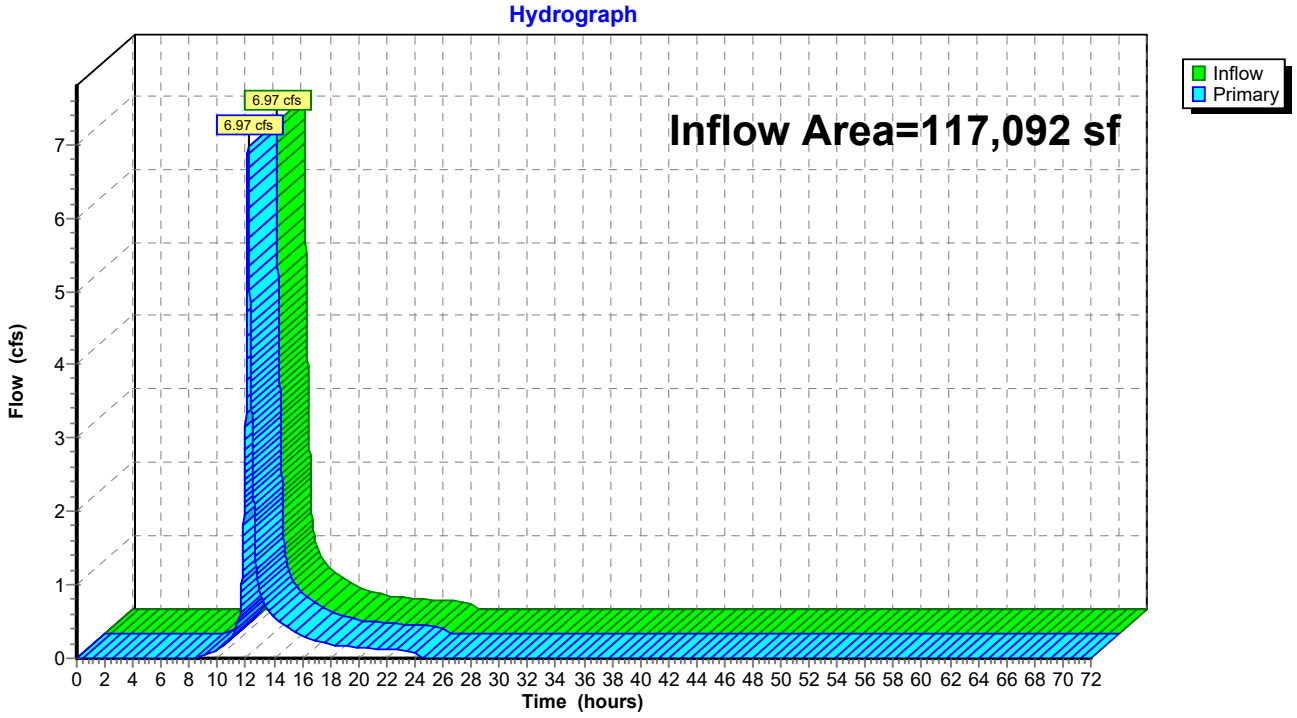


Summary for Pond B1.1: SWALE

Inflow Area = 117,092 sf, 0.00% Impervious, Inflow Depth = 2.63" for 10-year event
Inflow = 6.97 cfs @ 12.16 hrs, Volume= 25,634 cf
Primary = 6.97 cfs @ 12.16 hrs, Volume= 25,634 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B1.1: SWALE

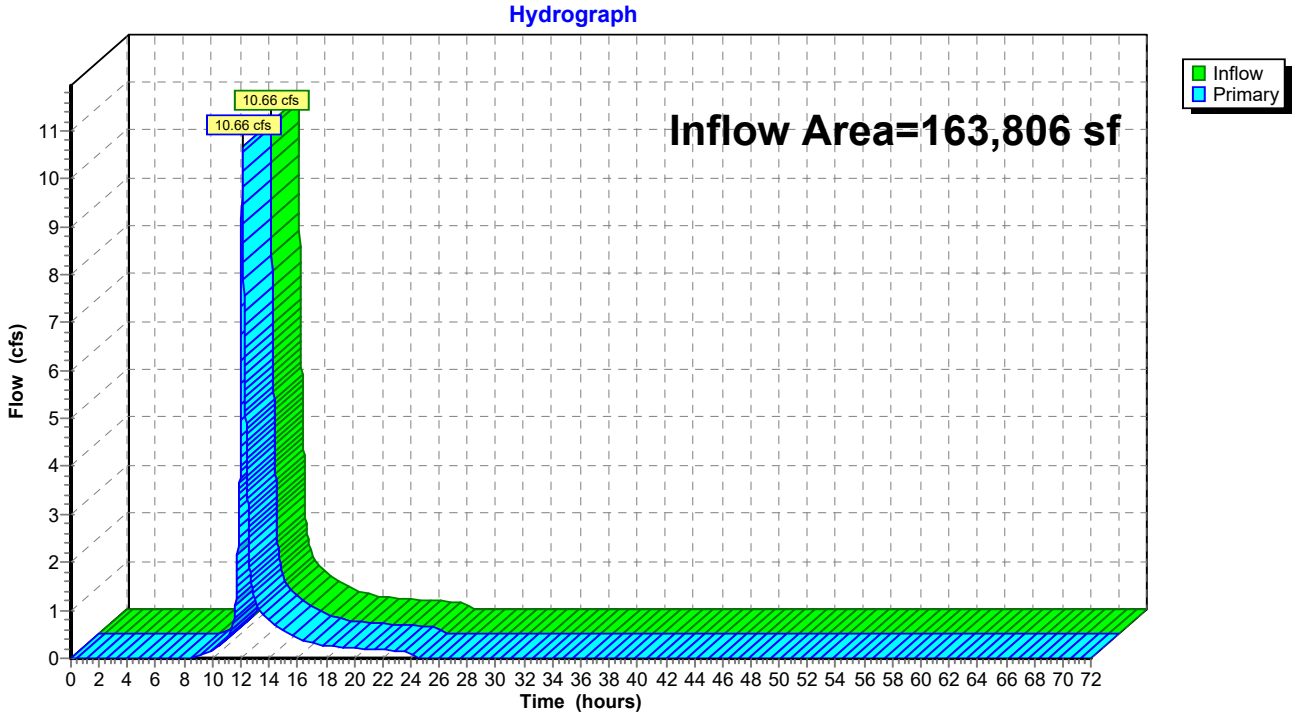


Summary for Pond B2.1: SWALE

Inflow Area = 163,806 sf, 0.00% Impervious, Inflow Depth = 2.63" for 10-year event
Inflow = 10.66 cfs @ 12.12 hrs, Volume= 35,860 cf
Primary = 10.66 cfs @ 12.12 hrs, Volume= 35,860 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B2.1: SWALE

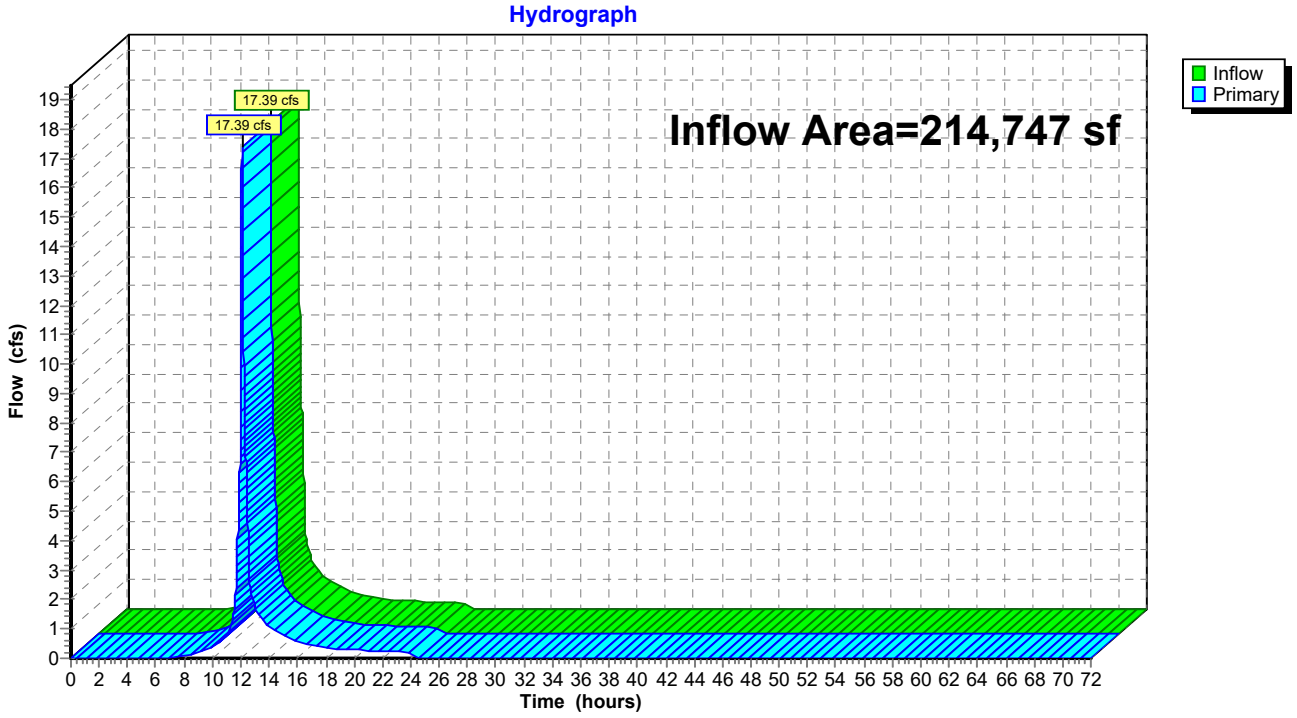


Summary for Link A: A

Inflow Area = 214,747 sf, 24.10% Impervious, Inflow Depth = 3.08" for 10-year event
Inflow = 17.39 cfs @ 12.09 hrs, Volume= 55,186 cf
Primary = 17.39 cfs @ 12.09 hrs, Volume= 55,186 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: A

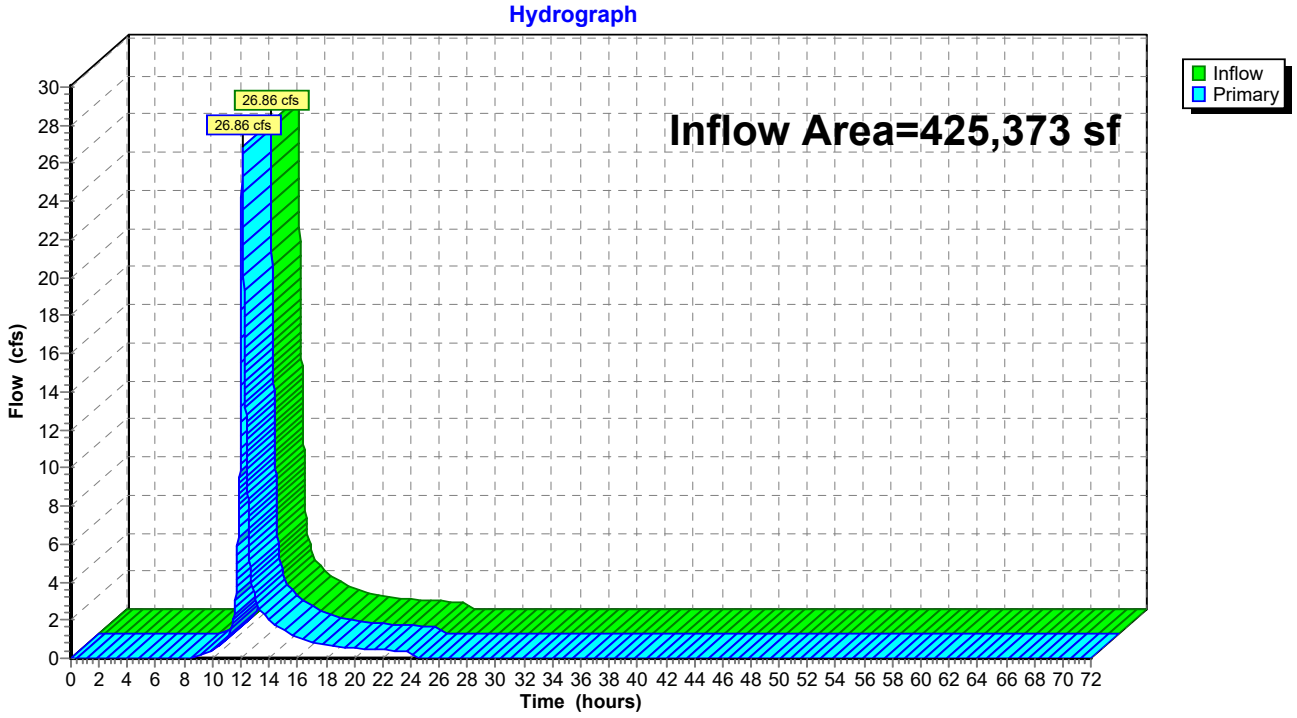


Summary for Link B: B

Inflow Area = 425,373 sf, 0.00% Impervious, Inflow Depth = 2.63" for 10-year event
Inflow = 26.86 cfs @ 12.11 hrs, Volume= 93,122 cf
Primary = 26.86 cfs @ 12.11 hrs, Volume= 93,122 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: B



Summary for Subcatchment A1: SUB-A1

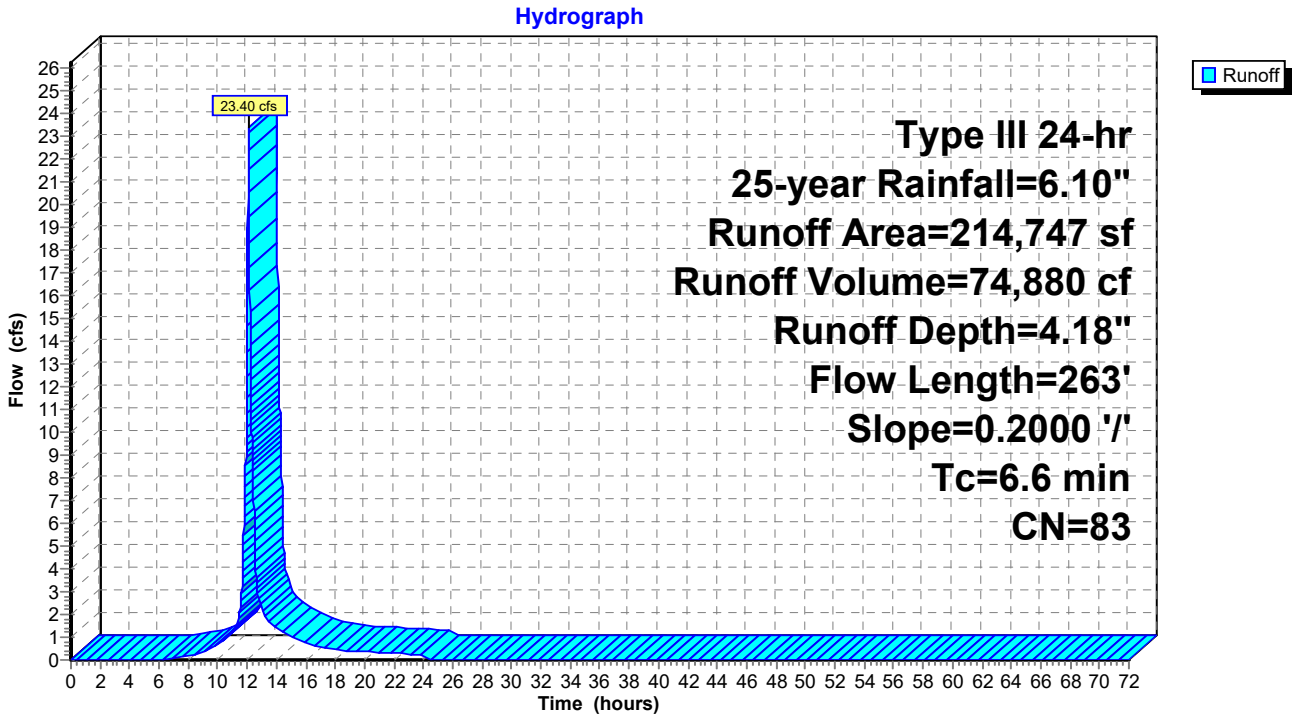
Runoff = 23.40 cfs @ 12.09 hrs, Volume= 74,880 cf, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

	Area (sf)	CN	Description
	46,532	98	Paved parking, HSG D
	5,228	98	Roofs, HSG D
*	130,649	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	32,338	78	Meadow, non-grazed, HSG D
	214,747	83	Weighted Average
	162,987		75.90% Pervious Area
	51,760		24.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	100	0.2000	0.29		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.9	163	0.2000	3.13		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
6.6	263	Total			

Subcatchment A1: SUB-A1



Summary for Subcatchment B1: SUB-B1

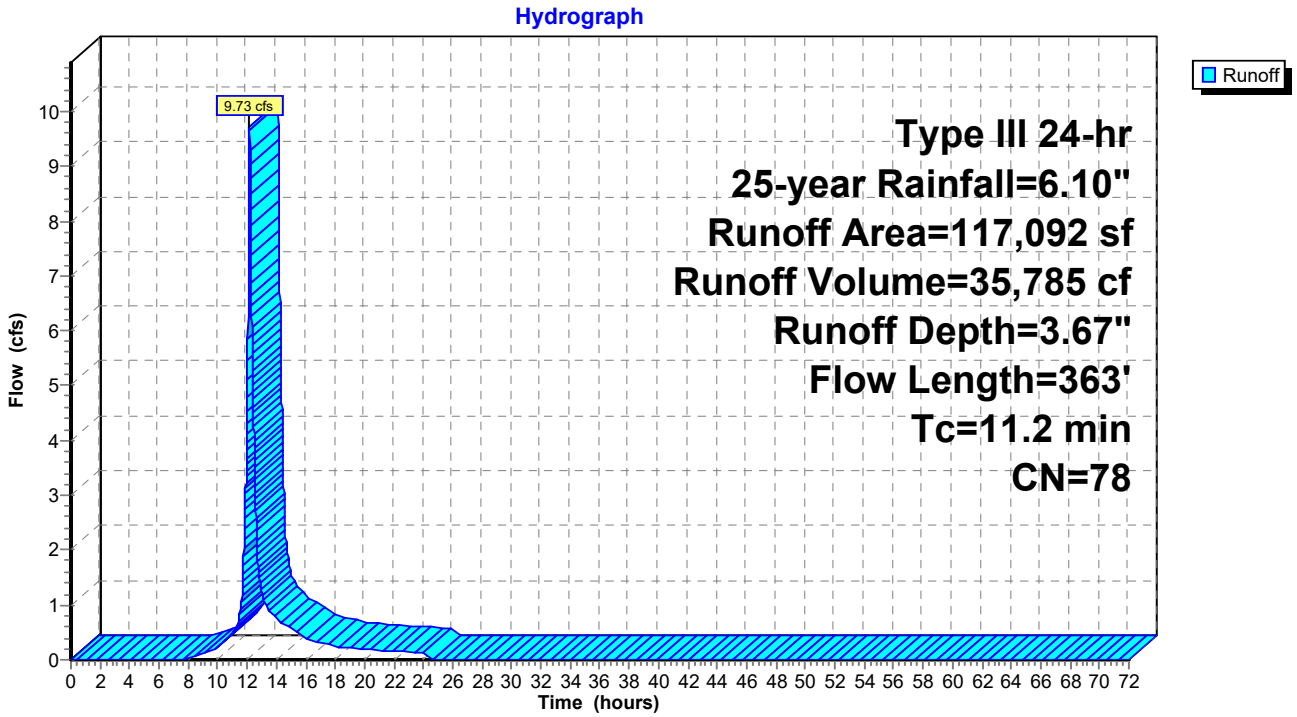
Runoff = 9.73 cfs @ 12.16 hrs, Volume= 35,785 cf, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

	Area (sf)	CN	Description
*	117,092	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	117,092		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.4	263	0.1900	3.05		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
11.2	363	Total			

Subcatchment B1: SUB-B1



Summary for Subcatchment B2: SUB-B2

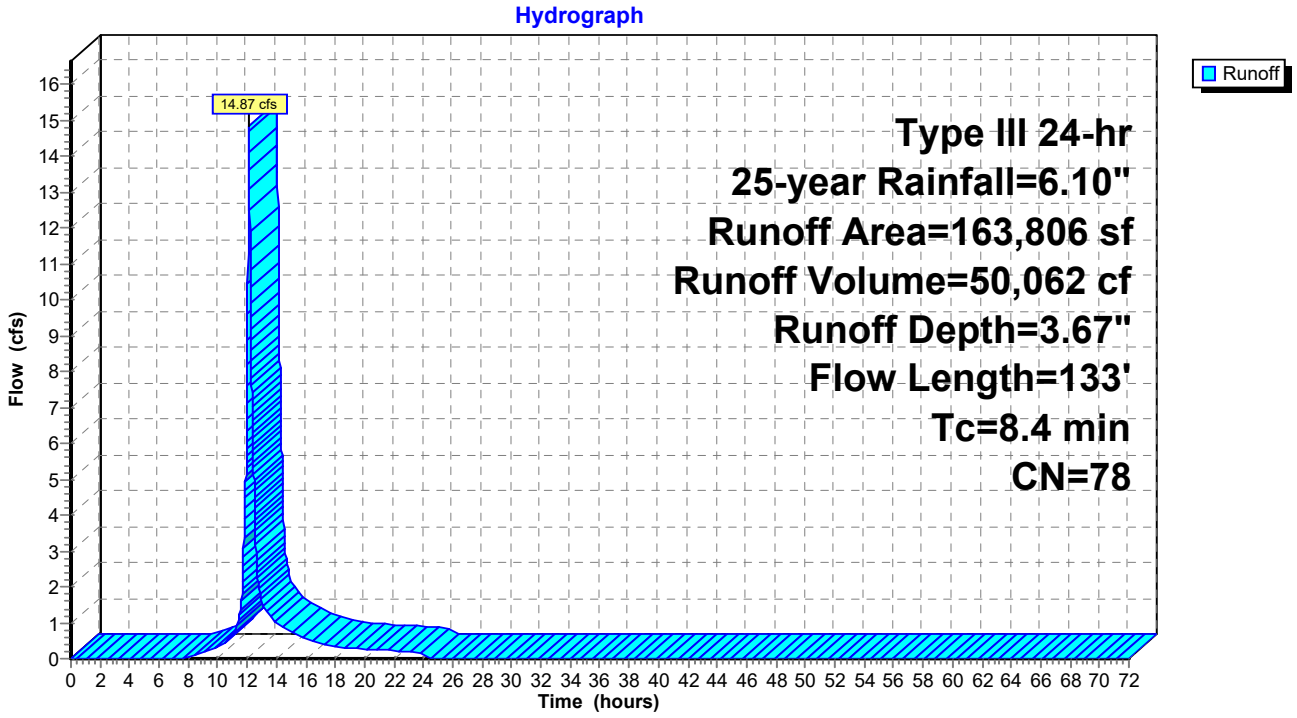
Runoff = 14.87 cfs @ 12.12 hrs, Volume= 50,062 cf, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

	Area (sf)	CN	Description
*	157,223	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	6,583	77	Woods, Good, HSG D
	163,806	78	Weighted Average
	163,806		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0800	0.20		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
0.2	33	0.1300	2.52		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
8.4	133	Total			

