TOWN OF WELLESLEY MASSACHUSETTS

ZONING BOARD OF APPEALS
TOWN HALL • 525 WASHINGTON STREET • WELLESLEY, MA 02482-5992

LENORE R. MAHONEY
Executive Secretary
Telephone
(781) 431-1019 Ext. 2208

Date: 12/4/18 ZBA: 2019-22

Petition for:		Residential Fee		Commercial & Municipal Fee	
Variance	X	$200			
Special Permit		$200			$500
Special Permit/Findings		$200			
Special Permit Renewals		$150			
Signs					$300
Site Plan Approval without PSI				X	$2,000 & Fire Department Consulting Fee
Site Plan Approval with PSI					$3,500
Appeals		$200			$300
Comprehensive Permit					$750
Publication & Mailing Fees/All Petitions	X	$25			$25
Petitioner assumes all costs for Peer Review					

Property Location: 350 and 106 Central Street Zoning District: Educational and Single Residence 40

Property located in a:

	Yes	No
Historic District		X
Wetlands Protection Area	X	
Water Supply Protection District	X	

Applicable Section(s) of the Zoning Bylaw: Section XIVE - Water Supply Protection District
Section XVIA - Project Approval Section XX - Heights of Buildings or Structures

Explanation of Request: Petitioner seeks Site Plan Approval for a project that will disturb more than 5,000sf to install a shot put, javelin and hammer/discus throwing areas and to regrade an existing pathway to within ADA accessibility thresholds. A portion of the existing synthetic turf area will be paved with asphalt and track surfacing to provide an area for the pole vault event. The petitioner also seeks a variance to install athletic field lighting that will exceed the maximum height of a structure.

Requested Relief:

	Lot Area		Front Yard Depth (Street Setback)
	Lot Coverage		Side Yard Width (Side Line Setback)
	Frontage		Rear Yard Depth (Rear Line Setback)
	Front Yard Width	X	Other Maximum height of structure

OWNER OF PROPERTY: Wellesley College

MAILING ADDRESS: 106 Central Street Wellesley, MA 02481

PHONE: WORK: Chris Ridge: 781-724-7804 HOME: _____

SIGNATURE OF OWNER: _____

PETITIONER (If different than Owner): Activitas, Inc. c/o Meg Buczynski

MAILING ADDRESS: 16 School Street Dedham, MA 02026

PHONE: WORK: 781-355-7040 HOME: _____

activitas

Planning | Landscape | Athletic Facilities

MEMORANDUM

Delivery: *hand delivered*

Date: 4 December 2018

To: **Wellesley Zoning Board of Appeals**
c/o Lenore Mahoney, Executive Secretary

By: Meg Buczynski
Activitas

cc: (via email)
Chris Ridge, Wellesley College
Marianne Cooley, Wellesley College
Holly Ganser, Activitas

Project: **Wellesley College – Athletics Accessibility Renovations**
#18032

re: Site Plan Approval

Dear Zoning Board of Appeals Members,

Enclosed is the required documentation for the Site Plan Review of the Wellesley College Athletics Accessibility Renovations project.

Project Description

The proposed project is located on Wellesley College's West Campus Athletic Complex located to the north of Waban Lake and to the east of Paintshop Pond. This existing Athletic Complex was developed in early 2000 at the former Henry Wood's Sons Paint Factory site. The elements being renovated include the track and field and adjacent support areas and the existing small practice field. The proposed project will renovate and/or upgrade the following elements:

- Existing Synthetic Turf Surface: The current surface located within the track oval is approximately fourteen (14) years old and has come to the end of its useful life. The existing synthetic turf carpet will be removed and a new synthetic turf carpet will be installed. At the same time miscellaneous improvements will be made in the field to upgrade existing communication and irrigation boxes. This work will not require removal or import of stone materials. The intent is to keep the existing stone in place and only fine grade the surface as needed before the new turf system is installed.
- New Pole Vault Area: A portion of the synthetic turf surface along the east side of the field will be renovated from synthetic turf to a new track surface. This will allow for improved programming for the track program and a safer event location for the pole vault area.
- Athletic Ballnetting: At the endlines of the synthetic turf field new 15' high athletic ballnetting will be installed to help programmatic needs in keeping balls within the field of

play. The poles for the systems are typically spaced 20' apart. The netting utilizes a pulley system to be raised and lowered.

- Overlay Track Surfacing: The existing track surface is meant to stay in place, be cleaned, and a new surface overlay installed on top. Small areas of the track that have delaminated from the existing asphalt may be removed and/or patched, but the intent is to keep the majority of the existing surface in place.
- Channel Drain Improvements: At the inside edge of the existing track oval there is an existing grated channel drain that collects runoff from track (the track pitches to the inside of the oval). A portion of the channel drain between the track oval and the track "D" areas (areas of the track between the endlines of the field and the track oval) will be replaced with a new drain that is more appropriate for a collegiate-level facility. This will not change the drainage patterns at the track, but rather provide an improved transition for track events that have to cross this channel drain (example steeple chase and high jump).
- Athletic Lighting: New Athletic Lighting is proposed at the track and field. The proposed system will include four (4) light poles that are 80'-90' high. Please note that a variance is being filed for the light poles exceeding the allowable 45' maximum structure height. In addition, the College has been in touch with the Hunnewell Family to discuss the lighting and a balloon height test was completed to help the Family understand potential site lines from their property. As of this memo, the Hunnewell Family has an understanding that the lighting in not anticipated to be viewable from the Hunnewell estate house, but a corner light on the field could be viewed from the topiary garden pavilion. The family representative was supportive of the College's proposed use policy which is in alignment with the Town's existing policy. They were concerned that such a policy might be expanded by the Town and College in the future to permit later evening use, but recognized that such a concern is "in the future". The College will continue to be in touch with the Hunnewell Family.
- ADA Accessibility Upgrades: The project proposes to regrade and repave portions of the existing walkway leading down to the track that exceed ADA/MAAB slope requirements for accessible walkways. In addition, new railings and guardrails will be installed at the existing seating area to meet ADA/MAAB standards for access stairs as well as provide dedicated areas for accessible seating.
- Track Throwing Events Areas: When the West Athletic Complex was originally installed, Wellesley College did not have a NCAA Varsity Track Program and throwing event areas were not installed as part of the original project. Since that time a NCAA Varsity Track Program has been implemented and this project seeks to install track throwing events that are essential to the program. A new shot put area, hammer/discus throwing cage, and a javelin runway are proposed at the small grass field between the Keohane Athletic Center and the competition soccer field. The shot put area and javelin runways are both horizontal

surface elements, while the hammer/discus cage is a vertical element to provide a safe space to throw discus and hammer.

Wellesley College Datum

As you will note, the project drawings are not on the Town of Wellesley datum. Wellesley College uses the NAVD88 coordinate system for all campus projects. The existing conditions survey was set on the NAVD88 datum in order to match the rest of the Wellesley College records.

Earthwork and Subsurface Conditions

The project will disturb approximately 23,000 sf of area, not including the areas of the track and field that are just being resurfaced (this number does include the renovation of turf-to-track for the pole vault area). The earthmoving anticipated is to regrade the walkway leading down to the track level to provide accessibility to the field level from the rest of the athletic facilities, renovation of the turf area to track surfacing for the pole vault area, and installation of the track throwing events at the small practice field.

The West Campus Athletic Complex was designed in 2000 and then built in 2004. It is a fully engineered site consisting of capped soils due to previous contamination from the former Henry Wood's Paint Shop that was located in this area. The existing track and synthetic turf field are NOT over the capped portion of the site. The proposed throwing event areas ARE over the capped portion of the site. We are working with Haley & Aldrich to ensure that there will be no disruption to the cap. The NRCS soil maps indicate that the majority of the track and field overlay A soils with one area being well-draining soils and the other being excessively draining and a very small area over D soils. H&A has all the subsurface information associated with the site based on their involvement in the original project. A memorandum will be provided prior to the January 10th hearing to explain the subsurface conditions.

Wetlands and Floodplain

The track and field are adjacent to Paintshop Pond and Lake Waban. None of the proposed work will impact these wetlands. A portion of the existing pathway along the west side of the track that is within the proposed project will repave in place is within the 100' wetland buffer associated with Paintshop Pond and as such a Notice of Intent will be filed with the Wellesley Natural Resources Committee as a part of this project.

The FEMA flood maps indicate that a small portion of the track is located within a flood zone. The proposed project will maintain the existing elevations of the track and field. The only proposed regrading is to the walkway on the north side of the track to provide an accessible route down to the track and field level. This area is fully outside of the floodplain as mapped by FEMA.

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Stormwater Drainage

The stormwater review of both the existing and proposed conditions of the project area was performed. The proposed drainage has been designed to comply with the Massachusetts Stormwater Standards and the Wellesley Wetlands Protection Regulations. The full stormwater report and supporting documents have been provided as part of this submission.

In addition to this Site Plan Approval submission, the project was submitted to the Design Review Board on November 30, 2018 and a Notice of Intent will be submitted to the NRC on December 20, 2018. The project site is an AUL and is subject to MassDEP's review for compliance with the MCP. We are working closely with Haley & Aldrich to review all requirements for construction at the site and are in the process of completing all necessary reviews and permits with DEP for this work.

I look forward to your review of the project and answering any questions you may have. If there are additional Boards/Departments that I should follow up with please let me know. If there any questions regarding this submission please do not hesitate to contact me at (781) 355-7040.

Thank you,

Megan Buczynski, PE
Activitas, Inc.
meb@activitas.com
(781)355-7040

Attachments:
Site Plan Approval Application
Project Drawings
FEMA FIRM Maps
Stormwater Report
Operation and Maintenance Plan

TOWN OF WELLESLEY MASSACHUSETTS

ZONING BOARD OF APPEALS

TOWN HALL • 525 WASHINGTON STREET • WELLESLEY, MA 02482-5992

Special Permit Granting Authority
Wellesley Town Hall
Wellesley, MA 02482

Date: 12/4/2018

ZBA Number: _____

Pursuant to the provisions of Section XVIA, subparagraph C, and Section 2 of the Zoning Bylaw, the undersigned hereby requests Site Plan Approval for the construction of Wellesley College Athletic Accessibility Renovations Project

Located at 350 and 106 Central Street

Within a Educational and Single Residence 40 District (s).

The following plans are submitted:

1. Existing Site Features Plan — Plan #EX1.1&EX1.2 (Title Block Number)
2. Site Development Plan — Plan # L1.1&L1.2
3. Plot Plan — Plan # N/A
4. Grading & Drainage Plan — Plan # L2.1 (Grading) L3.1 (Drainage)
5. Utilities Site Plan — Plan # E0.0&E1.0
6. Landscaping/Parking Plan — Plan # N/A
7. Architectural Plans — Plan # N/A through N/A
8. Subsurface Conditions Plan — Plan # See project Memo
9. Utilities Detail Plans — Plan # L4.1 through L4.2
   a. Structure Details — Plan # L4.2
   b. Plumbing Details — Plan # N/A
   c. Electric Details — Plan # E2.0

(Ten full sized copies of each plan, seven 11inch by 17 inch copies of each plan, a check in the amount of $2,225 payable to the Town of Wellesley, and a check in the amount of _____ payable to the Town of Wellesley Fire Department (for Site Plan Approval without PSI).

OWNER OF RECORD: Wellesley College
ADDRESS: 106 Central Street Wellesley, MA 02481
TELEPHONE NUMBER: Chris Ridge 781-724-7804

PETITIONER:(If not Owner, relationship to owner) Activitas, Inc
Design Consultant
ADDRESS: 16 School Street Dedham, MA 02026
TELEPHONE NUMBER: Meg Buczynski 781-355-7040

PROJECT CONTACT PERSON: Chris Ridge and Meg Buczynski
ADDRESS: Chris - 106 Central Street Wellesley, MA 02481 Meg - 16 School Street Dedham, MA 02026
TELEPHONE NUMBER: Chris - 781-724-7804 FAX NUMBER: _____
Meg- 781-355-7040

TOWN OF WELLESLEY

ZONING BOARD OF APPEALS

SITE PLAN APPROVAL REVIEW
PLANS AND SUBMITTAL CHECKLIST

Plans and submittals for site plan approval review are submitted to the Department of Public Works for its review and approval on behalf of the Zoning Board of Appeals shall contain the items listed in this checklist. Electric plans will be reviewed by representatives of the Wellesley Municipal Light Plant.

PLANS		CHECK
1. EXISTING SITE FEATURES PLAN		
a)	Location, type, size or dimension of existing trees and rock masses	X
b)	Surface drainage and topography with one foot contours	X
c)	Property lines, zoning districts, adjacent roadways, historical or archeological features	X
d)	Rights of way and easements (temporary and permanent)	X
e)	Wetlands and floodplains	X
f)	Adjacent public, footpaths, trails and other natural or man-made features such as walls and fences	X
g)	Plan to be Scale 1" = 40' or larger	X
h)	Plan must be stamped, dated and signed by a Registered Land Surveyor in the Commonwealth of Massachusetts	X
2. SITE PLAN DEVELOPMENT		
a)	Building locations, finish floor elevations at basement and first floor	N/A - No proposed buildin
b)	Grading detail for entire site with existing and proposed contours	X
c)	Existing and proposed curb cuts, design as per Town Policy by Board of Selectmen dated 5/15/73	N/A
d)	Property lines and easement lines	N/A
e)	All elevations on the Town of Wellesley datum base	See attached project mem
f)	North directional arrows shall be provided and point due north	X
g)	Plan must be stamped, dated and signed by a Registered Architect, Registered Land Surveyor or Professional Engineer in the Commonwealth of Massachusetts	X
3. PLOT PLAN		
a)	Existing buildings and structures	N/A
b)	Proposed structure(s) including all dimensions and distances from front, rear and side property lines	N/A
c)	Area of lot or lots included in the project	N/A
d)	Zoning district lines and portion of lot in different zoning district (if applicable)	N/A
e)	Names of all abutters as they appear on the most recent tax list	N/A
f)	The location of all permanent survey monuments	N/A
g)	Not less than 3 permanent benchmarks, preferably triangulated, shall be shown	N/A
h)	Plan must be stamped, dated and signed by a Registered Land Surveyor in the Commonwealth of Massachusetts	N/A

4. GRADING AND DRAINAGE PLAN

a)	Existing and proposed contours in one foot intervals of elevation	X
b)	Location of existing and proposed storm drainage structures	X
c)	Profile showing proposed utilities in relation to the ground surface	X
d)	Erosion control measures such as haybales and siltation fencing	X
e)	Plan must be stamped, dated and signed by a Registered Professional Engineer in the Commonwealth of Massachusetts	X

5. UTILITIES SITE PLAN

a)	Building location and elevations	X
b)	Existing utilities on project site and in abutting street	X
c)	Location, depth, size, (slope where applicable) and material of:	
	• Water service and hydrants	X - Existing
	• Gas service	X - Existing
	• Sanitary sewer connection (pipe to be SRD-35 PVC, green)	X - Existing
	• Storm drain installations	X
	• Electric service	X
	• Fire alarm connection	N/A
	• Telephone service	X-Existing
d)	Number utility structures such as manholes and catch basins for identification purposes	X
e)	Detail specifications for installation of all utilities including street pavement restoration as per current DPW standards	X
f)	Flow direction arrows on drain and sewer lines	X
g)	Plan must be stamped, dated and signed by a Registered Professional Engineer in the Commonwealth of Massachusetts	X

6. LANDSCAPING/PARKING PLAN The proposed project does not include an additional parking or alteration to parking. No additional landscaping is proposed as part of the project.

a)	Proposed landscaping of property	N/A
b)	Size, type and location of proposed plant materials with botanical names	N/A
c)	Consider the impact for plantings at their maturity size as relates to sight distances	N/A
d)	Landscaping plan shall be coordinated with the grading plan	NA
e)	Tree planting and shrub planting details	N/A
f)	Hardscape details such as walkways and patios	N/A
g)	See attached listing of undesirable plants as prepared by the Town Horticulturalist	N/A
h)	Plan must be stamped, dated and signed by a Registered Landscape Architect in the Commonwealth of Massachusetts	N/A
i)	No bushes or trees of any kind shall be planted within 10 feet in any direction of a Fire Department connection or a Master Fire Alarm box. Connections include hydrants, standpipes and sprinkler feeds on the outside of buildings.	N/A
j)	Parking lot plans shall include dimensions of parking spaces, maneuvering aisles, islands, turning radii, percentage of landscaped open space, percentage of interior landscaping, appropriate number of handicapped parking spaces, and directional flow arrows. All parking spaces shall be numbered	N/A

7. ARCHITECTURAL PLANS No new buildings are proposed as part of this project.

a)	Proposed floor plans	N/A
b)	Elevations of all sides of all buildings	N/A
c)	Sections identifying type and exterior finish of proposed buildings	N/A
d)	Plan must be stamped, dated and signed by a Registered Architect in the Commonwealth of Massachusetts	N/A

8. SUBSURFACE CONDITIONS PLAN Refer to attached project memo.

a)	Boring location with boring numbers	
b)	Boring logs	
c)	Ledge encountered and depth	
d)	Water encountered and depth	
e)	Percolation test info (if applicable)	

9. UTILITIES DETAIL PLAN

a)	Structure details	N/A
	• Sanitary sewer manholes	N/A
	• Drain manholes, detention structures, etc.	N/A
	• Catchbasins (gas and oil separators required at parking lots)	N/A
	• Outside grease trap if restaurant is proposed	N/A
b)	Plumbing details	N/A
	• Water service size and entrance location	N/A
	• Water meter size, location and piping detail	N/A
	• Size and location of water service backflow protection devices (if applicable)	N/A
	• Sanitary sewer size and entrance location with elevations	N/A
	• Size and location of sanitary sewer check valves (if applicable)	N/A
	• Oil/water separators and MDC gas traps (if applicable)	N/A
	• Pumping equipment (if applicable)	N/A
c)	Electrical Details	
	• Location service entrance	X
	• Size of Service	X
	• Meter location and switchgear arrangement	N/A- Fed from Campus System
	• Provision for future expansion	N/A - Existing Service
	• Transformer size and facilities for pad or vault room	N/A - Existing Service
	• Data including load requirements	N/A - Existing Service

GENERAL PLAN COMMENTS

a)	All plans must be stamped, signed and dated by a Registered Professional Engineer, or Architect in the Commonwealth of Massachusetts responsible for the particular plan's contents	X
b)	Title Blocks shall provide the name of project, job site location, architects and engineer responsible for plan contents, date and plan scale	X
c)	All plans must be numbered and titled	X
d)	All dates of revisions shall be included	X
e)	Provide retaining wall design details	X
f)	Provide locus plan drawn at a scale of 1" = 500' showing the relation of the project to adjoining properties within a radius of ¼ mile	X
g)	The cover sheet shall provide the names, mailing addresses and phone numbers of the land owner, building owner, architects and engineers and project contact person, and Table of Contents	X
h)	Location of all mechanical systems must be shown	X

SUBMITTALS

a)	Drain calculations showing capacities of the existing and proposed drain systems	See attached drainage repo
b)	Runoff calculations for the 10, 25 and 100 year storm event for storm drains, leaching basins or holding areas	See attached drainage repo
c)	Post development rate of peak runoff less than pre-development rate of peak runoff	See attached drainage repo
d)	Information showing that the DEP Stormwater Management Standards will be met	See attached drainage repo
e)	Operation and maintenance plan for drainage system	See attached Operation and Maintenance Plc
f)	Evaluation of existing municipal systems capacities	N/A
g)	Quantification and documentation of infiltration/inflow reduction measures	N/A
h)	Quantification and documentation of water conservation measures	N/A
i)	Written statement from a Registered Professional Engineer in the Commonwealth of Massachusetts regarding the adequacy of the water flow for the fire protection system	N/A
j)	Construction area to be fenced	N/A
k)	Traffic Management Plan during construction period	See Plan
l)	Area of construction worker and equipment parking	See Plan
m)	Materials staging area	See Plan

UNDESIRABLE PLANTS FOR LANDSCAPE DESIGNS SUBMITTED WITHIN THE TOWN OF WELLESLEY

	TREES:	
*	*Acer platanoides*	Norway Maple
*	*Acer pseudoplatanus*	Sycamore Maple
	Acer saccharinum	Silver Maple
*	*Ailanthus altissima*	Tree-of-Heaven
	Elaeagnus angustifolia	Russian-olive
	Morus alba	White Mulberry
*	*Phelodendron amurense*	Amur Cork-tree
	Populus alba	White Poplar
	Pyrus c. 'Bradford'	Bradford Pear
	Pyrus c. 'New Bradford'	New Bradford Pear
*	*Robinia pseudoacacia*	Black Locust
	Tsuga canadensis	Eastern Hemlock
	SHRUBS:	
	Alnus glutinosa	Common Alder
*	*Berberis thunbergii*	Japanese Barberry
*	*Berberis vulgaris*	Common Barberry
*	*Elaeagnus umbellata*	Autumn-olive
*	*Euonymus alatus*	Burning Bush
*	*Frangula alnus*	Glossy Buckthorn
*	*Ligustrum obtusifolium*	Border Privet
	Ligustrum sinese	Chinese Privet
	Ligustrum vulgare	Common Privet
*	*Lonicera maackii*	Amur Honeysuckle
*	*Lonicera morrowii*	Morrow Honeysuckle
*	*Lonicera tatarica*	Tatarian Honeysuckle
*	*Lonivera x bella*	Bell's Honeysuckle
*	*Rhamnus cathartica*	Common Buckthorn
*	*Rosa multiflora*	Multiflora Rose
	VINES:	
*	*Ampelopsis brevipedunculata*	Porcelain Ampelopsis
*	*Celastrus orbiculatus*	Chinese Bittersweet
*	*Cynanchum spp.*	Swallow-worts
*	*Humulus japonicas*	Japanese Hops
*	*Lonicera japonica*	Japanese Honeysuckle
*	*Polygonum perfoliatum*	Mile-a-minute Vine
	Wisteria sinensis	Chinese Wisteria
	ORNAMENTALS:	
*	*Aegopodium podagraria*	Goutweed
*	*Alliaria petiolate*	Garlic-mustard
*	*Iris pseudacorus*	Yellow Flag Iris
*	*Lythrum salicaria*	Purple Loosestrife
*	*Microstegium vimineum*	Japanese Stilt-grass
*	*Phalaris arundinaceae*	Ribbon Grass
*	*Pragmites australis*	Common Reed
*	*Polygonum cuspidatum*	Japanese Knotweed
	Utgica dioica	Stinging Nettle
	AQUATICS:	
*	*Hydrilla verticillata*	Hydrilla
*	*Myriophyllum spp.*	Water Milfoils
*	*Trapa natans*	Water-Chestnut

* Indicates species listed *A Guide to Invasive Plants in MA*

TOWN OF WELLESLEY MASSACHUSETTS

ZONING BOARD OF APPEALS

TOWN HALL • 525 WASHINGTON STREET • WELLESLEY, MA 02482-5992

OFFICIAL DEVELOPMENT PROSPECTUS

Applicable to Major Construction Projects
Submitted Under Section XVIA of the Zoning Bylaw
And Comprehensive Permit Projects Submitted
Under Chapter 40B

Date: 12/4/2018

Year/Number: _____

I. IDENTIFICATION

Petitioner: Activitas, Inc

Address: 16 School Street Dedham, MA 02026

Telephone: (781)355-7040

Land Owner of Record: Wellesley College 106 Central Street Wellesley, MA

Location of Property: 350 and 106 Central Street

Proposed Use of Property: Educational

Zoning Districts: (Including all overlay districts)

Educational, Single Residence 40, Water Supply Protection District

Are any other special permits or variances, other than Site Plan Approval required for this project? Yes X No _____

If yes, what is required? A variance for the height of the proposed athletic field lighting has been filed.

II. DESCRIPTION

Describe in detail the plan to be executed under the appropriate categories below

1. Land Area 350 Central Street - 978,320sf 106 Central Street - 9,261,686sf

2. Square footage of proposed construction footprint Total Limit of Work - 222,204sf

3. Square footage of existing building footprint N/A

4. Square footage of total structure footprint N/A

5. Total floor area of existing building N/A

6. Total floor area of proposed construction N/A

7. Total floor area after proposed construction completed N/A

8. Floor area ratio: N/A (Commercial)

9. Number of Buildings N/A

10. Number of Stories of each Building N/A

11. Height of each Building N/A

12. Number of Parking Spaces: (Existing/Proposed) The proposed project will not alter any of the parking on the facility.