Subcatchment B2: SUB-B2



Summary for Subcatchment B3: SUB-B3

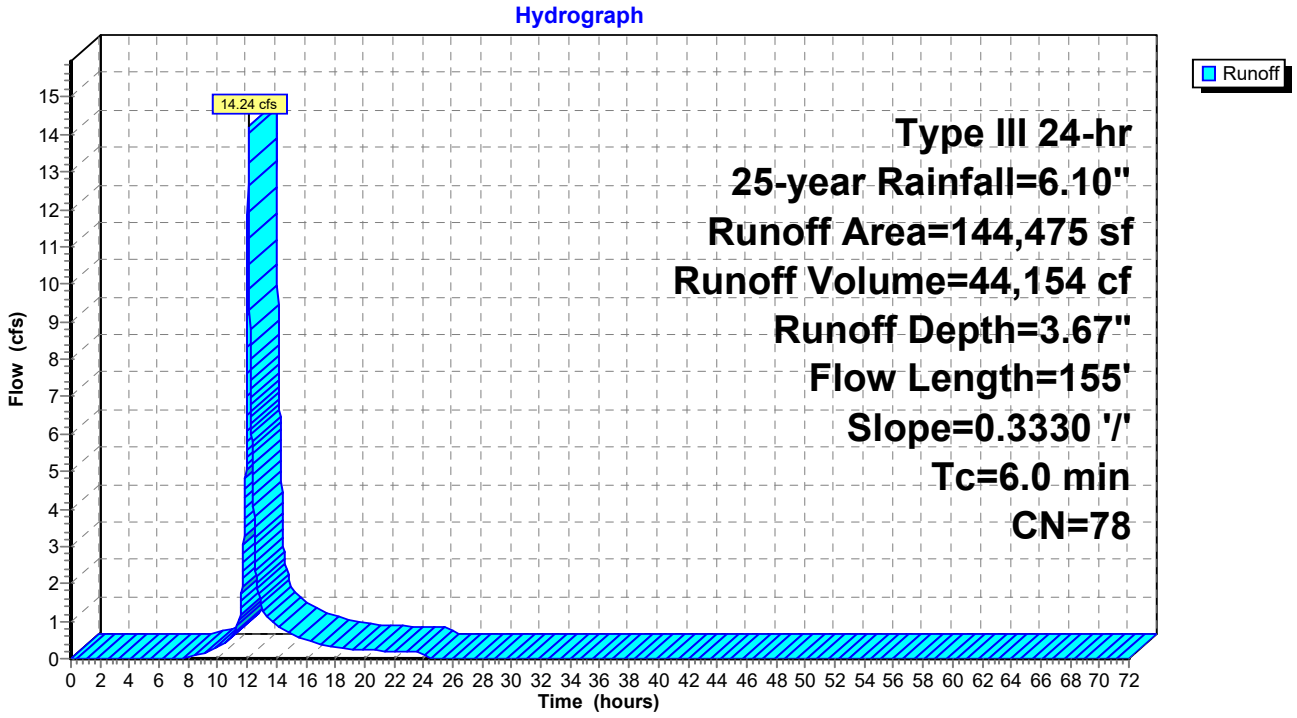
Runoff = 14.24 cfs @ 12.09 hrs, Volume= 44,154 cf, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

	Area (sf)	CN	Description
*	104,352	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	40,123	77	Woods, Good, HSG D
	144,475	78	Weighted Average
	144,475		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.3330	0.36		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.2	55	0.3330	4.04		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
4.8	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment B3: SUB-B3

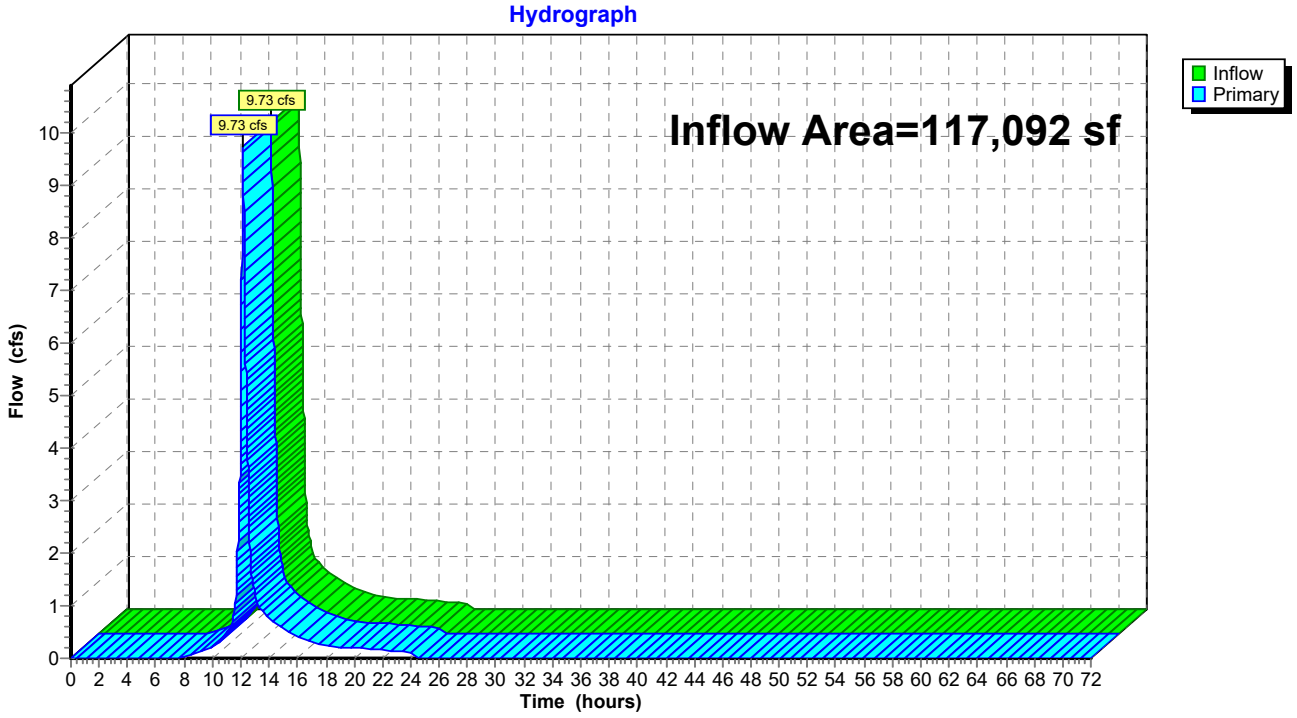


Summary for Pond B1.1: SWALE

Inflow Area = 117,092 sf, 0.00% Impervious, Inflow Depth = 3.67" for 25-year event
Inflow = 9.73 cfs @ 12.16 hrs, Volume= 35,785 cf
Primary = 9.73 cfs @ 12.16 hrs, Volume= 35,785 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B1.1: SWALE

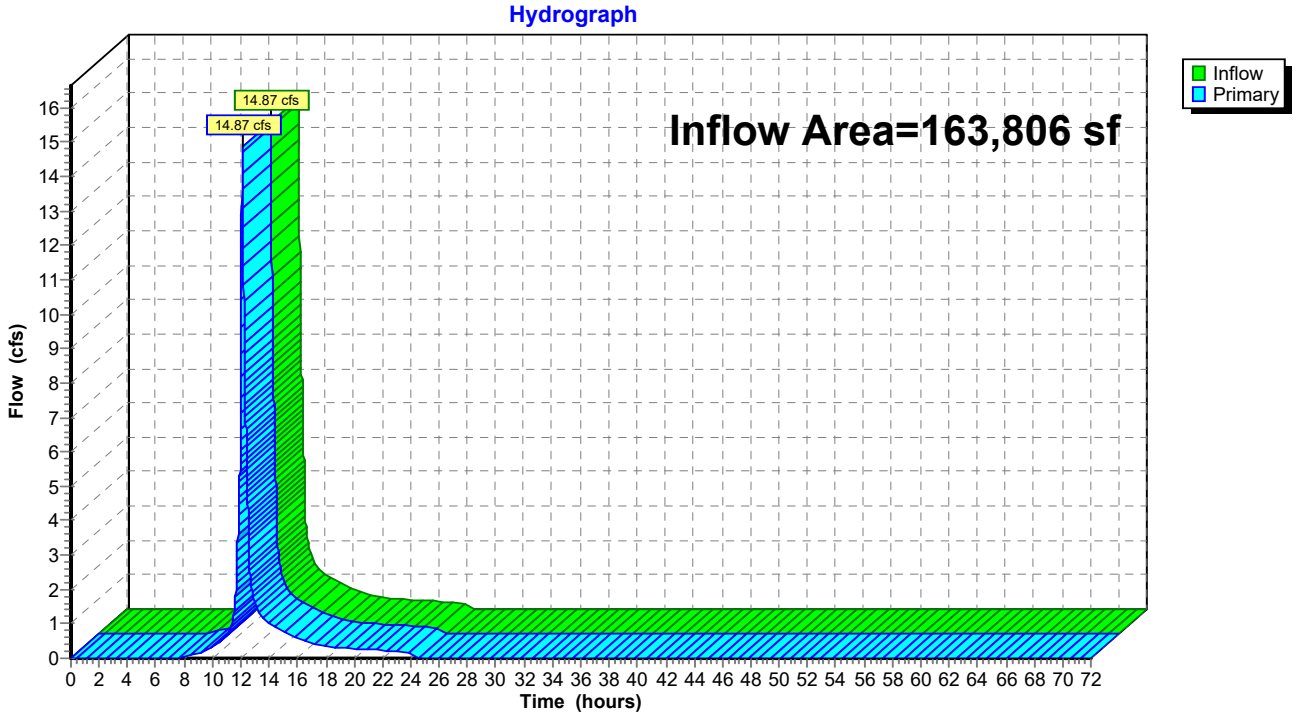


Summary for Pond B2.1: SWALE

Inflow Area = 163,806 sf, 0.00% Impervious, Inflow Depth = 3.67" for 25-year event
Inflow = 14.87 cfs @ 12.12 hrs, Volume= 50,062 cf
Primary = 14.87 cfs @ 12.12 hrs, Volume= 50,062 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B2.1: SWALE

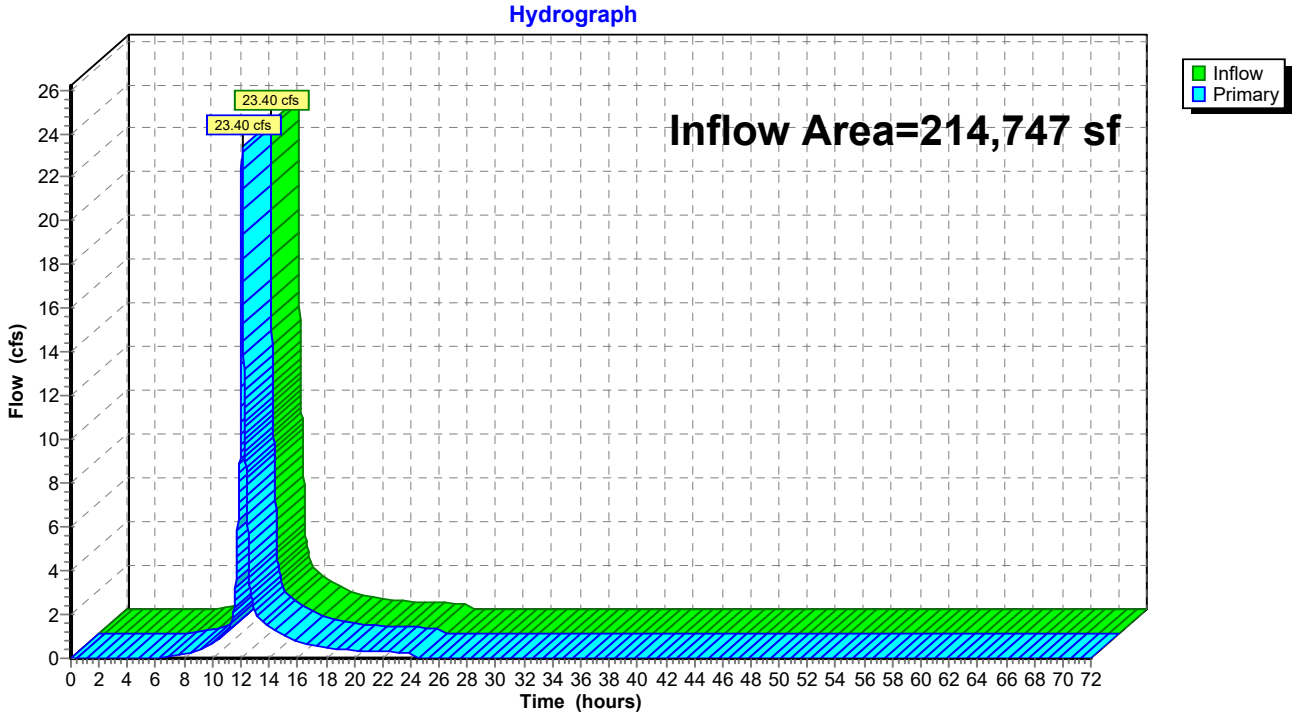


Summary for Link A: A

Inflow Area = 214,747 sf, 24.10% Impervious, Inflow Depth = 4.18" for 25-year event
Inflow = 23.40 cfs @ 12.09 hrs, Volume= 74,880 cf
Primary = 23.40 cfs @ 12.09 hrs, Volume= 74,880 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: A

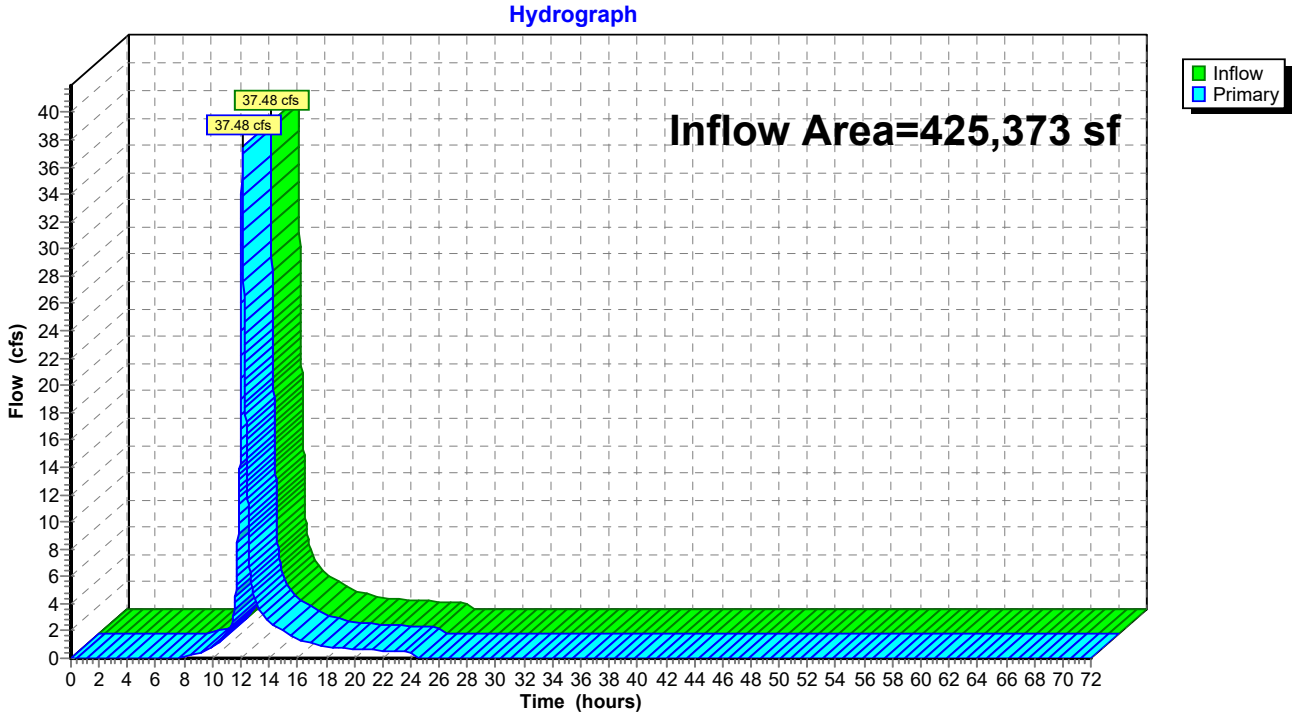


Summary for Link B: B

Inflow Area = 425,373 sf, 0.00% Impervious, Inflow Depth = 3.67" for 25-year event
Inflow = 37.48 cfs @ 12.11 hrs, Volume= 130,000 cf
Primary = 37.48 cfs @ 12.11 hrs, Volume= 130,000 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: B



Summary for Subcatchment A1: SUB-A1

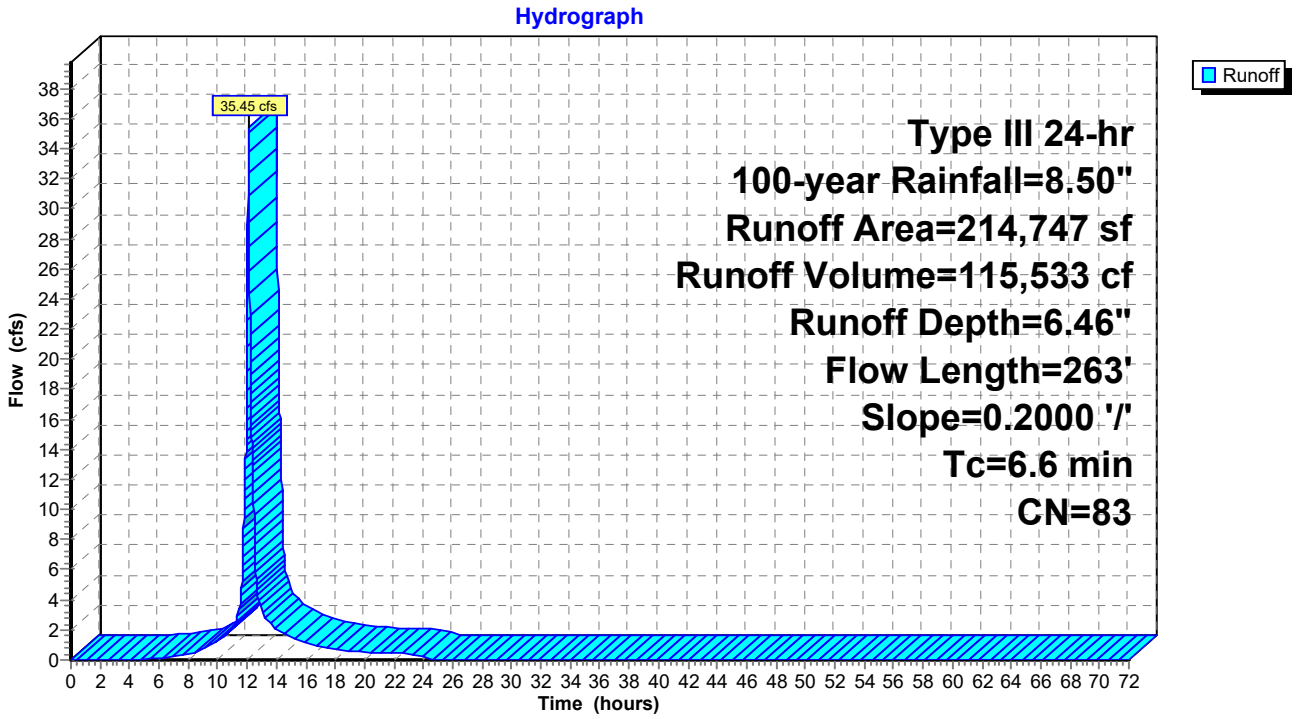
Runoff = 35.45 cfs @ 12.09 hrs, Volume= 115,533 cf, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.50"

	Area (sf)	CN	Description
	46,532	98	Paved parking, HSG D
	5,228	98	Roofs, HSG D
*	130,649	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	32,338	78	Meadow, non-grazed, HSG D
	214,747	83	Weighted Average
	162,987		75.90% Pervious Area
	51,760		24.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	100	0.2000	0.29		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.9	163	0.2000	3.13		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
6.6	263	Total			

Subcatchment A1: SUB-A1



Summary for Subcatchment B1: SUB-B1

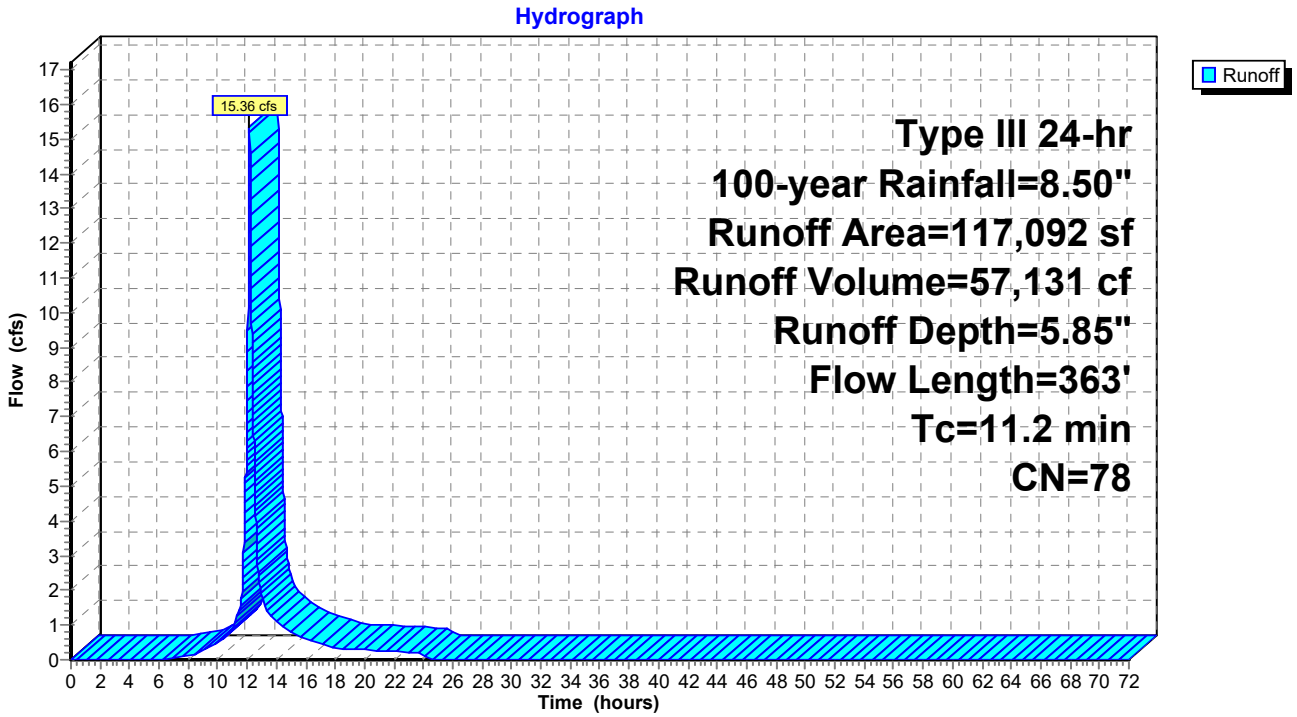
Runoff = 15.36 cfs @ 12.15 hrs, Volume= 57,131 cf, Depth= 5.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.50"

	Area (sf)	CN	Description
*	117,092	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	117,092		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.4	263	0.1900	3.05		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
11.2	363	Total			

Subcatchment B1: SUB-B1



Summary for Subcatchment B2: SUB-B2

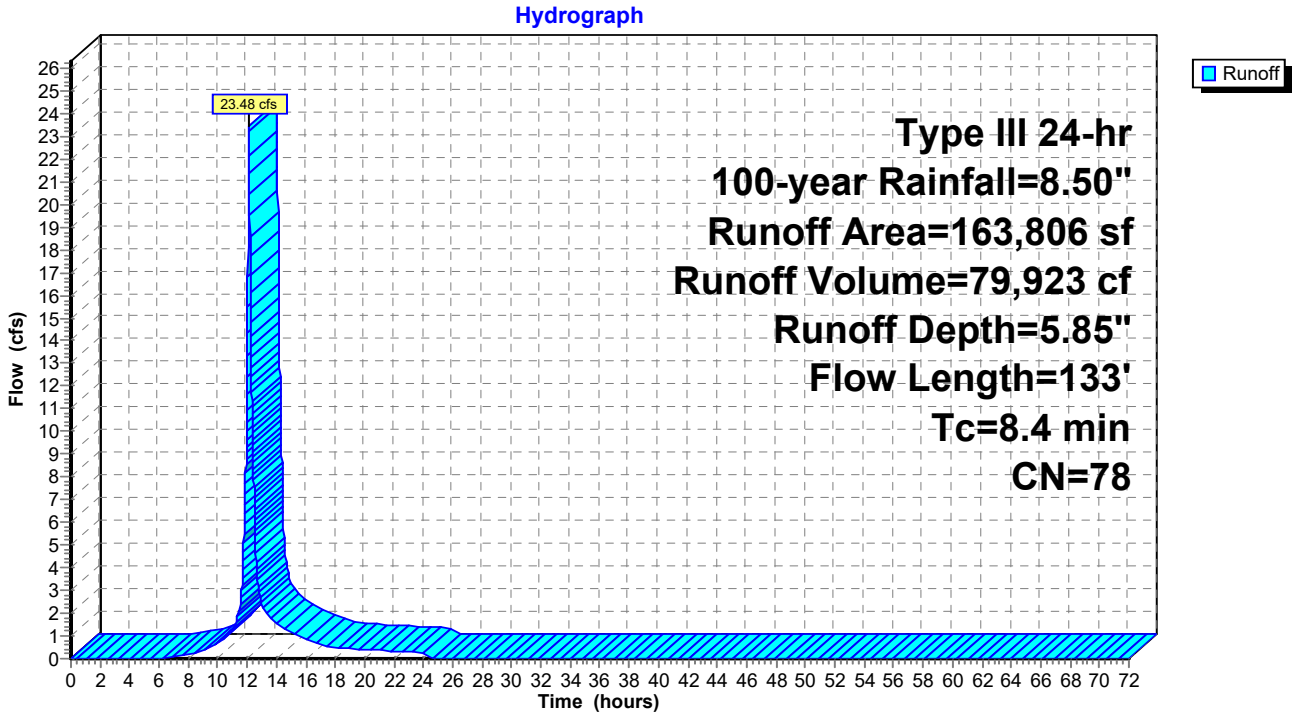
Runoff = 23.48 cfs @ 12.12 hrs, Volume= 79,923 cf, Depth= 5.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.50"

	Area (sf)	CN	Description
*	157,223	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	6,583	77	Woods, Good, HSG D
	163,806	78	Weighted Average
	163,806		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0800	0.20		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
0.2	33	0.1300	2.52		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
8.4	133	Total			

Subcatchment B2: SUB-B2



Summary for Subcatchment B3: SUB-B3

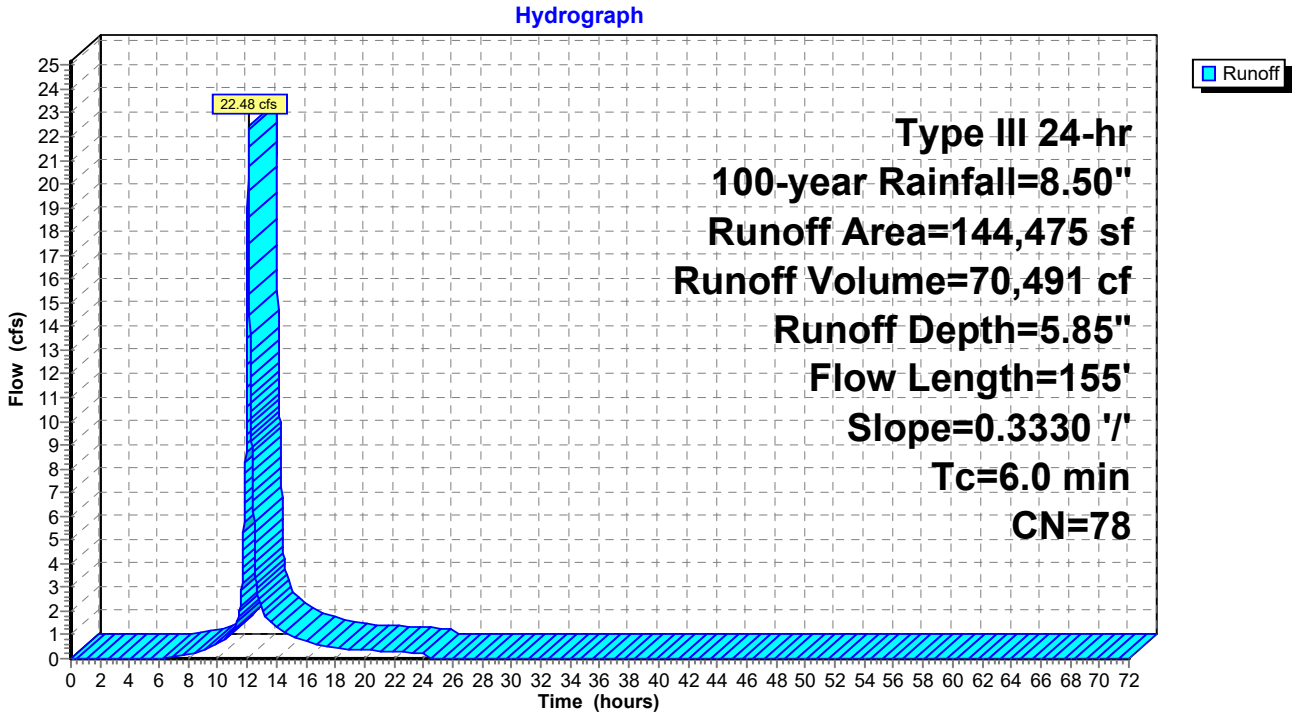
Runoff = 22.48 cfs @ 12.09 hrs, Volume= 70,491 cf, Depth= 5.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.50"

	Area (sf)	CN	Description
*	104,352	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	40,123	77	Woods, Good, HSG D
	144,475	78	Weighted Average
	144,475		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.3330	0.36		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.2	55	0.3330	4.04		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
4.8	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment B3: SUB-B3

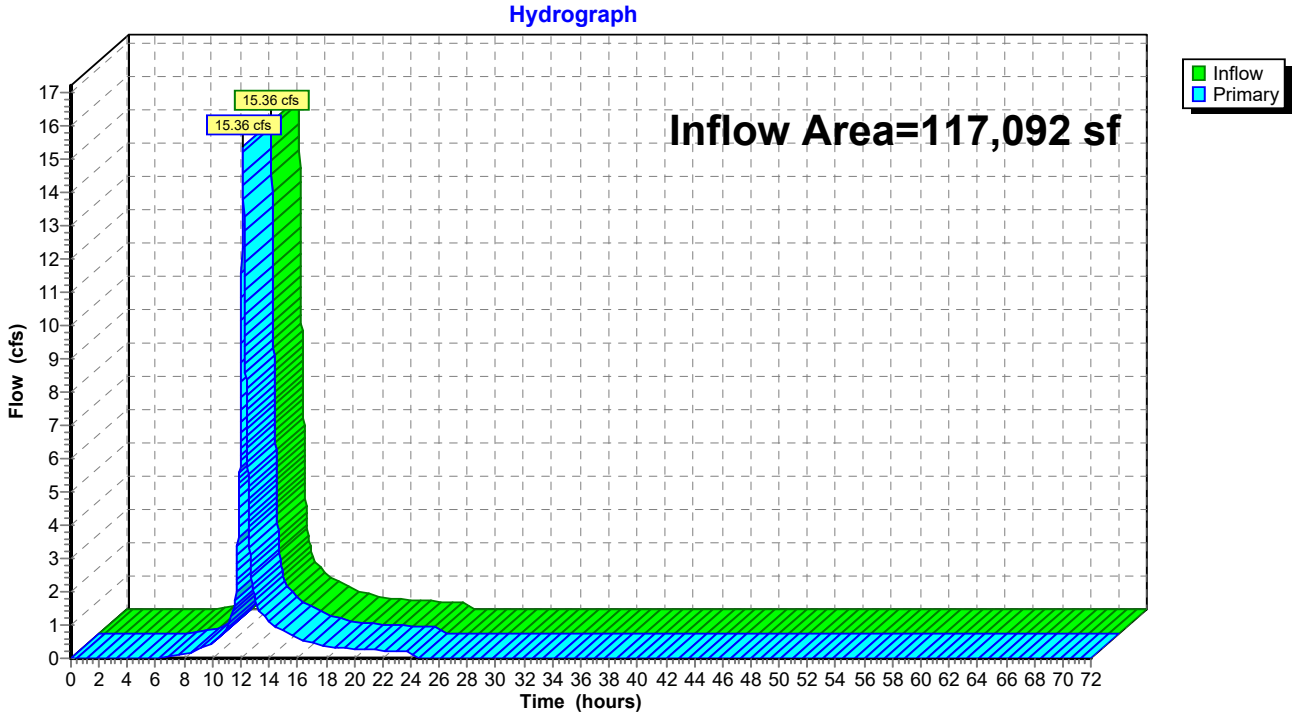


Summary for Pond B1.1: SWALE

Inflow Area = 117,092 sf, 0.00% Impervious, Inflow Depth = 5.85" for 100-year event
Inflow = 15.36 cfs @ 12.15 hrs, Volume= 57,131 cf
Primary = 15.36 cfs @ 12.15 hrs, Volume= 57,131 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B1.1: SWALE

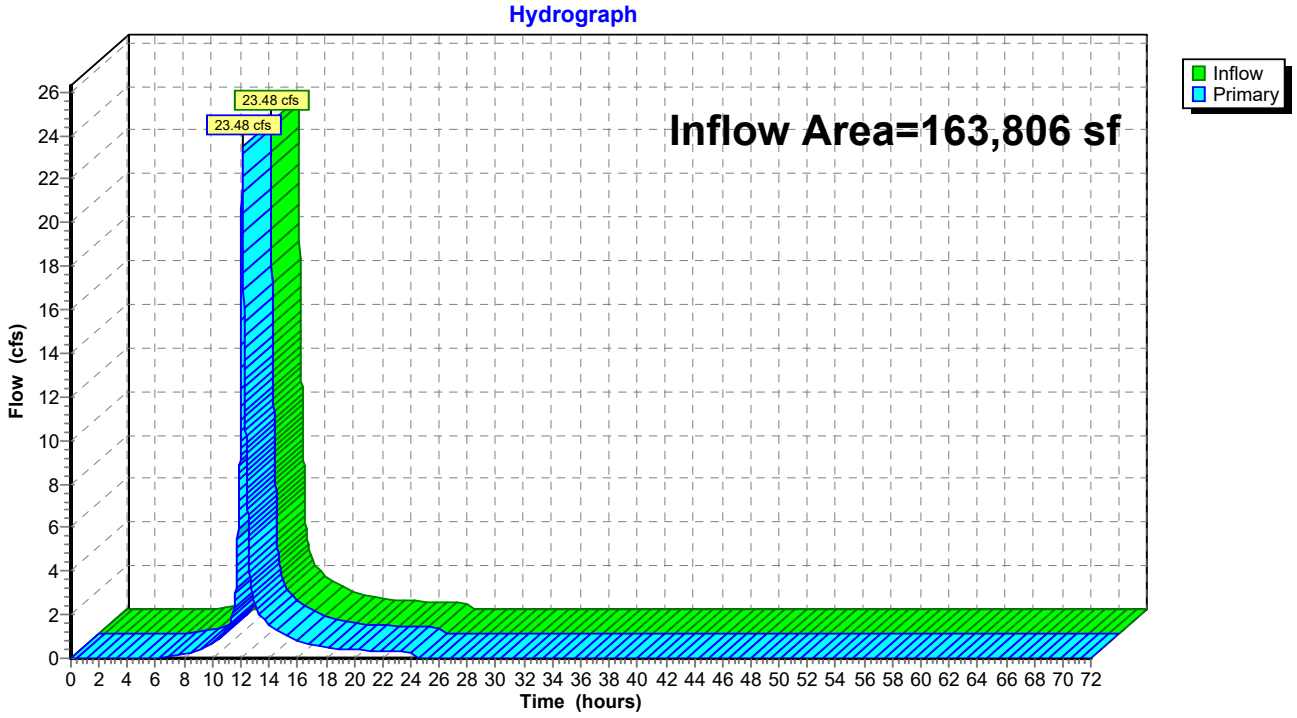


Summary for Pond B2.1: SWALE

Inflow Area = 163,806 sf, 0.00% Impervious, Inflow Depth = 5.85" for 100-year event
Inflow = 23.48 cfs @ 12.12 hrs, Volume= 79,923 cf
Primary = 23.48 cfs @ 12.12 hrs, Volume= 79,923 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B2.1: SWALE

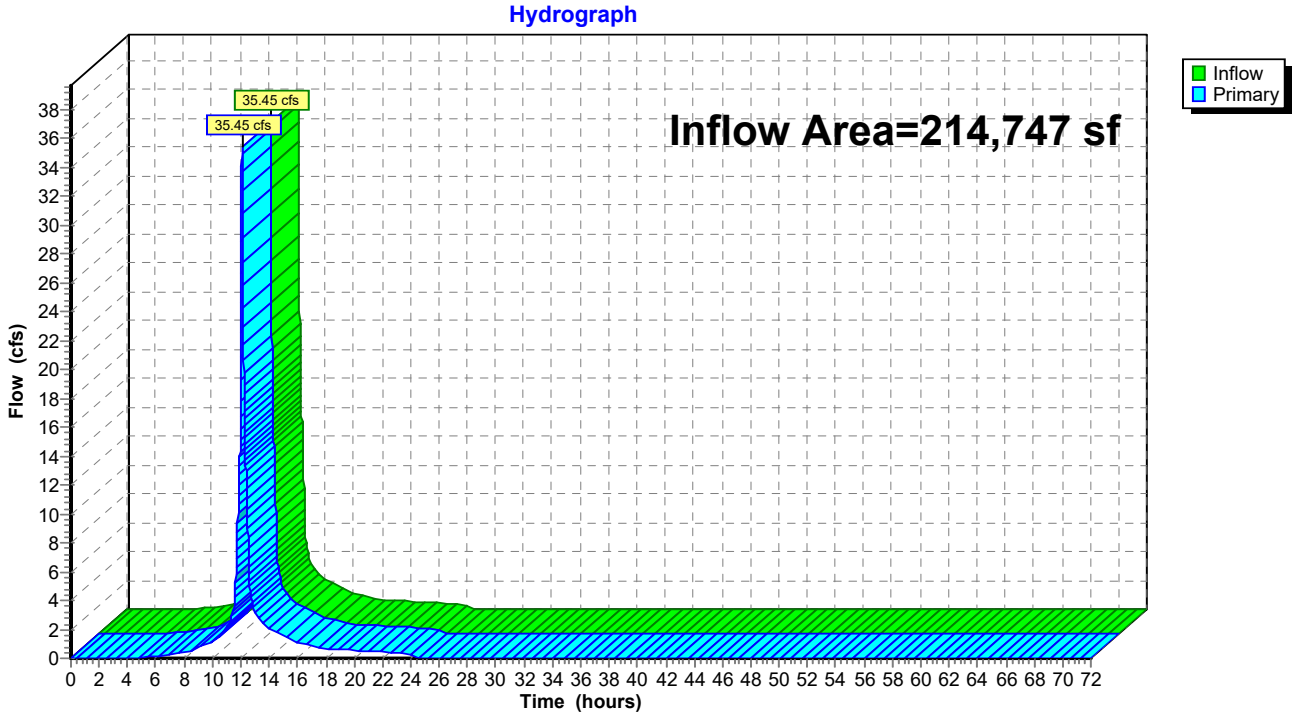


Summary for Link A: A

Inflow Area = 214,747 sf, 24.10% Impervious, Inflow Depth = 6.46" for 100-year event
Inflow = 35.45 cfs @ 12.09 hrs, Volume= 115,533 cf
Primary = 35.45 cfs @ 12.09 hrs, Volume= 115,533 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: A

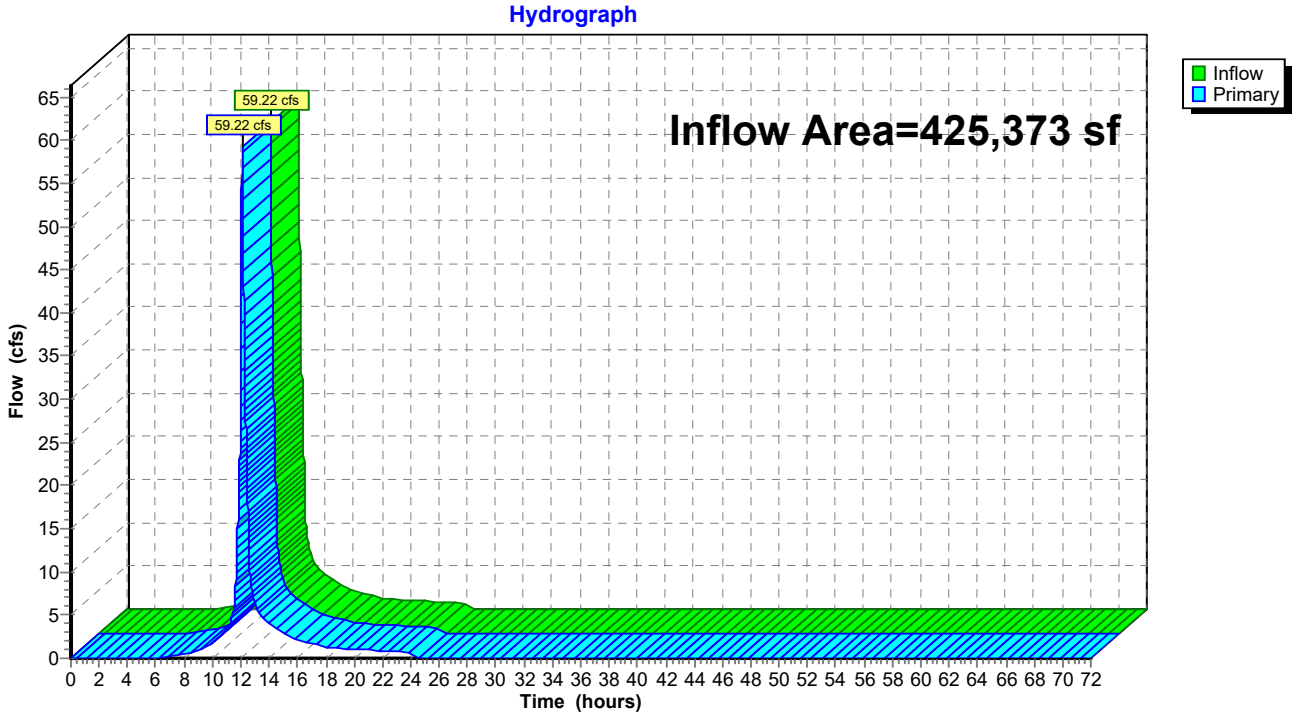


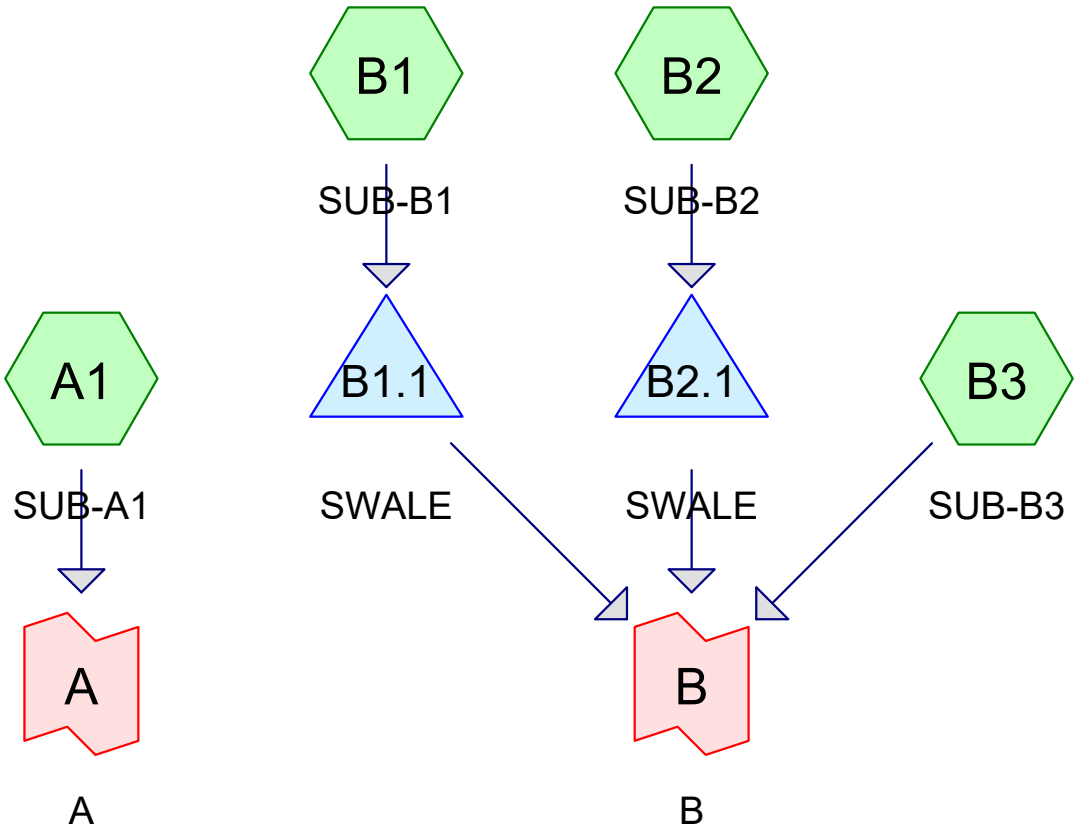
Summary for Link B: B

Inflow Area = 425,373 sf, 0.00% Impervious, Inflow Depth = 5.85" for 100-year event
Inflow = 59.22 cfs @ 12.11 hrs, Volume= 207,546 cf
Primary = 59.22 cfs @ 12.11 hrs, Volume= 207,546 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: B





Subcat Reach Pond Link

Routing Diagram for HYDRO-PR rev02
Prepared by Weston & Sampson Engineers, Inc., Printed 5/12/2022
HydroCAD® 10.10-3a s/n 00455 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.20	2
2	10-year	Type III 24-hr		Default	24.00	1	4.90	2
3	25-year	Type III 24-hr		Default	24.00	1	6.10	2
4	50-year	Type III 24-hr		Default	24.00	1	7.30	2
5	100-year	Type III 24-hr		Default	24.00	1	8.50	2

Summary for Subcatchment A1: SUB-A1

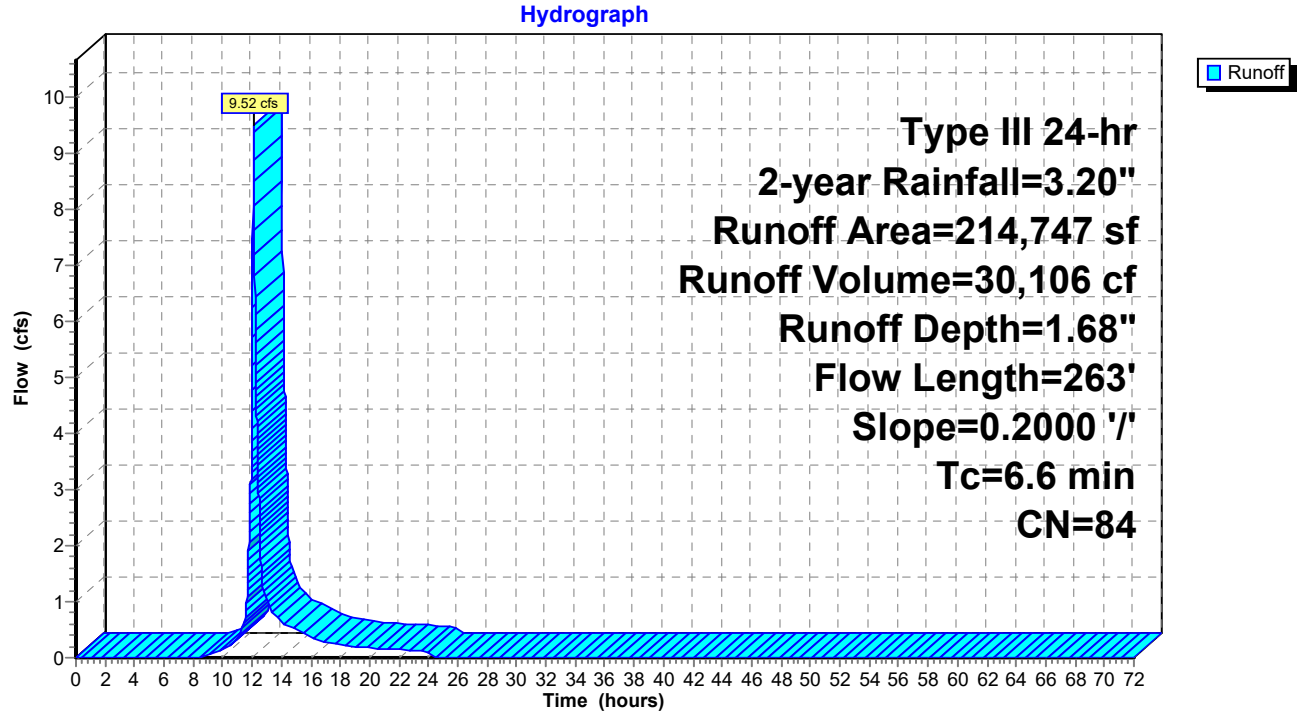
Runoff = 9.52 cfs @ 12.10 hrs, Volume= 30,106 cf, Depth= 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
	46,532	98	Paved parking, HSG D
	5,228	98	Roofs, HSG D
*	119,943	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	31,817	78	Meadow, non-grazed, HSG D
	11,227	96	Gravel surface, HSG A
	214,747	84	Weighted Average
	162,987		75.90% Pervious Area
	51,760		24.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	100	0.2000	0.29		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.9	163	0.2000	3.13		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
6.6	263	Total			