Standard_____/_____ Compact_____/___ Handicapped_____/_____

Covered_____/_____ Open_____/_____

Total (Existing and proposed) _____

Total Number Required _____

13. Number of handicapped sidewalk curb cuts provided N/A

14. Lot coverage in square feet (%)

	Before	After
1) Buildings	(N/A)	(N/A)
2) Drives & Parking	(N/A)	(N/A)
3) Other uses (identify uses and coverage)	(N/A)	(N/A)

15. Open Space

1) Landscaped area	(N/A)	(N/A)
2) Natural (i.e. woods, fields)	(N/A)	(N/A)
3) Recreational	(N/A)	(N/A)

A. Residential Construction The proposed project is not a residential construction project.

1. Number of Dwelling Units
   Efficiency_____ One Bedroom_____ Two Bedroom_____
   Three Bedroom_____ Other_____

2. How many units will be provided with handicapped access to bathrooms, toilets, entrances, egresses, etc.? _____

3. Density in square feet of land per dwelling unit.
   Existing _____ Proposed _____

4. Density in square feet of land per person:
   Existing _____ Proposed _____

III. TRAFFIC IMPACT ANALYSIS AND DATA (Explain basis for data entered) The proposed project will not generate a use differently than what exists currently. There will be no change in the traffic in and out of the site as a result of this project.

If, as a result of the proposed construction, the following conditions will exist, Questions 1-5 must be answered:

a. If the floor area of the building exceeds 10,000 sf; or

b. If 50 or more vehicle trips will be generated by the completed project in any single hour of the day.

1. Projected traffic generation of proposed new development:

a. Peak Day	In	Out	Total
24-Hour			
Am Peak Hour			
PM Peak Hour			

b. Typical or Average Day

24-Hour			
Am Peak Hour			
PM Peak Hour			

2. Current two-way traffic flows on frontage street(s):

	24 Hour	AM Peak Hour	PM Peak Hour
Street _____			
Street _____			

3. Data compiled by: _____

4. Date of data compilation: _____

5. Comment on adequacy of drive entrances & exits with respect to sight distance and other traffic operations considerations on frontage street(s)

Locations through which 30 or more vehicles approach from a single direc in any single hour of the day.
(List intersections and operational problems):

List possible hazardous pedestrian and bicycle crossings:

6. Has a separate Traffic Study been submitted? Yes_____ No_____

IV. PUBLIC UTILITIES - (Quantitative, state basis for data entered)

A. Estimated water consumption N/A gal/day The proposed project will not generate a use differently than what exists currently. There will b no change in the water or sewer use on site.

B. Number of Fire Hydrants - existing within 200 ft N/A Proposed N/A

C. Estimated discharge to sewer system N/A gal/day

D. Sewer Disposal - will any proposed on-site individual sewage disposal systems be designed to receive more than 110 gallons of sewage per quarter acre per day? Yes_____ No X

E. Refuse disposal N/A lbs. or tons/day The proposed project will not generate a use differently than what exists currently. There will be no change in the total refuse generated.

1. Proposed method of handlinc N/A

2. What provisions will be made to facilitate the recycling of solid waste? N/A

F. Service Voltage 208Y/120V Service Amperage 600A

1. Estimated peak electrical consumption N/A kw

a. Heating Seasor N/A kw b. Cooling Season N/A kw

2. Estimated annual electric energy consumption N/A kw

3. Three Phase Service X Single Phase Service _____

G. Are energy efficient appliances to be used? The proposed athletic field lighting has LED fixtures

H. What R-Factors will be used in insulation and glazing for walls and ceilings? N/A No building is proposed as a part of this project.

I. What energy source will be used for heating water?
Electric_____ Gas_____ Fuel Oil_____ Other No water heater is proposed for this project

J. Will electric resistance heating or heat pumps be used? Yes____ No X

K. Will the facility include an emergency electric generator?

Yes____ No No generators are proposed f this project

If YES, would you be willing to run it to reduce your peak load?

Yes____ No____

V. FIRE PROTECTION The proposed project will not generate a change in the existing use of the facility therefore no change to the fire protection systems are required.

A. *Fire flow presently available at site N/A

B. *Total floor area of building (Largest single building if more than one building) N/A

C. Type of Building Construction N/A

D. *Required fire flow for building (Maximum required for a single building if more than one building) N/A

E. *If required fire flow (D) exceeds available fire flow (A), describe plans to provide required fire flow (D)

N/A

F. Describe access for fire apparatus to building (s) N/A

*Written statement indicating these figures signed by a registered professional engineer must accompany submittal.

VI. ENVIRONMENTAL IMPACT

A. What percentage of the property is Wetlands *See attached project memo
Floodplains *See attached project memo

Will either be altered as a result of the project? No

B. Will the proposed development contribute in any way to pollution of groundwater, surface water, or waterway: Yes____ No X

Oil____ Salt____ Chemicals____ Other____

Explain
Wellesley College does not anticipate treating the new impervious areas with salt or other chemicals.

Describe proposed measures to eliminate or minimize such pollution:

C. Does the proposed development involve storage of any of the following materials above or below the ground?

No deicing chemicals or other related materials
No commercial fertilizers and other related materials
No hazardous materials
No liquid petroleum products

If YES to any of the above, list specific materials to be stored:

D. Impact on surface drainage See attached stormwater report for all items in Section D

1a. Current rate of peak runoff _____ cubic ft/second
b. Current volume of runoff _____ cubic feet or acre-feet

2a. Post-development rate of peak runoff _____ cfs
b. Post-development volume of runoff _____ cubic feet or acre-feet

(Design storm and rainfall intensity should be cited for #1 & #2)

3. Describe measures to eliminate or minimize any increase in rate of runoff

4. Might the project result in significant changes in existing drainage patterns? Will any abutting or other property be adversely affected by the changes?

E. Does the proposed structure include installation of floor drains?
Yes____ No X If YES, how many? ____

F. Will the project affect the condition, use, or access to any existing public open space or recreation area? If so, how?

No

G. Does the proposed development involve outside lighting? Yes X No____
if YES, state height of lighting fixtures 80'-90'

Will the outside lighting shine directly on abutting premises?
Yes____No X

If YES, explain

Describe proposed steps to minimize this impact _____

H. Might any site or structure of historic or archeological significance be affected? Yes____No X

Describe _____

I. Will the project require the removal of any street trees protected under M.G.L. Ch. 87? Yes____No X
If YES, how many?_____

J. Will the project involve blasting or pile driving? Yes____No X

1. What is the approximate volume of the material to be removed?

_____

Where will this material be disposed? On-site

K. Is an Environmental Notification Form required to be filed under M.G.L. Ch. 30, Section 61-62H, the Mass. Environmental Policy Act?
Yes____No X

VII. IMPACT OF WATER SUPPLY

A. Will the project result in an increase of 10,000 square feet or more of impervious area within a Water Supply Protection District defined by Section XIVE of the Zoning Bylaw? Yes____No X

If so, does it satisfy the design and operation standards of Section XIVE? Yes____No____

B. Will the project result in finished exterior grades lower than the existing grade and less than 5 feet of soil overburden above the maximum ground water elevation within a Water Supply Protection District? Yes____No X

C. Will catch basins be installed? Yes____No__X__
If so, how many? _____

Do catch basins presently exist? Yes__X__No____
If so, how many? _____

Are catch basins fitted with oil and grease traps? Yes____No N/A
How many? Existing _____ Proposed _____

D. Will water saving appliances be used or water conservation devices be used in all plumbing? Yes____No No plumbing is proposed for this project.

VIII. FINANCIAL IMPACT

A. Estimated Building Permit Valuation $2,500,000

B. Estimated assessed value $2,500,000

Town of Wellesley **DESIGN REVIEW BOARD** *Massachusetts*

Jose Soliva, Chair
Robert Skolnick, Vice Chair
Sheila Dinsmoor
Ingrid Carls
Amir Kripper

Robert Broder, *alternate*
Iris Lin, *alternate*
Juann Khoory, *alternate*

Town Hall
525 Washington Street
Wellesley, MA. 02482
Tel. (781) 431-1019 ext. 2237
Fax (781) 237-6495

Contact: Jeanette Rebecchi
jrebecchi@wellesleyma.gov

RECOMMENDATION

December 18, 2018

Richard Seegel, Chair
Zoning Board of Appeals
Town Hall, 525 Washington Street
Wellesley, MA 02482

Michael Grant
Inspector of Buildings
Town Hall, 525 Washington Street
Wellesley, MA 02482

Re: 350 & 106 Central Street, Wellesley College Athletic Complex Renovations
DRB: 18-65M – Major Construction

Dear Mr. Seegel and Mr. Grant,

Activitas, on behalf of Wellesley College ("the Applicant"), submitted a major construction application for design review on November 30, 2018. The Applicant is proposing renovations to portions of the West Campus Athletic Complex, as well as the installation of 80'-90' light poles over the track and field, and the creation of a new throwing area.

The Design Review Board reviewed the project at their meeting on December 12, 2018. Following a brief discussion, Ms. Khoory moved to recommend approval of the project with the following recommendations:

- *Minimize light spillage as best as possible.*
- *Utilize sustainable/recycled materials for all project areas to the extent practical.*

Ms. Carls seconded the motion. The motion passed unanimously (4-0).

Please contact me should you have further questions.

Sincerely,

Jeanette Rebecchi, Planner
On Behalf of the Design Review Board

Cc: *File Copy*
Megan Buczynski
Holly Ganser

NOTES TO USERS

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To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFE's shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Massachusetts State Plane Mainland Zone (FIPS zone 2001). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713- 3242 or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from digital orthophotography. These map files were provided in digital format by Massachusetts Geographic Information Systems (MassGIS). Ortho imagery was produced at a scale of 1:5,000. Aerial photography is dated April 2005.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline** in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations** and **floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

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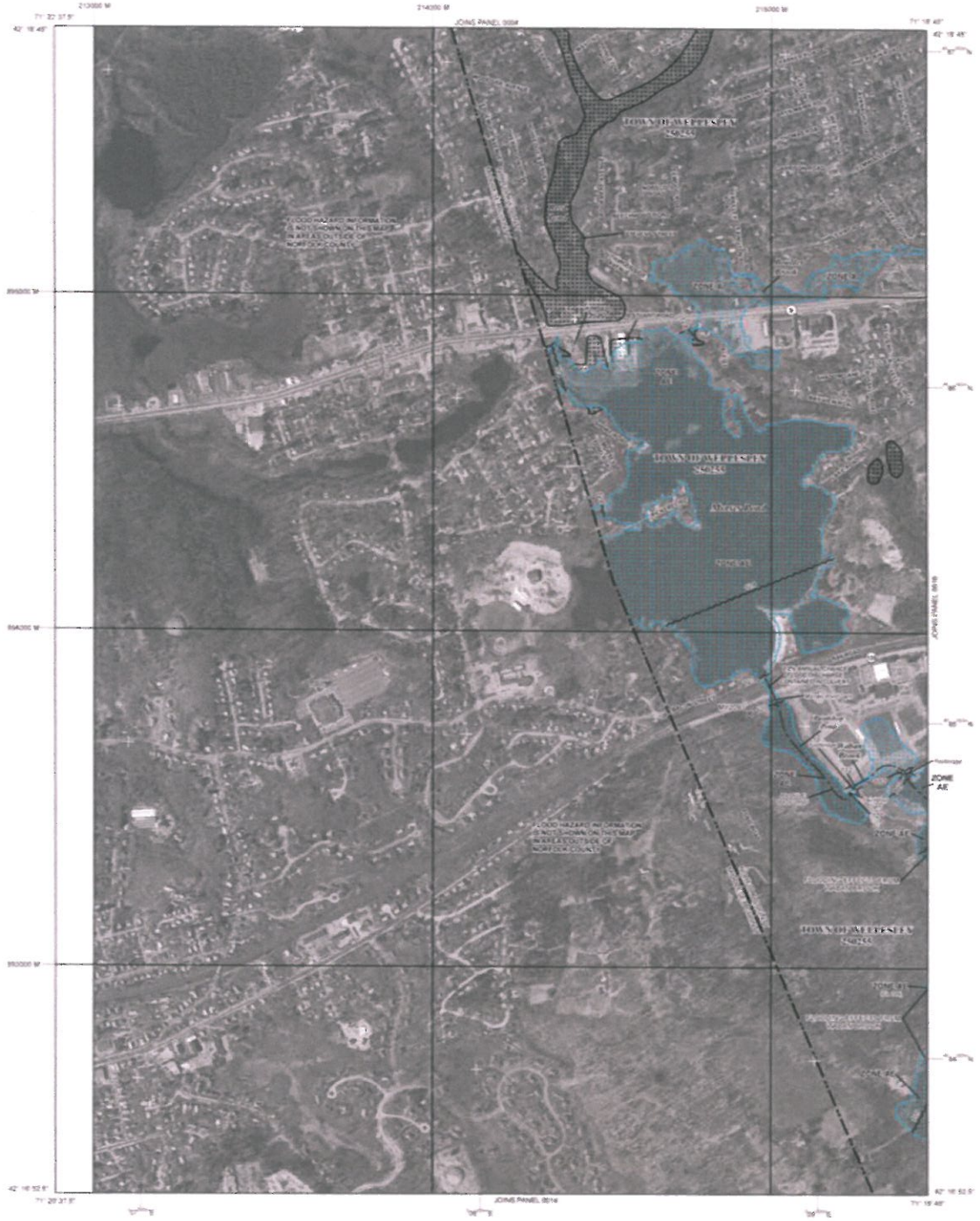

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, V, A99, AR, AO, AH, AE, and AR. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.

ZONE AE — Base Flood Elevations determined.

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR — Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are generally identified with a slanted "X".

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway Boundary

Zone D Boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

Base Flood Elevation line and value; elevation in feet*

Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Culvert

Bridge

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

1000-meter Universal Transverse Mercator grid values, zone 19N

Bench mark (see explanation in notes to Users section of this panel)

MAP REPOSITORIES
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EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
July 17, 2012

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0012E

FIRM

FLOOD INSURANCE RATE MAP

NORFOLK COUNTY, MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 12 OF 430
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
[illegible]	[illegible]	[illegible]	[illegible]

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
25021C0012E
EFFECTIVE DATE
JULY 17, 2012

Federal Emergency Management Agency

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LEGEND

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FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

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OTHERWISE PROTECTED AREAS (OPAs)

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1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway Boundary

Zone D Boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Culvert

Bridge

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) western hemisphere

1000-meter Mesh: Massachusetts State Plane Mainland Zone (FIPS Zone 2001), Lambert Conformal Conic projection

1000-meter Universal Transverse Mercator grid values, zone 19N

Bench mark (see explanation in Notes to Users section of this FIRM panel)

River Mile

MAP REPOSITORIES
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EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
July 17, 2012

EFFECTIVE DATES OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 500'
500 0 1000 FEET
150 0 150 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0016E

FIRM

FLOOD INSURANCE RATE MAP

NORFOLK COUNTY, MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 16 OF 430
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MEDFIELD, TOWN OF	250238	0016	E
MILLIS, TOWN OF	250239	0016	E

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MAP NUMBER
25021C0016E
EFFECTIVE DATE
JULY 17, 2012

Federal Emergency Management Agency

MAINTENANCE MANUAL

CONTENTS

INTRODUCTION TO MAINTENANCE

Following these simple suggestions will significantly extend the life and performance of your product:

- Keep it clean
- Do not abuse it. No vehicle traffic, no heavy static loads, or fireworks, etc.
- Make all minor repairs to your surface promptly
- Consult with a Shaw Sports Turf professional if your repairs and renovations are complicated
- Maintain proper infill levels in high use areas

NOTE: This manual is intended for customer use. It is important that the people who are responsible for field maintenance are thoroughly familiar with its contents and refer to it regularly. The contents in this manual represent the most current information regarding suggested procedures for the proper use and care of Shaw Sports Turf synthetic turf systems.

Shaw Sports Turf makes no representations, warranties or guarantees of any kind, expressed or implied, regarding the information contained herein and disclaims all liability or any loss or damage arising out of its use.

USAGE GUIDES

Each Shaw Sports Turf surface is specially designed for optimal performance and is suitable for some of the following applications:

- Football, Soccer, Lacrosse, Field Hockey, Rugby
- Softball / Baseball (non-metal cleats)
- Marching Band
- Physical Exercises
- Physical Education Activities
- Pneumatic rubber-tired maintenance and service vehicles
- Pedestrian traffic and other similar uses

PROTECTING YOUR SURFACE

It is good business to protect your investment and take care of your synthetic turf system. To do this most effectively, KEEP IT CLEAN. The following maintenance precautions are advised:

- Control access to field
- Keep your surface free of litter, mud and debris
- Post signs prohibiting smoking and carrying food or drink onto the field
- Minimize and properly monitor the use of motorized vehicles on your surface
- Repair minor damage promptly
- Follow suggested maintenance and cleaning procedures

CLEANING AND STAIN REMOVAL

For outdoor surfaces, rain is the best cleanser. Rainfall gently cleans the fibers of dust, pollen and airborne pollutants in a way that is difficult to duplicate. In areas where rainfall is scarce – or during prolonged periods of drought – an occasional watering is beneficial to cleanse the synthetic surface. Listed below are the suggested precautionary maintenance practices:

- Keep trash and litter containers on site
- Route field's access traffic in such a way to minimize mud/dirt tracking on the field
- Set up drinks for athletes during practice breaks off the synthetic surface if possible
- Enforce a smoke free environment and discourage the use of chewing tobacco, gum and sunflower seeds

DAILY CARE

Daily care is on-going care, it does not necessarily mean care each and every day. The amount and frequency of daily care is dependant on not only the surface, but also by the volume and the type of use. Shaw Sports Turf recommends that every Shaw turf system shall be periodically groomed and swept to remove litter and dust etc.

LITTER REMOVAL

Light trash (paper, peanut shells, sunflower seeds, athletic tape etc.) and airborne dust can be removed easily with a lawn sweeper or maintenance sweeper.

SWEEPERS

When using machines, several points should be observed:

BRISTLE TYPE

The sweeper should have synthetic fiber bristles such as nylon or polypropylene. The minimum brush length should be 2.5". The maximum bristle diameter should be .030". The brush must contain no metal or wire. Metal fibers can fall out and cause injuries to players and can also damage the surface.

BRUSH SETTING

The brush setting should be monitored. The actual setting will of course depend on the model and type of sweeper. The sweeper will work best, however, when the brush is set so that it barely touches the tips of the fibers of the turf.

DO NOT SET THE BRUSH SO LOW THAT IT DIGS INTO THE TURF PILE OR BACKING.

Too low a setting can damage the turf. Vacuum cleaners are not recommended to remove mud. Contact your Shaw Sports Turf representative if you have any questions about the type of machine to use or brush settings.

TURF LOADING LIMITATIONS

Brushing and brush cleaning may require several trips over the field to finish the operation. Any sweeper that weighs more than 300 lbs. should have turf type low ground pressure tires (pneumatic tires) with a maximum tire pressure of 35 pounds per square inch (psi). Do not park vehicles on the turf, especially in the heat of the day, or leave vehicles on wet turf for long periods of time.

EXHAUST FUMES

For outdoor use we recommend either electric or propane. The type of fuel or power used by a sweeper is of no major importance for outdoor use. However, if the sweeper has an internal combustion engine, make certain that the hot engine exhaust is not discharged down toward the playing surface. Hot objects can damage the field and engine exhaust may soil it. Also check to make sure that the sweeper is designed in such a way that a hot muffler or exhaust pipe cannot drop onto the surface.

OIL SPILLAGE, ETC.

Care should be taken to prevent lubricating oil, gasoline, grease, transmission fluids, battery acid, brake fluid, etc. from dripping, leaking or spilling on the turf surface during sweepings. Such spills can discolor the turf and damage the fibers and turf backing. Proper maintenance procedures should be observed in this regard. Battery acid and other fluids should not be allowed on the surface. Never change or add fluids to maintenance equipment while on the surface.

CAUTION: Electrically powered units may not be properly grounded, do not use them on wet or damp surfaces.

FREQUENCY

The removal of loose rubbish and surface dust should be performed on an as needed basis, generally about once a week depending on usage.

DO'S

Shaw Sports Turf synthetic turf systems are designed to resist both wear and exposure to the elements. The effectiveness of their materials, design and construction is demonstrated by the long life of fields under heavy use in many climates. The following are the most obvious precautions:

- Control access to the synthetic turf system. Keep the synthetic turf system and close adjacent areas clean and free of litter, mud and debris.
- Post signs prohibiting smoking and carrying food or drink onto the synthetic turf system.
- Observe load limits for static and rolling loads, especially when the surface is wet.
- Repair minor damage promptly.
- Follow suggested maintenance and cleaning procedures.
- Contact your Shaw Sports Turf representative for assistance with repairs, renovation work, or any further technical details.

DON'T'S

DO NOT ABUSE THE SYNTHETIC TURF SYSTEM WITH:

- Vehicle traffic
- Heavy static loads
- Fireworks
- Storage of materials such as drums, lumber, equipment, etc.
- Golfing, shot putting, javelin or discus throwing
- Use of long spike track shoes
- Open flames, welding, etc.
- Use of wire brushes in any form
- Use of cleaning equipment, materials, and methods not authorized by Shaw Sports Turf
- High-pressure water sprays exceeding 500 PSI
- Vehicles with non-pneumatic tires
- Introduction of infills or impregnated layers other than supplied or authorized by Shaw Sports Turf
- Do not allow the use of bikes, skateboards, lawn mowers, etc.
- Do not allow any unauthorized use
- Improper storage of a Shaw Sports Turf removable synthetic turf system

GROOMING OF INFILLED TURF

Shaw Sports Turf recommends that every Shaw turf system has a routine brushing every 80 to 120 hours of usage. Routine brushing is accomplished with a commercial turf brush suitable for brushing the surface.

If you do not have a commercial turf brush please contact your Shaw Sports Turf representative to purchase one.

Infilled surfaces do require grooming. Additional grooming may be necessary only when and if the infill has become displaced due to excessive use in certain areas of the surface such as a goal and heavy traffic areas.

ROUTINE BRUSHING

Routine brushing keeps the surface free from debris, but also maintains your Shaw Sports Turf synthetic turf system at its optimum performance. Routine brushing simultaneously achieves three objectives:

1. Keeps infill layer uniform in its distribution
2. Ensures that the exposed part of the fiber is uniform in its direction and stays erect
3. Helps remove litter, leaves, dirt, etc.

The realized benefits from routine brushing are:

1. Consistent footing and ball bounce throughout the surface
2. Maximum aesthetic appeal
3. Lengthened life expectancy

STAIN REMOVAL GENERAL INSTRUCTIONS

Shaw Sports Turf fibers are among the most stain resistant in the industry. Most stains are not "true" stains but rather residue of foreign matter that must be promptly and thoroughly removed.

The first rule in spot removal is promptness. It is always easier to clean up a fresh spill than one that has dried and hardened. Remove any solid or paste-like deposit with a spatula or table knife. Blot up excess liquids with a thick stack of paper towels or a dry absorbent such as "kitty litter" or Fullers Earth. Dry absorbents can then be swept or vacuumed up.

Shaw Sports Turf surfaces provide good resistance to staining. However, it is important to realize they are only one part of a sophisticated system of various components designed for overall field performance. Some cleaning agents that are safe for the fiber can be harmful to other components of the system.

NYLON FIBERS

Cleaning agents are grouped into two sets, one of which can be used in liberal amounts directly on the turf surface, and the second which should only be applied by rubbing a cloth soaked in cleaner, in order to minimize penetration of possibly harmful agents below the turf fibers.

In the first group of cleaners, which generally can be applied to non-infilled systems without any special precautions, are the following:

1. A warm, mild solution of granular household detergent such as Tide or ALL in water, or any neutral low sudsing detergent that is recommended for fine fabrics. Use approximately one teaspoon of detergent to one pint of water. This will handle most stains.
2. Use three percent solution of ammonia in water for more severe cleaning problems. (NOTE: household ammonia is three percent. Industrial aqua ammonia is 33 percent. Dilute nine parts water to one part industrial ammonia, or the available supply as appropriate.) Thoroughly flush the surface, rinse with plenty of cold water afterwards.
3. Clean, dry absorbents such as paper towels or commercial "kitty litter" can be used for applicable stains.