Subcatchment A1: SUB-A1



Summary for Subcatchment B1: SUB-B1

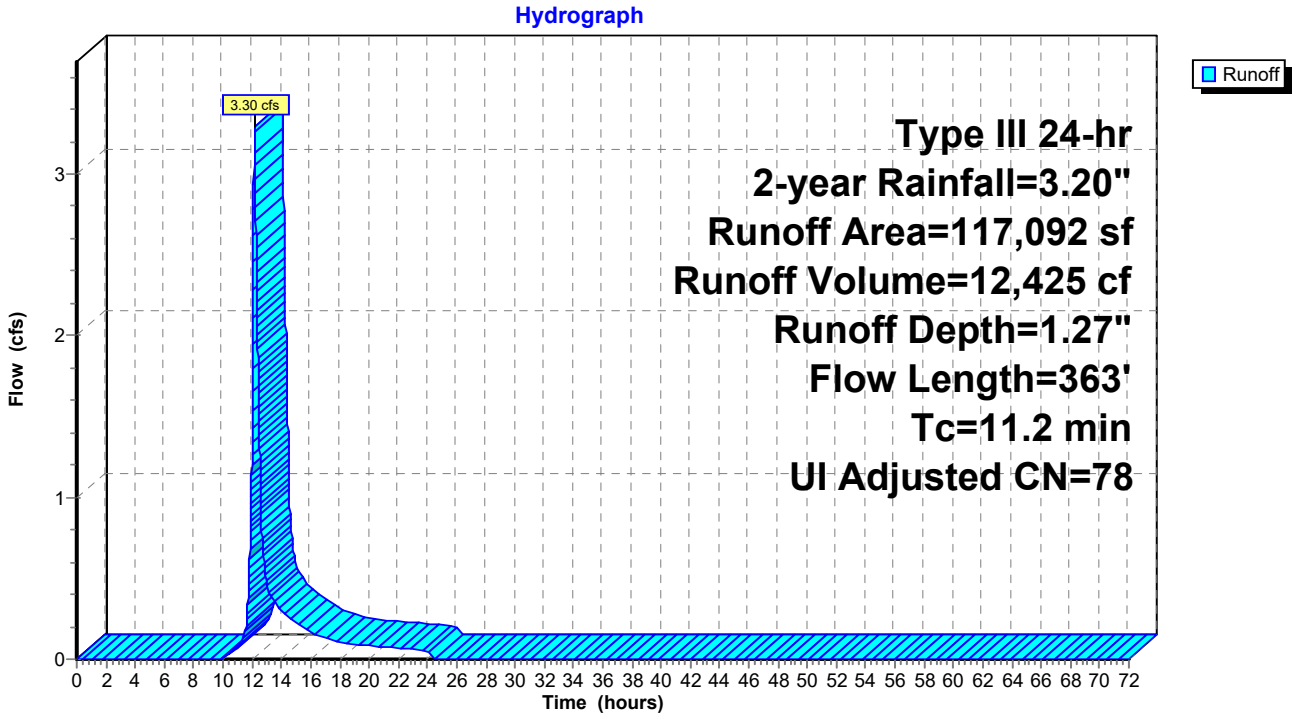
Runoff = 3.30 cfs @ 12.16 hrs, Volume= 12,425 cf, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Adj	Description
*	111,892	78		Meadow, non-grazed, HSG D (LANDFILL CAP)
*	5,200	98		Unconnected pavement, HSG D (ballast blocks)
	117,092	79	78	Weighted Average, UI Adjusted
	111,892			95.56% Pervious Area
	5,200			4.44% Impervious Area
	5,200			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.4	263	0.1900	3.05		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
11.2	363	Total			

Subcatchment B1: SUB-B1



Summary for Subcatchment B2: SUB-B2

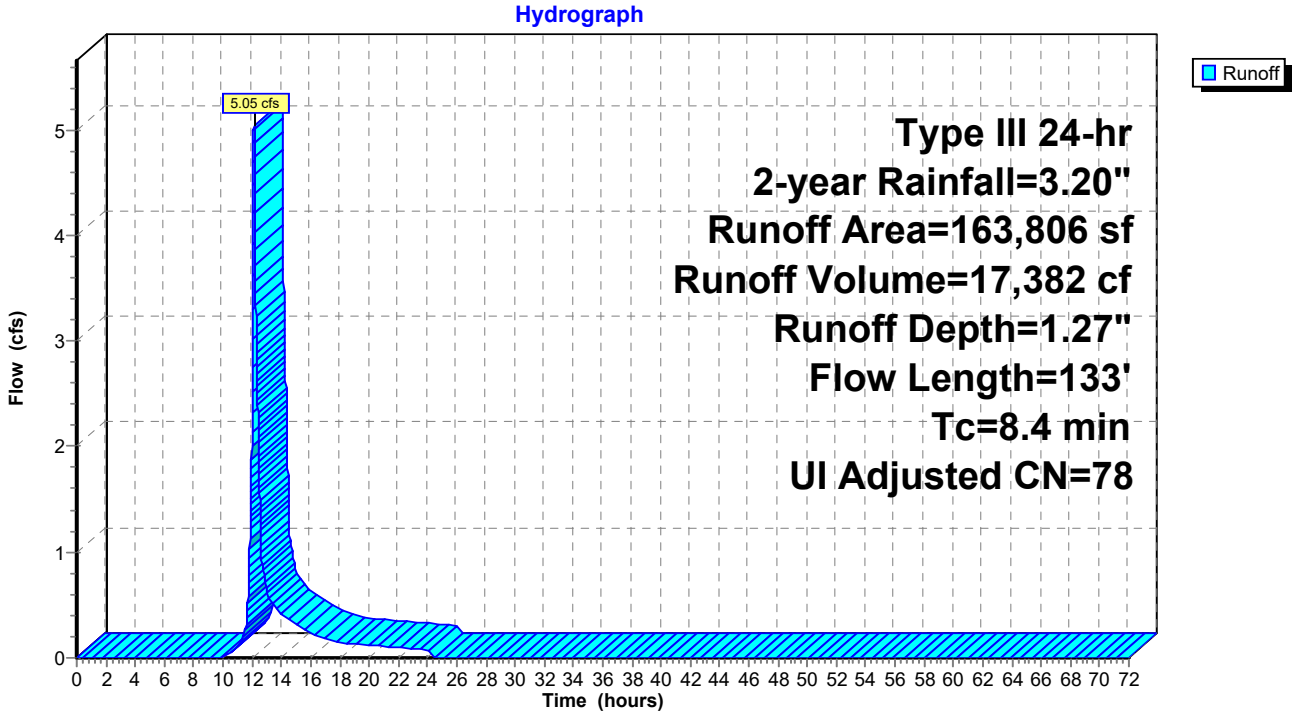
Runoff = 5.05 cfs @ 12.12 hrs, Volume= 17,382 cf, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Adj	Description
*	151,343	78		Meadow, non-grazed, HSG D (LANDFILL CAP)
	6,583	77		Woods, Good, HSG D
*	919	98		Unconnected pavement, HSG D (Eq. Pad)
	586	96		Gravel surface, HSG D
*	4,375	98		Unconnected pavement, HSG D (ballast blocks)
	163,806	79	78	Weighted Average, UI Adjusted
	158,512			96.77% Pervious Area
	5,294			3.23% Impervious Area
	5,294			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0800	0.20		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
0.2	33	0.1300	2.52		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
8.4	133	Total			

Subcatchment B2: SUB-B2



Summary for Subcatchment B3: SUB-B3

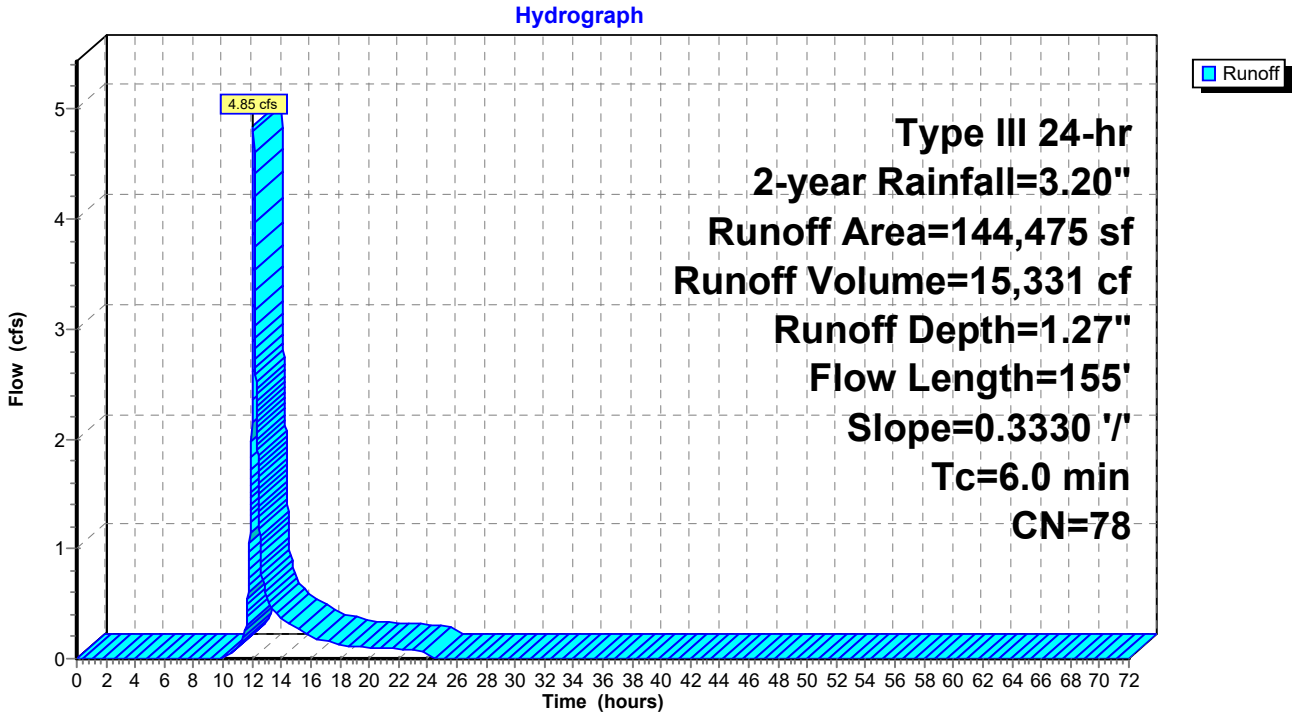
Runoff = 4.85 cfs @ 12.09 hrs, Volume= 15,331 cf, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.20"

	Area (sf)	CN	Description
*	104,352	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	40,123	77	Woods, Good, HSG D
	144,475	78	Weighted Average
	144,475		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.3330	0.36		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.2	55	0.3330	4.04		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
4.8	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment B3: SUB-B3

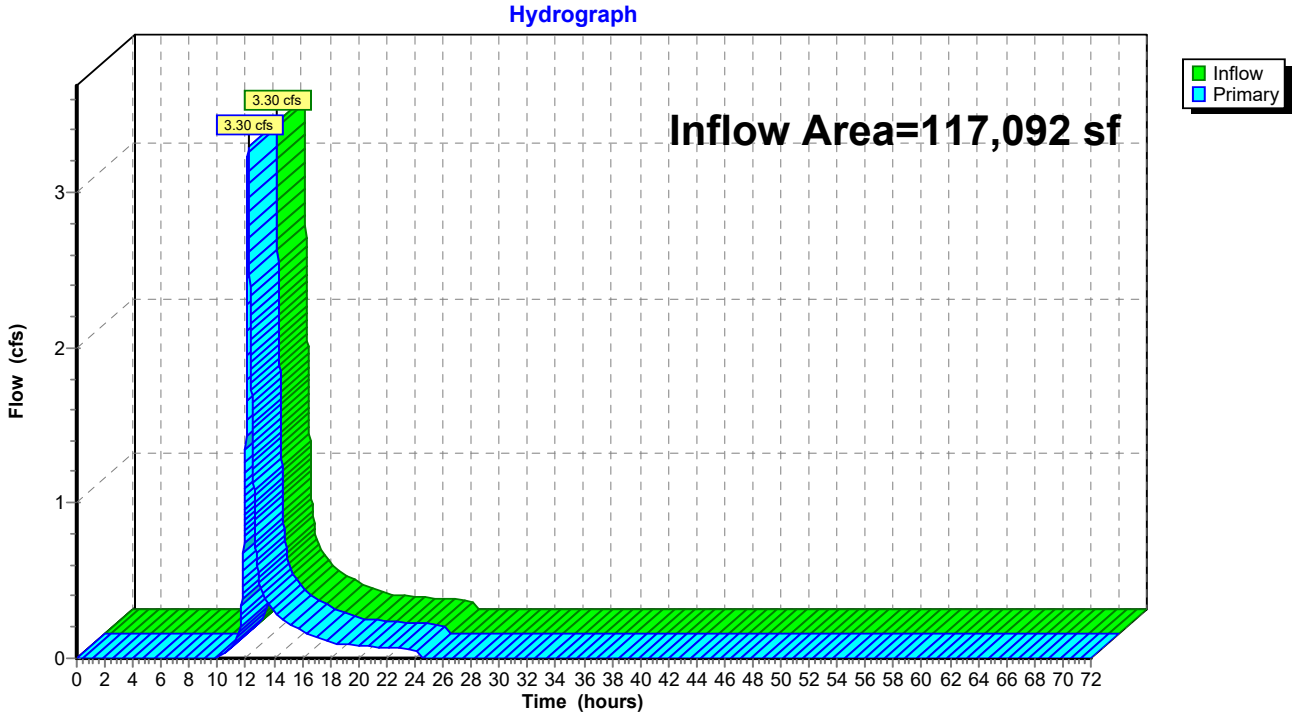


Summary for Pond B1.1: SWALE

Inflow Area = 117,092 sf, 4.44% Impervious, Inflow Depth = 1.27" for 2-year event
Inflow = 3.30 cfs @ 12.16 hrs, Volume= 12,425 cf
Primary = 3.30 cfs @ 12.16 hrs, Volume= 12,425 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B1.1: SWALE

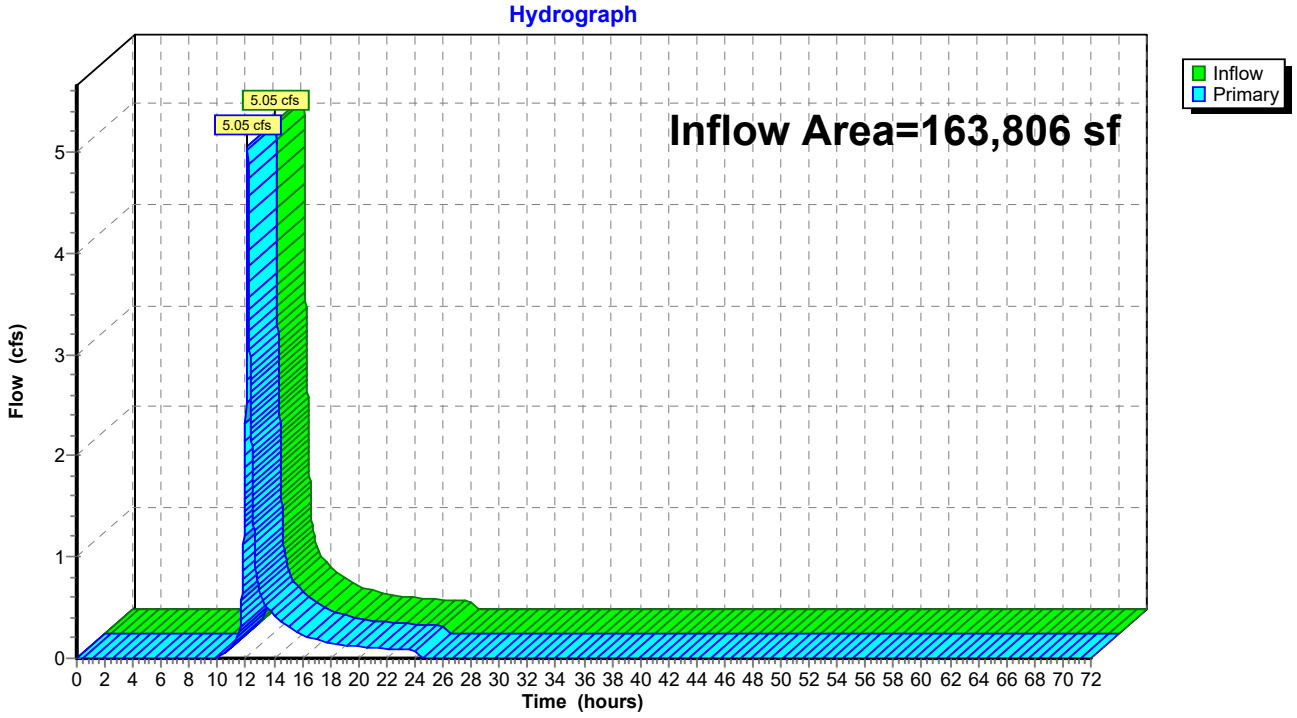


Summary for Pond B2.1: SWALE

Inflow Area = 163,806 sf, 3.23% Impervious, Inflow Depth = 1.27" for 2-year event
Inflow = 5.05 cfs @ 12.12 hrs, Volume= 17,382 cf
Primary = 5.05 cfs @ 12.12 hrs, Volume= 17,382 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B2.1: SWALE

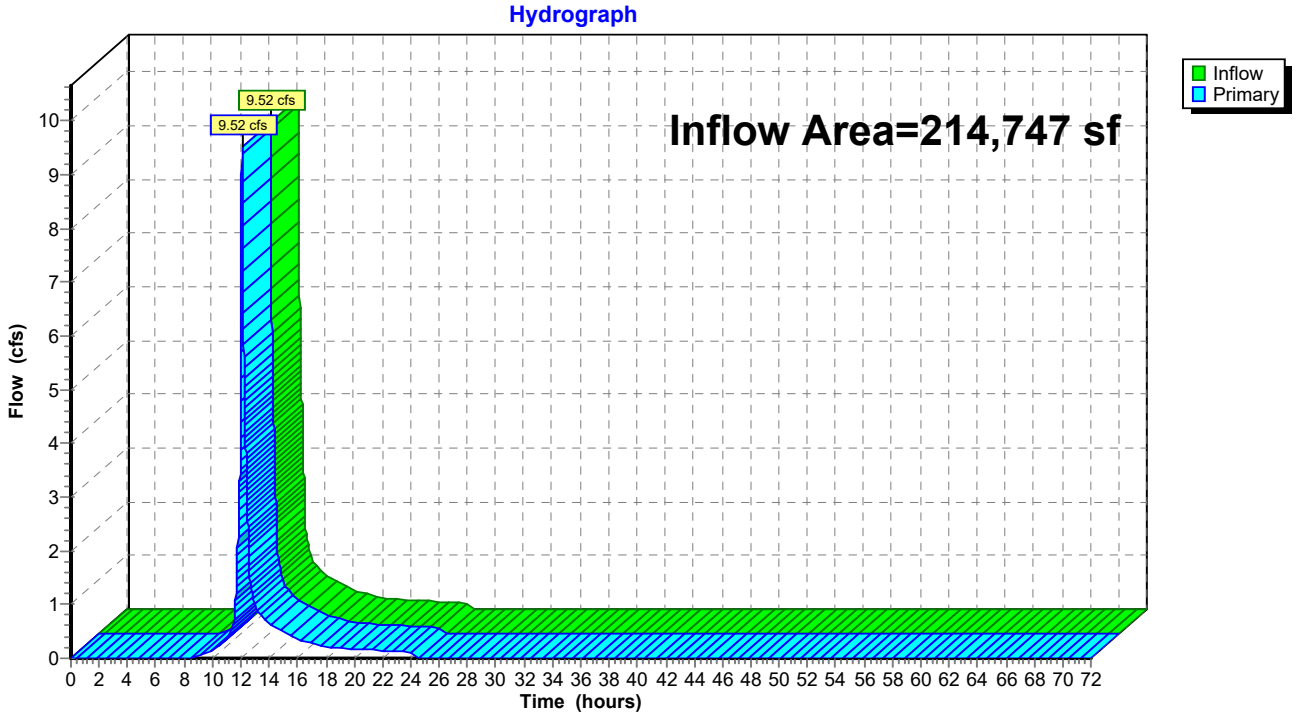


Summary for Link A: A

Inflow Area = 214,747 sf, 24.10% Impervious, Inflow Depth = 1.68" for 2-year event
Inflow = 9.52 cfs @ 12.10 hrs, Volume= 30,106 cf
Primary = 9.52 cfs @ 12.10 hrs, Volume= 30,106 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: A

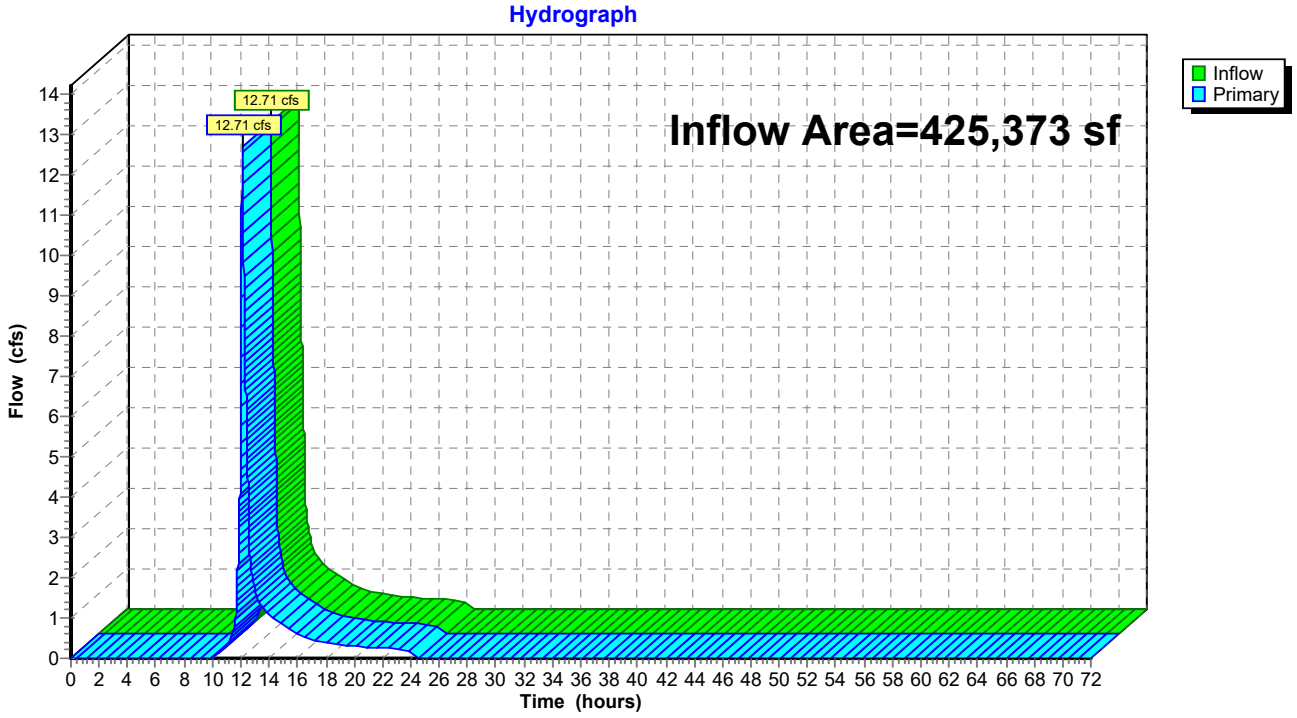


Summary for Link B: B

Inflow Area = 425,373 sf, 2.47% Impervious, Inflow Depth = 1.27" for 2-year event
Inflow = 12.71 cfs @ 12.12 hrs, Volume= 45,138 cf
Primary = 12.71 cfs @ 12.12 hrs, Volume= 45,138 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: B



Summary for Subcatchment A1: SUB-A1

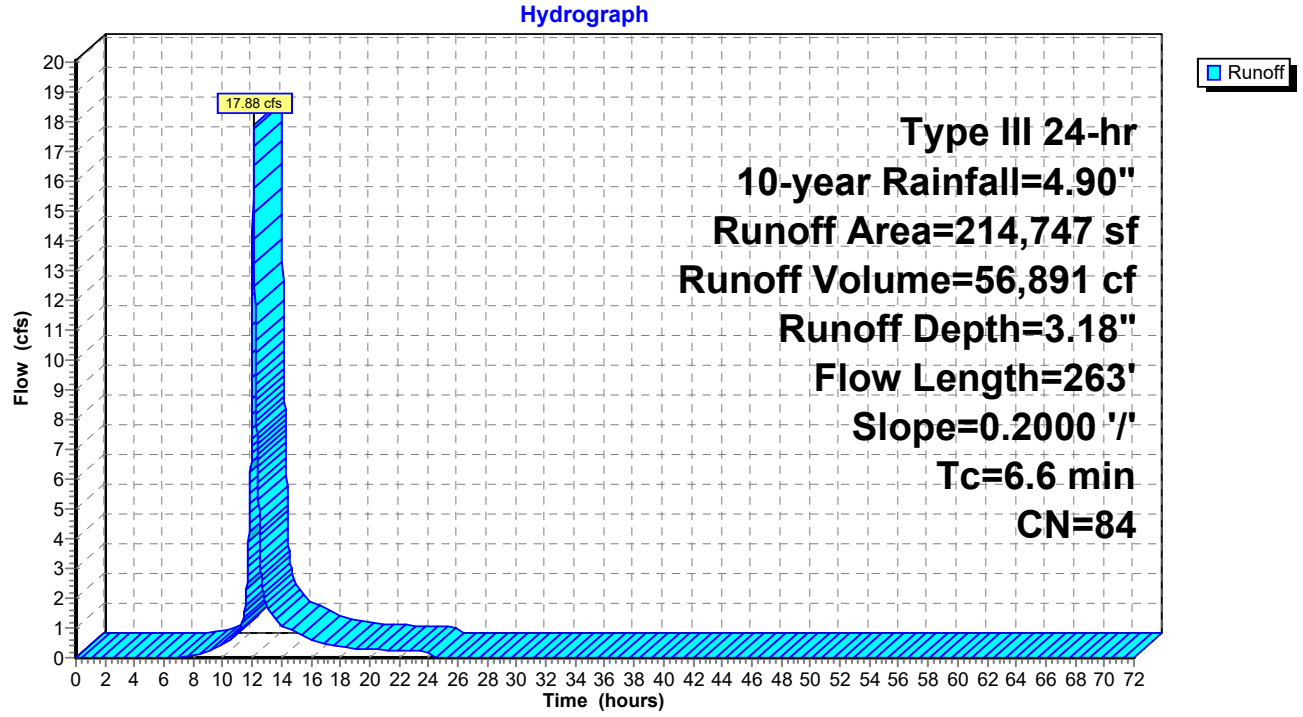
Runoff = 17.88 cfs @ 12.09 hrs, Volume= 56,891 cf, Depth= 3.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

	Area (sf)	CN	Description
	46,532	98	Paved parking, HSG D
	5,228	98	Roofs, HSG D
*	119,943	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	31,817	78	Meadow, non-grazed, HSG D
	11,227	96	Gravel surface, HSG A
	214,747	84	Weighted Average
	162,987		75.90% Pervious Area
	51,760		24.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	100	0.2000	0.29		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.9	163	0.2000	3.13		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
6.6	263	Total			

Subcatchment A1: SUB-A1



Summary for Subcatchment B1: SUB-B1

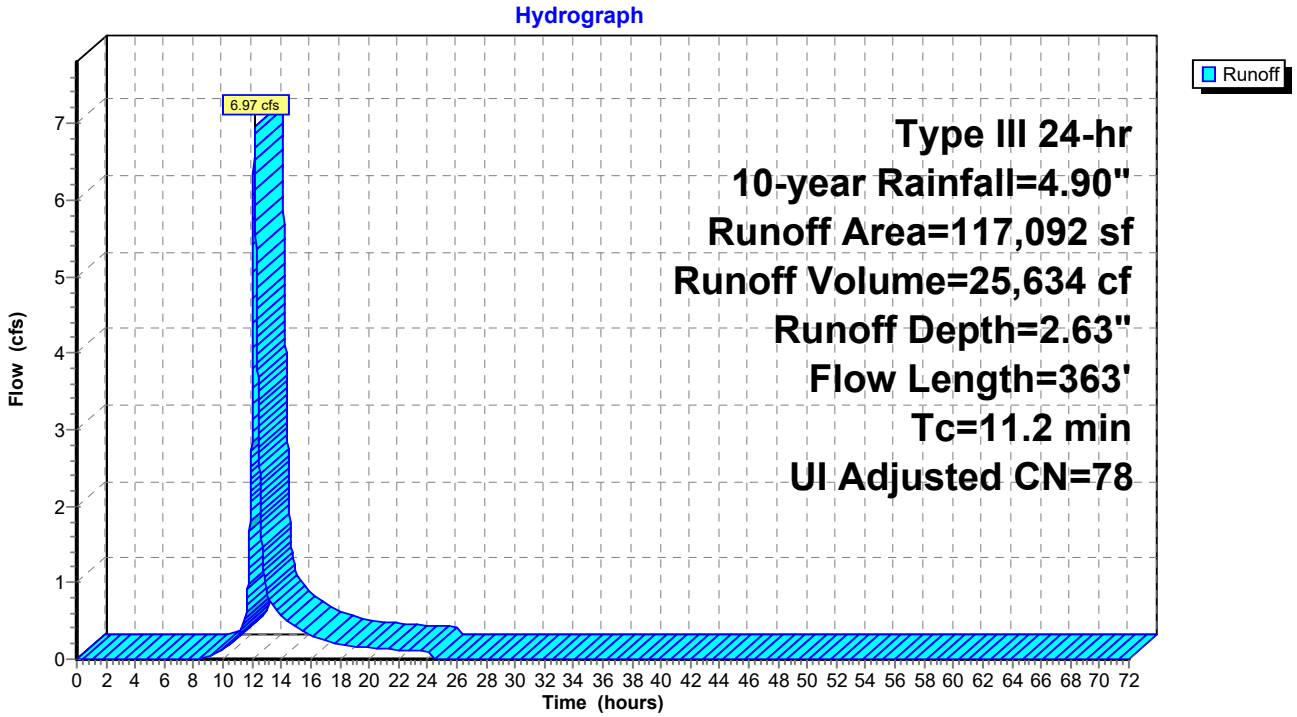
Runoff = 6.97 cfs @ 12.16 hrs, Volume= 25,634 cf, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

	Area (sf)	CN	Adj	Description
*	111,892	78		Meadow, non-grazed, HSG D (LANDFILL CAP)
*	5,200	98		Unconnected pavement, HSG D (ballast blocks)
	117,092	79	78	Weighted Average, UI Adjusted
	111,892			95.56% Pervious Area
	5,200			4.44% Impervious Area
	5,200			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.4	263	0.1900	3.05		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
11.2	363	Total			

Subcatchment B1: SUB-B1



Summary for Subcatchment B2: SUB-B2

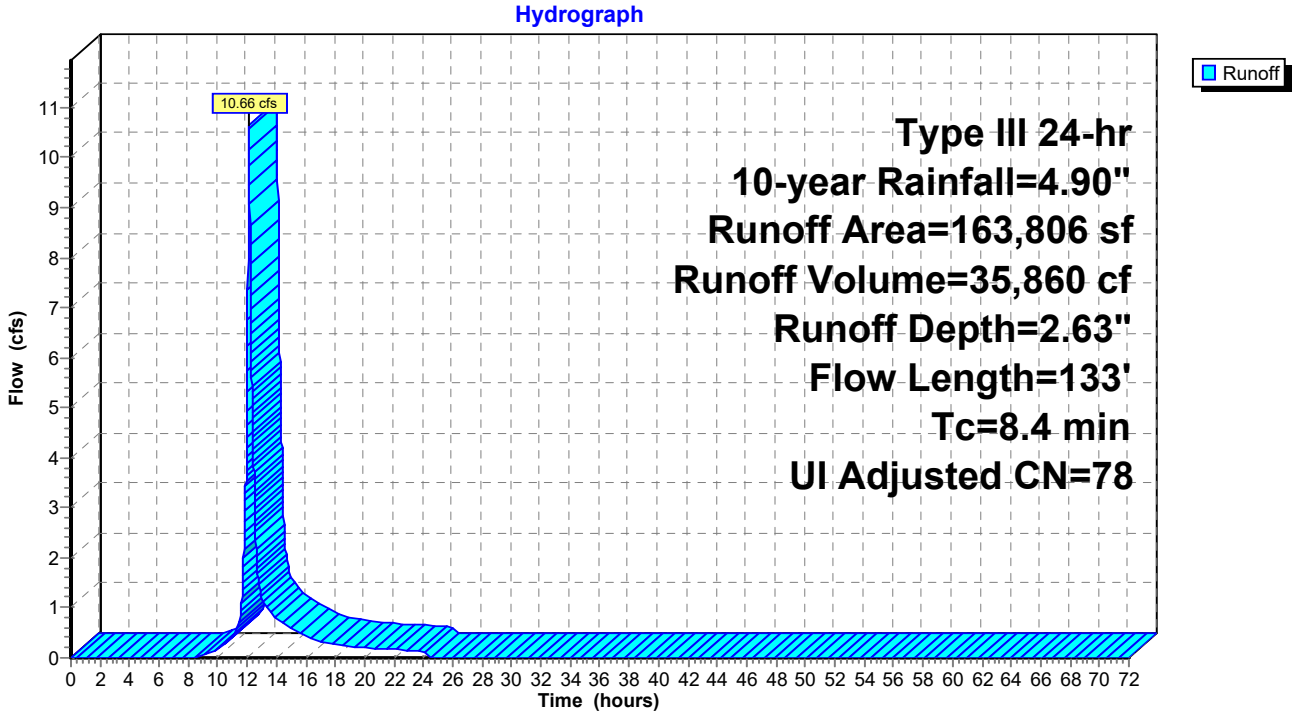
Runoff = 10.66 cfs @ 12.12 hrs, Volume= 35,860 cf, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

	Area (sf)	CN	Adj	Description
*	151,343	78		Meadow, non-grazed, HSG D (LANDFILL CAP)
	6,583	77		Woods, Good, HSG D
*	919	98		Unconnected pavement, HSG D (Eq. Pad)
	586	96		Gravel surface, HSG D
*	4,375	98		Unconnected pavement, HSG D (ballast blocks)
	163,806	79	78	Weighted Average, UI Adjusted
	158,512			96.77% Pervious Area
	5,294			3.23% Impervious Area
	5,294			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0800	0.20		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
0.2	33	0.1300	2.52		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
8.4	133	Total			

Subcatchment B2: SUB-B2



Summary for Subcatchment B3: SUB-B3

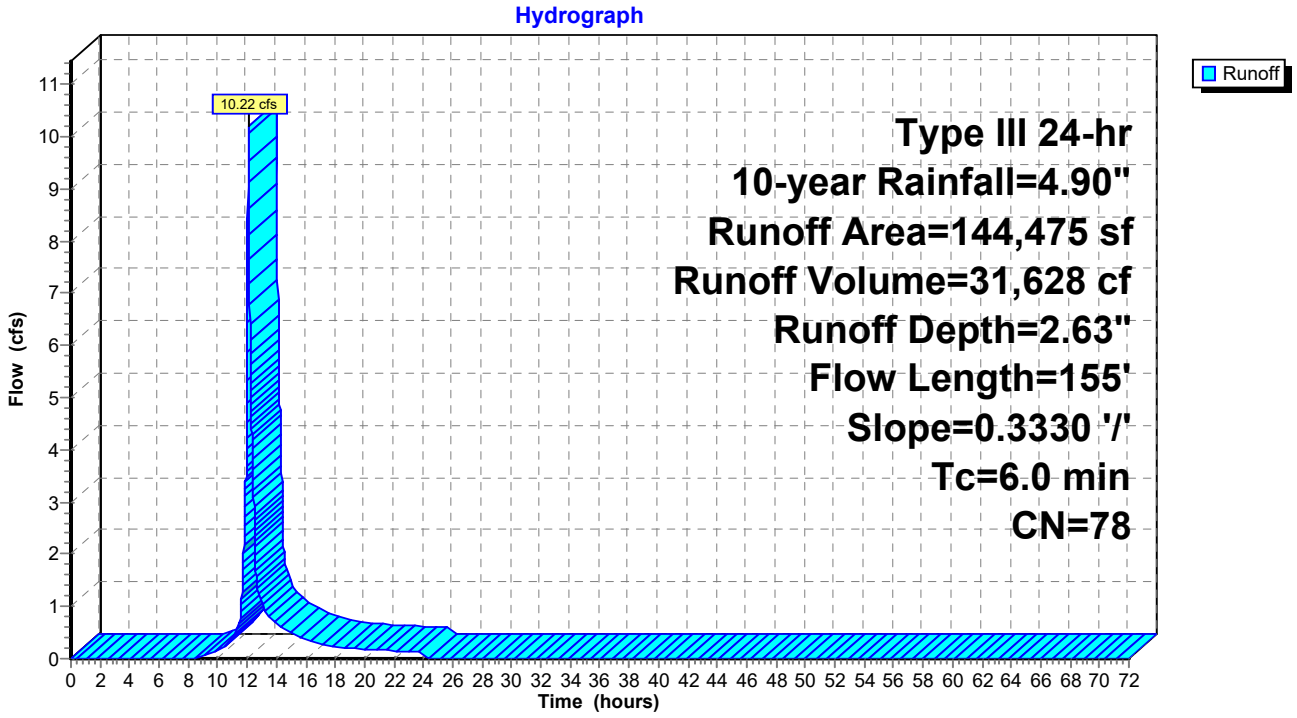
Runoff = 10.22 cfs @ 12.09 hrs, Volume= 31,628 cf, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.90"

	Area (sf)	CN	Description
*	104,352	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	40,123	77	Woods, Good, HSG D
	144,475	78	Weighted Average
	144,475		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.3330	0.36		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.2	55	0.3330	4.04		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
4.8	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment B3: SUB-B3

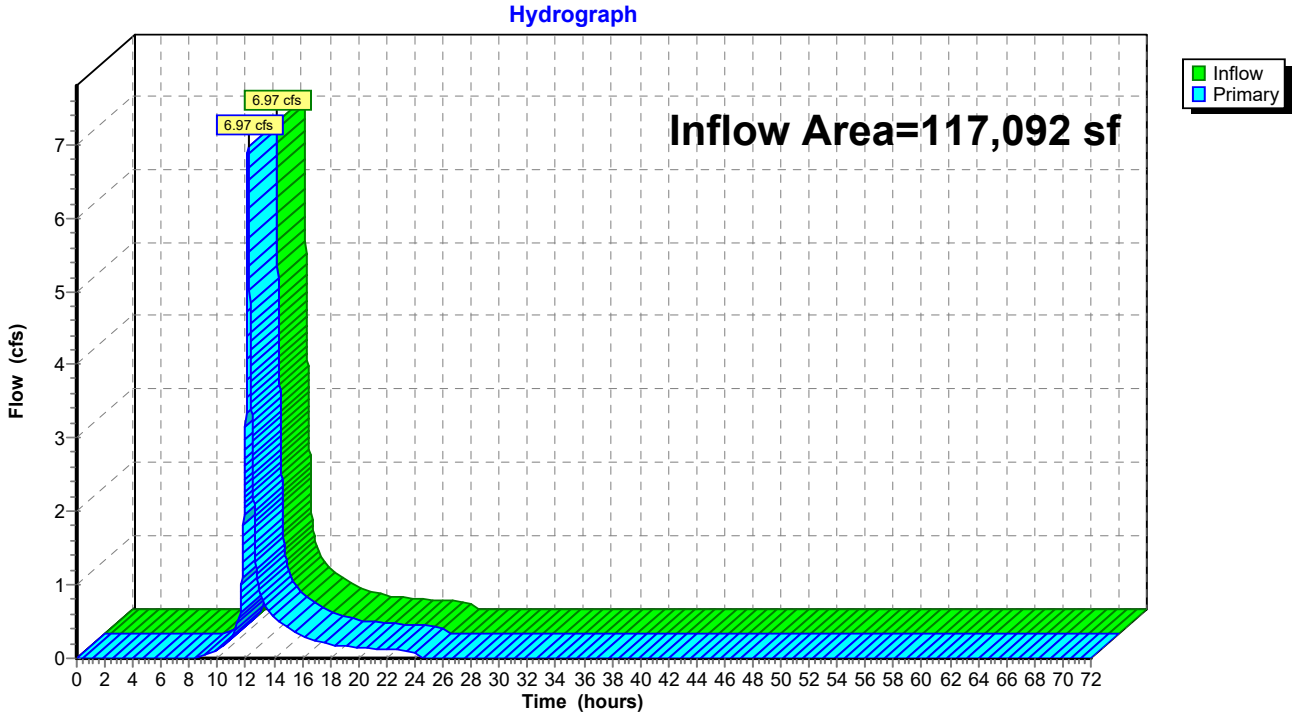


Summary for Pond B1.1: SWALE

Inflow Area = 117,092 sf, 4.44% Impervious, Inflow Depth = 2.63" for 10-year event
Inflow = 6.97 cfs @ 12.16 hrs, Volume= 25,634 cf
Primary = 6.97 cfs @ 12.16 hrs, Volume= 25,634 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B1.1: SWALE

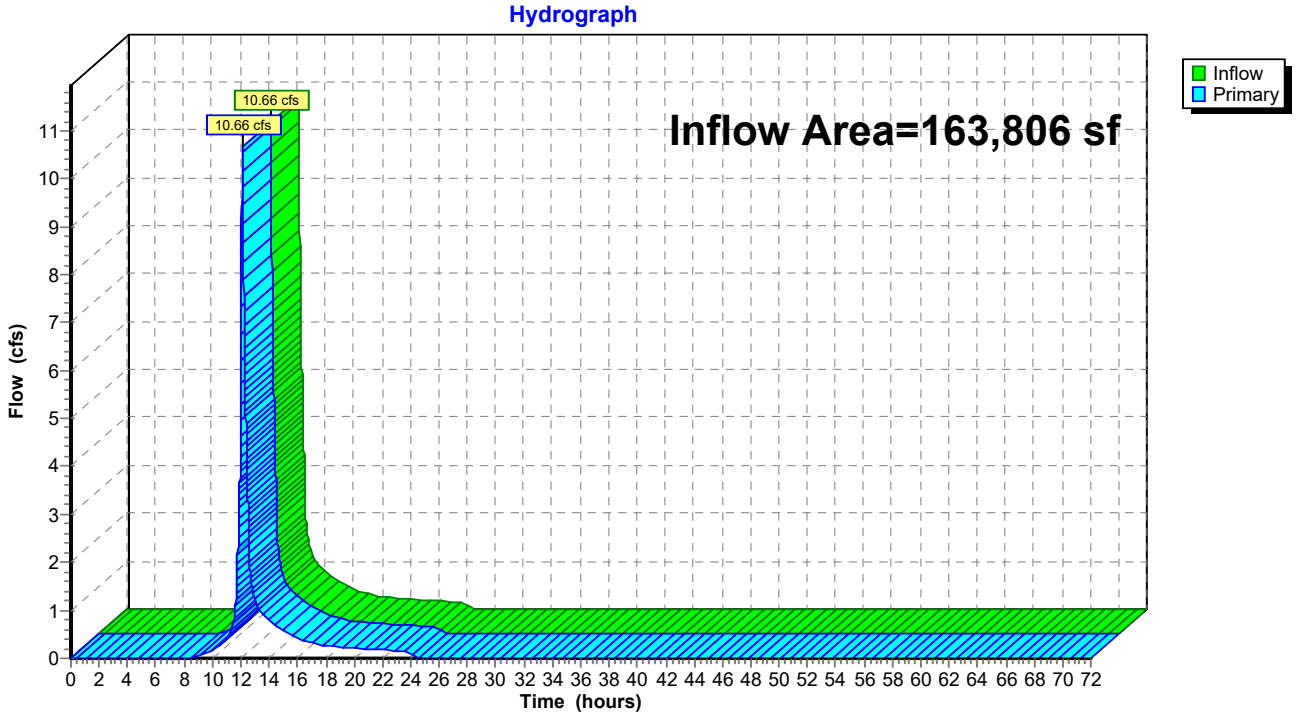


Summary for Pond B2.1: SWALE

Inflow Area = 163,806 sf, 3.23% Impervious, Inflow Depth = 2.63" for 10-year event
Inflow = 10.66 cfs @ 12.12 hrs, Volume= 35,860 cf
Primary = 10.66 cfs @ 12.12 hrs, Volume= 35,860 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B2.1: SWALE

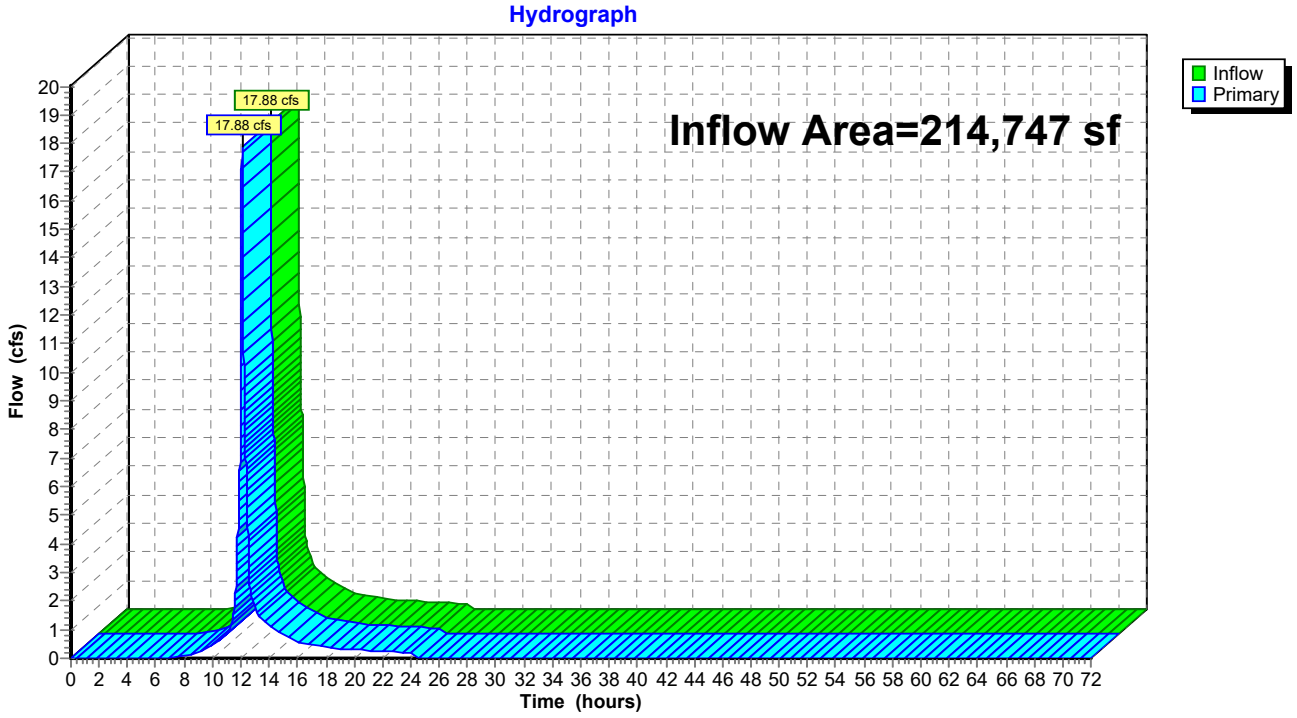


Summary for Link A: A

Inflow Area = 214,747 sf, 24.10% Impervious, Inflow Depth = 3.18" for 10-year event
Inflow = 17.88 cfs @ 12.09 hrs, Volume= 56,891 cf
Primary = 17.88 cfs @ 12.09 hrs, Volume= 56,891 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: A