In the second group of cleaners, where agents must be applied sparingly, care must be taken to avoid penetration beneath the turf fibers. We recommend consulting a professional for application instructions.

POLYPROPYLENE & POLYETHYLENE FIBERS

Polypropylene & polyethylene fibers are among the most stain resistant fibers known to man. Hence, most "stains" on Shaw Sports Turf polypropylene and polyethylene fields are not true stains but rather residues of foreign matter which must be promptly and thoroughly removed. (This is not the case with nylon and other fibers on the market.)

Most "stains" on polypropylene or polyethylene fields can be removed with water or soap and water. The first rule is promptness. It is much easier to clean up a fresh oil spill before it has time to dry and harden. Remove any solid or paste-like deposit promptly using a dull knife or spatula-like tool. Blot up excess liquids with a stack of towels, cloth or paper. Dry absorbent clay based materials, such as cat litter absorbers ("kitty litter") can be very useful and should be stored on site. Such dry absorbers can be sweptor vacuumed up.

Cleaning agents are grouped into two sets, one of which can be used in liberal amounts directly on the turf surface, and the second of which should only be applied by rubbing a cloth soaked in the cleaner, in order to minimize penetration of possibly harmful agents below the turf fibers.

The first group of cleaners can generally be applied to infilled systems without any special precautions.

"WATER BORNE" RESIDUES

Most "stains" commonly associated with polypropylene and polyethylene playing fields can be classified as "water borne" stains. These stains are best removed using a warm mild solution of granular household detergent (non-abrasive) and water.

TYPICAL WATER BORNE STAINS

Acid	Cola	Latex Paint
Alcohol	Dye	Milk
Alkali	Food Coloring	Mustard
Beer	Fruit Juice	Tea
Blood	Gatorade	Thimerosal
Butter	Glue	Urine
Chocolate	Ice Cream	Water Colors
Coffee	Ketchup	

1. Brush the residue with a stiff brush
2. Scrub the area with soap and water
3. Rinse the area thoroughly with clear water to remove all traces of soap
4. Dry with absorbent towel(s), if necessary

A three percent solution of ammonia in water may be used in lieu of household detergent for more stubborn residues or stains.

NON "WATER BORNE" RESIDUES

In the second group of cleaners, where agents must be applied sparingly, care must be taken to avoid penetration into the turf fibers. We recommend consulting a professional for application instructions.

NON WATER BORNE STAINS

Asphalt	Floor Wax	Rubber Cleat Marks
Ball-point	Grease	Shoe Polish
Chewing Gum	Lipstick	Suntan Oil
Cooking Oil	Motor Oil	
Crayon	Paraffin wax	

FIELD MARKING, LOGOS, ADVERTISING AND DECORATION PAINTED LINE AND MARKING SYSTEM

NOTE: Inlaid line and marking systems are preferred for optimum performance. Inlaid line and marking systems are constructed utilizing the same material specifications, and are to be inset in such a manner to ensure a good bond, an even finished surface and physical strength equal to the material prior to introduction of the line and marking system. Permanent inlaid line and marking systems are more attractive than painted systems because of the reduction in maintenance and quality of image.

Alternative painting of line and marking systems and their care is explained below. Many facility owners like to use elaborate line and marking systems, including facility logos, league logos, sponsor logos, mid-field and end-zone designs in assorted colors. Others prefer the simpler approach of sharp, well-defined game markings with no extraneous markings. In either instance, the materials and techniques used in applying paints will determine the life of the markings and the ease of removal when these need to be changed. In marking, do not apply paint too heavily. Light applications give good visibility and adequate life and are less abrasive than excessive layers of "caked-on" paint. Also, where possible, do not paint over inlaid lines and logos.

DRY MARKINGS

Chalk markings are NOT recommended for infilled systems. Dry chalk can be captured by the infill which can degrade a field's performance and drainage. There are some aerosol chalks that have proven to work well on synthetic turf. Some brands can stain inlaid lines and logos. We recommend Pioneer's Aerosol chalk as it fades to white over time and will not stain turf.

PAINTS

Regardless of the type of paint used and design required, best results will be obtained when paint is applied to a clean, dry, dust and grease-free base. It is extremely important that old, degraded paint and dirt be washed off any area that is to be repainted if the best appearance and traffic resistance are to be obtained.

If your field needs this type of attention, we recommend contacting a Pioneer Athletics representative for quotations and scheduling at 800-877-1500.

TEMPORARY PAINT

The recommended paints in this category are designed to be easily removable after usage in a limited number of sport games on infilled systems. Usually, the removal can be achieved by applying a special paint remover solution, agitating with a deck brush or remover machine and rinsing thoroughly with water. We suggest a top quality water based paint designed specifically for synthetic turf such as Pioneer Athletics GameLine paints. One day curing of these paints, at moderate temperature and dry weather, is sufficient. Traditional grass paints or household paints can be very difficult to remove.

DURABLE PAINTS

High quality latex based permanent paint is highly durable. Once applied and cured, this paint may require special chemicals and equipment to remove. Thus it is imperative that use of this paint be restricted to carefully chosen areas. For each of the above paints, it is recommended that 24-48 hours be allowed for complete cure. Paint should always be applied to dry turf at moderate temperatures. We recommend Pioneer Athletic's ExtremeLine paints for infilled systems and Titan for non-infilled systems.

STRIPING AND PAINTING

The application procedure for applying temporary and permanent paint is as follows:

Remove excess paint existing on field. Test application procedure before going on the field (use a scrap of turf fastened to asphalt, plywood or use a corner of the field.) Use no more paint than absolutely necessary. Keep water on hand and readily available to rinse any spills or mistakes before they dry.

The paint should be applied lightly to the tips of the turf fibers–not the entire length of every fiber. Applying the paint too heavily makes for a very rough, abrasive surface and will make the removal job very difficult. An airless system is recommended as it provides a superior look while using less paint. We recommend applying paint at 500-1,000 psi using a 317 or smaller tip. Sprayers that do not atomize the paint are not recommended as paint will flow into the infill and negatively impact removal and field performance.

When applying paint, use large templates and cardboard or wood windshields to minimize paint over-spray.

For logos and other markings, always use a guide such as templates or straight edges. Applying more than one coat of paint may make removal significantly more difficult. Therefore, we recommend a single coat be used where possible.

Painting Shaw Sports Turf systems with brushes or rollers is not recommended. Spraying equipment is recommended for the following four reasons:

1. Spraying can make a more uniform paint application
2. A more intricate template can be used if the paint is sprayed
3. Paint can be applied more rapidly with spray techniques
4. Paint can be removed more easily from areas that have been correctly sprayed than from areas on which the paint has been rolled

PAINT REMOVAL

The main key to efficient removal of temporary paint from surfaces is initial control in the application. The use of excessive amounts of paints is wasteful, presents abrasion hazards to players and requires extra work in removal.

Either of the following two techniques should result in clean removal of temporary paints within reasonable time and without excessive labor.

EQUIPMENT NEEDED FOR PAINT REMOVAL:

Use a street broom, deck brush, small sprayer or watering can, water hose, medium-sized tank or bucket for mixing, and a couple of wet vacuums.

MATERIALS NEEDED:

Paint removal method requires the use of 8 percent ammonia. The solution should be prepared in advance and access to water outlets provided. The percent ammonia solution is prepared from aqua ammonia (33 percent ammonia) by diluting with three parts water to one part aqua ammonia.

CAUTION: Aqua ammonia is a strong chemical. Follow the seller's instruction for handling – including eye protection, avoiding skin contact, etc. Ammonia is very corrosive to copper alloys do not use brass nozzles or fittings. For mixing, use galvanized watering cans and a sprayer tank at all times.

PROCEDURES

1. Hose down the painted area with water until the surface is saturated. Using a sprayer or a watering can, apply the ammonia solution on the painted area. It is important that the ammonia solution be metered out uniformly at the rate of one gallon per 45 to 50 square feet. Scrub the wet area with a street broom until the ammonia solution turns to foam. A sweeping motion similar to sweeping a floor is sufficient. During this step, the paint will start to loosen and the pigment will begin to run. However, do not shorten the sweeping at this point.

2. Wait about 10 minutes to allow the foamed ammonia to work. Apply the same amount of ammonia solution on the area a second time. Thoroughly scrub the area with a street broom. This scrubbing is not intended to be a light scrub, scrub vigorously.

3. Hose down the area with water and simultaneously pick up the water and dislodged paint residue with the wet vacuum. Do not let the water and paint residue seep across the field. If the residue and water start to spread, stop the hosing and let the wet vacuum catch up. Repeat the process if necessary. However, if the paint was applied lightly and uniformly, repeating the process should not be necessary.

If the paint stubbornly adheres to the turf, take the following additional steps:

1. Repeat steps as above. Blast or fracture the paint loose with hot water from an industrial high pressure hot water sprayer. Set the water temperature at 150 degrees F (65C). Do not spray the water at "point blank" range – keep the wand at least 12 - 15 inches (30 - 40cm) from the turf. Use 10 gallons of hot water per minute and a water pressure of no more than 300 psi (21 kg/cm^2). No solvent is required.
2. Wet vacuum the residue and water or immediately flood the field.
3. Rinse the area thoroughly with lots of water and pick up rinse water rapidly to avoid unsightly spots or paint residue.

LOAD LIMITS

As a general rule, no long term static load of more than 3 PSI (300 lbs./sq.ft), nor any transient rolling load of more than 35 PSI be applied to any Shaw Sports Turf surface (foam pad or elastic layer underpad). Rolling loads of up to 30 psi are acceptable on an occasional basis. (The loading of a pneumatic-tired vehicle is approximately equal to the air pressure in its tires.)

It is good practice to eliminate any unnecessary long-term static loads. Sheets of 3/4" exterior plywood or pieces of 2" x 10" lumber may be used to spread major static loads and thus minimize the risk of damage to the turf system.

NOTE: Under static loads, the surface should first be covered with a load spreader such as polyethylene sheeting to keep it clean. New plywood may contain materials that will leach out and stain the turf if it is exposed to water therefore a polypropylene barrier should be used under the plywood to prevent this from happening.

SNOW AND ICE MANAGEMENT

Snow and ice are not harmful to Shaw Sports Turf synthetic turf systems and can generally be left to melt and run off on their own accord. Sometimes, however, it becomes essential to clear away snow and ice to permit scheduled use of the surface. When this happens, the working principle for snow is to leave it in place until as near to time of use as possible. Doing so will minimize the risk of ice build up from cold wind blowing across a damp snow-cleared surface. Ice removal is more difficult, especially if a heavy layer has built up following freezing rains (see below). Two methods are used for snow removal:

SNOW BLOWERS

If the snow is dry and powdery, it can be swept or blown from the field using a rotary brush or snow blower. Be sure that any machinery used is set so as not to dig into the turf or gouge the surface.

If using a blower:

1. The first pass of the blower should be down the center of the field.
2. Second pass should be made at the edge of either side of the first pass and the blower must be adjusted so that the snow is deposited in the truck.
3. The blower then continues down one side and up the other accompanied by the truck.
4. Clean off remaining snow with a mechanical broom.

SNOW PLOWS

Snow that is wet and sticky may be more easily pushed off the field by using a snow blade with a 4" to 6" wide rubber tip mounted on a Jeep or light tractor. If such a blade is used, extreme care should be taken to avoid digging into the surface. The best blade setting is one that barely "kisses" the top of the surface and rolls the snow ahead of the blade.

In this procedure, the snow itself will maintain contact with the surface. Wood, metal or other rigid surface blades should not be used. Adjust the blade to proper height taking care that it will not gouge

or dig into the surface. Shaw Sports Turf recommends wheels on each side of the blade to ensure the blade can not possibly dig into the surface.

If using a plow:

1. Push snow into piles off playing surface.
2. Scoop into truck using front-end-loader., also with rubber tipped blade. Use extreme caution.
3. Use a rotary mechanical broom to clean off the remaining snow.

Severe cases of ice can be removed by using a small lawn roller to break up the ice and then proceed as above. It is recommended that all of the equipment used as described above be moved on pneumatic tires. LUGS, STUDS AND CHAINS ARE DAMAGING AND SHOULD NOT BE USED.

Snow removal equipment may be stopped momentarily on the surface, but DO NOT PARK SUCH EQUIPMENT ON THE FIELD OVERNIGHT OR FOR SEVERAL HOURS. Tire pressure should be below 35 PSI.

IMPORTANT: Keep tarps or field covers off the field in freezing weather. They are difficult to remove when frozen to the surface. Avoid using a tarp on the field during freezing weather. Tarps can freeze to the turf by means of condensation and thus can be very difficult to remove for a scheduled event.

WATERING OUTDOOR SYNTHETIC TURF SYSTEMS

Some owners have found it desirable to deliberately wet their synthetic turf surfaces, especially in periods of very hot weather.

Wetting the surface provides moisture for cooling the field before evaporation takes place. It also acts as a lubricant to the turf but it must be noted it may also lower traction to a slight degree. On a hot sunny day outdoor playing surfaces can receive enough radiant energy to evaporate about a quart of water per square yard per hour. As the moisture evaporates the temperature of the synthetic turf will match that of natural grass in the same area.

A full sized soccer, hockey or football field may evaporate up to 1200 gallons of water per hour in extremely hot weather. If you decide to water your field, be careful to distribute the water evenly. If water is put on the field, it should not be from a polluted supply. Also be aware, when a field is watered on an extremely hot day, you risk dangerously raising the heat index level which can be harmful to athletes.

SPECIAL EVENTS ON NON-REMOVABLE SYNTHETIC TURF SYSTEMS

Assemblies and convocation facilities with synthetic surfaces are often used for graduation ceremonies at many colleges / universities. The basic precaution is to keep long-term static loads below 300 pounds per square foot by the use of plywood or other load spreaders. Normally, 4' x 8' sheets of 3/4 " plywood do a good job of load spreading, provided the load is not applied too near the edges of each panel. Landscape fabric should be laid over the turf under the load spreaders to avoid staining or spoilage of the turf.

Any chairs placed directly on the playing field surface should be inspected to be sure that the tips of the legs couldn't damage the turf. Metal chair legs should be protected with rubber tips. The legs of wooden chairs should be free of any sharp edges that may tear the turf or damage the underpad.

MINOR REPAIRS TO TURF SURFACES

Your playing surface has been carefully engineered to provide many years of service. In the case of vandalism or unusual abuse, limit your maintenance staff to performing minor repair. For more serious problems, consult your Shaw Sports Turf representative.

WHEN TO REPAIR

To properly maintain a synthetic playing field, be aware of day-to-day activities, usage and condition of the facility. It is very important that any minor damage be repaired immediately because a small problem may eventually grow into a major repair. In addition to routine awareness of field conditions, once or twice a year, each field should be given a careful and thorough inspection, preferably in the spring with a follow-up in early fall. All seams should be inspected and any loose areas noted and repaired. Go over the body of each panel of fabric and note any rips and/or tears. Assess the status of the under-padding and the condition of the surface. In the case of an older and/or heavily used field, inspections should be made more frequently.

WHY A SPRING INSPECTION?

Fields endure their heaviest scheduled activity during the fall months. Once your inspection has been completed you may require the assistance of a professional Shaw Sports Turf crew. Your Shaw Sports Turf representative is always available to assist in the case of an emergency, but planned visits permit more efficient and cost effective service. If repairs are required they are easier to make in warm, dry weather. Adhesives will hold better and cure faster when there is more opportunity to leave the repaired area undisturbed. Gluing repairs should not be attempted if the field is wet.

WHAT ARE "MINOR REPAIRS?"

An open spot in a sewn or glued seam, where the loose area in the seam extends from a few inches to one or two feet (along a glued seam line where at least one of the turf edges is still attached to the seam tape).

Cuts, rips or tears in the surface fabric that are less than six inches or so in length do not generally require a special trip by our service staff and can be repaired by the owner without much effort. These can also be regarded as minor unless allowed to become larger. All of these problems can be handled by sewing or adhering the repairs. To repair minor seam openings or loose seam areas:

1. For infilled systems vacuum sand or rubber from the turf to be repaired.
2. Be sure that the fabrics to be adhered are dry, free from loose sand, dirt, old adhesive and other foreign matter.
3. Remove the area of debris.
4. Position the fabric to check for satisfactory final placement.

5. Be sure the seaming tape to which the fabric will be adhered is itself adhered to the underlying pad (If system uses an underlying pad).
6. Apply a small amount of caulk onto seaming tape. Avoid excessive adhesive to reduce the possibility of bleed through or bleed out. Spread the adhesive with a trowel and trowel so that the entire fabric is coated lightly and evenly.
7. Press the fabric into the adhesive bed uniformly.
8. Weight down the area and allow to cure for a minimum of 2 hours.
9. For in-filled systems, spread appropriate rubber or sand on the repaired area and brush into the turf thoroughly until even with surrounding playing areas.

SMOKING SHOULD BE STRICTLY PROHIBITED IN THIS AREA!

OTHER TYPICAL REPAIRS
CIGARETTE / FIREWORK BURNS

Use a hand held metal brush (such as is used to remove paint) and brush the spot vigorously to separate the fibers. If brushing the turf does not remove the damage, take a razor knife and cut the fused area away.

CONCLUSION

Since 1989, Shaw Sports Turf has refined installation techniques and developed and manufactured synthetic surfaces that are extremely advanced both in material and design. In comparison to natural grass surfaces, our synthetic turf systems can be considered virtually "maintenance-free. " However, your surface will perform, look and feel better for a longer period of time if the maintenance procedures outlined in this manual are followed closely. This manual attempts to address and answer the most frequently asked questions regarding your surface. However, there are always new demands, uncertainties and unanticipated occurrences that may arise. Please, do not hesitate to call us for any questions or concerns that you may have regarding specific care for your surface.

PROHIBITED ACTIVITIES ON A SYNTHETIC TURF SYSTEM:

- Storage of materials such as drums, lumber, equipment, etc
- Unnecessary vehicle traffic
- Shot putting, javelin or discus throwing, and the use of any metal spiked shoe
- Open flame, fireworks, welding, etc.
- Use of wire brushes in any form
- Use of cleaning equipment, methods or materials not authorized
- High-pressure water sprays exceeding 1000 psi
- Vehicles with non-pneumatic tires
- Introduction of infills that varies from the Shaw Sports Turf specifications

Like most sports surfaces, your Shaw Sports Turf system requires scheduled cleaning and maintenance to ensure the appearance of the surface. The frequency of this cleaning schedule depends on the desired performance, the type of surface and its uses, the hours of operation and the foot traffic volume of the facility. The closer a maintenance schedule is followed, the better the appearance and performance of your synthetic turf system.

KEY POINTS TO REMEMBER

- Keep the field clean.
- Cross-brush the turf surface as often as required.
- Post "NO SMOKING" signs around the turf. Some people break the rules, but most will follow them. Surfaces do not burn readily, but will scorch as a result of cigarettes and burning matches.
- Do not park vehicles or equipment on the field for hours or overnight.
- Do not abuse the surface by overloading it. Place plywood on surface to protect and to displace weight of heavy loads over a larger area.
- Call for help or advice when you have questions about your field and its use. Your representative can assist with your questions and inquiries and we are always eager to help you experience your field to its fullest potential.
- Follow the exact recommendations and procedures shown in this manual, will assure that your Shaw Sports Turf surface will give you years of good service with minimal maintenance.

www.shawsportsturf.com

Stormwater Report

Wellesley College Athletic Accessibility Renovations

Wellesley College
106 Central Street
Wellesley, MA 02481

Owner:
Wellesley College
106 Central Street
Wellesley, MA 02481

Submitted To:
Town of Wellesley
Building Department
525 Washington Street
Wellesley, MA 02482

Civil Engineer/ Landscape Architect:
Activitas, Inc.
16 School Street
Dedham, MA 02026
(781) 355-7040

Electrical Engineer
RDK Engineers, an NV5 Company
200 Brickstone Square
Andover, MA 01810
(978) 296-6232

Surveyor
Landtech Consultants
515 Groton Road
Westford, MA 01886
(978) 692-6100

Geotechnical Engineer
Haley & Aldrich
465 Medford Street #2200
Charlestown, MA 02129
(617)886-7400

December 4, 2018

Executive Summary

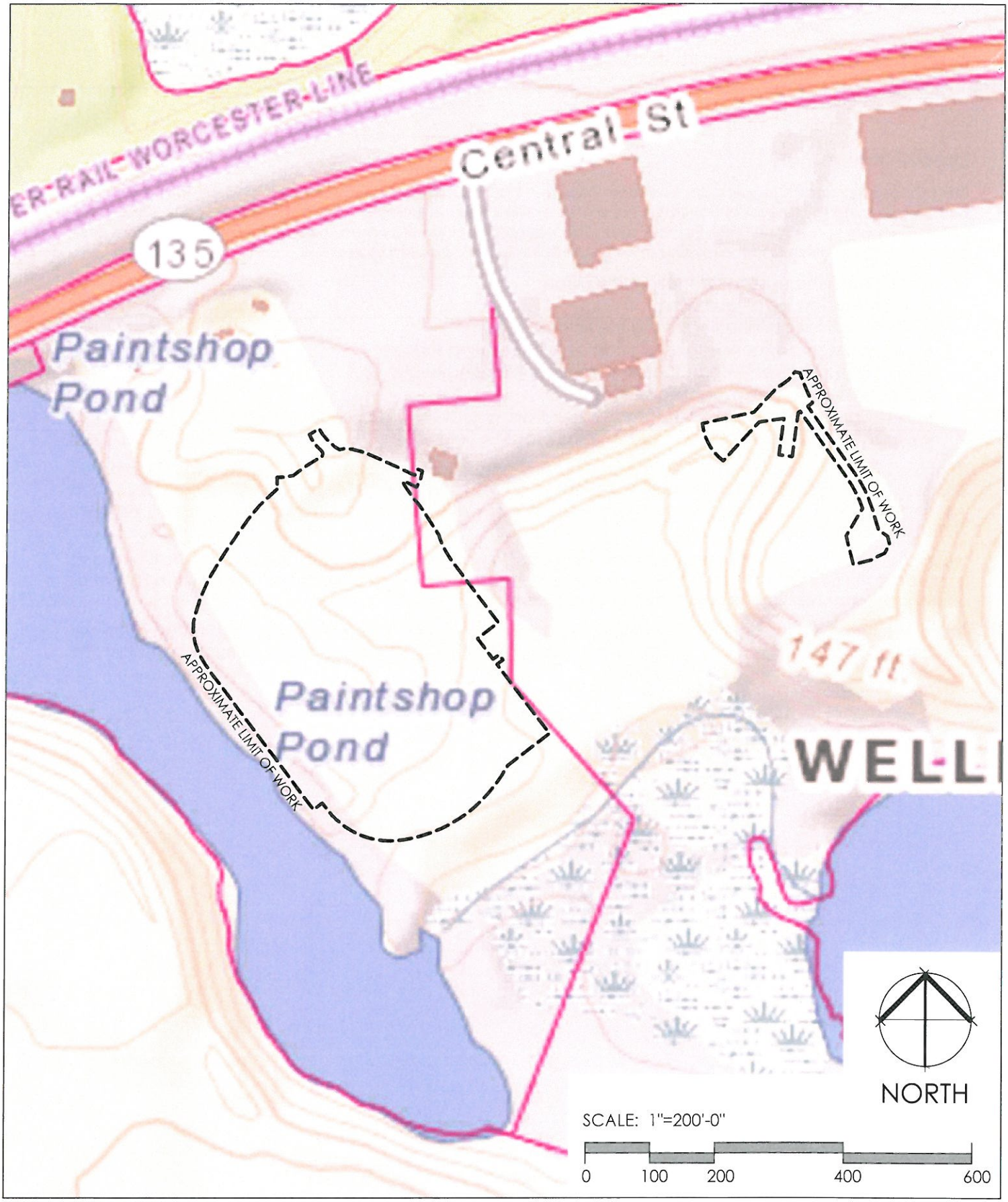
The proposed project is located on Wellesley College's West Campus Athletic Complex located to the north of Waban Lake and to the east of Paintshop Pond. This existing Athletic Complex was developed in early 2000 at the former Henry Wood's Sons Paint Factory site. The elements being renovated include the track and field and adjacent support areas and the existing small practice field. The proposed project will:

- Replace the existing synthetic turf surface;
- Install a new pole vault area;
- Install athletic ballnetting along the field endlines;
- Install a layer of new track surfacing over the existing surface;
- Provide improvements to the existing channel drain system;
- Install a new athletic lighting system;
- Provide ADA accessibility upgrades at walkways and spectator seating; and
- Install track throwing events at the small practice field

Construction of the proposed project is subject to the Massachusetts Department of Environmental Protection Stormwater Management Policy (January 2008) and local bylaws. The project will comply with the DEP policy and will satisfy regulatory requirements set forth by MA DEP, the MA Wetlands Protection Act and the Town of Wellesley Wetlands Protection Bylaw.