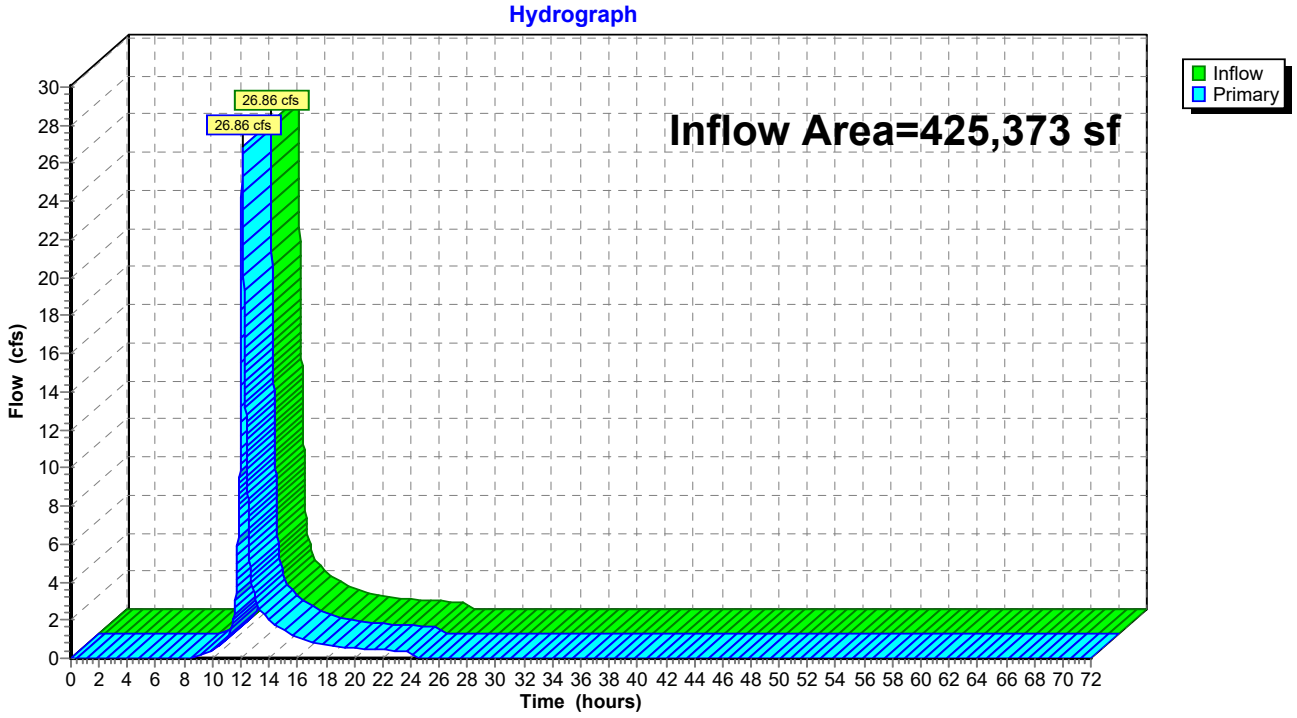


Summary for Link B: B

Inflow Area = 425,373 sf, 2.47% Impervious, Inflow Depth = 2.63" for 10-year event
Inflow = 26.86 cfs @ 12.11 hrs, Volume= 93,122 cf
Primary = 26.86 cfs @ 12.11 hrs, Volume= 93,122 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: B



Summary for Subcatchment A1: SUB-A1

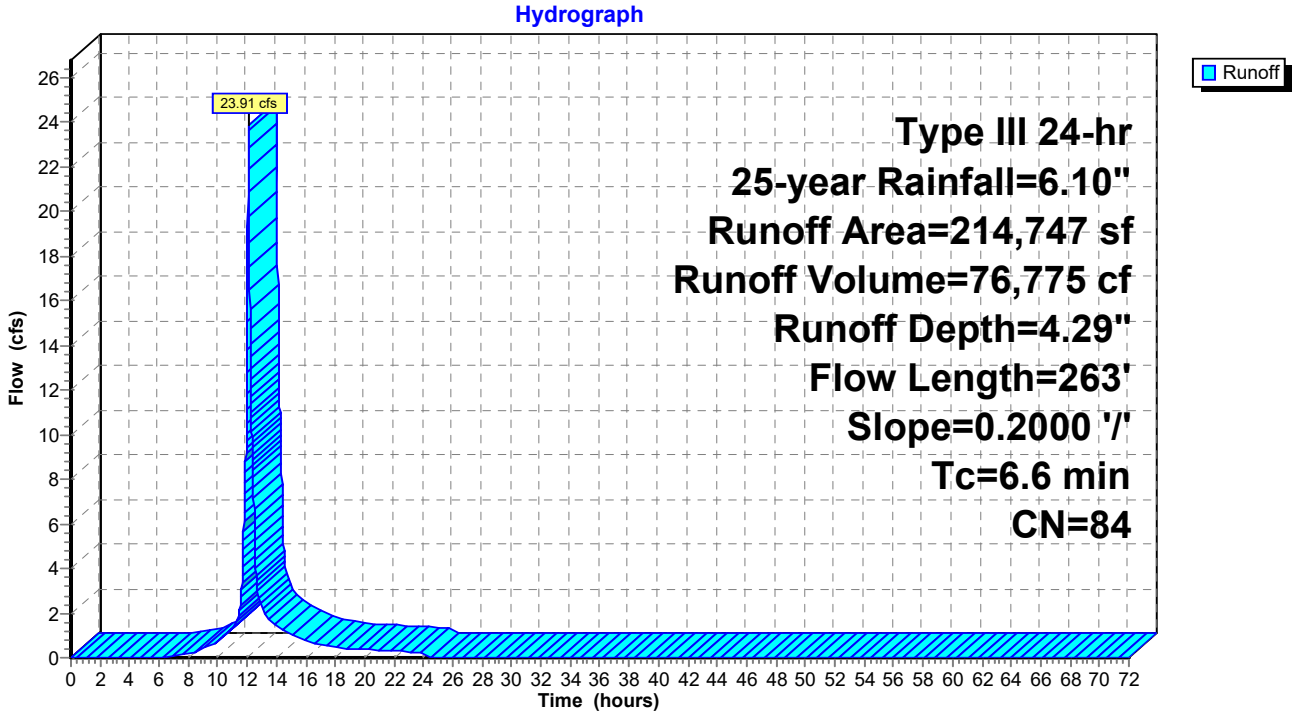
Runoff = 23.91 cfs @ 12.09 hrs, Volume= 76,775 cf, Depth= 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

	Area (sf)	CN	Description
	46,532	98	Paved parking, HSG D
	5,228	98	Roofs, HSG D
*	119,943	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	31,817	78	Meadow, non-grazed, HSG D
	11,227	96	Gravel surface, HSG A
	214,747	84	Weighted Average
	162,987		75.90% Pervious Area
	51,760		24.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	100	0.2000	0.29		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.9	163	0.2000	3.13		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
6.6	263	Total			

Subcatchment A1: SUB-A1



Summary for Subcatchment B1: SUB-B1

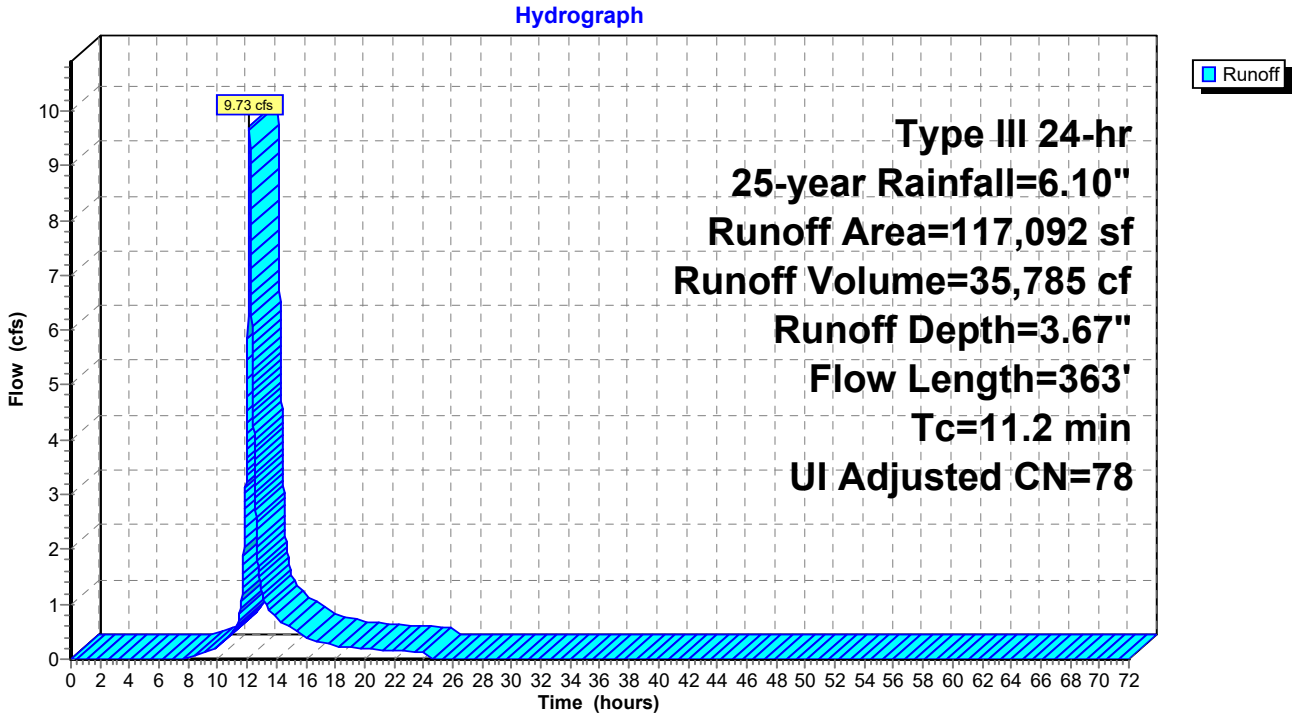
Runoff = 9.73 cfs @ 12.16 hrs, Volume= 35,785 cf, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

	Area (sf)	CN	Adj	Description
*	111,892	78		Meadow, non-grazed, HSG D (LANDFILL CAP)
*	5,200	98		Unconnected pavement, HSG D (ballast blocks)
	117,092	79	78	Weighted Average, UI Adjusted
	111,892			95.56% Pervious Area
	5,200			4.44% Impervious Area
	5,200			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.4	263	0.1900	3.05		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
11.2	363	Total			

Subcatchment B1: SUB-B1



Summary for Subcatchment B2: SUB-B2

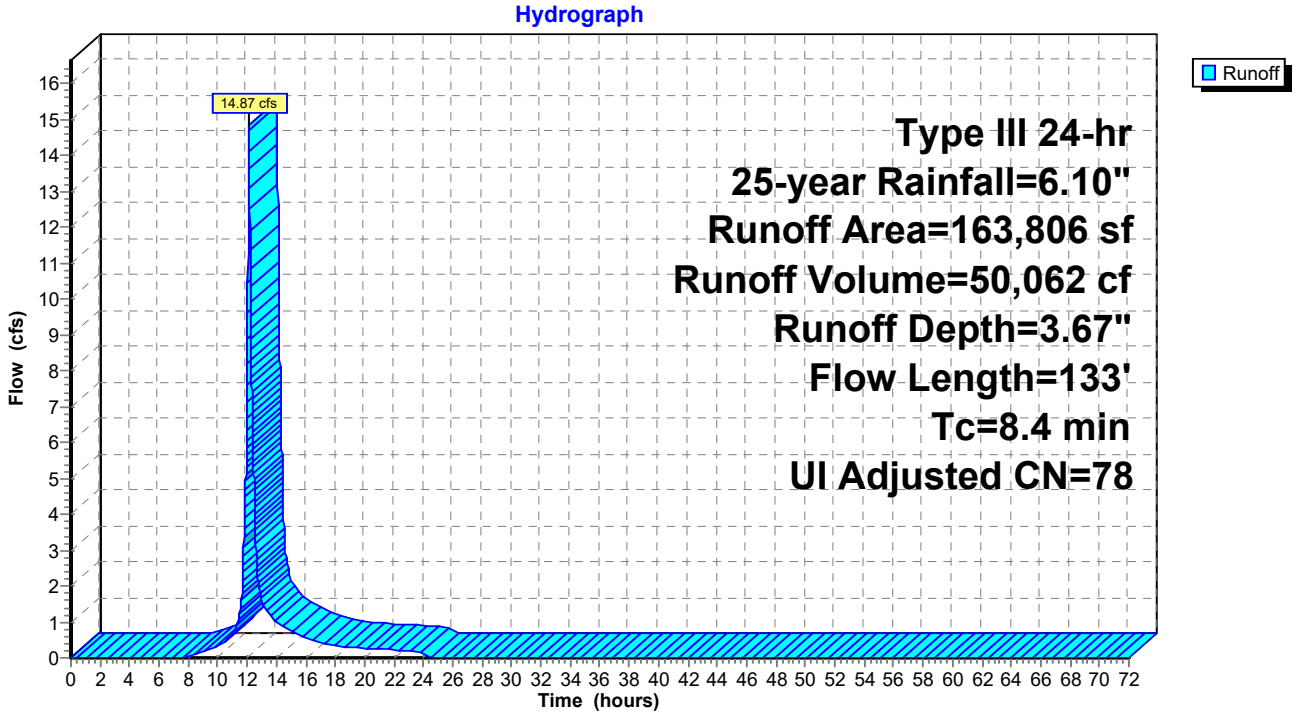
Runoff = 14.87 cfs @ 12.12 hrs, Volume= 50,062 cf, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

	Area (sf)	CN	Adj	Description
*	151,343	78		Meadow, non-grazed, HSG D (LANDFILL CAP)
	6,583	77		Woods, Good, HSG D
*	919	98		Unconnected pavement, HSG D (Eq. Pad)
	586	96		Gravel surface, HSG D
*	4,375	98		Unconnected pavement, HSG D (ballast blocks)
	163,806	79	78	Weighted Average, UI Adjusted
	158,512			96.77% Pervious Area
	5,294			3.23% Impervious Area
	5,294			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0800	0.20		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
0.2	33	0.1300	2.52		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
8.4	133	Total			

Subcatchment B2: SUB-B2



Summary for Subcatchment B3: SUB-B3

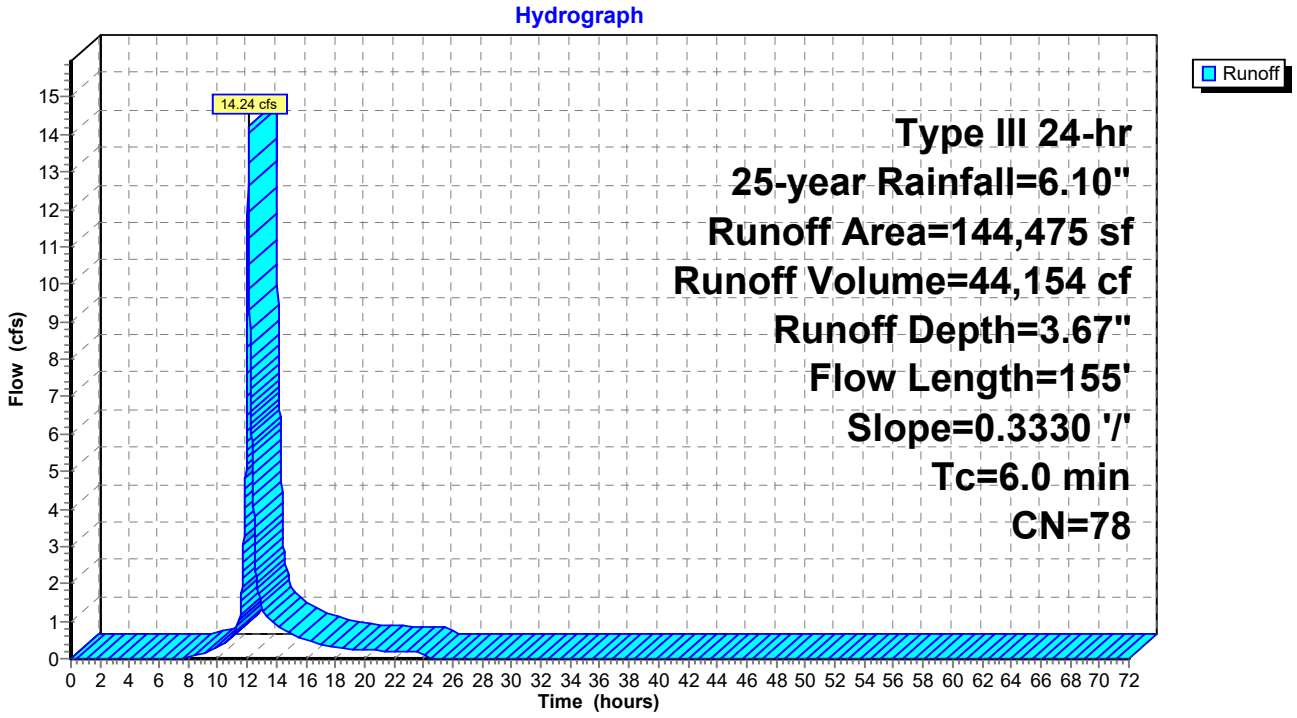
Runoff = 14.24 cfs @ 12.09 hrs, Volume= 44,154 cf, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.10"

	Area (sf)	CN	Description
*	104,352	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	40,123	77	Woods, Good, HSG D
	144,475	78	Weighted Average
	144,475		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.3330	0.36		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.2	55	0.3330	4.04		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
4.8	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment B3: SUB-B3

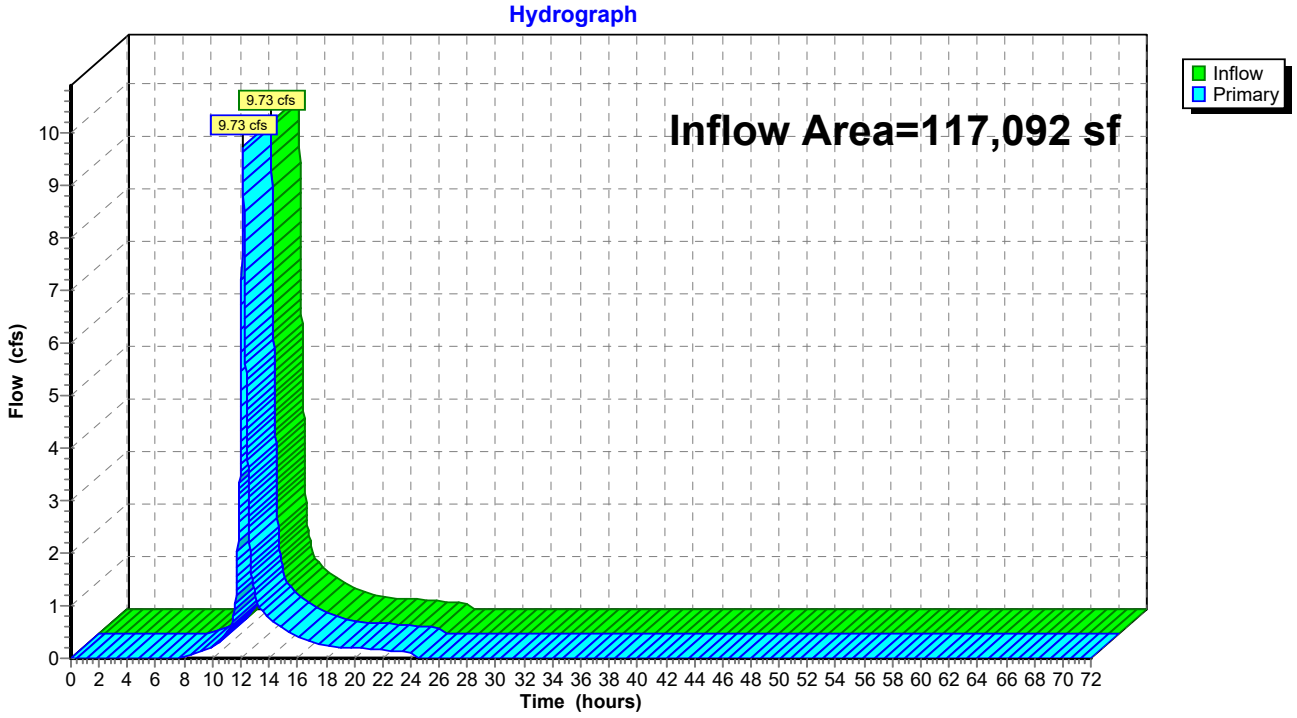


Summary for Pond B1.1: SWALE

Inflow Area = 117,092 sf, 4.44% Impervious, Inflow Depth = 3.67" for 25-year event
Inflow = 9.73 cfs @ 12.16 hrs, Volume= 35,785 cf
Primary = 9.73 cfs @ 12.16 hrs, Volume= 35,785 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B1.1: SWALE

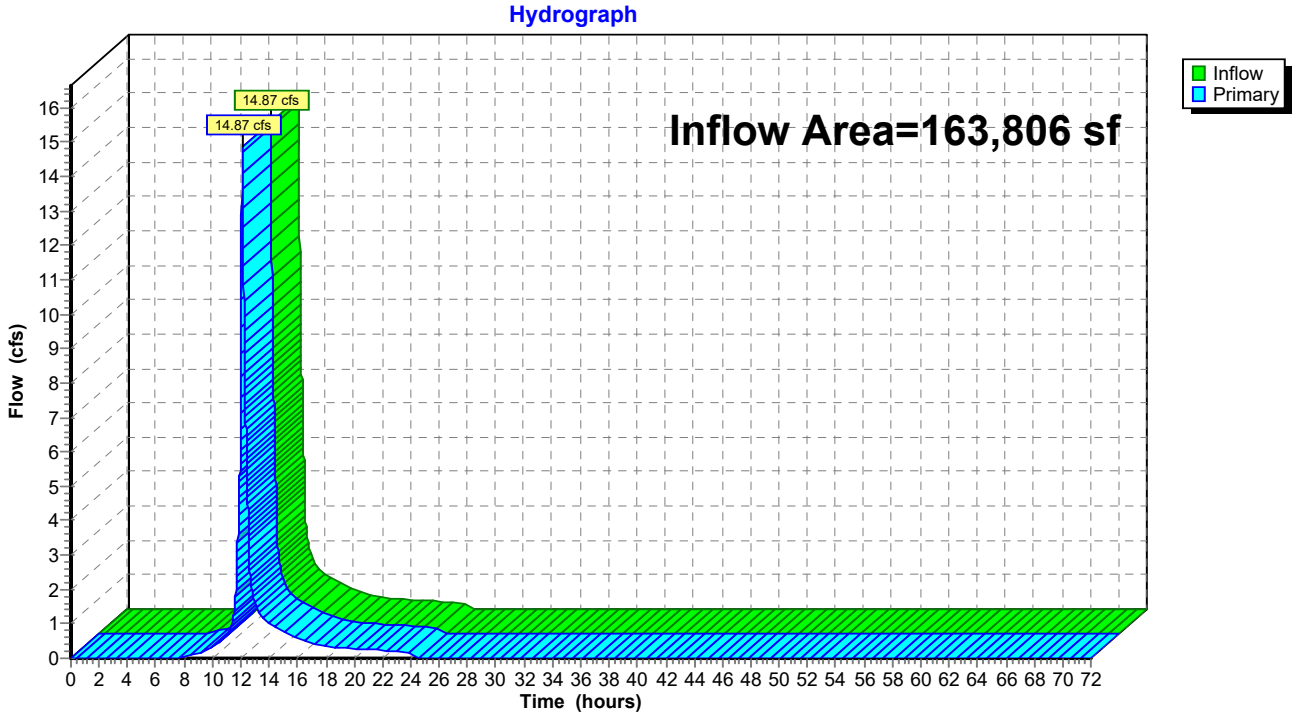


Summary for Pond B2.1: SWALE

Inflow Area = 163,806 sf, 3.23% Impervious, Inflow Depth = 3.67" for 25-year event
Inflow = 14.87 cfs @ 12.12 hrs, Volume= 50,062 cf
Primary = 14.87 cfs @ 12.12 hrs, Volume= 50,062 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B2.1: SWALE