Under the existing and proposed conditions stormwater runoff is collected within the synthetic turf field and connects to the existing drainage system that flows to the existing stormwater basin on-site. The project will meet all applicable Stormwater Standards to the extent practicable.

The following report was created in accordance with the "Massachusetts Stormwater Handbook" dated January 2008 and the local bylaws and is organized into sections that correspond to the categories listed in the "Massachusetts Stormwater Report Checklist".



activitas
Planning | Landscape | Athletic Facilities
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telephone: (781) 326-2600
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WELLESLEY COLLEGE
ATHLETIC ACCESSIBILITY RENOVATIONS
LOCUS MAP

JOB NO.	18032
DATE	4 DECEMBER 2018
SCALE	1"=200'-0"
REF. NO.	
SKETCH NO.	1

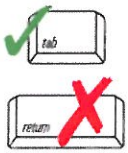
Massachusetts Stormwater Report Checklist

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

M Buczynski 12/3/2018
Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- [X] No disturbance to any Wetland Resource Areas
- [ ] Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- [ ] Reduced Impervious Area (Redevelopment Only)
- [X] Minimizing disturbance to existing trees and shrubs
- [ ] LID Site Design Credit Requested:
  - [ ] Credit 1
  - [ ] Credit 2
  - [ ] Credit 3
- [X] Use of "country drainage" versus curb and gutter conveyance and pipe
- [ ] Bioretention Cells (includes Rain Gardens)
- [ ] Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- [ ] Treebox Filter
- [ ] Water Quality Swale
- [ ] Grass Channel
- [ ] Green Roof
- [ ] Other (describe): _____

Standard 1: No New Untreated Discharges

- [X] No new untreated discharges
- [X] Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- [X] Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☐ Soil Analysis provided.

☐ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☐ The BMP is sized (and calculations provided) based on:

- ☐ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

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

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☒ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☐ Name of the stormwater management system owners;
- ☐ Party responsible for operation and maintenance;
- ☐ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☐ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

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1.0 Project Type

The proposed project is located on Wellesley College's West Campus Athletic Complex located to the north of Waban Lake and to the east of Paintshop Pond. This existing Athletic Complex was developed in early 2000 at the former Henry Wood's Sons Paint Factory site. The elements being renovated include the track and field and adjacent support areas and the existing small practice field. The proposed project will renovate and/or upgrade the following elements:

- Existing Synthetic Turf Surface: The current surface will be removed and replaced with a new synthetic surface as the existing carpet has come to the end of its useful life.
- New Pole Vault Area: A portion of the synthetic turf surface along the east side of the field will be renovated from synthetic turf to track surfacing.
- Athletic Ballnetting: At the endlines of the synthetic turf field new 15' high athletic ballnetting will be installed to help programmatic needs in keeping balls within the field of play.
- Overlay Track Surfacing: A new top layer of track surfacing will be installed over the existing track surfacing to improve surface resiliency.
- Channel Drain Improvements: At the inside edge of the existing track oval there is an existing grated channel drain that collects runoff from track (the track pitches to the inside of the oval). A portion of the channel drain between the track oval and the track "D" areas (areas of the track between the endlines of the field and the track oval) will be replaced with a new drain that is more appropriate for a collegiate-level facility. This will not change the drainage patterns at the track, but rather provide an improved transition for track events that have to cross this channel drain (example steeple chase and high jump).
- Athletic Lighting: New Athletic Lighting is proposed at the track and field. The proposed system will include four (4) light poles that are 80'-90' high. Please note that a variance is being filed for the light poles exceeding the allowable 45' maximum structure height.
- ADA Accessibility Upgrades: The project proposes to regrade and repave portions of the existing walkway leading down to the track that exceed ADA/MAAB slope requirements for accessible walkways. In addition, new railings and guardrails will be installed at the existing seating area to meet ADA/MAAB standards for access stairs as well as provide dedicated areas for accessible seating.
- Track Throwing Events Areas: When the West Athletic Complex was originally installed, Wellesley College did not have a NCAA Varsity Track Program and throwing event areas were not installed as part of the original project. Since that time a NCAA Varsity Track Program has been implemented and this project seeks to install track throwing events that are essential to the program. A new shot put area, hammer/discus throwing cage, and a javelin runway are proposed at the small grass field between the Keohane Athletic Center and the competition soccer field.

The project has been designed in accordance with the "Massachusetts Stormwater Handbook" dated January 2008 and applicable local bylaws.

2.0 LID Measures

Key features of Low Impact Development (LID) stormwater management systems include implementing practices that maintain a site's existing hydrology, using decentralized practices to manage stormwater close to the source of generation, and maximizing onsite infiltration to reduce runoff and landscape watering requirements.

The following LID techniques Best Management Practices are specified in the proposed development program to mitigate the increase in stormwater runoff from the site.

BMPs Used:

- Use of "country drainage" and overland flow in areas of the site.

3.0 Standard 1 – No New Untreated Discharges

The MA Stormwater Handbook requires that the project demonstrate that there are no new, untreated discharges and that new discharges will not cause erosion or scour to downstream wetlands or waters of the Commonwealth.

The computations and strategies for Standards 4 through 6 in this report demonstrate that there will be no new untreated discharges from the site. The use of level spreaders and riprap basins at stormwater outlets provide protection to not cause erosion or scour to downstream wetlands and/or waters of the Commonwealth.

4.0 Standard 2 – Peak Rate and Volume Attenuation

Standard 2 requires that peak rates of flow be attenuated for the proposed condition and the Town of Wellesley Bylaw requires a 5% reduction of rates and volumes in the 2-yr and 10-yr storms and to meet or reduce rate and volume for the 50-yr and 100-yr storms. The following section outlines the procedure for determining the peak rates and volume for the existing condition as well as the methods for attenuating the peak flows and volumes in the proposed condition.

4.1 Overview

This analysis considers the proposed project site and surrounding areas that contribute stormwater to the site and associated areas. The following section outlines the procedure for determining peak rates and volumes for the 2-, 10-, 50-, and 100-year storms.

4.2 Soil Conditions

A current NRCS soil report was compiled and shows that soils within the area of analysis are well-draining/excessively draining with an exception of a potion to the southeast of the track. The NRCS report can be found in the Attachments Section of this report. With respect to the NRCS soil report, the majority of soils on-site have high infiltration rates and calculations below utilize Rawl's rates for the respective soils on site.

Table 1: NRCS Soil Types

Map Designation	Soil Name	Soil Group (Raul's Rate)
51	Swansea Muck, 0-1% slopes	B/D (0.09 in/hr)
245B	Hinckley Loamy Sand, 3-8% slopes	A (2.41 in/hr)
245C	Hinckley Loamy Sand, 8-15% slopes	A (2.41 (in/hr)
253D	Hinckley Loamy Sand, 15-35% slopes	A (2.41 in/hr)
254A	Merrimac Fine Sandy Loam, 0-3% slopes	A (2.41 in/hr)
600	Pits, Sand, and Gravel	A (8.27 in/hr)
602	Urban Land, 0-15% slopes	A (2.41 in/hr)
626A	Merrimac-Urban Land Complex, 0-8% Slopes	A (2.41 in/hr)

4.3 Drainage Model Considerations and Results

Track & Field Area

Neither a curve number nor a runoff coefficient for synthetic turf formally exists. This means that an engineer must use his/her best judgment in completing calculations based on previous experience, existing site conditions, and the known profile of the synthetic turf system. We typically will use a curve number that is similar to good grass over whatever soil type the soils maps and/or a test pit show, not account for infiltration at the bottom of the field profile

and use a Tc of 6min. This is a precedent we have been using for many years and seems consistent with the results at the actual constructed conditions. Synthetic turf drains vertically and therefore there is no actual surface runoff, which means it would have a very low CN. However, that runoff is now flowing subsurface laterally through compacted stone and over the subsurface soils resulting in infiltration of some of that runoff based on the existing soil type. Therefore we have found it prudent to use a "good grass" CN, not account for infiltration, and use a fast Tc and that is what we typically use for a new synthetic turf field drainage model.

However, the West Campus Athletic Complex was designed in 2000 and then built in 2004. It is a fully engineered site consisting of capped soils due to previous contamination from the former Henry Wood's Paint Shop that was located in this area. The existing track and synthetic turf field are NOT over the capped portion of the site. The proposed throwing event areas ARE over the capped portion of the site. The drainage report associated with the original project cannot be found. Ideally we would reuse the model from that report to consider the proposed changes at the site. However, with that material unavailable, we must use our best judgment in using what we do know for the existing synthetic turf field. What we do already know is that the majority of the track and field overlay A soils with one area being well-draining soils and the other being excessively draining and a very small area over D soils; we know the profile and collection system of the synthetic turf field; and we know the field utilizes an 8" pipe for an outlet of the system. We also know that the runoff from the surrounding track areas flow to a channel drain that ties into the field drainage system. In this particular case based on the soil types, the well draining soils, and results from field infiltration rate testing that was completed, we felt it was appropriate in this unique case to model the turf with a CN of 98, a slower Tc, and assume infiltration over the entire turf profile using the infiltration rates of the soils within the footprint of the field. In running these calculations we found that in the existing conditions it shows ponding on the surface of the track and field in the 50-year storm and above. To the best of our knowledge, this does not happen. However, we consider this to be a conservative approach to the model because if the infiltration capacity is even better than what we have used and/or the Tc is longer than what was used, then the rate and volume of runoff will be even less than what the model is calculating.

In the proposed conditions at the track and field, the change is that the project will replace a length of the synthetic turf field with track pavement and surfacing for use of a pole vault area. This means that while the surface CN will not change (remains at 98), the ability to infiltrate over that new area of paving will be removed and therefore the rate and volume of runoff will increase. The proposed design will install an outlet control structure to further choke back the flow of runoff leaving the track and field drainage system from the 8" pipe to mitigate the peak flow and volumes.

Throwing Event Area

The new throwing events are proposed on the small natural grass practice field area. This location is over the existing engineered barrier capping the soils below. The existing field profile is basically 2" of sod, 36" of sand, and a shallow drainage system sitting on top of an impermeable membrane. Water cannot infiltrate in the area of the cap. The majority of this sand based grass field drains vertically to the subsurface drainage system or flows laterally to existing area drains adjacent to the field. The drainage system outlets to an existing water quality swale to the south of the field. The drainage area flowing towards the water quality swale is 5.70-acres. The proposed change in impervious surface attributed to the throwing events is 0.07-acres. The drainage model shows that the change in impervious in this drainage area is so insignificant that it does not increase rate or volume. Understanding that the local bylaw requires a 5% reduction on rate and volume in the 2- and 10- year storms, we are requesting that this requirement be waived for this area as there is no way to decrease the volume because we cannot infiltrate over the cap and the profile is limiting to allow for use of the field for detention.

The following sections describe in detail how the site model was setup and the results of the model for the 2-, 10-, 50-, and 100-year storms.

4.4 Existing Conditions

The areas of analysis were broken into two discharge points that eventually come together. However, for this analysis it makes sense to consider these separately:

DP-1A is the existing surface detention basin on-site that a large portion of the athletic facility including the track and field area drains to. For this model, we only consider the track and field area for the analysis.

DP-1B is the existing water quality swale to the south of the small practice field where the subsurface grass field drainage system outlets.

4.4.1 Existing Drainage Areas

EX-01 is approximately 3.93 acres and consists of the track and field portion of the site. Runoff from this area is collected in the existing track and field, connects into the site drainage system, and discharges to the stormwater basin to the north of the track (DP-1A). This drainage area was analyzed separately in order to break out the drainage flowing out of the track and field system. In consideration of meeting the Wellesley stormwater standard for decreasing discharge rates from existing to proposed conditions in the 2-year and 10-year storms by 5%, this was the only area deemed necessary for analysis to meet that standard. Refer to the Existing Conditions HydroCAD model.

EX-02 is approximately 5.70 acres and consists of the two natural grass fields and an asphalt walkway to the east of the track. Runoff from these fields are collected within the field's subsurface drainage system associated with the capping of the engineered barrier and discharged to a water treatment swale to the south of the fields (DP-1B).

Table 2: Summary of Ground Covering for Existing Conditions

Drainage Area	Total Area (SF)	Soil Type	Impervious* (SF)	Track (SF)	Synthetic Turf (SF)	Sand (SF)	Crushed Stone (SF)	Infield (SF)	Landscape (SF)	Landscape (Good) (SF)
EX-01	171,340	51	-	6,514	1,029	-	-	-	-	-
		245C	-	22,339	71,795	-	-	-	4,513	-
		253D	-	11,179	-	-	-	-	741	-
		600	-	29,664	22,950	616	-	-	-	-
EX-02	248,173	51	-	-	-	-	-	-	30,063	60,357
		245C	-	-	-	-	-	-	1,634	2,108
		253D	12,112	-	-	-	-	-	58,372	72,398
		254A	-	-	-	-	-	-	7,559	3,570

*Impervious surfaces include asphalt pavement, cement concrete, buildings, granite, and retaining walls.

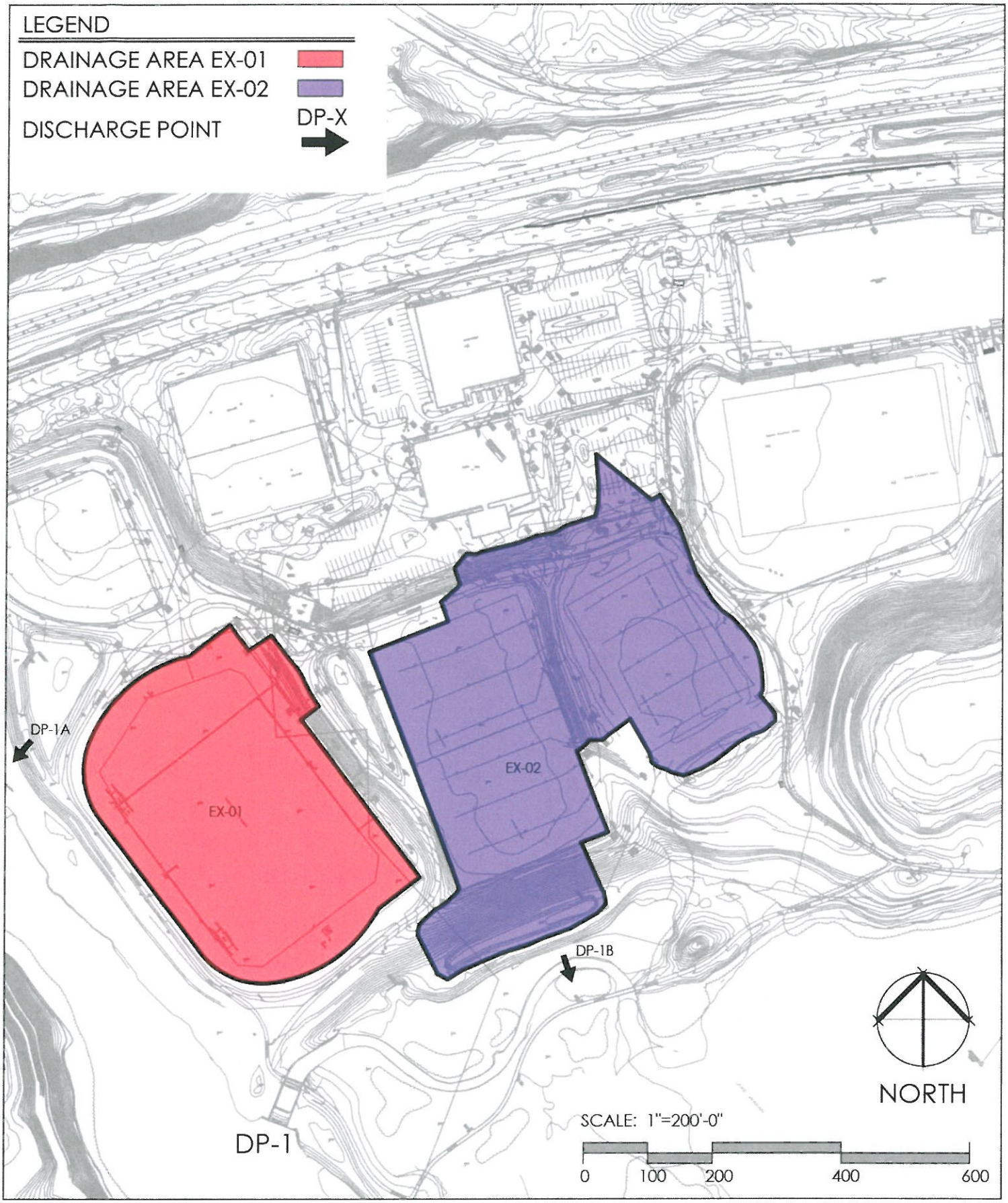
Figure 2 shows a map of the existing drainage areas.

Table 3 summarizes the existing drainage areas, including the pertinent information used for the hydrologic analysis.

Table 3: Existing Characteristics Summary

Drainage Area	Area	Curve Number*	Tc** (min)
	Acres (AC)		
EX-01	3.93	96	9.3
EX-02	5.70	66	8.3

*Reference Attachment Section 13: HydroCAD Data – Existing_Conditions-2018_12_03, CN of each drainage area.
**Reference Attachment Section 13: HydroCAD Data – Existing_Conditions-2018_12_03, Tc of each drainage area.



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WELLESLEY COLLEGE
ATHLETIC ACCESSIBILITY RENOVATIONS
PRE-DEVELOPMENT PLAN

JOB NO.	18032
DATE	4 DECEMBER 2018
SCALE	1"=200'-0"
REF. NO.	
SKETCH NO.	2

4.5 Proposed Conditions

The proposed project includes the resurfacing of the existing track, installation of a new infilled synthetic turf system, installation of track paving in lieu of an area of synthetic turf, repaving of existing asphalt ADA accessible walkways adjacent to the track and field, construction of throwing events at the small practice field, and installation of new athletic lighting at the track and field. The proposed conditions continue to consider the drainage areas described in the Existing Conditions section, as modified to align with the proposed project site adjustments.

4.5.1 Proposed Drainage Areas

The following is a breakdown of the proposed drainage areas.

PR-01 is approximately 3.93 acres and consists of the track and field portion of the site. The change from existing to proposed conditions is the installation of track paving in an area previously containing synthetic turf. Runoff from this area is collected in the existing drainage system and discharges to the stormwater basin to the north of the track (DP-1A). This drainage area was analyzed separately in order to break out the drainage flowing out of the track and field system. In order to meet the Wellesley stormwater standard for decreasing discharge rates and volumes from existing to proposed conditions in the 2-year and 10-year storms, this was the only area deemed necessary to meet that standard. Refer to the Proposed Conditions HydroCAD model.

PR-02 is approximately 5.70 acres and consists of the two natural grass fields and an asphalt walkway to the east of the track, and the new track throwing event areas. As discussed in Section 4.3, while there is a small increase in impervious area, it is so insignificant that it does not produce an increase in runoff or volume from the site. Runoff from these fields is collected within the field's subsurface drainage system and discharged to a water treatment swale (DP-1B).

Table 4: Summary of Ground Covering for Existing Conditions

Drainage Area	Total Area (SF)	Soil Type	Impervious* (SF)	Track (SF)	Synthetic Turf (SF)	Sand (SF)	Crushed Stone (SF)	Infield (SF)	Landscape (SF)	Landscape (Good) (SF)
PR-01	171,340	51	-	7,467	74	-	-	-	-	-
		245C	-	31,803	62,334	-	-	-	4,512	-
		253D	-	11,179	-	-	-	-	741	-
		600	-	29,664	22,950	616	-	-	-	-
PR-02	248,173	51	-	-	-	-	-	-	30,063	60,357
		245C	-	-	-	-	-	-	1,634	2,108
		253D	14,040	-	-	-	2,715	-	55,359	70,769
		254A	1,036	-	-	-	-	-	6,766	3,326

*Impervious surfaces include asphalt pavement, cement concrete, buildings, granite, and retaining walls.

4.5.2 Proposed Drainage Area Summary

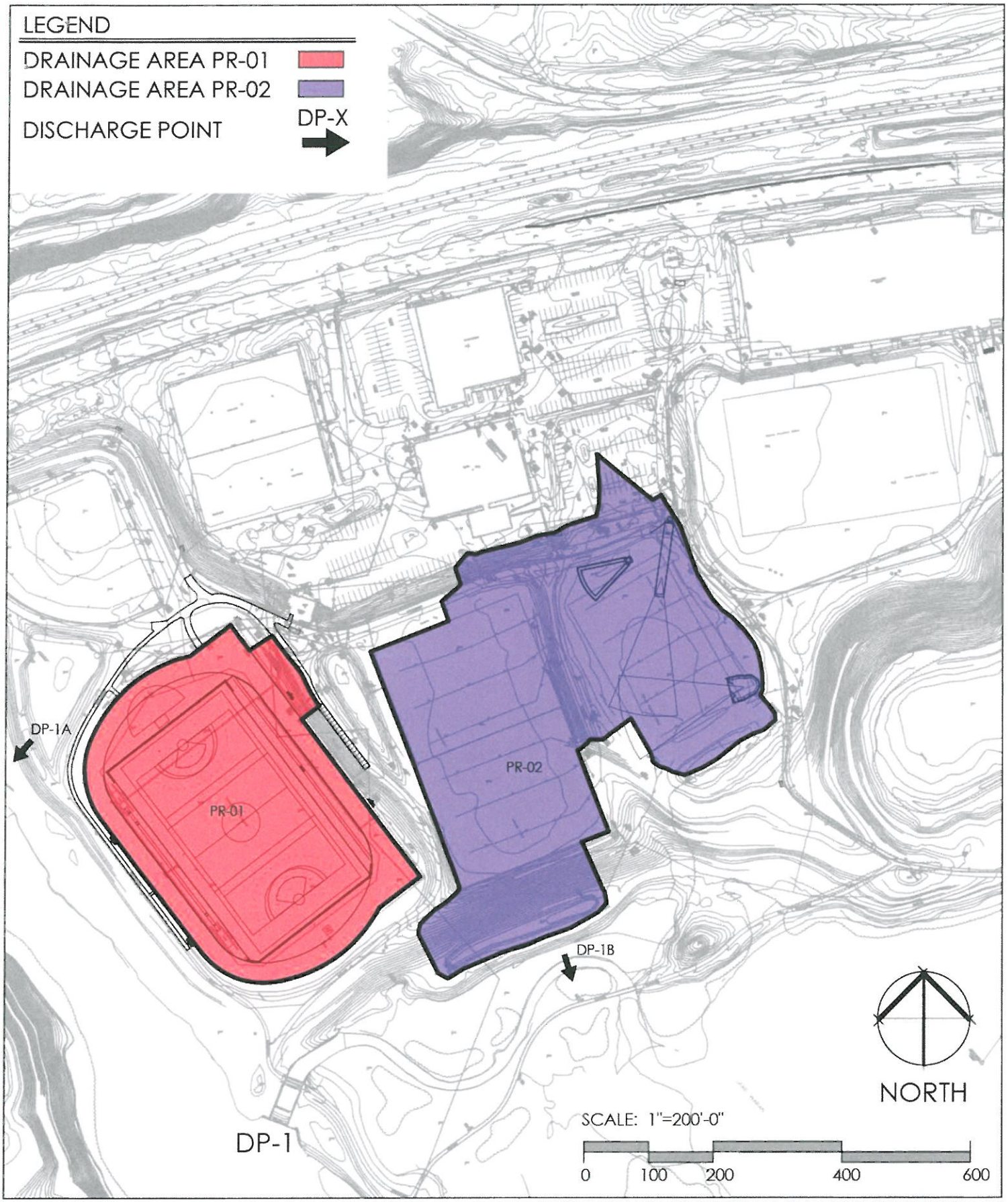
Figure 3 shows a map of the proposed drainage areas and respective discharge points.

Table 5: Proposed Conditions Drainage Area Characteristics Summary

Drainage Area	Area	Curve Number*	Tc** (min)
	Acres (AC)		
PR-01	3.93	96	9.3
PR-02	5.70	66	8.3

*Reference Attachment Section 13: HydroCAD Data – Proposed_Conditions-2018_12_03, CN of each drainage area.

**Reference Attachment Section 13: HydroCAD Data – Proposed_Conditions-2018_12_03, Tc of each drainage area.



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SKETCH NO.	3

4.6 Peak Discharge Runoff Rates and Volumes

The comparison of Peak Discharge Rates and Volumes for the 2-, 10-, 50-, and 100-year storm events under the existing and proposed conditions considers the comparison of total runoff in existing and proposed conditions for the two Discharge Points at the site.

Overall Discharge Point Analysis

A comparison of existing to proposed conditions was completed for the 2-, 10-, 50-, and 100-year storm events. This is to show that stormwater leaving the overall site is at a lower rate than the existing conditions and that proposed rates and volumes experience a 5% reduction in the 2-year and 10-year storms in relation to the existing conditions.

Table 6: Overall Discharge Point Analysis of Existing and Proposed Peak Rates of Runoff

Discharge Point	2-Year Storm		10-Year Storm		50-Year Storm		100-Year Storm	
	Existing (cfs)	Proposed (cfs)	Existing (cfs)	Existing (cfs)	Proposed (cfs)	Proposed (cfs)	Existing (cfs)	Proposed (cfs)
DP-!A	0.71	0.47 (-33%)	1.22	0.78 (-36%)	1.29	0.80	1.31	0.81
DP-1B	3.55	3.55	11.04	11.04	20.90	20.90	25.53	25.53

cfs- Cubic feet per second

Table 7: Overall Discharge Point Analysis of Existing and Proposed Peak Volume of Runoff

Discharge Point	2-Year Storm		10-Year Storm		50-Year Storm		100-Year Storm	
	Existing (cf)	Proposed (cf)	Existing (cf)	Existing (cf)	Proposed (cf)	Proposed (cf)	Existing (cf)	Proposed (cf)
DP-!A	420	297 (-29%)	2,453	1,757 (-28%)	4,760	3,409	5,886	4,214
DP-1B	14,463	14,463	38,432	38,432	70,521	70,521	85,771	85,771

cf- Cubic feet

As noted in Section 4.3, with the work in EX-02 being so insignificant and therefore no change in rates or volumes to DP-1B and the fact that this work is over the engineered barrier, we respectfully request a waiver from the 5% reduction requirement for the 2- and 10-year storms.

4.7 Methodology and Design Criteria

4.7.1 Hydrologic Model Description

The drainage analysis was performed using the Soil Conservation Service (SCS) TR-55 and TR-20 methodologies and the computer program HydroCAD 10.00-22 by HydroCAD software Solutions, LLC.

4.7.2 Design Storms

The analysis was performed on the 2-, 10-, 50-, and 100-year frequency rainfall events. The events were based on the 24-hour Type-III duration storm.

4.7.3 Time of Concentration

Time of concentration (Tc) values were calculated using Average Velocities for Overland Flow, found in SCS TR-55 Urban Hydrology for Small Watersheds. The minimum Tc used was six (6) minutes.

4.7.4 Curve Numbers

Curve numbers were developed for each of the different use categories and hydrologic soil group types within each sub-area. The curve numbers were based on the SCS TR-55 methodology and are included in the HydroCAD input and output found in the Attachments Section.

4.7.5 Rainfall Depth

Rainfall depths were acquired from Town of Wellesley Municipal Stormwater Drainage System Rules and Regulations. Rainfall events for the 2-, 10-, 50-, and 100-year storms were analyzed.

The following rainfall depths were used in the calculations:

Storm Event	**Rainfall Depth**
2-Year	3.31 inches
10-Year	5.19 inches
50-Year	7.26 inches
100-Year	8.17 inches

5.0 Standard 3 – Recharge

The intent of this standard is to ensure that the infiltration volume of precipitation into the ground under post-development conditions is at least as much as the infiltration volume under pre-development conditions. Standard 3 requires the restoration of recharge, using infiltration measures and careful site design. Through judicious use of low impact development techniques and other approaches that minimize impervious surfaces and mimic natural conditions, new developments can approximate pre-development recharge for most storms.

At the proposed throwing event area of the project, the subsurface contains an engineered barrier at a depth of approximately 42" due to lead pollution in the past. Infiltration in this area cannot occur due to the woven geotextile fabric cap. As noted in the previous section, the additional impervious added to the small practice field is so insignificant that it does not cause an increase in rates or volumes.

The track and field portion of the project increases impervious surface with the installation of the track paving. However as the model and results show in the previous section, the field base profile will be used for addition detention and infiltration of the runoff and therefore the rates and volumes are lower in the proposed conditions therefore meeting the intent of this Standard.

6.0 Standard 4 – Water Quality

Stormwater management systems will be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). The MA Stormwater Handbook states that this standard is met when:

1. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
2. Structural stormwater best management practices are sized to capture the required water quality volume as determined in accordance with the Massachusetts Stormwater Handbook; and
3. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

Runoff from the impervious surfaces in the project scope will not have the TSS loads associated with typical impervious areas such as drives and roadways. Wellesley College does not anticipate treating the proposed impervious surfaces in this project. In consideration of the impervious surface type and use, runoff from these surfaces already meet the intent of Standard 4 without additional treatment.

A long-term pollution prevention plan is required to identify practices taken for source control and pollution prevention. This information has been provided as part of the Operation and Maintenance Plan and can be found in the Attachments Section.

7.0 Standard 5 – Land Uses with Higher Potential Pollutant Loads

The Athletic Accessibility Renovations site is not considered a land use with Higher Potential Pollutant loads and therefore Standard 5 is not applicable to this project.

8.0 Standard 6 – Critical Areas

Runoff from the Athletic Accessibility Renovations project does not discharge to any critical areas and therefore is not subject to additional treatment required by Standard 6.

9.0 Standard 7 – Redevelopment

The project site is not considered a redevelopment project per the MA Stormwater Handbook criteria.

10.0 Standard 8 – Construction Period Pollution Prevention and Erosion & Sedimentation Control

Construction period pollution prevention and erosion and sedimentation control measures will be implemented at the Athletic Accessibility Renovations project site to control construction related impacts during construction and land disturbance activities.

The general contractor for the project will be responsible for the implementation of the construction period controls.

The project will disturb approximately 5.10 acres of land during the construction process. However, the new construction amenities on-site (throwing event pads and runways and new installation of track surfacing inside of the oval) will not will not disturb more than one acre of earth and therefore will not require a NPDES permit. Although a SWPPP is not necessary for this project, the contractor shall take the following measures into account during construction.

10.1 Erosion and Sediment Controls

10.1.1 Perimeter Controls

General

The contractor will install, inspect and maintain perimeter erosion and sediment controls adequate to mitigate impacts from site surface runoff. At a minimum, controls will be installed as shown on the project drawings, please see Appendix A. Additional perimeter controls shall be installed as required to control runoff from the site.

Specific Perimeter Controls

Straw Wattle Barriers

Installation/Intent:

Erosion control barriers (straw wattles) will be installed prior to the start of construction. These barriers will remain in place until all tributary surfaces have been fully stabilized.

Hay bale/silt sock barriers will be placed to trap sediment transported by runoff before it reaches the drainage system or leaves the construction site. In areas where high runoff velocities or high sediment loads are expected, silt fencing may be installed adjacent to the hay bale barriers. This semi-permeable barrier made of a synthetic porous fabric will provide additional protection. The silt fences and hay bale barrier will be replaced as determined by periodic field inspection. The underside of hay bales will be kept in close contact with the earth and reset as necessary. Hay bale barriers and siltation fences will be maintained and cleaned until slopes have healthy stands of grass.

Maintenance Requirements:

1. Sediment behind the erosion control device shall be checked twice each month and after each heavy rain. Silt shall be removed if greater than 6 in. deep. Sediment deposits shall be disposed of off- site, in a location and manner which will not cause sediment nuisance elsewhere.
2. Condition of erosion control device shall be checked twice each month or more frequently as required. Damaged and/or deteriorated items shall be replaced. Erosion control devices shall be maintained in place and in effective condition.

3. Hay bales shall be inspected frequently and maintained or replaced as required to maintain both their effectiveness and essentially their original condition. Underside of bales shall be kept in close contact with the earth below at all times, as required to prevent water from washing beneath bales.

Drain System Protection

Installation/Intent:

Hay bale sediment traps or silt sacks will be installed at drainage structures and maintained and cleaned until slopes have healthy stands of grass. Drain manholes and storm drain pipes will be cleaned of sediment and debris after the completion of construction. Sediment collected in structures will be disposed of properly and covered, if stored on-site.

Maintenance Requirements:

1. Sediment behind the erosion control device shall be checked twice each month and after each heavy rain. Silt shall be removed if greater than 6 in. deep or is impacting the function of the device.

10.1.2 Sediment Track-Out

General

The contractor will install, inspect and maintain a stabilized construction entrance and wheel wash station for the duration of the project to minimize sediment tracking onto impervious surfaces and public ways.

Maintenance Requirements:

1. Conditions at the exit from the site shall be inspected, at a minimum of, at the start and finish of each workday. Any sediment tracks or accumulation shall be cleaned by means of sweeping, vacuuming, or brushing/shoveling. Hosing or sweeping of sediment into stormwater conveyance infrastructure not intended for sediment control is prohibited.
2. Entrance shall be top dressed with new stone as required to maintain effectiveness. Additional locations may also be considered if sediment tracking becomes an issue.

10.1.3 Stockpiled Sediment of Soil

General

The contractor shall take steps to minimize the amount of soils and materials that are stock piled on-site. All stockpiles shall be outside the 100' BVW buffer. Materials not intended for installation or re-use shall be removed from the site in a timely manner. Materials stockpiles shall be located to minimize potential for runoff impacts, generally away from the surface waters and drainage inlets. In advance of significant rainstorms, considerations for additional protection, including covering the piles, shall be made.

Perimeter Protection

Installation/Intent:

As soil/material stockpiles are needed they shall have perimeter protection of hay bales, straw wattles and/or silt fence.

Maintenance Requirements:

1. Conditions at the stockpile shall be inspected, at a minimum of, at the start and finish of each workday and after a significant rain event. Any sediment accumulation shall be cleaned by means of sweeping, vacuuming, or brushing/shoveling. Hosing or sweeping of sediment into stormwater conveyance infrastructure not intended for sediment control is prohibited.

10.2 Pollution Prevention Standards

10.2.1 Potential Sources of Pollution

Construction Site Pollutants

Pollutant-Generating Activity	Pollutants or Pollutant Constituents	Location on Site (Or reference SWPPP site map)
Clearing/Grading/Earthwork	Sediment	Refer to Project Drawings
Paving Operations	Sediment, trash, oils	Refer to Project Drawings
Material Delivery/Storage	Sediment, oils, solids, chemicals	Site Entrance/Staging Area
Solid Waste	Solids	Contractor Staging Area
Spills	Sediment, Nutrients, Oils, Trash, Other Chemicals	
Vehicle Maintenance/Storage	Sediment, Oils, Chemicals	Contractor Staging Area
Landscape Operations	Sediment, Nutrients, Bacteria	Refer to Project Drawings
Sanitary Facilities	Sediment, Bacteria, Nutrients	Contractor Staging Area

10.2.2 Washing of Equipment or Vehicles

General

Designate special paved areas for vehicle repair. To direct washwater to sanitary sewer systems or other treatment facilities, ensure that vehicle washing areas are impervious and are bermed. Use blowers or vacuums instead of water to remove dry materials from vehicles if possible. Because water alone can remove most dirt adequately, use high-pressure water spray without detergents at vehicle washing areas. If you must use detergents, avoid phosphate- or organic-based cleansers to reduce nutrient enrichment and biological oxygen demand in wastewater. Use only biodegradable products that are free of halogenated solvents. Clearly mark all washing areas, and inform workers that all washing must occur in this area. Do not perform other activities, such as vehicle repairs, in the wash area.

Maintenance Requirements:

Maintenance of vehicle wash areas is minimal.

11.0 Standard 9 – Operation and Maintenance Plan

The goal of the Operation and Maintenance Plan is not only to protect resources on-site or nearby, but also to protect resources in the region that may be affected by the activities at the site. For the proposed water quality treatment measures and the implementation of Best Management Practices (BMPs) refer to Section 6.0, Standard 4—Water Quality.

The stormwater management system will be owned by Wellesley College and they will be responsible for operation and maintenance.

The Post Construction Operation and Maintenance Plan is included in the Attachments Section.

12.0 Standard 10 – Prohibition of Illicit Discharges

Standard 10 of the Massachusetts Stormwater Handbook prohibits illicit discharges to stormwater management systems. As stated in the handbook, "The stormwater management system is the system for conveying, treating, and infiltrating stormwater on-site, including stormwater best management practices and any pipes intended to transport stormwater to the groundwater, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater."

It is fully understood that the Storm Water Pollution Prevention Plan (SWPPP) for the Athletic Accessibility Renovations project will include procedures to prevent illicit discharges to the stormwater management system.

Standard 10 also states that "The Illicit Discharge Compliance Statement must be accompanied by a site map that is drawn to scale and that identifies the location of any systems for conveying stormwater on the site and shows that these systems do not allow the entry of any illicit discharges into the stormwater management system. The site map shall identify the location of any systems for conveying wastewater and/or groundwater on the site and show that there are no connections between the stormwater and wastewater management systems and the location of any measures taken to prevent the entry of illicit discharges into the stormwater management system." Included with the Stormwater Report is a Utility Plan that displays the location of all of the stormwater management components as well as other utilities (existing and proposed) on the project site and conforms to requirements of a "site map" to accompany the Illicit Discharge Compliance Statement.

Illicit Discharge Compliance Statement

Per the requirements of Standard 10 of the Massachusetts Stormwater Management Standards it shall be stated that No Illicit Discharges exist on the Athletic Accessibility Renovations site at 106 Central Street in Wellesley, Massachusetts.

13.0 Attachments

Site Maps
2018 NRCS Soil Report
Storage Calculations
HydroCAD Calculations
Operation and Maintenance Plan (Bound Separately)

Site Maps

See attached design documents.

Soil Maps and Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Norfolk and Suffolk Counties, Massachusetts

December 4, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:4,860 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 14, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 12, 2014—Sep 28, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	17.8	17.2%
51	Swansea muck, 0 to 1 percent slopes	4.4	4.3%
245B	Hinckley loamy sand, 3 to 8 percent slopes	9.7	9.4%
245C	Hinckley loamy sand, 8 to 15 percent slopes	11.9	11.5%
253D	Hinckley loamy sand, 15 to 35 percent slopes	30.1	29.0%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	6.5	6.3%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	2.8	2.7%
420C	Canton fine sandy loam, 8 to 15 percent slopes	0.3	0.3%
600	Pits, sand and gravel	5.0	4.9%
602	Urban land, 0 to 15 percent slopes	5.1	4.9%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	8.4	8.1%
653	Udorthents, sandy	1.7	1.6%
Totals for Area of Interest		**103.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called

noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can

be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Norfolk and Suffolk Counties, Massachusetts

1—Water

Map Unit Setting

National map unit symbol: vkyp
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

51—Swansea muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2trl2
Elevation: 0 to 1,140 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Swansea and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Swansea

Setting

Landform: Swamps, bogs
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material over loose sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 24 inches: muck
Oa2 - 24 to 34 inches: muck
Cg - 34 to 79 inches: coarse sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 16.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Freetown

Percent of map unit: 10 percent
Landform: Swamps, bogs
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

245B—Hinckley loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svm8
Elevation: 0 to 1,430 feet
Mean annual precipitation: 36 to 53 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hinckley and similar soils: 85 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Outwash terraces, outwash deltas, outwash plains, eskers, moraines, kame terraces, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Linear, convex, concave
Across-slope shape: Convex, linear, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 8 percent
Landform: Moraines, outwash terraces, outwash deltas, kame terraces, outwash plains, kames, eskers
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Linear, convex, concave
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Outwash terraces, outwash deltas, kame terraces, outwash plains, moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope, base slope, head slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent
Landform: Moraines, outwash terraces, outwash deltas, kame terraces, outwash plains, kames, eskers
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Linear, convex, concave
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

245C—Hinckley loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svm9
Elevation: 0 to 1,480 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Eskers, moraines, outwash terraces, outwash deltas, kame terraces, outwash plains, kames
Landform position (two-dimensional): Shoulder, toeslope, footslope, backslope
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, riser
Down-slope shape: Convex, concave, linear
Across-slope shape: Concave, linear, convex
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 5 percent
Landform: Outwash terraces, outwash deltas, kames, eskers, moraines, kame terraces, outwash plains
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser
Down-slope shape: Linear, concave, convex
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Kame terraces, outwash plains, moraines, outwash deltas, outwash terraces
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Outwash terraces, outwash plains, kames, eskers, moraines
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Side slope, crest, head slope, nose slope, riser

Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

253D—Hinckley loamy sand, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2svmd
Elevation: 0 to 860 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Eskers, moraines, outwash terraces, outwash deltas, kame terraces, outwash plains, kames
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Crest, nose slope, side slope, head slope, riser
Down-slope shape: Linear, convex, concave
Across-slope shape: Linear, concave, convex
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 10 percent
Landform: Outwash terraces, outwash deltas, kames, eskers, moraines, kame terraces, outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, crest, side slope, head slope, riser
Down-slope shape: Linear, concave, convex
Across-slope shape: Linear, concave, convex
Hydric soil rating: No

Merrimac

Percent of map unit: 3 percent
Landform: Moraines, outwash terraces, outwash plains, kame terraces, kames, eskers
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, crest, head slope, nose slope, riser
Down-slope shape: Linear, convex, concave
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 2 percent
Landform: Outwash terraces, kame terraces, outwash plains, outwash deltas, moraines
Landform position (two-dimensional): Backslope, footslope, toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

254A—Merrimac fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tyqr
Elevation: 0 to 1,100 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, kames, eskers, moraines, outwash terraces
Landform position (two-dimensional): Backslope, footslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Outwash plains, eskers, kames, deltas
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam

Percent of map unit: 3 percent
Landform: Outwash plains, outwash terraces, stream terraces, kames, eskers, moraines
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 2 percent
Landform: Deltas, dunes, outwash plains, outwash terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Kames, eskers, moraines, outwash terraces, outwash plains
Landform position (two-dimensional): Backslope, footslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Kames, deltas, outwash plains, eskers
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Outwash plains, deltas, dunes, outwash terraces
Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent
Landform: Stream terraces, moraines, outwash terraces, outwash plains, kames, eskers
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

420C—Canton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w817
Elevation: 0 to 1,330 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Canton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Landform: Ridges, moraines, hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: gravelly fine sandy loam
2C - 26 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Natural drainage class: Well drained

Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Scituate

Percent of map unit: 6 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Montauk

Percent of map unit: 6 percent
Landform: Moraines, drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Newfields

Percent of map unit: 4 percent
Landform: Moraines, hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Charlton

Percent of map unit: 4 percent
Landform: Hills, ground moraines, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

600—Pits, sand and gravel

Map Unit Setting

National map unit symbol: vkxc
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits

Setting

Parent material: Loose, excavated sandy and gravelly glaciofluvial deposits

602—Urban land, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: vkyj
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 99 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Excavated and filled land

Minor Components

Rock outcrops

Percent of map unit: 1 percent
Hydric soil rating: Unranked

626B—Merrimac-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyr9
Elevation: 0 to 820 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Merrimac and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash terraces, outwash plains, kames, eskers, moraines
Landform position (two-dimensional): Backslope, footslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Outwash plains, eskers, kames, deltas
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Outwash terraces, deltas, outwash plains, dunes
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

653—Udorthents, sandy

Map Unit Setting

National map unit symbol: vky8
Elevation: 0 to 3,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Excavated and filled sandy glaciofluvial deposits

Typical profile

H1 - 0 to 6 inches: variable
H2 - 6 to 60 inches: variable

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Hydric soil rating: Unranked

Minor Components

Udorthents

Percent of map unit: 8 percent
Hydric soil rating: Unranked

Urban land

Percent of map unit: 5 percent
Hydric soil rating: Unranked

Swansea

Percent of map unit: 2 percent
Landform: Bogs
Hydric soil rating: Yes

Storage Calculations

EXISTING CONDITIONS

Perimeter Drain Pipe #1 (Piece #1)

Givens	
Invert 1 Elevation	126.69 ft
Invert 2 Elevation	126.66 ft
Top of Trench Elevation at Pipe Midpoint	127.67 ft
Diameter of Pipe	0.6666 ft
Length of Pipe	6 ft
Width of Trench	1.5 ft
Voids	30 %

Calculations	
Average Pipe Elevation	126.68 ft
Height of Stone	0.99 ft
Cross-Sectional Area of Trench	1.48 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	1.13 ft^2
Cross-Sectional Area of Voids (including pipe)	0.69 ft^2
Volume	3.80 ft^3

Perimeter Drain Pipe #2 (Piece #1)

Givens	
Invert 1 Elevation	126.69 ft
Invert 2 Elevation	126.66 ft
Top of Trench Elevation at Pipe Midpoint	127.67 ft
Diameter of Pipe	0.6666 ft
Length of Pipe	6 ft
Width of Trench	1.5 ft
Voids	30 %

Calculations	
Average Pipe Elevation	126.68 ft
Height of Stone	0.99 ft
Cross-Sectional Area of Trench	1.48 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	1.13 ft^2
Cross-Sectional Area of Voids (including pipe)	0.69 ft^2
Volume	3.80 ft^3

Perimeter Drain Pipe #1 (Piece #2)

Givens	
Invert 1 Elevation	126.66 ft
Invert 2 Elevation	125.62 ft
Top of Trench Elevation at Pipe Midpoint	127.96 ft
Diameter of Pipe	0.6666 ft
Length of Pipe	215 ft
Width of Trench	1.5 ft
Voids	30 %

Calculations	
Average Pipe Elevation	126.14 ft
Height of Stone	1.82 ft
Cross-Sectional Area of Trench	2.73 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	2.38 ft^2
Cross-Sectional Area of Voids (including pipe)	1.06 ft^2
Volume	227.90 ft^3

Perimeter Drain Pipe #2 (Piece #2)

Givens	
Invert 1 Elevation	126.66 ft
Invert 2 Elevation	124.86 ft
Top of Trench Elevation at Pipe Midpoint	127.58 ft
Diameter of Pipe	0.6666 ft
Length of Pipe	361 ft
Width of Trench	1.5 ft
Voids	30 %

Calculations	
Average Pipe Elevation	125.76 ft
Height of Stone	1.82 ft
Cross-Sectional Area of Trench	2.73 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	2.38 ft^2
Cross-Sectional Area of Voids (including pipe)	1.06 ft^2
Volume	382.66 ft^3

Perimeter Drain Pipe #1 (Piece #3)

Givens	
Invert 1 Elevation	125.62 ft
Invert 2 Elevation	123.78 ft
Top of Trench Elevation at Pipe Midpoint	127.67 ft
Diameter of Pipe	0.67 ft
Length of Pipe	376 ft
Width of Trench	2.67 ft
Voids	30 %

Calculations	
Average Pipe Elevation	124.7 ft
Height of Stone	2.97 ft
Cross-Sectional Area of Trench	7.93 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	7.58 ft^2
Cross-Sectional Area of Voids (including pipe)	2.62 ft^2
Volume	985.12 ft^3

Perimeter Drain Pipe #2 (Piece #3)

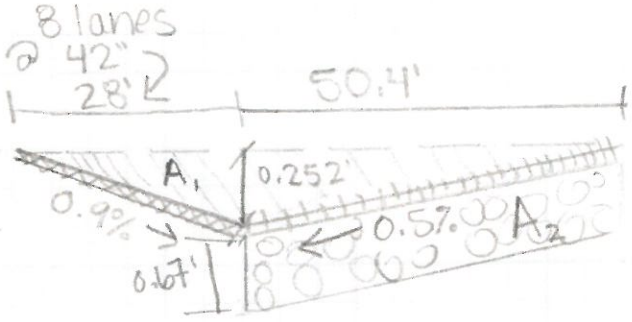
Givens	
Invert 1 Elevation	124.86 ft
Invert 2 Elevation	123.78 ft
Top of Trench Elevation at Pipe Midpoint	127.86 ft
Diameter of Pipe	0.6666 ft
Length of Pipe	233 ft
Width of Trench	1.5 ft
Voids	30 %