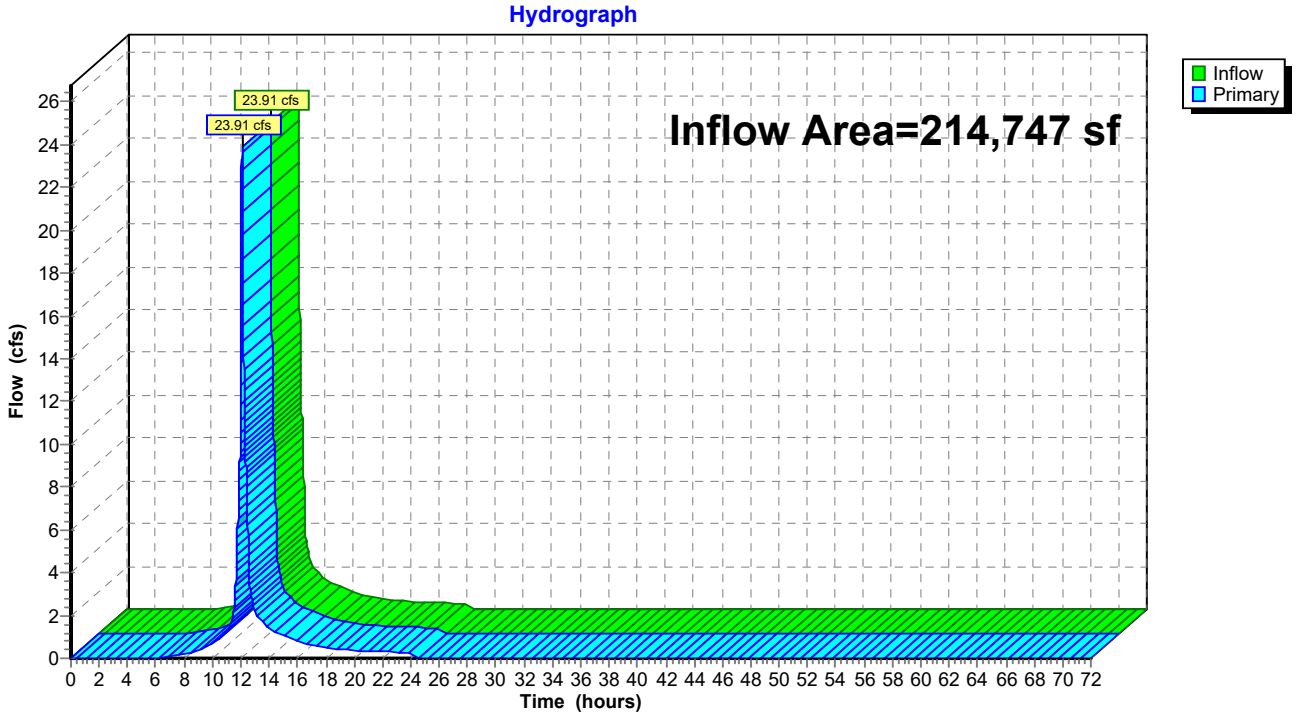


Summary for Link A: A

Inflow Area = 214,747 sf, 24.10% Impervious, Inflow Depth = 4.29" for 25-year event
Inflow = 23.91 cfs @ 12.09 hrs, Volume= 76,775 cf
Primary = 23.91 cfs @ 12.09 hrs, Volume= 76,775 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: A

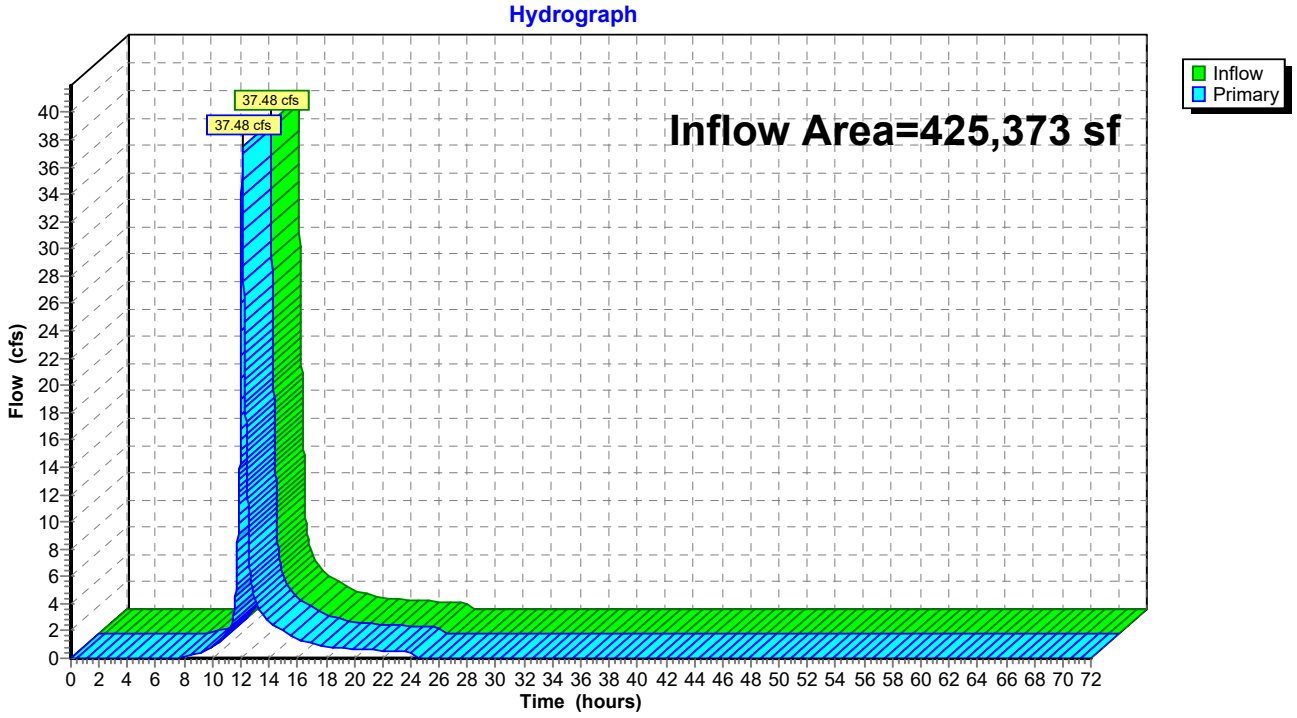


Summary for Link B: B

Inflow Area = 425,373 sf, 2.47% Impervious, Inflow Depth = 3.67" for 25-year event
Inflow = 37.48 cfs @ 12.11 hrs, Volume= 130,000 cf
Primary = 37.48 cfs @ 12.11 hrs, Volume= 130,000 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: B



Summary for Subcatchment A1: SUB-A1

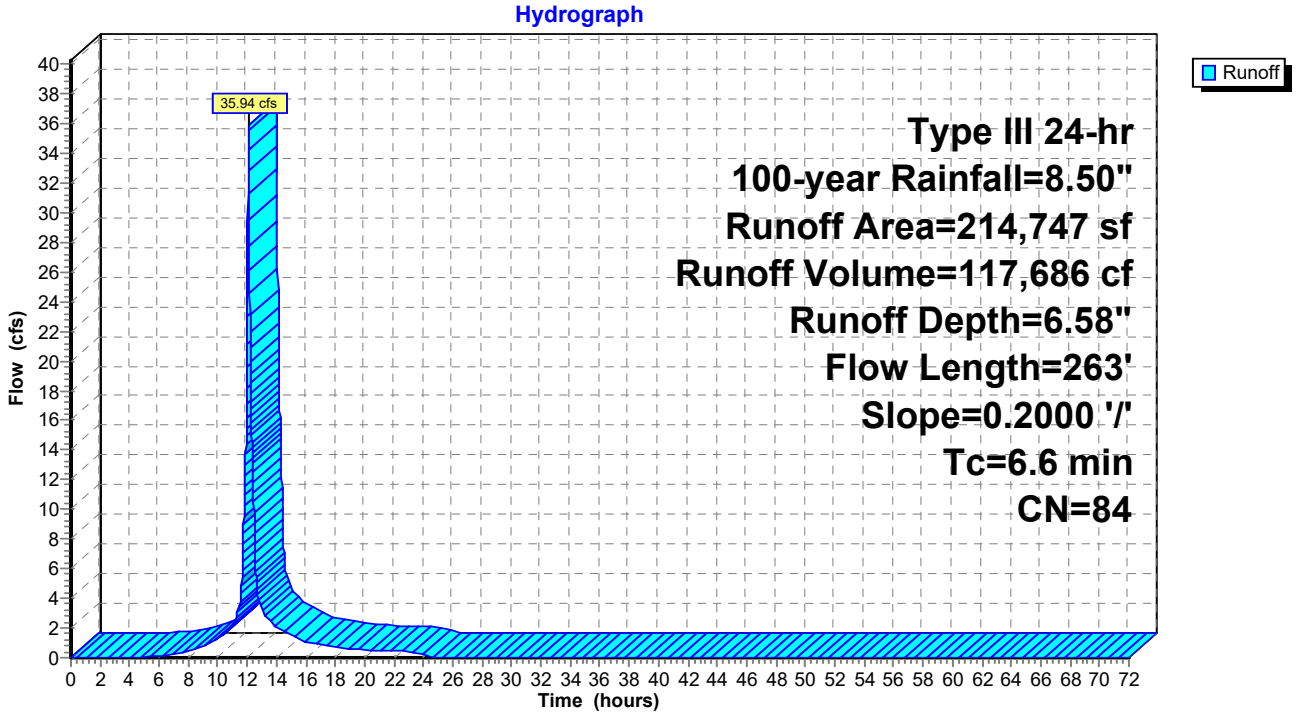
Runoff = 35.94 cfs @ 12.09 hrs, Volume= 117,686 cf, Depth= 6.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.50"

	Area (sf)	CN	Description
	46,532	98	Paved parking, HSG D
	5,228	98	Roofs, HSG D
*	119,943	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	31,817	78	Meadow, non-grazed, HSG D
	11,227	96	Gravel surface, HSG A
	214,747	84	Weighted Average
	162,987		75.90% Pervious Area
	51,760		24.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	100	0.2000	0.29		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.9	163	0.2000	3.13		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
6.6	263	Total			

Subcatchment A1: SUB-A1



Summary for Subcatchment B1: SUB-B1

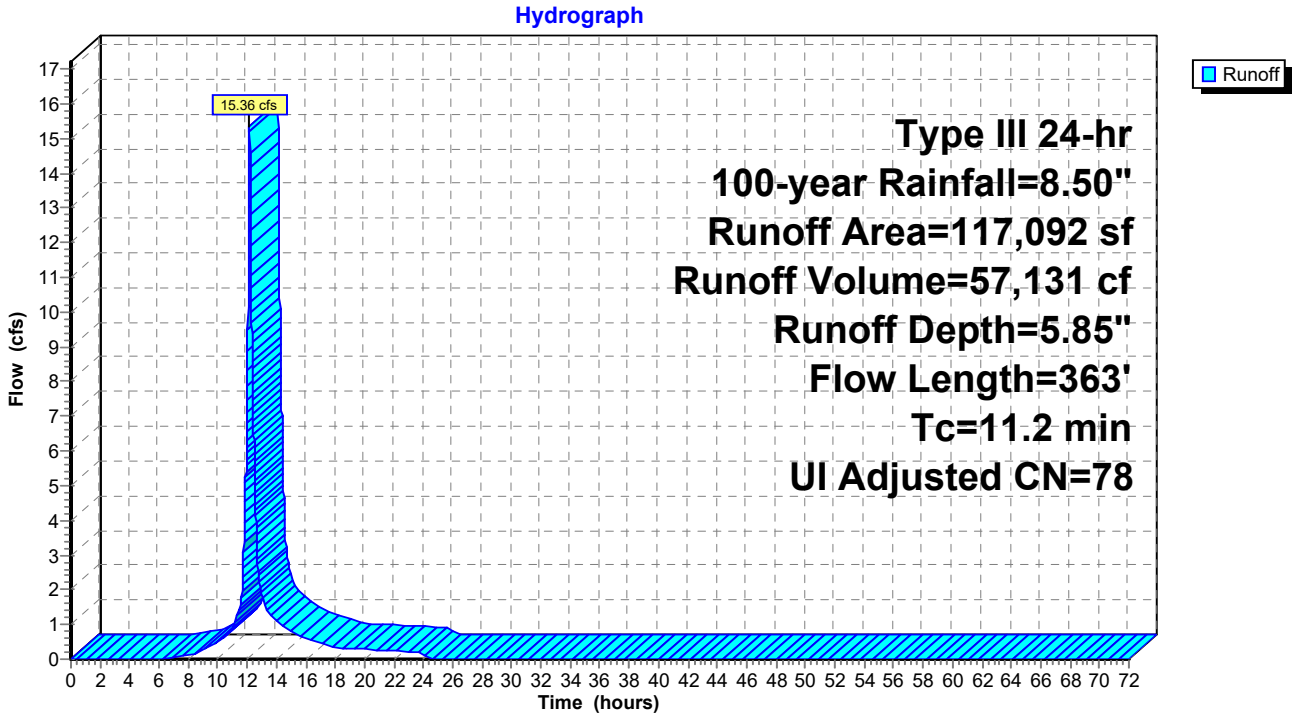
Runoff = 15.36 cfs @ 12.15 hrs, Volume= 57,131 cf, Depth= 5.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.50"

	Area (sf)	CN	Adj	Description
*	111,892	78		Meadow, non-grazed, HSG D (LANDFILL CAP)
*	5,200	98		Unconnected pavement, HSG D (ballast blocks)
	117,092	79	78	Weighted Average, UI Adjusted
	111,892			95.56% Pervious Area
	5,200			4.44% Impervious Area
	5,200			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.8	100	0.0500	0.17		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.4	263	0.1900	3.05		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
11.2	363	Total			

Subcatchment B1: SUB-B1



Summary for Subcatchment B2: SUB-B2

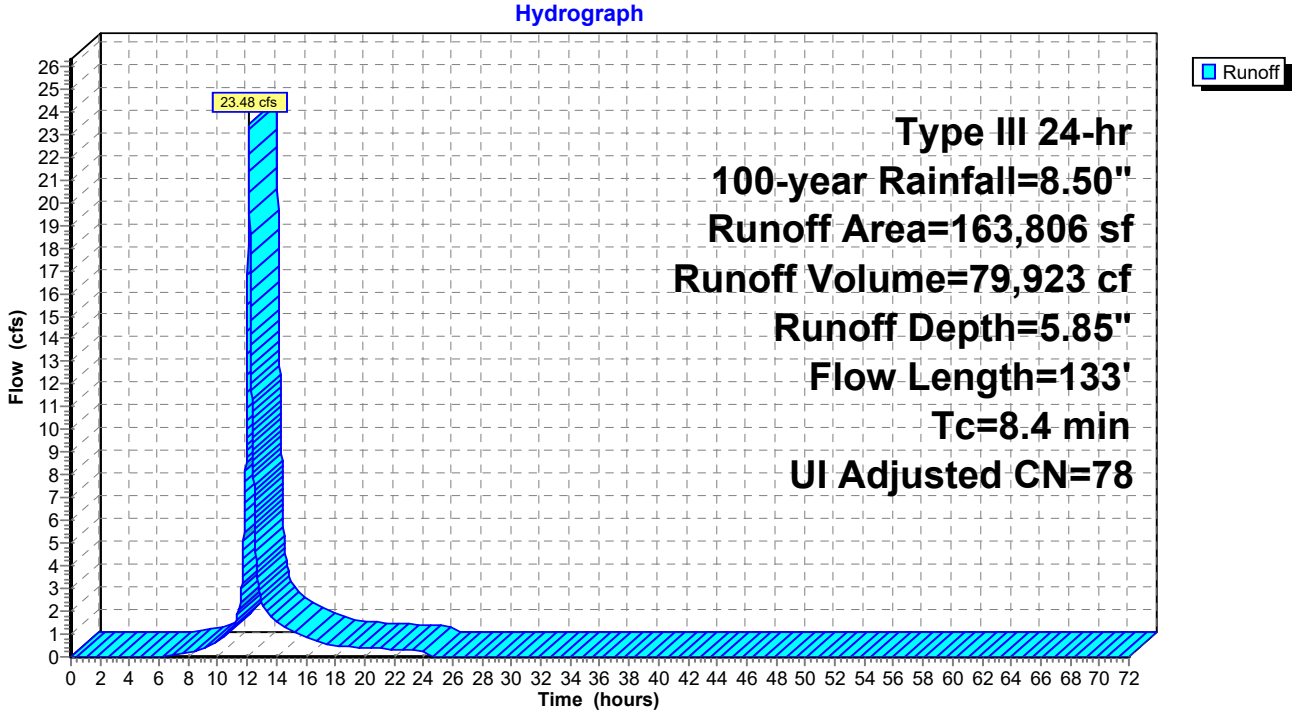
Runoff = 23.48 cfs @ 12.12 hrs, Volume= 79,923 cf, Depth= 5.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.50"

	Area (sf)	CN	Adj	Description
*	151,343	78		Meadow, non-grazed, HSG D (LANDFILL CAP)
	6,583	77		Woods, Good, HSG D
*	919	98		Unconnected pavement, HSG D (Eq. Pad)
	586	96		Gravel surface, HSG D
*	4,375	98		Unconnected pavement, HSG D (ballast blocks)
	163,806	79	78	Weighted Average, UI Adjusted
	158,512			96.77% Pervious Area
	5,294			3.23% Impervious Area
	5,294			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.0800	0.20		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
0.2	33	0.1300	2.52		**Shallow Concentrated Flow, Shallow 1** Short Grass Pasture Kv= 7.0 fps
8.4	133	Total			

Subcatchment B2: SUB-B2



Summary for Subcatchment B3: SUB-B3

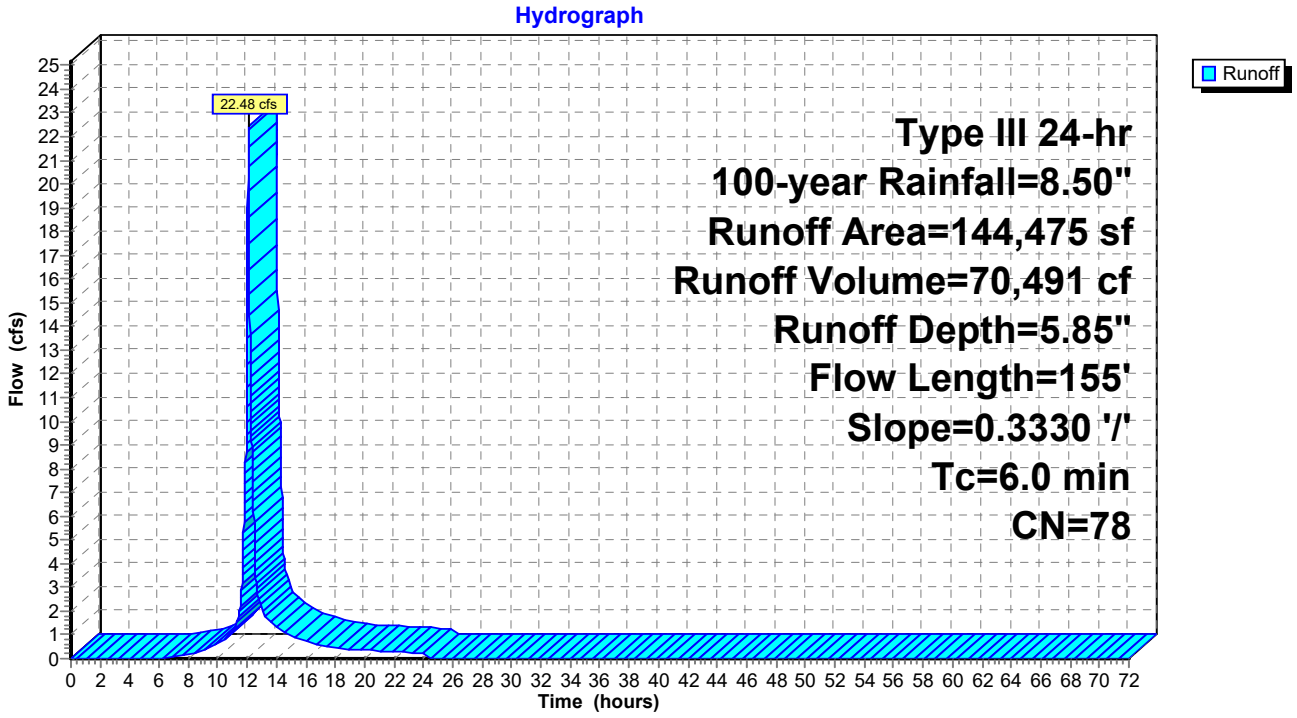
Runoff = 22.48 cfs @ 12.09 hrs, Volume= 70,491 cf, Depth= 5.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.50"

	Area (sf)	CN	Description
*	104,352	78	Meadow, non-grazed, HSG D (LANDFILL CAP)
	40,123	77	Woods, Good, HSG D
	144,475	78	Weighted Average
	144,475		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	100	0.3330	0.36		**Sheet Flow, Sheet flow** Grass: Dense n= 0.240 P2= 3.23"
0.2	55	0.3330	4.04		**Shallow Concentrated Flow, SCF** Short Grass Pasture Kv= 7.0 fps
4.8	155	Total, Increased to minimum Tc = 6.0 min			