Calculations	
Average Pipe Elevation	124.32 ft
Height of Stone	3.54 ft
Cross-Sectional Area of Trench	5.31 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	4.96 ft^2
Cross-Sectional Area of Voids (including pipe)	1.84 ft^2
Volume	428.72 ft^3

Total Volumes

Calculations
Volume 124.32-127.59 = 2032.00 ft^3

EXISTING CONDITIONS



$A_1 = (1/2)(28')(0.252') + (1/2)(50.4')(.252')$

$= 3.53\ sf + 6.35\ sf$

$= 9.88\ sf$

$A_2 = (0.67')(50.4')$

$= 33.6\ sf$

$V_1 = (9.88\ sf)(1300')$ ← average perimeter around field

$= 12,844\ cf$

$V_2 = (33.6\ sf)(374')(2)$ ← approximate length of field; ↑ both sides of field

$= 25132.8\ cf$

$= (25132.8\ cf)(.40)$ ← stone voids

$= 10053.12\ cf$

TOTAL STORAGE

PIPE STORAGE - 124.32 - 127.80 = 2,032 cf ← from pipe storage calculations
FIELD STORAGE - 127.30 - 128.47 10,053 cf
ABOVE FIELD STORAGE - 128.47 - 128.72 = 12,844 cf

PROPOSED CONDITIONS

Perimeter Drain Pipe #1 (Piece #1)

Givens	
Invert 1 Elevation	126.69 ft
Invert 2 Elevation	126.66 ft
Top of Trench Elevation at Pipe Midpoint	127.67 ft
Diameter of Pipe	0.6666 ft
Length of Pipe	6 ft
Width of Trench	1.5 ft
Voids	30 %

Calculations	
Average Pipe Elevation	126.68 ft
Height of Stone	0.99 ft
Cross-Sectional Area of Trench	1.48 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	1.13 ft^2
Cross-Sectional Area of Voids (including pipe)	0.69 ft^2
Volume	3.80 ft^3

Perimeter Drain Pipe #2 (Piece #1)

Givens	
Invert 1 Elevation	126.69 ft
Invert 2 Elevation	126.66 ft
Top of Trench Elevation at Pipe Midpoint	127.67 ft
Diameter of Pipe	0.6666 ft
Length of Pipe	6 ft
Width of Trench	1.5 ft
Voids	30 %

Calculations	
Average Pipe Elevation	126.68 ft
Height of Stone	0.99 ft
Cross-Sectional Area of Trench	1.48 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	1.13 ft^2
Cross-Sectional Area of Voids (including pipe)	0.69 ft^2
Volume	3.80 ft^3

Perimeter Drain Pipe #1 (Piece #2)

Givens	
Invert 1 Elevation	126.66 ft
Invert 2 Elevation	125.62 ft
Top of Trench Elevation at Pipe Midpoint	127.96 ft
Diameter of Pipe	0.6666 ft
Length of Pipe	209 ft
Width of Trench	1.5 ft
Voids	30 %

Calculations	
Average Pipe Elevation	126.14 ft
Height of Stone	1.82 ft
Cross-Sectional Area of Trench	2.73 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	2.38 ft^2
Cross-Sectional Area of Voids (including pipe)	1.06 ft^2
Volume	221.54 ft^3

Perimeter Drain Pipe #2 (Piece #2)

Givens	
Invert 1 Elevation	126.66 ft
Invert 2 Elevation	124.86 ft
Top of Trench Elevation at Pipe Midpoint	127.58 ft
Diameter of Pipe	0.6666 ft
Length of Pipe	361 ft
Width of Trench	1.5 ft
Voids	30 %

Calculations	
Average Pipe Elevation	125.76 ft
Height of Stone	1.82 ft
Cross-Sectional Area of Trench	2.73 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	2.38 ft^2
Cross-Sectional Area of Voids (including pipe)	1.06 ft^2
Volume	382.66 ft^3

Perimeter Drain Pipe #1 (Piece #3)

Givens	
Invert 1 Elevation	125.62 ft
Invert 2 Elevation	123.78 ft
Top of Trench Elevation at Pipe Midpoint	127.67 ft
Diameter of Pipe	0.67 ft
Length of Pipe	368 ft
Width of Trench	2.67 ft
Voids	30 %

Calculations	
Average Pipe Elevation	124.7 ft
Height of Stone	2.97 ft
Cross-Sectional Area of Trench	7.93 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	7.58 ft^2
Cross-Sectional Area of Voids (including pipe)	2.62 ft^2
Volume	964.16 ft^3

Perimeter Drain Pipe #2 (Piece #3)

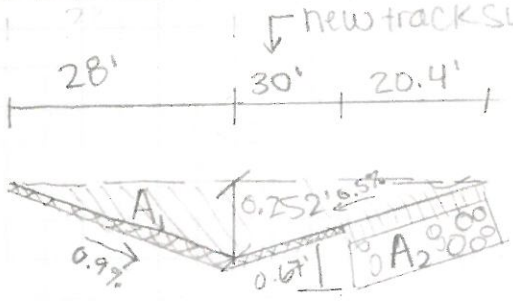
Givens	
Invert 1 Elevation	124.86 ft
Invert 2 Elevation	123.78 ft
Top of Trench Elevation at Pipe Midpoint	127.86 ft
Diameter of Pipe	0.6666 ft
Length of Pipe	223 ft
Width of Trench	1.5 ft
Voids	30 %

Calculations	
Average Pipe Elevation	124.32 ft
Height of Stone	3.54 ft
Cross-Sectional Area of Trench	5.31 ft^2
Cross-Sectional Area of Pipe	0.35 ft^2
Cross-Sectional Area of Stone	4.96 ft^2
Cross-Sectional Area of Voids (including pipe)	1.84 ft^2
Volume	410.32 ft^3

Total Volumes

Calculations
Volume 124.32-127.59 = 1986.30 ft^3

PROPOSED CONDITIONS



$A_1 = (1/2)(28')(0.252') + (1/2)(50.4')(0.252')$ ← same as existing
$= 9.88\ sf$

$A_2 = (0.67')(20.4')$
$= 13.6\ Sf$

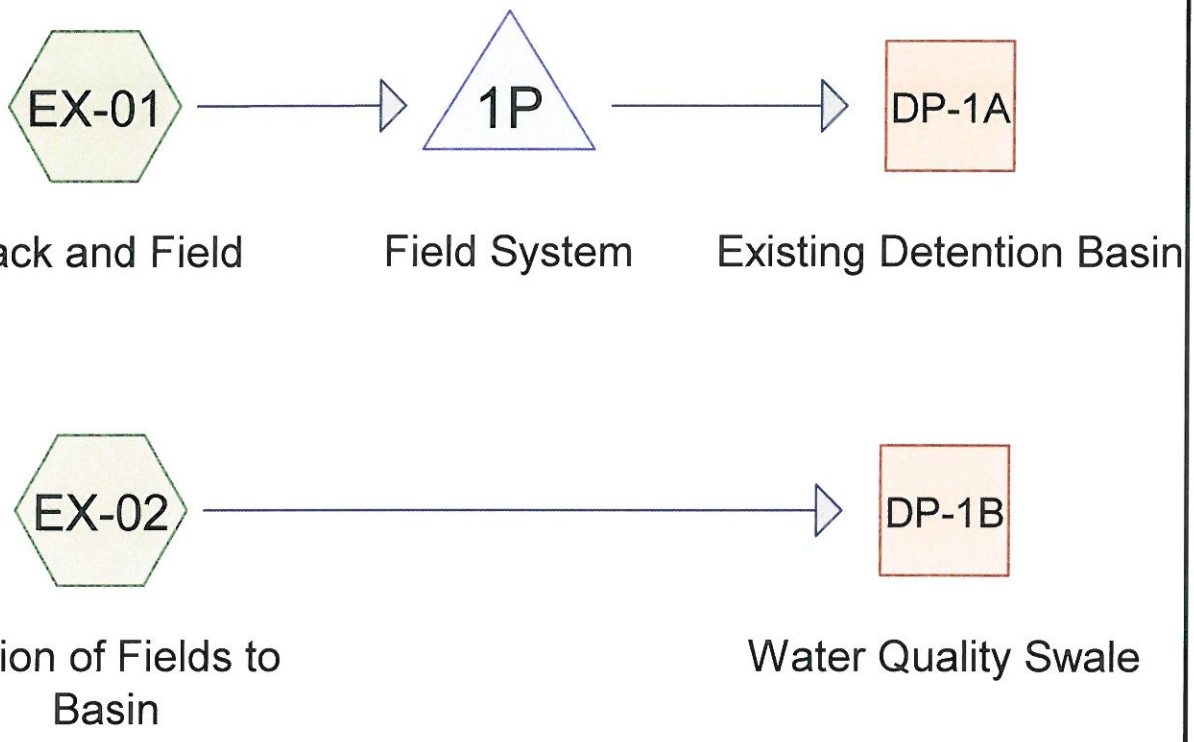
$V_1 = 12,844\ cf$ ← same as existing

$V_2 = (13.6sf)(374')(2)$
$= 10172.8\ cf$
$= (10172.8\ cf)(0.40)$
$= 4,069.12\ Cf$

TOTAL STORAGE

PIPE STORAGE - 124.32-127.80 = 1,986 Cf ← from pipe storage calculations
FIELD STORAGE - 127.80 - 128.47 = 4069 Cf
ABOVE FIELD STORAGE - 128.47 - 128.72 = 12,844 Cf

HydroCAD Data



Subcat Reach Pond Link

Routing Diagram for Existing_Conditions_2018_12-01
Prepared by Activitas, Inc., Printed 12/3/2018

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-01: Track and Field Runoff Area=171,340 sf 96.57% Impervious Runoff Depth=2.86"
Flow Length=713' Slope=0.0050 '/' Tc=9.3 min CN=96 Runoff=10.98 cfs 40,803 cf

Subcatchment EX-02: Portion of Fields to Runoff Area=248,173 sf 4.88% Impervious Runoff Depth=0.70"
Flow Length=199' Tc=8.3 min CN=66 Runoff=3.55 cfs 14,463 cf

Reach DP-1A: Existing Detention Basin Inflow=0.71 cfs 420 cf
Outflow=0.71 cfs 420 cf

Reach DP-1B: Water Quality Swale Inflow=3.55 cfs 14,463 cf
Outflow=3.55 cfs 14,463 cf

Pond 1P: Field System Peak Elev=125.53' Storage=706 cf Inflow=10.98 cfs 40,803 cf
Discarded=8.39 cfs 40,319 cf Primary=0.71 cfs 420 cf Outflow=9.10 cfs 40,738 cf

Total Runoff Area = 419,513 sf Runoff Volume = 55,266 cf Average Runoff Depth = 1.58"
57.67% Pervious = 241,931 sf 42.33% Impervious = 177,582 sf

Summary for Subcatchment EX-01: Track and Field

Runoff = 10.98 cfs @ 12.12 hrs, Volume= 40,803 cf, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

	Area (sf)	CN	Description
*	6,514	98	Track Surface, HSG D, 51
*	22,339	98	Track Surface, HSG A, 245C
*	11,179	98	Track Surface, HSG A, 253D
*	29,664	98	Track Surface, HSG A, 600
*	22,950	98	Synthetic Turf, Fair, HSG A, 600
*	1,029	98	Synthetic Turf, Fair, HSG D, 51
*	71,795	98	Synthetic Turf, Fair, HSG A, 245C
*	4,513	49	50-75% Grass cover, Fair, HSG A, 245C
*	741	49	50-75% Grass cover, Fair, HSG A, 253D
*	616	96	Sand, HSG A, 600
	171,340	96	Weighted Average
	5,870		3.43% Pervious Area
	165,470		96.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	115	0.0050	0.64		**Shallow Concentrated Flow, Lateral Flow Through Stone Base** Cultivated Straight Rows Kv= 9.0 fps
6.3	598	0.0050	1.59	0.56	**Pipe Channel, Perimeter Pipe** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.020 Corrugated PE, corrugated interior
9.3	713	Total			

Summary for Subcatchment EX-02: Portion of Fields to Basin

Runoff = 3.55 cfs @ 12.14 hrs, Volume= 14,463 cf, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

	Area (sf)	CN	Description
*	30,063	89	<50% Grass cover, Poor, HSG D, 51
*	60,357	80	>75% Grass cover, Good, HSG D, 51
*	1,634	68	<50% Grass cover, Poor, HSG A, 245C
*	2,108	39	>75% Grass cover, Good, HSG A, 245C
*	12,112	98	Pavement, HSG A, 253D
*	58,372	68	<50% Grass cover, Poor, HSG A, 253D
*	72,398	39	>75% Grass cover, Good, HSG A, 253D
*	7,559	68	<50% Grass cover, Poor, HSG A, 254A
*	3,570	39	>75% Grass cover, Good, HSG A, 254A
	248,173	66	Weighted Average
	236,061		95.12% Pervious Area
	12,112		4.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, 0-50** Grass: Short n= 0.150 P2= 3.22"
0.8	81	0.0100	1.61		**Shallow Concentrated Flow, 50-131** Unpaved Kv= 16.1 fps
0.1	37	0.0920	4.88		**Shallow Concentrated Flow, 131-168** Unpaved Kv= 16.1 fps
0.0	6	0.0100	2.03		**Shallow Concentrated Flow, 168-174** Paved Kv= 20.3 fps
0.0	25	0.3400	9.39		**Shallow Concentrated Flow, 174-199** Unpaved Kv= 16.1 fps
8.3	199	Total			

Summary for Reach DP-1A: Existing Detention Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 0.03" for 2-Year event
Inflow = 0.71 cfs @ 12.19 hrs, Volume= 420 cf
Outflow = 0.71 cfs @ 12.19 hrs, Volume= 420 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP-1B: Water Quality Swale

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 248,173 sf, 4.88% Impervious, Inflow Depth = 0.70" for 2-Year event
Inflow = 3.55 cfs @ 12.14 hrs, Volume= 14,463 cf
Outflow = 3.55 cfs @ 12.14 hrs, Volume= 14,463 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Field System

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 2.86" for 2-Year event
Inflow = 10.98 cfs @ 12.12 hrs, Volume= 40,803 cf
Outflow = 9.10 cfs @ 12.19 hrs, Volume= 40,738 cf, Atten= 17%, Lag= 4.1 min
Discarded = 8.39 cfs @ 12.06 hrs, Volume= 40,319 cf
Primary = 0.71 cfs @ 12.19 hrs, Volume= 420 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 125.53' @ 12.19 hrs Surf.Area= 0 sf Storage= 706 cf

Plug-Flow detention time= 1.3 min calculated for 40,738 cf (100% of inflow)
Center-of-Mass det. time= 0.3 min (776.4 - 776.2)

Volume	Invert	Avail.Storage	Storage Description
#1	124.32'	24,929 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
124.32	0
127.80	2,032
128.47	12,085
128.72	24,929

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.32'	**4.39 cfs Exfiltration (600 Soils) at all elevations**
#2	Discarded	124.32'	**4.00 cfs Exfiltration (245C Soils) at all elevations**
#3	Primary	124.32'	**8.0" Round Culvert** L= 145.0' Ke= 0.200 Inlet / Outlet Invert= 124.32' / 123.60' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.35 sf

Discarded OutFlow Max=8.39 cfs @ 12.06 hrs HW=124.37' (Free Discharge)
↑—**1=Exfiltration (600 Soils)** (Exfiltration Controls 4.39 cfs)
└—**2=Exfiltration (245C Soils)** (Exfiltration Controls 4.00 cfs)

Primary OutFlow Max=0.71 cfs @ 12.19 hrs HW=125.53' (Free Discharge)
↑—**3=Culvert** (Barrel Controls 0.71 cfs @ 2.03 fps)

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-01: Track and Field Runoff Area=171,340 sf 96.57% Impervious Runoff Depth=4.72"
Flow Length=713' Slope=0.0050 '/' Tc=9.3 min CN=96 Runoff=17.65 cfs 67,414 cf

Subcatchment EX-02: Portion of Fields to Runoff Area=248,173 sf 4.88% Impervious Runoff Depth=1.86"
Flow Length=199' Tc=8.3 min CN=66 Runoff=11.04 cfs 38,432 cf

Reach DP-1A: Existing Detention Basin Inflow=1.22 cfs 2,453 cf
Outflow=1.22 cfs 2,453 cf

Reach DP-1B: Water Quality Swale Inflow=11.04 cfs 38,432 cf
Outflow=11.04 cfs 38,432 cf

Pond 1P: Field System Peak Elev=127.99' Storage=4,833 cf Inflow=17.65 cfs 67,414 cf
Discarded=8.39 cfs 64,997 cf Primary=1.22 cfs 2,453 cf Outflow=9.61 cfs 67,450 cf

Total Runoff Area = 419,513 sf Runoff Volume = 105,846 cf Average Runoff Depth = 3.03"
57.67% Pervious = 241,931 sf 42.33% Impervious = 177,582 sf

Summary for Subcatchment EX-01: Track and Field

Runoff = 17.65 cfs @ 12.12 hrs, Volume= 67,414 cf, Depth= 4.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.19"

	Area (sf)	CN	Description
*	6,514	98	Track Surface, HSG D, 51
*	22,339	98	Track Surface, HSG A, 245C
*	11,179	98	Track Surface, HSG A, 253D
*	29,664	98	Track Surface, HSG A, 600
*	22,950	98	Synthetic Turf, Fair, HSG A, 600
*	1,029	98	Synthetic Turf, Fair, HSG D, 51
*	71,795	98	Synthetic Turf, Fair, HSG A, 245C
*	4,513	49	50-75% Grass cover, Fair, HSG A, 245C
*	741	49	50-75% Grass cover, Fair, HSG A, 253D
*	616	96	Sand, HSG A, 600
	171,340	96	Weighted Average
	5,870		3.43% Pervious Area
	165,470		96.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	115	0.0050	0.64		**Shallow Concentrated Flow, Lateral Flow Through Stone Base** Cultivated Straight Rows Kv= 9.0 fps
6.3	598	0.0050	1.59	0.56	**Pipe Channel, Perimeter Pipe** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.020 Corrugated PE, corrugated interior
9.3	713	Total			

Summary for Subcatchment EX-02: Portion of Fields to Basin

Runoff = 11.04 cfs @ 12.13 hrs, Volume= 38,432 cf, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.19"

	Area (sf)	CN	Description
*	30,063	89	<50% Grass cover, Poor, HSG D, 51
*	60,357	80	>75% Grass cover, Good, HSG D, 51
*	1,634	68	<50% Grass cover, Poor, HSG A, 245C
*	2,108	39	>75% Grass cover, Good, HSG A, 245C
*	12,112	98	Pavement, HSG A, 253D
*	58,372	68	<50% Grass cover, Poor, HSG A, 253D
*	72,398	39	>75% Grass cover, Good, HSG A, 253D
*	7,559	68	<50% Grass cover, Poor, HSG A, 254A
*	3,570	39	>75% Grass cover, Good, HSG A, 254A
	248,173	66	Weighted Average
	236,061		95.12% Pervious Area
	12,112		4.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, 0-50** Grass: Short n= 0.150 P2= 3.22"
0.8	81	0.0100	1.61		**Shallow Concentrated Flow, 50-131** Unpaved Kv= 16.1 fps
0.1	37	0.0920	4.88		**Shallow Concentrated Flow, 131-168** Unpaved Kv= 16.1 fps
0.0	6	0.0100	2.03		**Shallow Concentrated Flow, 168-174** Paved Kv= 20.3 fps
0.0	25	0.3400	9.39		**Shallow Concentrated Flow, 174-199** Unpaved Kv= 16.1 fps
8.3	199	Total			

Summary for Reach DP-1A: Existing Detention Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 0.17" for 10-Year event
Inflow = 1.22 cfs @ 12.29 hrs, Volume= 2,453 cf
Outflow = 1.22 cfs @ 12.29 hrs, Volume= 2,453 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP-1B: Water Quality Swale

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 248,173 sf, 4.88% Impervious, Inflow Depth = 1.86" for 10-Year event
Inflow = 11.04 cfs @ 12.13 hrs, Volume= 38,432 cf
Outflow = 11.04 cfs @ 12.13 hrs, Volume= 38,432 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Field System

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 4.72" for 10-Year event
Inflow = 17.65 cfs @ 12.12 hrs, Volume= 67,414 cf
Outflow = 9.61 cfs @ 12.29 hrs, Volume= 67,450 cf, Atten= 46%, Lag= 10.1 min
Discarded = 8.39 cfs @ 11.98 hrs, Volume= 64,997 cf
Primary = 1.22 cfs @ 12.29 hrs, Volume= 2,453 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 127.99' @ 12.29 hrs Surf.Area= 0 sf Storage= 4,833 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.7 min (766.3 - 764.6)

Volume	Invert	Avail.Storage	Storage Description
#1	124.32'	24,929 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
124.32	0
127.80	2,032
128.47	12,085
128.72	24,929

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.32'	**4.39 cfs Exfiltration (600 Soils) at all elevations**
#2	Discarded	124.32'	**4.00 cfs Exfiltration (245C Soils) at all elevations**
#3	Primary	124.32'	**8.0" Round Culvert** L= 145.0' Ke= 0.200 Inlet / Outlet Invert= 124.32' / 123.60' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.35 sf

Discarded OutFlow Max=8.39 cfs @ 11.98 hrs HW=124.37' (Free Discharge)
└**1=Exfiltration (600 Soils)** (Exfiltration Controls 4.39 cfs)
└**2=Exfiltration (245C Soils)** (Exfiltration Controls 4.00 cfs)

Primary OutFlow Max=1.22 cfs @ 12.29 hrs HW=127.99' (Free Discharge)
└**3=Culvert** (Barrel Controls 1.22 cfs @ 3.49 fps)

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-01: Track and Field Runoff Area=171,340 sf 96.57% Impervious Runoff Depth=6.78"
Flow Length=713' Slope=0.0050 '/' Tc=9.3 min CN=96 Runoff=24.94 cfs 96,848 cf

Subcatchment EX-02: Portion of Fields to Runoff Area=248,173 sf 4.88% Impervious Runoff Depth=3.41"
Flow Length=199' Tc=8.3 min CN=66 Runoff=20.90 cfs 70,521 cf

Reach DP-1A: Existing Detention Basin Inflow=1.29 cfs 4,760 cf
Outflow=1.29 cfs 4,760 cf

Reach DP-1B: Water Quality Swale Inflow=20.90 cfs 70,521 cf
Outflow=20.90 cfs 70,521 cf

Pond 1P: Field System Peak Elev=128.47' Storage=12,260 cf Inflow=24.94 cfs 96,848 cf
Discarded=8.39 cfs 92,097 cf Primary=1.29 cfs 4,760 cf Outflow=9.68 cfs 96,857 cf

Total Runoff Area = 419,513 sf Runoff Volume = 167,369 cf Average Runoff Depth = 4.79"
57.67% Pervious = 241,931 sf 42.33% Impervious = 177,582 sf

Summary for Subcatchment EX-01: Track and Field

Runoff = 24.94 cfs @ 12.12 hrs, Volume= 96,848 cf, Depth= 6.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=7.26"

	Area (sf)	CN	Description
*	6,514	98	Track Surface, HSG D, 51
*	22,339	98	Track Surface, HSG A, 245C
*	11,179	98	Track Surface, HSG A, 253D
*	29,664	98	Track Surface, HSG A, 600
*	22,950	98	Synthetic Turf, Fair, HSG A, 600
*	1,029	98	Synthetic Turf, Fair, HSG D, 51
*	71,795	98	Synthetic Turf, Fair, HSG A, 245C
*	4,513	49	50-75% Grass cover, Fair, HSG A, 245C
*	741	49	50-75% Grass cover, Fair, HSG A, 253D
*	616	96	Sand, HSG A, 600
	171,340	96	Weighted Average
	5,870		3.43% Pervious Area
	165,470		96.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	115	0.0050	0.64		**Shallow Concentrated Flow, Lateral Flow Through Stone Base** Cultivated Straight Rows Kv= 9.0 fps
6.3	598	0.0050	1.59	0.56	**Pipe Channel, Perimeter Pipe** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.020 Corrugated PE, corrugated interior
9.3	713	Total			

Summary for Subcatchment EX-02: Portion of Fields to Basin

Runoff = 20.90 cfs @ 12.12 hrs, Volume= 70,521 cf, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=7.26"

	Area (sf)	CN	Description
*	30,063	89	<50% Grass cover, Poor, HSG D, 51
*	60,357	80	>75% Grass cover, Good, HSG D, 51
*	1,634	68	<50% Grass cover, Poor, HSG A, 245C
*	2,108	39	>75% Grass cover, Good, HSG A, 245C
*	12,112	98	Pavement, HSG A, 253D
*	58,372	68	<50% Grass cover, Poor, HSG A, 253D
*	72,398	39	>75% Grass cover, Good, HSG A, 253D
*	7,559	68	<50% Grass cover, Poor, HSG A, 254A
*	3,570	39	>75% Grass cover, Good, HSG A, 254A
	248,173	66	Weighted Average
	236,061		95.12% Pervious Area
	12,112		4.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, 0-50** Grass: Short n= 0.150 P2= 3.22"
0.8	81	0.0100	1.61		**Shallow Concentrated Flow, 50-131** Unpaved Kv= 16.1 fps
0.1	37	0.0920	4.88		**Shallow Concentrated Flow, 131-168** Unpaved Kv= 16.1 fps
0.0	6	0.0100	2.03		**Shallow Concentrated Flow, 168-174** Paved Kv= 20.3 fps
0.0	25	0.3400	9.39		**Shallow Concentrated Flow, 174-199** Unpaved Kv= 16.1 fps
8.3	199	Total			

Summary for Reach DP-1A: Existing Detention Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 0.33" for 50-Year event
Inflow = 1.29 cfs @ 12.40 hrs, Volume= 4,760 cf
Outflow = 1.29 cfs @ 12.40 hrs, Volume= 4,760 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP-1B: Water Quality Swale

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 248,173 sf, 4.88% Impervious, Inflow Depth = 3.41" for 50-Year event
Inflow = 20.90 cfs @ 12.12 hrs, Volume= 70,521 cf
Outflow = 20.90 cfs @ 12.12 hrs, Volume= 70,521 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Field System

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 6.78" for 50-Year event
Inflow = 24.94 cfs @ 12.12 hrs, Volume= 96,848 cf
Outflow = 9.68 cfs @ 12.40 hrs, Volume= 96,857 cf, Atten= 61%, Lag= 16.8 min
Discarded = 8.39 cfs @ 11.85 hrs, Volume= 92,097 cf
Primary = 1.29 cfs @ 12.40 hrs, Volume= 4,760 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 128.47' @ 12.40 hrs Surf.Area= 0 sf Storage= 12,260 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 5.0 min (762.3 - 757.3)

Volume	Invert	Avail.Storage	Storage Description
#1	124.32'	24,929 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
124.32	0
127.80	2,032
128.47	12,085
128.72	24,929

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.32'	**4.39 cfs Exfiltration (600 Soils) at all elevations**
#2	Discarded	124.32'	**4.00 cfs Exfiltration (245C Soils) at all elevations**
#3	Primary	124.32'	**8.0" Round Culvert** L= 145.0' Ke= 0.200 Inlet / Outlet Invert= 124.32' / 123.60' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.35 sf

Discarded OutFlow Max=8.39 cfs @ 11.85 hrs HW=124.37' (Free Discharge)
↑—**1=Exfiltration (600 Soils)** (Exfiltration Controls 4.39 cfs)
└—**2=Exfiltration (245C Soils)** (Exfiltration Controls 4.00 cfs)

Primary OutFlow Max=1.29 cfs @ 12.40 hrs HW=128.47' (Free Discharge)
↑—**3=Culvert** (Barrel Controls 1.29 cfs @ 3.71 fps)

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX-01: Track and Field Runoff Area=171,340 sf 96.57% Impervious Runoff Depth=7.69"
Flow Length=713' Slope=0.0050 '/' Tc=9.3 min CN=96 Runoff=28.13 cfs 109,806 cf

Subcatchment EX-02: Portion of Fields to Runoff Area=248,173 sf 4.88% Impervious Runoff Depth=4.15"
Flow Length=199' Tc=8.3 min CN=66 Runoff=25.53 cfs 85,771 cf

Reach DP-1A: Existing Detention Basin Inflow=1.31 cfs 5,886 cf
Outflow=1.31 cfs 5,886 cf

Reach DP-1B: Water Quality Swale Inflow=25.53 cfs 85,771 cf
Outflow=25.53 cfs 85,771 cf

Pond 1P: Field System Peak Elev=128.55' Storage=16,200 cf Inflow=28.13 cfs 109,806 cf
Discarded=8.39 cfs 103,885 cf Primary=1.31 cfs 5,886 cf Outflow=9.70 cfs 109,771 cf

Total Runoff Area = 419,513 sf Runoff Volume = 195,577 cf Average Runoff Depth = 5.59"
57.67% Pervious = 241,931 sf 42.33% Impervious = 177,582 sf

Summary for Subcatchment EX-01: Track and Field

Runoff = 28.13 cfs @ 12.12 hrs, Volume= 109,806 cf, Depth= 7.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.17"

	Area (sf)	CN	Description
*	6,514	98	Track Surface, HSG D, 51
*	22,339	98	Track Surface, HSG A, 245C
*	11,179	98	Track Surface, HSG A, 253D
*	29,664	98	Track Surface, HSG A, 600
*	22,950	98	Synthetic Turf, Fair, HSG A, 600
*	1,029	98	Synthetic Turf, Fair, HSG D, 51
*	71,795	98	Synthetic Turf, Fair, HSG A, 245C
*	4,513	49	50-75% Grass cover, Fair, HSG A, 245C
*	741	49	50-75% Grass cover, Fair, HSG A, 253D
*	616	96	Sand, HSG A, 600
	171,340	96	Weighted Average
	5,870		3.43% Pervious Area
	165,470		96.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	115	0.0050	0.64		**Shallow Concentrated Flow, Lateral Flow Through Stone Base** Cultivated Straight Rows Kv= 9.0 fps
6.3	598	0.0050	1.59	0.56	**Pipe Channel, Perimeter Pipe** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.020 Corrugated PE, corrugated interior
9.3	713	Total			

Summary for Subcatchment EX-02: Portion of Fields to Basin

Runoff = 25.53 cfs @ 12.12 hrs, Volume= 85,771 cf, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.17"

	Area (sf)	CN	Description
*	30,063	89	<50% Grass cover, Poor, HSG D, 51
*	60,357	80	>75% Grass cover, Good, HSG D, 51
*	1,634	68	<50% Grass cover, Poor, HSG A, 245C
*	2,108	39	>75% Grass cover, Good, HSG A, 245C
*	12,112	98	Pavement, HSG A, 253D
*	58,372	68	<50% Grass cover, Poor, HSG A, 253D
*	72,398	39	>75% Grass cover, Good, HSG A, 253D
*	7,559	68	<50% Grass cover, Poor, HSG A, 254A
*	3,570	39	>75% Grass cover, Good, HSG A, 254A
	248,173	66	Weighted Average
	236,061		95.12% Pervious Area
	12,112		4.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, 0-50** Grass: Short n= 0.150 P2= 3.22"
0.8	81	0.0100	1.61		**Shallow Concentrated Flow, 50-131** Unpaved Kv= 16.1 fps
0.1	37	0.0920	4.88		**Shallow Concentrated Flow, 131-168** Unpaved Kv= 16.1 fps
0.0	6	0.0100	2.03		**Shallow Concentrated Flow, 168-174** Paved Kv= 20.3 fps
0.0	25	0.3400	9.39		**Shallow Concentrated Flow, 174-199** Unpaved Kv= 16.1 fps
8.3	199	Total			

Summary for Reach DP-1A: Existing Detention Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 0.41" for 100-Year event
Inflow = 1.31 cfs @ 12.44 hrs, Volume= 5,886 cf
Outflow = 1.31 cfs @ 12.44 hrs, Volume= 5,886 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP-1B: Water Quality Swale

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 248,173 sf, 4.88% Impervious, Inflow Depth = 4.15" for 100-Year event
Inflow = 25.53 cfs @ 12.12 hrs, Volume= 85,771 cf
Outflow = 25.53 cfs @ 12.12 hrs, Volume= 85,771 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Field System

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 7.69" for 100-Year event
Inflow = 28.13 cfs @ 12.12 hrs, Volume= 109,806 cf
Outflow = 9.70 cfs @ 12.44 hrs, Volume= 109,771 cf, Atten= 66%, Lag= 19.1 min
Discarded = 8.39 cfs @ 11.81 hrs, Volume= 103,885 cf
Primary = 1.31 cfs @ 12.44 hrs, Volume= 5,886 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 128.55' @ 12.44 hrs Surf.Area= 0 sf Storage= 16,200 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 6.8 min (761.9 - 755.0)

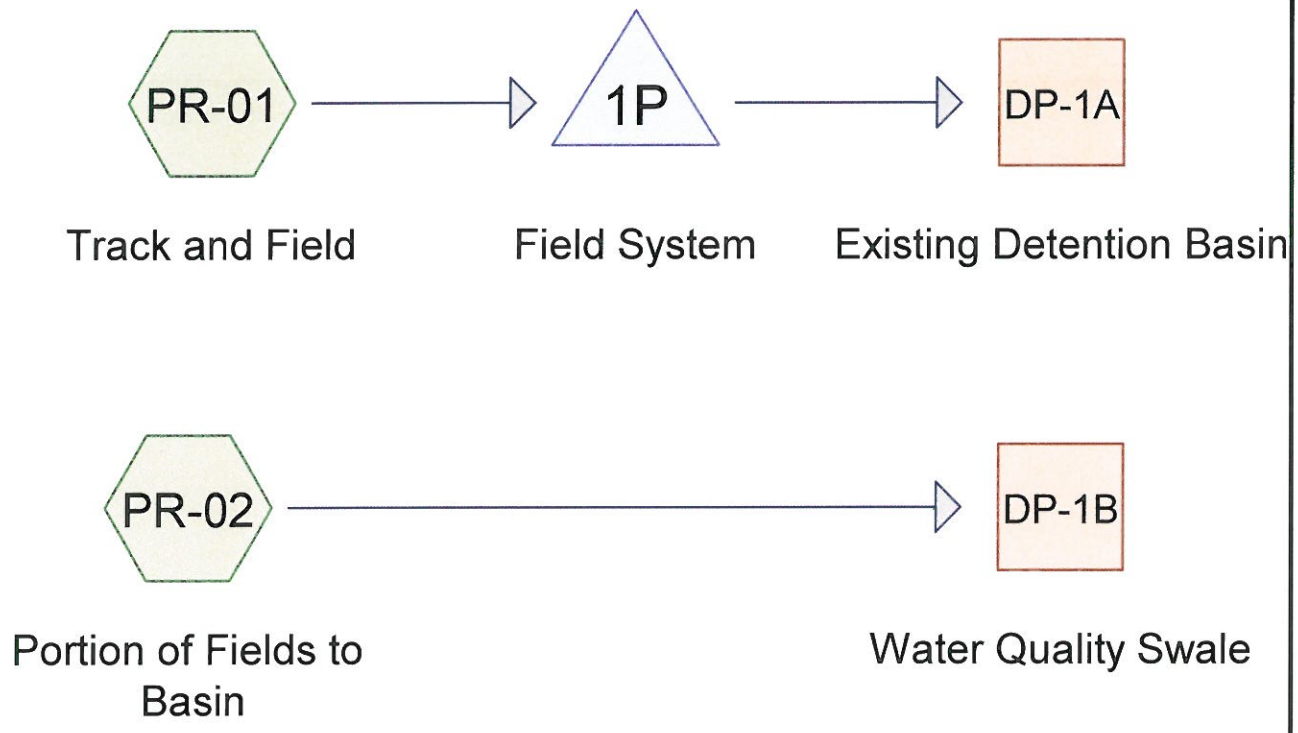
Volume	Invert	Avail.Storage	Storage Description
#1	124.32'	24,929 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
124.32	0
127.80	2,032
128.47	12,085
128.72	24,929

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.32'	**4.39 cfs Exfiltration (600 Soils) at all elevations**
#2	Discarded	124.32'	**4.00 cfs Exfiltration (245C Soils) at all elevations**
#3	Primary	124.32'	**8.0" Round Culvert** L= 145.0' Ke= 0.200 Inlet / Outlet Invert= 124.32' / 123.60' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.35 sf

Discarded OutFlow Max=8.39 cfs @ 11.81 hrs HW=124.37' (Free Discharge)
↑—**1=Exfiltration (600 Soils)** (Exfiltration Controls 4.39 cfs)
↑—**2=Exfiltration (245C Soils)** (Exfiltration Controls 4.00 cfs)

Primary OutFlow Max=1.31 cfs @ 12.44 hrs HW=128.55' (Free Discharge)
↑—**3=Culvert** (Barrel Controls 1.31 cfs @ 3.74 fps)



Subcat Reach Pond Link

Routing Diagram for Proposed_Conditions_2018_12_01-FIELD_STORAGE
Prepared by Activitas, Inc., Printed 12/3/2018

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR-01: Track and Field Runoff Area=171,340 sf 96.57% Impervious Runoff Depth=2.86"
Flow Length=713' Slope=0.0050 '/' Tc=9.3 min CN=96 Runoff=10.98 cfs 40,803 cf

Subcatchment PR-02: Portion of Fields to Runoff Area=248,173 sf 6.07% Impervious Runoff Depth=0.70"
Flow Length=199' Tc=8.3 min CN=66 Runoff=3.55 cfs 14,463 cf

Reach DP-1A: Existing Detention Basin Inflow=0.47 cfs 297 cf
Outflow=0.47 cfs 297 cf

Reach DP-1B: Water Quality Swale Inflow=3.55 cfs 14,463 cf
Outflow=3.55 cfs 14,463 cf

Pond 1P: Field System Peak Elev=126.25' Storage=1,103 cf Inflow=10.98 cfs 40,803 cf
Discarded=7.87 cfs 40,517 cf Primary=0.47 cfs 297 cf Outflow=8.34 cfs 40,814 cf

Total Runoff Area = 419,513 sf Runoff Volume = 55,266 cf Average Runoff Depth = 1.58"
56.96% Pervious = 238,966 sf 43.04% Impervious = 180,547 sf

Summary for Subcatchment PR-01: Track and Field

Runoff = 10.98 cfs @ 12.12 hrs, Volume= 40,803 cf, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

	Area (sf)	CN	Description
*	7,467	98	Track Surface, HSG D, 51
*	31,803	98	Track Surface, HSG A, 245C
*	11,179	98	Track Surface, HSG A, 253D
*	29,664	98	Track Surface, HSG A, 600
*	74	98	Synthetic Turf, Fair, HSG D
*	62,334	98	Synthetic Turf, Fair, HSG A
*	22,950	98	Synthetic Turf, Fair, HSG A
*	4,512	49	50-75% Grass cover, Fair, HSG A, 245C
*	741	49	50-75% Grass cover, Fair, HSG A, 253D
*	616	96	Sand, HSG A, 600
	171,340	96	Weighted Average
	5,869		3.43% Pervious Area
	165,471		96.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	115	0.0050	0.64		**Shallow Concentrated Flow, Lateral Flow Through Stone Base** Cultivated Straight Rows Kv= 9.0 fps
6.3	598	0.0050	1.59	0.56	**Pipe Channel, Perimeter Pipe** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.020
9.3	713	Total			

Summary for Subcatchment PR-02: Portion of Fields to Basin

Runoff = 3.55 cfs @ 12.14 hrs, Volume= 14,463 cf, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.31"

	Area (sf)	CN	Description
*	30,063	89	<50% Grass cover, Poor, HSG D, 51
*	60,357	80	>75% Grass cover, Good, HSG D, 51
*	1,634	68	<50% Grass cover, Poor, HSG A, 245C
*	2,108	39	>75% Grass cover, Good, HSG A, 245C
*	13,262	98	Pavement, HSG A, 253D
*	778	98	Concrete, HSG A, 253D
*	2,715	76	Crushed Stone, HSG A, 253D
*	55,359	68	<50% Grass cover, Poor, HSG A, 253D
*	70,769	39	>75% Grass cover, Good, HSG A, 253D
*	1,036	98	Concrete, HSG A, 254A
*	6,766	68	<50% Grass cover, Poor, HSG A, 254A
*	3,326	39	>75% Grass cover, Good, HSG A, 254A
	248,173	66	Weighted Average
	233,097		93.93% Pervious Area
	15,076		6.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, 0-50** Grass: Short n= 0.150 P2= 3.22"
0.8	81	0.0100	1.61		**Shallow Concentrated Flow, 50-131** Unpaved Kv= 16.1 fps
0.1	37	0.0920	4.88		**Shallow Concentrated Flow, 131-168** Unpaved Kv= 16.1 fps
0.0	6	0.0100	2.03		**Shallow Concentrated Flow, 168-174** Paved Kv= 20.3 fps
0.0	25	0.3400	9.39		**Shallow Concentrated Flow, 174-199** Unpaved Kv= 16.1 fps
8.3	199	Total			

Summary for Reach DP-1A: Existing Detention Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 0.02" for 2-Year event
Inflow = 0.47 cfs @ 12.21 hrs, Volume= 297 cf
Outflow = 0.47 cfs @ 12.21 hrs, Volume= 297 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP-1B: Water Quality Swale

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 248,173 sf, 6.07% Impervious, Inflow Depth = 0.70" for 2-Year event
Inflow = 3.55 cfs @ 12.14 hrs, Volume= 14,463 cf
Outflow = 3.55 cfs @ 12.14 hrs, Volume= 14,463 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Field System

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 2.86" for 2-Year event
Inflow = 10.98 cfs @ 12.12 hrs, Volume= 40,803 cf
Outflow = 8.34 cfs @ 12.21 hrs, Volume= 40,814 cf, Atten= 24%, Lag= 5.2 min
Discarded = 7.87 cfs @ 12.05 hrs, Volume= 40,517 cf
Primary = 0.47 cfs @ 12.21 hrs, Volume= 297 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 126.25' @ 12.21 hrs Surf.Area= 0 sf Storage= 1,103 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (776.5 - 776.2)

Volume	Invert	Avail.Storage	Storage Description
#1	124.32'	18,899 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
124.32	0
127.80	1,986
128.47	6,055
128.72	18,899

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.32'	**4.39 cfs Exfiltration (600) at all elevations**
#2	Discarded	124.32'	**3.48 cfs Exfiltration (245C Soils) at all elevations**
#3	Primary	124.82'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=7.87 cfs @ 12.05 hrs HW=124.37' (Free Discharge)
↑—**1=Exfiltration (600)** (Exfiltration Controls 4.39 cfs)
↑—**2=Exfiltration (245C Soils)** (Exfiltration Controls 3.48 cfs)

Primary OutFlow Max=0.47 cfs @ 12.21 hrs HW=126.25' (Free Discharge)
↑—**3=Orifice/Grate** (Orifice Controls 0.47 cfs @ 5.41 fps)

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR-01: Track and Field Runoff Area=171,340 sf 96.57% Impervious Runoff Depth=4.72"
Flow Length=713' Slope=0.0050 '/' Tc=9.3 min CN=96 Runoff=17.65 cfs 67,414 cf

Subcatchment PR-02: Portion of Fields to Runoff Area=248,173 sf 6.07% Impervious Runoff Depth=1.86"
Flow Length=199' Tc=8.3 min CN=66 Runoff=11.04 cfs 38,432 cf

Reach DP-1A: Existing Detention Basin Inflow=0.78 cfs 1,757 cf
Outflow=0.78 cfs 1,757 cf

Reach DP-1B: Water Quality Swale Inflow=11.04 cfs 38,432 cf
Outflow=11.04 cfs 38,432 cf

Pond 1P: Field System Peak Elev=128.45' Storage=5,908 cf Inflow=17.65 cfs 67,414 cf
Discarded=7.87 cfs 65,787 cf Primary=0.78 cfs 1,757 cf Outflow=8.65 cfs 67,544 cf

Total Runoff Area = 419,513 sf Runoff Volume = 105,846 cf Average Runoff Depth = 3.03"
56.96% Pervious = 238,966 sf 43.04% Impervious = 180,547 sf

Summary for Subcatchment PR-01: Track and Field

Runoff = 17.65 cfs @ 12.12 hrs, Volume= 67,414 cf, Depth= 4.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.19"

	Area (sf)	CN	Description
*	7,467	98	Track Surface, HSG D, 51
*	31,803	98	Track Surface, HSG A, 245C
*	11,179	98	Track Surface, HSG A, 253D
*	29,664	98	Track Surface, HSG A, 600
*	74	98	Synthetic Turf, Fair, HSG D
*	62,334	98	Synthetic Turf, Fair, HSG A
*	22,950	98	Synthetic Turf, Fair, HSG A
*	4,512	49	50-75% Grass cover, Fair, HSG A, 245C
*	741	49	50-75% Grass cover, Fair, HSG A, 253D
*	616	96	Sand, HSG A, 600
	171,340	96	Weighted Average
	5,869		3.43% Pervious Area
	165,471		96.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	115	0.0050	0.64		**Shallow Concentrated Flow, Lateral Flow Through Stone Base** Cultivated Straight Rows Kv= 9.0 fps
6.3	598	0.0050	1.59	0.56	**Pipe Channel, Perimeter Pipe** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.020
9.3	713	Total			

Summary for Subcatchment PR-02: Portion of Fields to Basin

Runoff = 11.04 cfs @ 12.13 hrs, Volume= 38,432 cf, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=5.19"

	Area (sf)	CN	Description
*	30,063	89	<50% Grass cover, Poor, HSG D, 51
*	60,357	80	>75% Grass cover, Good, HSG D, 51
*	1,634	68	<50% Grass cover, Poor, HSG A, 245C
*	2,108	39	>75% Grass cover, Good, HSG A, 245C
*	13,262	98	Pavement, HSG A, 253D
*	778	98	Concrete, HSG A, 253D
*	2,715	76	Crushed Stone, HSG A, 253D
*	55,359	68	<50% Grass cover, Poor, HSG A, 253D
*	70,769	39	>75% Grass cover, Good, HSG A, 253D
*	1,036	98	Concrete, HSG A, 254A
*	6,766	68	<50% Grass cover, Poor, HSG A, 254A
*	3,326	39	>75% Grass cover, Good, HSG A, 254A
	248,173	66	Weighted Average
	233,097		93.93% Pervious Area
	15,076		6.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, 0-50** Grass: Short n= 0.150 P2= 3.22"
0.8	81	0.0100	1.61		**Shallow Concentrated Flow, 50-131** Unpaved Kv= 16.1 fps
0.1	37	0.0920	4.88		**Shallow Concentrated Flow, 131-168** Unpaved Kv= 16.1 fps
0.0	6	0.0100	2.03		**Shallow Concentrated Flow, 168-174** Paved Kv= 20.3 fps
0.0	25	0.3400	9.39		**Shallow Concentrated Flow, 174-199** Unpaved Kv= 16.1 fps
8.3	199	Total			

Summary for Reach DP-1A: Existing Detention Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 0.12" for 10-Year event
Inflow = 0.78 cfs @ 12.33 hrs, Volume= 1,757 cf
Outflow = 0.78 cfs @ 12.33 hrs, Volume= 1,757 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP-1B: Water Quality Swale

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 248,173 sf, 6.07% Impervious, Inflow Depth = 1.86" for 10-Year event
Inflow = 11.04 cfs @ 12.13 hrs, Volume= 38,432 cf
Outflow = 11.04 cfs @ 12.13 hrs, Volume= 38,432 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Field System

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 4.72" for 10-Year event
Inflow = 17.65 cfs @ 12.12 hrs, Volume= 67,414 cf
Outflow = 8.65 cfs @ 12.33 hrs, Volume= 67,544 cf, Atten= 51%, Lag= 12.1 min
Discarded = 7.87 cfs @ 11.96 hrs, Volume= 65,787 cf
Primary = 0.78 cfs @ 12.33 hrs, Volume= 1,757 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 128.45' @ 12.33 hrs Surf.Area= 0 sf Storage= 5,908 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.5 min (767.0 - 764.6)

Volume	Invert	Avail.Storage	Storage Description
#1	124.32'	18,899 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
124.32	0
127.80	1,986
128.47	6,055
128.72	18,899

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.32'	**4.39 cfs Exfiltration (600) at all elevations**
#2	Discarded	124.32'	**3.48 cfs Exfiltration (245C Soils) at all elevations**
#3	Primary	124.82'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=7.87 cfs @ 11.96 hrs HW=124.37' (Free Discharge)
↑—**1=Exfiltration (600)** (Exfiltration Controls 4.39 cfs)
└—**2=Exfiltration (245C Soils)** (Exfiltration Controls 3.48 cfs)