Subcatchment B3: SUB-B3

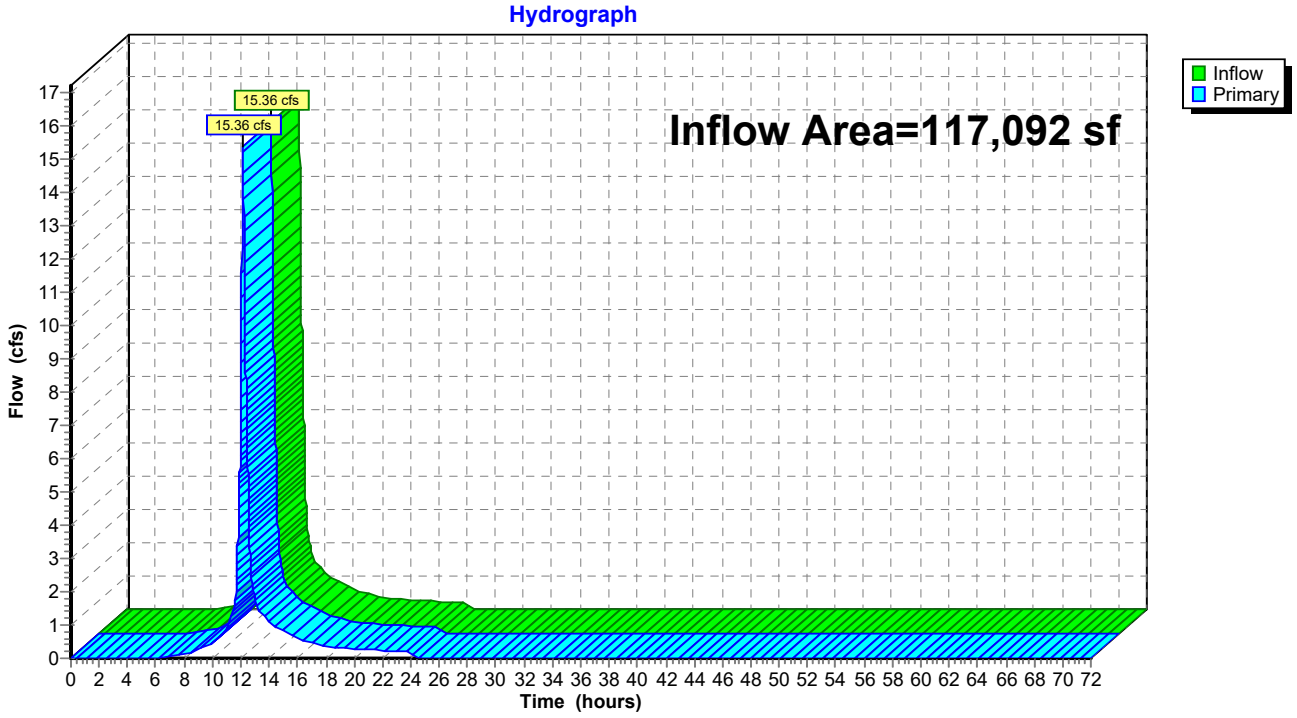


Summary for Pond B1.1: SWALE

Inflow Area = 117,092 sf, 4.44% Impervious, Inflow Depth = 5.85" for 100-year event
Inflow = 15.36 cfs @ 12.15 hrs, Volume= 57,131 cf
Primary = 15.36 cfs @ 12.15 hrs, Volume= 57,131 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B1.1: SWALE

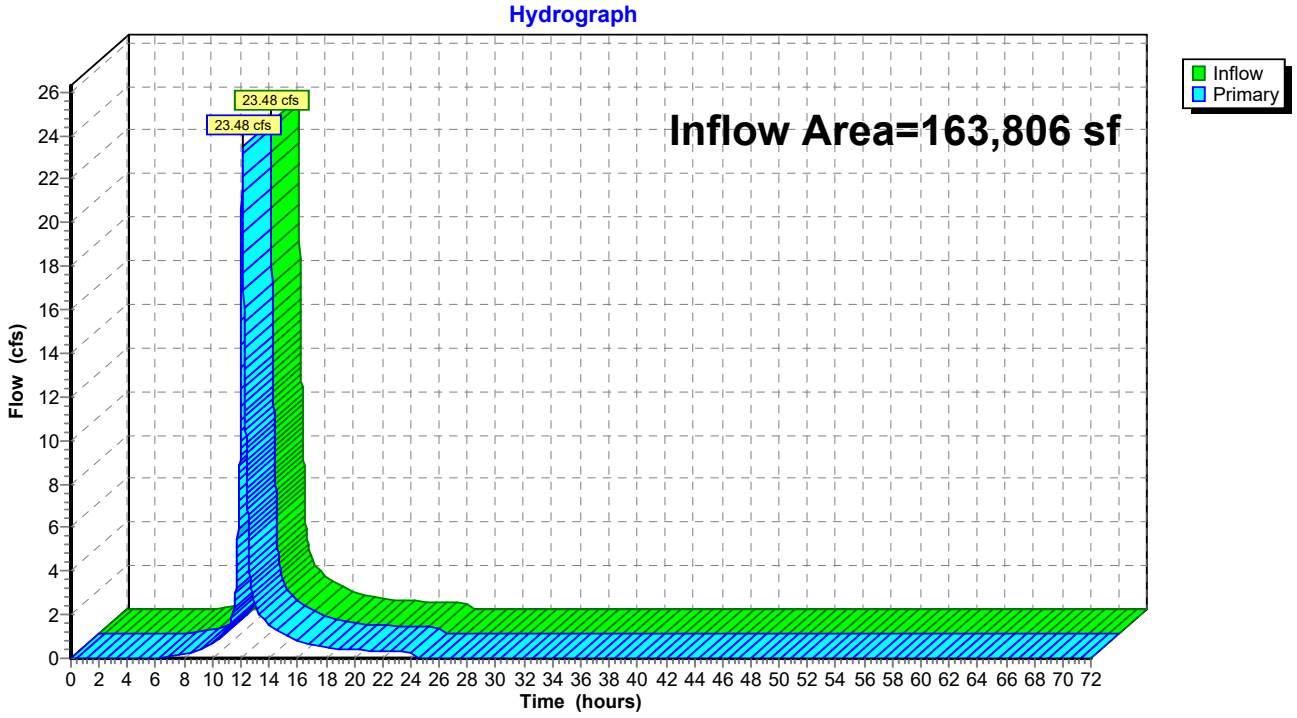


Summary for Pond B2.1: SWALE

Inflow Area = 163,806 sf, 3.23% Impervious, Inflow Depth = 5.85" for 100-year event
Inflow = 23.48 cfs @ 12.12 hrs, Volume= 79,923 cf
Primary = 23.48 cfs @ 12.12 hrs, Volume= 79,923 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Pond B2.1: SWALE

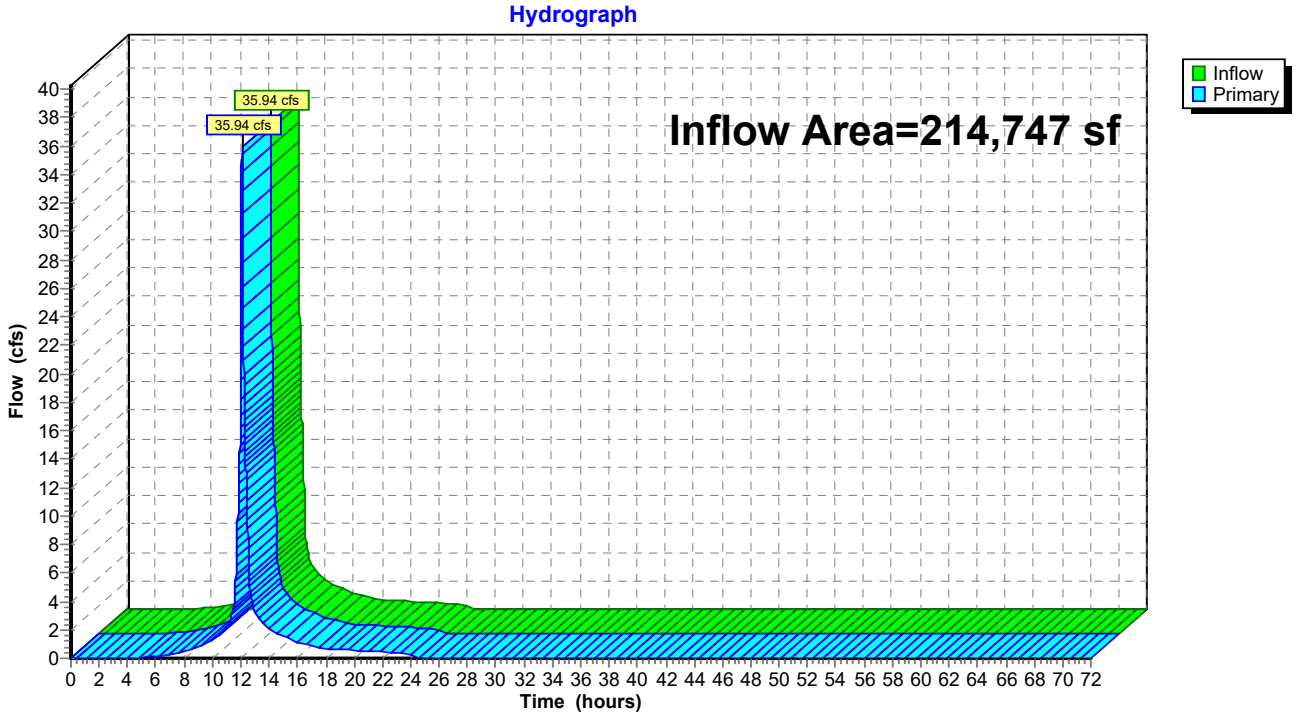


Summary for Link A: A

Inflow Area = 214,747 sf, 24.10% Impervious, Inflow Depth = 6.58" for 100-year event
Inflow = 35.94 cfs @ 12.09 hrs, Volume= 117,686 cf
Primary = 35.94 cfs @ 12.09 hrs, Volume= 117,686 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: A

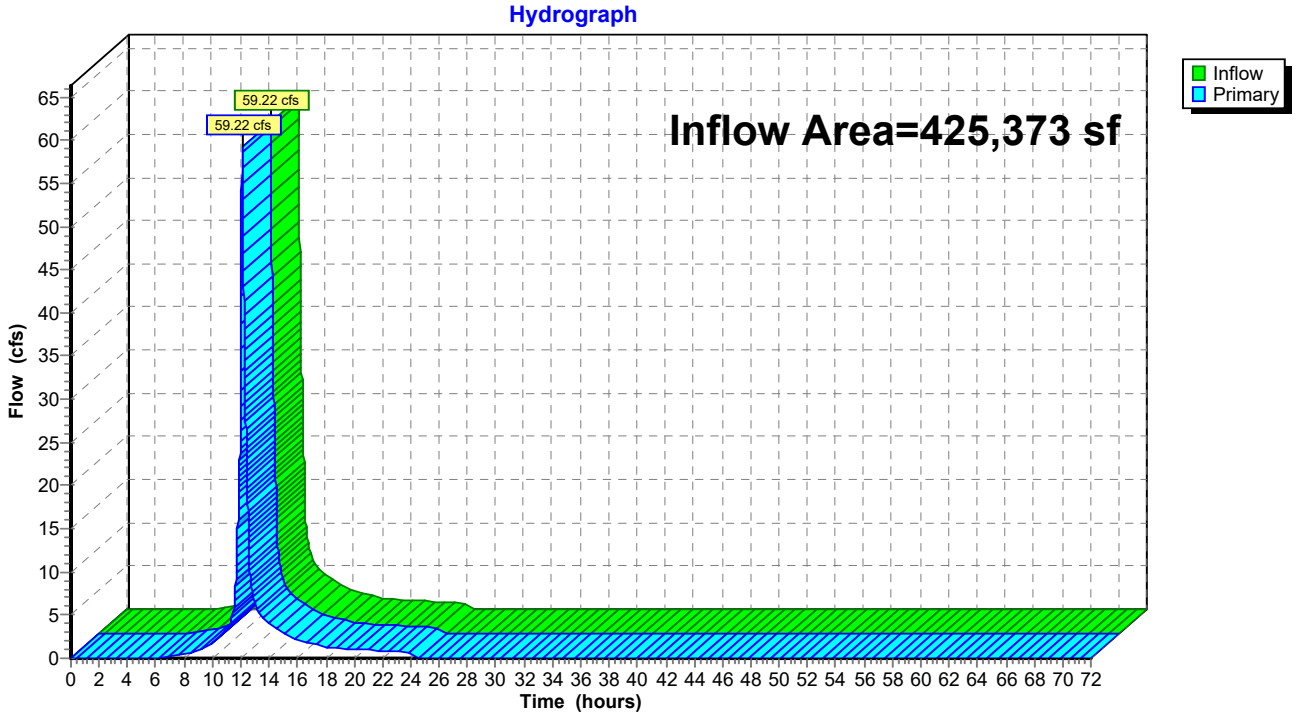


Summary for Link B: B

Inflow Area = 425,373 sf, 2.47% Impervious, Inflow Depth = 5.85" for 100-year event
Inflow = 59.22 cfs @ 12.11 hrs, Volume= 207,546 cf
Primary = 59.22 cfs @ 12.11 hrs, Volume= 207,546 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link B: B



APPENDIX J - STORMWATER NARRATIVE

ATTACHMENT D – Long Term Pollution Prevention Plan

Long Term Pollution Prevention Plan

This Long Term Pollution Prevention Plan is provided to identify the proper procedures and practices for source control and pollution prevention.

Storage and Handling of Oil and other Hazardous Materials

There will be no hazardous materials stored or handled onsite with the exception of fuel for construction equipment. Fuel will be stored in approved storage containers, outside of wetland resource areas and associated buffer zones.

Operation and Maintenance of Stormwater Control Structures

The Town of Millbury will remain owner and operator of the existing stormwater BMPs. Millbury Landfill Solar LLC will maintain temporary controls for the site during construction as outlined in the Construction Period Erosion and Sedimentation Control Plan and Operation and Maintenance Plan Included in Attachment E.

Landscaping

The landscaped areas will be maintained by Millbury Landfill Solar LLC and the Town of Millbury as outlined in the lease agreement between Ameresco, Inc. and the Town of Millbury.

Septic System

There will be no septic system or wastewater produced on site.

Non-Hazardous Waste Management/Good Housekeeping Practices

All non-hazardous waste is to be stored in designated trash or recycling containers onsite for periodic collection by a hired trash collecting vendor or Contractor during construction. Following construction, all non-hazardous waste should not be stored onsite. Millbury Landfill Solar LLC maintenance staff should inspect the site during maintenance visits and if trash is observed, it should be collected and removed from the site.

Prohibition of Illicit Discharges

Illicit discharges to the on-site stormwater management system are strictly prohibited. Illicit discharges are defined as any direct or indirect non-stormwater discharge to the on-site stormwater system. There are no existing illicit discharges associated with the project.

APPENDIX J - STORMWATER NARRATIVE

ATTACHMENT E – Construction Period Erosion and Sedimentation Control Plan and Operation and Maintenance Plan

SECTION 1: Introduction

The proposed project is located on Town of Millbury property. Parcel 24-19 is approximately 19.99 acres and consists of a closed landfill cap adjacent to the Town's transfer station. The project applicant proposes construction of a ground mounted solar and battery energy storage project encompassing approximately 4.7 acres of the approximately 19.99 acre site.

As part of this project, this "Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan" has been created to minimize erosion and sedimentation during the implementation of the project.

SECTION 2: Construction Period Pollution Prevention Measures

Best Management Practices (BMPs) will be utilized as Construction Period Pollution Prevention Measures to minimize erosion and sedimentation. The objectives of the BMPs for construction activity are to minimize the disturbed areas, stabilize any disturbed areas, control the site perimeter, and retain sediment. Both erosion and sedimentation controls and non-stormwater best management measures will be used to minimize site disturbance and ensure compliance with the performance standards of the Wetlands Protection Act and Stormwater Standards. Measures will be taken to minimize the area disturbed by construction activities to reduce the potential for soil erosion and stormwater pollution problems. In addition, good housekeeping measures will be followed for the day-to-day operation of the construction site under the control of the contractor to minimize the impact of construction. This section describes the control practices that will be in place during construction activities. Recommended control practices will comply with the standards set in the MA DEP Stormwater Policy Handbook.

2.1 Minimize Disturbed Area and Protect Natural Features and Soil

In order to minimize disturbed areas, work will be completed within well-defined work limits. These work limits are shown on the construction plans. The Contractor will be responsible to make sure that their workers and any subcontractors know the proper work limits and do not extend their work into the undisturbed areas. The protective measures are described in more detail in the following sections.

2.2 Control Stormwater Flowing onto and through the Project

Construction areas limits will be lined with straw wattle sediment barriers. The barriers will be inspected at least once every 7 calendar days and within 24 hours of a storm event of 0.25 inches or greater, and accumulated silt will be removed as needed.

2.3 Stabilize Soils

The Contractor should limit the area of land which is exposed and unvegetated during construction. In areas where the period of exposure will be greater than two (2) months, mulching, the use of erosion control mats, or other protective measures will be provided as specified on the plans.

The Contractor should follow the seeding requirements outlined on the plans and will be responsible for maintaining the seeded areas until final acceptance is received. Final acceptance after 90 days following construction, or until the site reaches 70% stabilization, whichever is longer.

2.4 Proper Storage and Cover of Any Stockpiles

The location of the Contractor's storage areas for equipment and/or materials should be upon cleared portions of the job site or areas to be cleared as a part of this project, outside of wetlands and wetland buffer areas.

Adequate measures for erosion and sediment control such as the placement of straw wattle sediment barriers around the downstream perimeter of stockpiles will be employed to protect any downstream areas from siltation.

2.5 Perimeter Controls and Sediment Barriers

Straw wattle as described in Section 5 will be utilized to ensure that sedimentation does not occur outside the perimeter of the work area.

2.6 Storm Drain Inlet Protection

There are no storm drains in the work area.

2.7 Retain Sediment On-Site

The Contractor will be responsible to monitor erosion control measures. Whenever necessary, the Contractor will clear sediment from the straw wattle sediment barriers that have been silted up during construction. Inspections must be documented using the attached Monitoring Form.

2.8 Material Handling and Waste Management

Materials stored on-site will be stored in a neat, orderly manner in appropriate containers. Materials will be kept in their original containers with the original manufacturer's label. Substances will not be mixed with one another unless recommended by the manufacturer.

Waste materials will be collected and stored in a securely lidded metal container from a licensed management company. The waste and any construction debris from the site will be hauled off-site and disposed of properly. The contractor will be responsible for waste removal. Manufacturer's recommendations for proper use and disposal will be followed for materials. If portable sanitary waste facilities will be used on-site, sanitary waste will be collected from the units a minimum of once a week, by a licensed sanitary waste management contractor.

2.9 Designated Washout Areas

The Contractor should use washout facilities at their own facilities.

2.10 Proper Equipment/Vehicle Fueling and Maintenance Practices

On-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the risk of leakage. To ensure that leaks from stored equipment do not contaminate the site, oil-absorbing mats will be placed under oil-containing equipment during storage. Regular fueling and service of the equipment may be performed using approved methods and with care taken to minimize chance of spills. Repair of equipment or machinery within the 100' water resources area is not allowed. Any petroleum products will be stored in tightly sealed containers that are clearly labeled with spill control pads/socks placed under/around their perimeters.

2.11 Equipment/Vehicle Washing

The Contractor will be responsible to ensure that no equipment is washed on-site.

SECTION 3: Spill Prevention and Control Plan

The Contractor will be responsible for preventing spills in accordance with the project drawings and applicable federal, state, and local regulations. The Contractor will identify a properly trained site employee, involved with the day-to-day site operations to be the spill prevention and cleanup coordinator. The name(s) of the responsible spill personnel will be posted on-site. Each employee will be instructed that all spills are to be reported to the spill prevention and cleanup coordinator.

3.1 Spill Control Equipment

Spill control/containment equipment will be kept in the work area. Materials and equipment necessary for spill cleanup will be kept either in the work area or in an otherwise accessible on-site location. Equipment and materials will include, but not be limited to, absorbent booms/mats, brooms, dust pans, mops, rags, gloves, goggles, sand, plastic and metal containers specifically for this purpose. It is the responsibility of the Contractor to ensure the inventory will be readily accessible and maintained.

3.2 Notification

Workers will be directed to inform the on-site supervisor of a spill event. The supervisor will assess the incident and initiate proper containment and response procedures immediately upon notification. Workers should avoid direct contact with spilled materials during the containment procedures. Primary notification of a spill should be made to the local Fire Department and Police Departments. Secondary Notification will be to the certified cleanup contractor if deemed necessary by Fire and/or Police personnel. The third level of notification (within 1 hour), if required, is to the DEP or municipality's Licensed Site Professional (LSP) if the spill exceeds the reportable quantity for the material spilt. The specific cleanup contractor to be used will be identified by the Contractor prior to commencement of construction activities.

3.3 Spill Containment and Clean-Up Measures

Spills will be contained with granular sorbent material, sand, sorbent pads, booms or all of the above to prevent spreading. Certified cleanup contractors should complete spill cleanup. The material manufacturer's recommended methods for spill cleanup will be clearly posted and on-site personnel will be made aware of the procedures and the location of the information and cleanup supplies.

3.4 Hazardous Materials Spill Report

The Contractor will report and record any spill. The spill report will present a description of the release, including the quantity and type of material, date of the spill, circumstances leading to the release, location of spill, response actions and personnel, documentation of notifications and corrective measures implemented to prevent reoccurrence.

This document does not relieve the Contractor of the Federal reporting requirements of 40 CFR Part 110, 40 CFR Part 117, 40 CFR Part 302 and the State requirements specified under the Massachusetts Contingency Plan (M.C.P) relating to spills or other releases of oils or hazardous substances. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a twenty-four (24) hour period, the Contractor is required to comply with the response requirements of the above mentioned regulations. Spills of oil or hazardous material in excess of the reportable quantity will be reported to the National Response Center (NRC).

SECTION 4: Contact Information/Responsible Parties

Owner/Operator:
Millbury Landfill Solar LLC
Ray Hanna
111 Speen Street
Framingham, Massachusetts 01701
866-263-7372

Engineer:
Rob Bukowski, PE
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978-532-1900

Site Inspector:
TBD

Contractor:
TBD

SECTION 5: Erosion and Sedimentation Control

Erosion and Sedimentation Control Drawings can be found in the attached project plans (Appendix C) which include technical specifications for installation and monitoring control devices.

SECTION 6: Site Development Plan

The proposed site development plan is included in the attached plans.

SECTION 7: Operation and Maintenance of Erosion Control

The erosion control measures will be installed as detailed in project plans. If there is a failure of the controls, the Contractor is required to stop work until the failure is repaired.

Periodically throughout the work, the sediment that has been deposited against the controls will be removed to ensure that the controls are working properly.

SECTION 8: Inspection Schedule

During construction, the erosion and sedimentation controls will be inspected at least once every 7 calendar days and within 24 hours of the end of a storm event of 0.25 inches or greater. Once the Contractor is selected, an on-site inspector will be identified to ensure that erosion and sedimentation controls are in place and working properly.

Stormwater Operation and Maintenance Plan

1.0 Introduction

This Stormwater Operation and Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of the existing best management practices (BMP) installed on the project site. Included in this O&M Plan is a description and an inspection form for each BMP type.

2.0 Contact Information/Responsible Parties

The Town of Millbury is the owner and operator of the existing stormwater system in place at the Millbury Landfill; however, during construction of the Solar PV Development, Millbury Landfill Solar LLC will be responsible for its upkeep and maintenance. Financing of the maintenance for the site will be performed in accordance with the lease agreement between the Town of Millbury and Ameresco, Inc.

Owner:
Town of Millbury
Sean Hendricks, Town Manager
127 Elm Street
Millbury, MA 01527
508-865-4710

Operator:
Millbury Landfill Solar LLC
Ray Hanna
111 Speen Street
Framingham, Massachusetts 01701
866-263-7372

Engineer:
Rob Bukowski, PE
Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978-532-1900

Site Inspector:
TBD

Contractor:
TBD

3.0 BMP Descriptions and Locations

3.1 Rip Rap Lined Swales

There are four (4) rip rap lined swales around the top perimeter of the landfill used to convey stormwater runoff to the perimeter wetlands of the site.

4.0 Inspection, Maintenance Checklist and Schedule

4.1 Rip Rap Line Swales

Swales are to be inspected during construction at least once every 7 calendar days, or every 14 calendar days and within 24 hours of a storm event of 0.25 inches. The following items will be inspected:

- Sediment accumulation,
- Debris and trash, and
- Ponding.

All accumulated sediment and debris in the swales will be removed and disposed of in accordance with local, state, and federal regulations.
the swales twice per year. During inspections, check the swales for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding and sedimentation.

4.2 Inspections and Record Keeping

- An inspection form must be filled out every time maintenance work is performed.
- A binder is to be kept that contains all of the completed inspection forms and any other related materials.
- A review of Operation & Maintenance actions should take place annually such that the Stormwater BMPs and vegetative cover are being maintained in accordance with this Operation & Maintenance Plan.
- Operation & Maintenance log forms for the last three years, at a minimum, should be maintained.
- The inspection and maintenance schedule may be refined in the future based on the findings and results of this Operation & Maintenance program or policy.

INSPECTION CHECKLIST SHEETS

Rip Rap Lined Swale

Frequency: During construction: at least once every 7 calendar days, or every 14 calendar days and within 24 hours of a storm event of 0.25 inches

Swale Number: _____

Inspected By: _____ Date:_____

Observations: _____

_____

_____

Actions Taken: _____

_____

_____

Instructions: Inspect swales for sediment accumulation, debris, trash and ponding. Manually remove sediment and debris.