Primary OutFlow Max=0.78 cfs @ 12.33 hrs HW=128.45' (Free Discharge)
↑—**3=Orifice/Grate** (Orifice Controls 0.78 cfs @ 8.96 fps)

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR-01: Track and Field Runoff Area=171,340 sf 96.57% Impervious Runoff Depth=6.78"
Flow Length=713' Slope=0.0050 '/' Tc=9.3 min CN=96 Runoff=24.94 cfs 96,848 cf

Subcatchment PR-02: Portion of Fields to Runoff Area=248,173 sf 6.07% Impervious Runoff Depth=3.41"
Flow Length=199' Tc=8.3 min CN=66 Runoff=20.90 cfs 70,521 cf

Reach DP-1A: Existing Detention Basin Inflow=0.80 cfs 3,409 cf
Outflow=0.80 cfs 3,409 cf

Reach DP-1B: Water Quality Swale Inflow=20.90 cfs 70,521 cf
Outflow=20.90 cfs 70,521 cf

Pond 1P: Field System Peak Elev=128.63' Storage=14,142 cf Inflow=24.94 cfs 96,848 cf
Discarded=7.87 cfs 93,399 cf Primary=0.80 cfs 3,409 cf Outflow=8.67 cfs 96,808 cf

Total Runoff Area = 419,513 sf Runoff Volume = 167,369 cf Average Runoff Depth = 4.79"
56.96% Pervious = 238,966 sf 43.04% Impervious = 180,547 sf

Summary for Subcatchment PR-01: Track and Field

Runoff = 24.94 cfs @ 12.12 hrs, Volume= 96,848 cf, Depth= 6.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=7.26"

	Area (sf)	CN	Description
*	7,467	98	Track Surface, HSG D, 51
*	31,803	98	Track Surface, HSG A, 245C
*	11,179	98	Track Surface, HSG A, 253D
*	29,664	98	Track Surface, HSG A, 600
*	74	98	Synthetic Turf, Fair, HSG D
*	62,334	98	Synthetic Turf, Fair, HSG A
*	22,950	98	Synthetic Turf, Fair, HSG A
*	4,512	49	50-75% Grass cover, Fair, HSG A, 245C
*	741	49	50-75% Grass cover, Fair, HSG A, 253D
*	616	96	Sand, HSG A, 600
	171,340	96	Weighted Average
	5,869		3.43% Pervious Area
	165,471		96.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	115	0.0050	0.64		**Shallow Concentrated Flow, Lateral Flow Through Stone Base** Cultivated Straight Rows Kv= 9.0 fps
6.3	598	0.0050	1.59	0.56	**Pipe Channel, Perimeter Pipe** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.020
9.3	713	Total			

Summary for Subcatchment PR-02: Portion of Fields to Basin

Runoff = 20.90 cfs @ 12.12 hrs, Volume= 70,521 cf, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=7.26"

	Area (sf)	CN	Description
*	30,063	89	<50% Grass cover, Poor, HSG D, 51
*	60,357	80	>75% Grass cover, Good, HSG D, 51
*	1,634	68	<50% Grass cover, Poor, HSG A, 245C
*	2,108	39	>75% Grass cover, Good, HSG A, 245C
*	13,262	98	Pavement, HSG A, 253D
*	778	98	Concrete, HSG A, 253D
*	2,715	76	Crushed Stone, HSG A, 253D
*	55,359	68	<50% Grass cover, Poor, HSG A, 253D
*	70,769	39	>75% Grass cover, Good, HSG A, 253D
*	1,036	98	Concrete, HSG A, 254A
*	6,766	68	<50% Grass cover, Poor, HSG A, 254A
*	3,326	39	>75% Grass cover, Good, HSG A, 254A
	248,173	66	Weighted Average
	233,097		93.93% Pervious Area
	15,076		6.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, 0-50** Grass: Short n= 0.150 P2= 3.22"
0.8	81	0.0100	1.61		**Shallow Concentrated Flow, 50-131** Unpaved Kv= 16.1 fps
0.1	37	0.0920	4.88		**Shallow Concentrated Flow, 131-168** Unpaved Kv= 16.1 fps
0.0	6	0.0100	2.03		**Shallow Concentrated Flow, 168-174** Paved Kv= 20.3 fps
0.0	25	0.3400	9.39		**Shallow Concentrated Flow, 174-199** Unpaved Kv= 16.1 fps
8.3	199	Total			

Summary for Reach DP-1A: Existing Detention Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 0.24" for 50-Year event
Inflow = 0.80 cfs @ 12.44 hrs, Volume= 3,409 cf
Outflow = 0.80 cfs @ 12.44 hrs, Volume= 3,409 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP-1B: Water Quality Swale

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 248,173 sf, 6.07% Impervious, Inflow Depth = 3.41" for 50-Year event
Inflow = 20.90 cfs @ 12.12 hrs, Volume= 70,521 cf
Outflow = 20.90 cfs @ 12.12 hrs, Volume= 70,521 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Field System

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 6.78" for 50-Year event
Inflow = 24.94 cfs @ 12.12 hrs, Volume= 96,848 cf
Outflow = 8.67 cfs @ 12.44 hrs, Volume= 96,808 cf, Atten= 65%, Lag= 19.0 min
Discarded = 7.87 cfs @ 11.83 hrs, Volume= 93,399 cf
Primary = 0.80 cfs @ 12.44 hrs, Volume= 3,409 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 128.63' @ 12.44 hrs Surf.Area= 0 sf Storage= 14,142 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 6.7 min (764.0 - 757.3)

Volume	Invert	Avail.Storage	Storage Description
#1	124.32'	18,899 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
124.32	0
127.80	1,986
128.47	6,055
128.72	18,899

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.32'	**4.39 cfs Exfiltration (600) at all elevations**
#2	Discarded	124.32'	**3.48 cfs Exfiltration (245C Soils) at all elevations**
#3	Primary	124.82'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=7.87 cfs @ 11.83 hrs HW=124.37' (Free Discharge)
↑—**1=Exfiltration (600)** (Exfiltration Controls 4.39 cfs)
└—**2=Exfiltration (245C Soils)** (Exfiltration Controls 3.48 cfs)

Primary OutFlow Max=0.80 cfs @ 12.44 hrs HW=128.63' (Free Discharge)
↑—**3=Orifice/Grate** (Orifice Controls 0.80 cfs @ 9.19 fps)

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PR-01: Track and Field Runoff Area=171,340 sf 96.57% Impervious Runoff Depth=7.69"
Flow Length=713' Slope=0.0050 '/' Tc=9.3 min CN=96 Runoff=28.13 cfs 109,806 cf

Subcatchment PR-02: Portion of Fields to Runoff Area=248,173 sf 6.07% Impervious Runoff Depth=4.15"
Flow Length=199' Tc=8.3 min CN=66 Runoff=25.53 cfs 85,771 cf

Reach DP-1A: Existing Detention Basin Inflow=0.81 cfs 4,214 cf
Outflow=0.81 cfs 4,214 cf

Reach DP-1B: Water Quality Swale Inflow=25.53 cfs 85,771 cf
Outflow=25.53 cfs 85,771 cf

Pond 1P: Field System Peak Elev=128.71' Storage=18,367 cf Inflow=28.13 cfs 109,806 cf
Discarded=7.87 cfs 105,542 cf Primary=0.81 cfs 4,214 cf Outflow=8.68 cfs 109,756 cf

Total Runoff Area = 419,513 sf Runoff Volume = 195,577 cf Average Runoff Depth = 5.59"
56.96% Pervious = 238,966 sf 43.04% Impervious = 180,547 sf

Summary for Subcatchment PR-01: Track and Field

Runoff = 28.13 cfs @ 12.12 hrs, Volume= 109,806 cf, Depth= 7.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.17"

	Area (sf)	CN	Description
*	7,467	98	Track Surface, HSG D, 51
*	31,803	98	Track Surface, HSG A, 245C
*	11,179	98	Track Surface, HSG A, 253D
*	29,664	98	Track Surface, HSG A, 600
*	74	98	Synthetic Turf, Fair, HSG D
*	62,334	98	Synthetic Turf, Fair, HSG A
*	22,950	98	Synthetic Turf, Fair, HSG A
*	4,512	49	50-75% Grass cover, Fair, HSG A, 245C
*	741	49	50-75% Grass cover, Fair, HSG A, 253D
*	616	96	Sand, HSG A, 600
	171,340	96	Weighted Average
	5,869		3.43% Pervious Area
	165,471		96.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	115	0.0050	0.64		**Shallow Concentrated Flow, Lateral Flow Through Stone Base** Cultivated Straight Rows Kv= 9.0 fps
6.3	598	0.0050	1.59	0.56	**Pipe Channel, Perimeter Pipe** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.020
9.3	713	Total			

Summary for Subcatchment PR-02: Portion of Fields to Basin

Runoff = 25.53 cfs @ 12.12 hrs, Volume= 85,771 cf, Depth= 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.17"

	Area (sf)	CN	Description
*	30,063	89	<50% Grass cover, Poor, HSG D, 51
*	60,357	80	>75% Grass cover, Good, HSG D, 51
*	1,634	68	<50% Grass cover, Poor, HSG A, 245C
*	2,108	39	>75% Grass cover, Good, HSG A, 245C
*	13,262	98	Pavement, HSG A, 253D
*	778	98	Concrete, HSG A, 253D
*	2,715	76	Crushed Stone, HSG A, 253D
*	55,359	68	<50% Grass cover, Poor, HSG A, 253D
*	70,769	39	>75% Grass cover, Good, HSG A, 253D
*	1,036	98	Concrete, HSG A, 254A
*	6,766	68	<50% Grass cover, Poor, HSG A, 254A
*	3,326	39	>75% Grass cover, Good, HSG A, 254A
	248,173	66	Weighted Average
	233,097		93.93% Pervious Area
	15,076		6.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, 0-50** Grass: Short n= 0.150 P2= 3.22"
0.8	81	0.0100	1.61		**Shallow Concentrated Flow, 50-131** Unpaved Kv= 16.1 fps
0.1	37	0.0920	4.88		**Shallow Concentrated Flow, 131-168** Unpaved Kv= 16.1 fps
0.0	6	0.0100	2.03		**Shallow Concentrated Flow, 168-174** Paved Kv= 20.3 fps
0.0	25	0.3400	9.39		**Shallow Concentrated Flow, 174-199** Unpaved Kv= 16.1 fps
8.3	199	Total			

Summary for Reach DP-1A: Existing Detention Basin

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 0.30" for 100-Year event
Inflow = 0.81 cfs @ 12.48 hrs, Volume= 4,214 cf
Outflow = 0.81 cfs @ 12.48 hrs, Volume= 4,214 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Reach DP-1B: Water Quality Swale

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 248,173 sf, 6.07% Impervious, Inflow Depth = 4.15" for 100-Year event
Inflow = 25.53 cfs @ 12.12 hrs, Volume= 85,771 cf
Outflow = 25.53 cfs @ 12.12 hrs, Volume= 85,771 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Field System

Inflow Area = 171,340 sf, 96.57% Impervious, Inflow Depth = 7.69" for 100-Year event
Inflow = 28.13 cfs @ 12.12 hrs, Volume= 109,806 cf
Outflow = 8.68 cfs @ 12.48 hrs, Volume= 109,756 cf, Atten= 69%, Lag= 21.1 min
Discarded = 7.87 cfs @ 11.79 hrs, Volume= 105,542 cf
Primary = 0.81 cfs @ 12.48 hrs, Volume= 4,214 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 128.71' @ 12.48 hrs Surf.Area= 0 sf Storage= 18,367 cf

Plug-Flow detention time= 9.3 min calculated for 109,756 cf (100% of inflow)
Center-of-Mass det. time= 9.0 min (764.0 - 755.0)

Volume	Invert	Avail.Storage	Storage Description
#1	124.32'	18,899 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
124.32	0
127.80	1,986
128.47	6,055
128.72	18,899

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.32'	**4.39 cfs Exfiltration (600) at all elevations**
#2	Discarded	124.32'	**3.48 cfs Exfiltration (245C Soils) at all elevations**
#3	Primary	124.82'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=7.87 cfs @ 11.79 hrs HW=124.36' (Free Discharge)
↑—**1=Exfiltration (600)** (Exfiltration Controls 4.39 cfs)
↑—**2=Exfiltration (245C Soils)** (Exfiltration Controls 3.48 cfs)

Primary OutFlow Max=0.81 cfs @ 12.48 hrs HW=128.71' (Free Discharge)
↑—**3=Orifice/Grate** (Orifice Controls 0.81 cfs @ 9.29 fps)

Operation and Maintenance Plan

Bound Separately

Operation and Maintenance Plan

Wellesley College Athletic Accessibility Renovations

106 Central Street
Wellesley, MA 02481

Owner:
Wellesley College
106 Central Street
Wellesley, MA 02481
(781) 283-1000

Submitted To:
Town of Wellesley
Site Plan Review Committee
525 Washington Street
Wellesley, MA 02481
(781) 431-1019

Applicant:
Activitas, Inc.
16 School Street
Dedham, MA 02026
(781) 355-7040

December 4, 2018

Table of Contents

1.0 Operation and Maintenance Plan

The Wellesley College Athletic Accessibility Renovations project site is subject to Standard 9 Operation and Maintenance Plan of the Massachusetts Stormwater Handbook. This Operation and Maintenance Plan details management recommendations for long-term pollution prevention.

The area to be renovated is the existing track and field and one of the natural grass fields east of the track. The project scope is limited to an area of approximately 5.10 acres. The project consists of installation of a new infilled synthetic turf playing surface, renovation of the resilient track surface and installation of new resilient track surfacing on the eastern straightaway, and construction of a new throwing events located at the existing eastern natural grass field. The project consists of a new development.

The surfacing types within the limit of work consist of bituminous walkways that will be maintained year round, and cement concrete and track surfacing that will not require maintenance.

1.1 Outlet Control Structure

There will be one outlet control structure on site to control the flow out of the synthetic turf drainage system. The outlet control structure should be inspected twice each year and cleaned twice per year. The outlet control structure should be checked at least four times a year and at the end of the foliage and snow-removal season.

- Record all maintenance and repairs. Submit reports every year for compliance.
- Inspect the outlet control structure every storm (or at least four times a year) and at the end of the foliage and snow-removal season.
- If sediment is more than six inches deep and/or there are floatable pollutants, they will be removed from the outlet control structure and disposed of.

1.2 Synthetic Turf Field Maintenance

See Appendix 2.2 for an example of a synthetic turf maintenance manual.

1.3 Vegetated Areas Maintenance

Although not a structural component of the drainage system, the maintenance of vegetated areas may affect the function of stormwater management practices. This includes the health/density of vegetative cover and activities such as the application and disposal of lawn and garden care products, disposal of leaves and yard trimmings.

- Inspect planted areas on a semi-annual basis and remove any litter.
- Maintain planted areas adjacent to pavement to prevent soil washout.
- Immediately clean any soil deposited on pavement.
- Re-seed bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming.
- Plant alternative mixture of grass species in the event of unsuccessful establishment.

1.4 Spill Prevention and Control Plan

The Property Owner will be responsible for training of people in the proper handling and cleanup of spilled materials. No spilled hazardous materials or hazardous wastes will be allowed to come in contact with stormwater discharges. If such contact occurs, the stormwater discharge will be contained on site until appropriate measures in compliance with state and federal regulations are taken to dispose of such contaminated stormwater.

In order to minimize the potential for a spill of hazardous materials to come into contact with stormwater, the following steps will be implemented:

1. All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, cleaning solvents, additives for soil stabilization, concrete curing compounds and additives, etc.) will be stored in a secure location, with their lids on, preferably under cover, when not in use.
2. The minimum practical quantity of all such materials will be kept on the site.

3. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dustpans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided at the maintenance area of the site.
4. Manufacturers recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

In the event of a spill, the following procedures should be followed:

1. All spills will be cleaned up immediately after discovery.
2. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with hazardous substances.
3. The Owner will be notified immediately.
4. Spills of toxic or hazardous materials will be reported to the appropriate federal, state, and/or local government agency, regardless of the size of the spill.

The Property Owner will be the spill prevention and response coordinator. He will designate the individuals who will receive spill prevention and response training. These individuals will each become responsible for a particular phase of prevention and response. The names of these personnel will be posted in the material storage area and other applicable areas onsite.

2.0 Appendices

2.1 Operations and Maintenance Logs

Inspection for Year:

NOTE: See Operations and Maintenance Plan for details of inspection requirements.

Structural Best Management Practice	Action	Date Completed	Comments	Completed By	Action	Date Completed	Comments	Completed By
Outlet Control Structures	Inspect				Clean if required – (See Plan for details)			

2.2 Example Synthetic Turf Maintenance Manual

LOCUS MAP 1" = 500'

NORTH

LIST OF DRAWINGS

PERMITTING DOCUMENTS

WELLESLEY COLLEGE

WELLESLEY COLLEGE ATHLETIC ACCESSIBILITY RENOVATIONS

WELLESLEY, MA

OWNER

Wellesley College
106 Central Street
Wellesley, Massachusetts 02481
(781) 283-1000

LANDSCAPE ARCHITECT

Activitas, Inc.
Sixteen School Street
Dedham, Massachusetts 02026-4310
(781) 326 - 2600

ELECTRICAL ENGINEER

NV5
200 Brickstone Square
Andover, Massachusetts 01810
(978) 296-6232

GEOTECHNICAL ENGINEER

Haley & Aldrich
465 Medford Street #2200
Charlestown, Massachusetts 02129
(617) 886-7400

WETLAND SPECIALIST

Epsilon Associates, Inc.
3 Mill & Main Place, Suite 250
Maynard, Massachusetts 01754
(978) 461-6271

SURVEY

Landtech Consultants
515 Groton Road
Westford, Massachusetts 01886
(978) 692-6100

WELLESLEY COLLEGE
WELLESLEY COLLEGE ATHLETIC
ACCESSIBILITY RENOVATIONS

PERMITTING DOCUMENTS
NOVEMBER 30, 2018

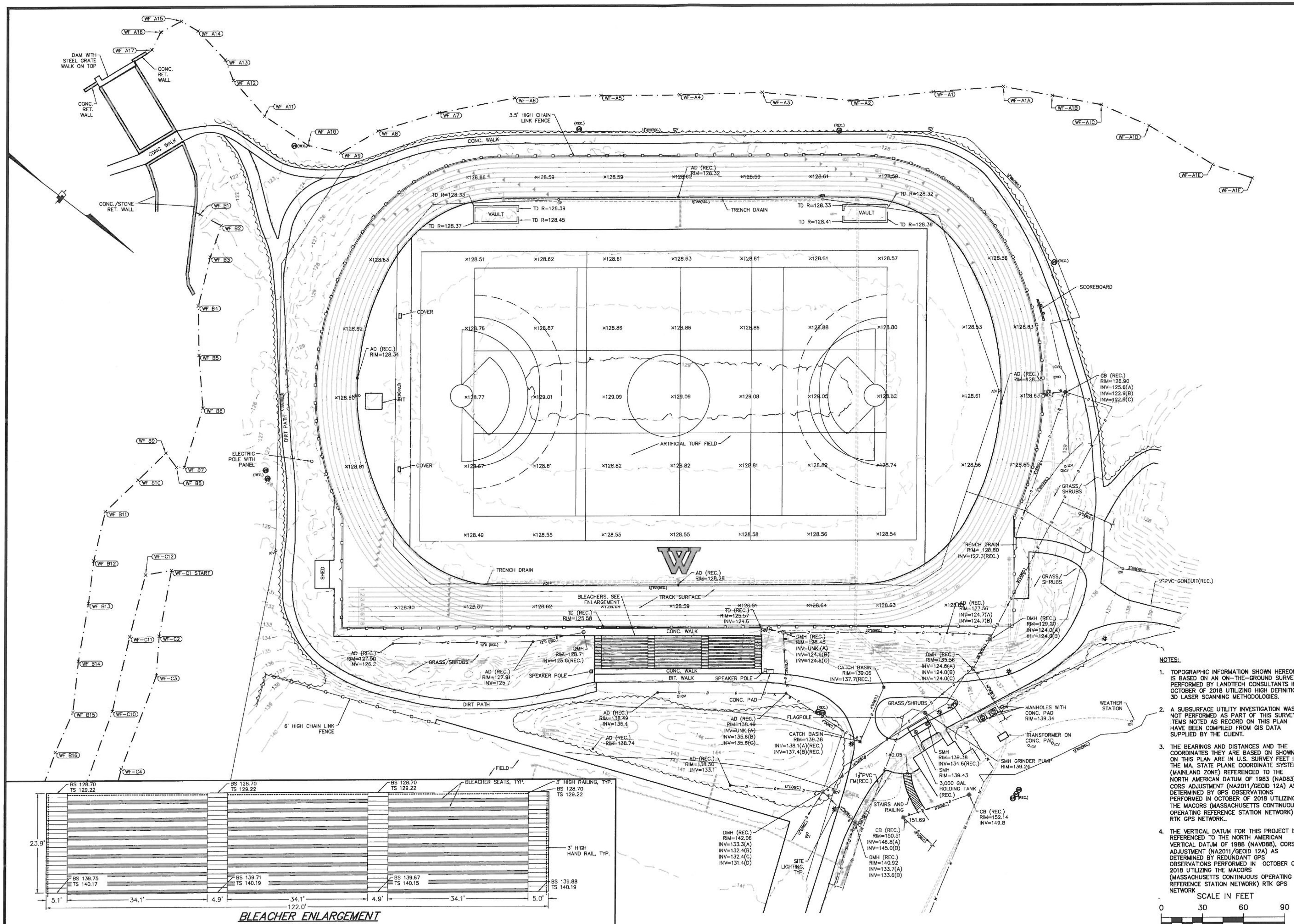
1. DRB-11/30/18
2. SPR-12/4/18

OWNER

Wellesley College
106 Central Street
Wellesley, MA 02481

activitas

Planning | Landscape | Athletic Facilities



NOTES:

1. TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON AN ON-THE-GROUND SURVEY PERFORMED BY LANDTECH CONSULTANTS IN OCTOBER OF 2018 UTILIZING HIGH DEFINITION 3D LASER SCANNING METHODOLOGIES.
2. A SUBSURFACE UTILITY INVESTIGATION WAS NOT PERFORMED AS PART OF THIS SURVEY. ITEMS NOTED AS RECORD ON THIS PLAN HAVE BEEN COMPILED FROM GIS DATA SUPPLIED BY THE CLIENT.
3. THE BEARINGS AND DISTANCES AND THE COORDINATES THEY ARE BASED ON SHOWN ON THIS PLAN ARE IN U.S. SURVEY FEET IN THE MA. STATE PLANE COORDINATE SYSTEM (MAINLAND ZONE) REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), CORS ADJUSTMENT (NA2011/GEOID 12A) AS DETERMINED BY GPS OBSERVATIONS PERFORMED IN OCTOBER OF 2018 UTILIZING THE MACORS (MASSACHUSETTS CONTINUOUS OPERATING REFERENCE STATION NETWORK) RTK GPS NETWORK..
4. THE VERTICAL DATUM FOR THIS PROJECT IS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), CORS ADJUSTMENT (NA2011/GEOID 12A) AS DETERMINED BY REDUNDANT GPS OBSERVATIONS PERFORMED IN OCTOBER OF 2018 UTILIZING THE MACORS (MASSACHUSETTS CONTINUOUS OPERATING REFERENCE STATION NETWORK) RTK GPS NETWORK

SCALE IN FEET
0 30 60 90

EXISTING TOPOGRAPHY PLAN

WELLESLEY COLLEGE
WELLESLEY, MASSACHUSETTS

Scale: 1"= 30'
DECEMBER 3, 2018

Prepared for:
ACTIVITAS
16 SCHOOL STREET
DEDHAM, MA

Scan	Draft	Check
TL	ART	CML

DATE	REVISION	BY

LandTech Consultants
Engineering/Design/Surveying/Permitting
515 Groton Road, - Westford, MA 01886
Ph: (978) 692-6100 - landtechinc.com

Job. No. 18-194
Dwg. No. 10510
Sheet 1 OF 3

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Wellesley, Massachusetts

WELLESLEY COLLEGE ATHLETIC
ACCESSIBILITY RENOVATIONS

REV:
DRB - 11/30/2016
SPR - 12/04/2018

SEAL:

Permitting Documents -
November 30, 2018

EXISTING
CONDITIONS
PLAN SHEET II

SCALE:	AS NOTED
JOB NO:	18032.00
FILE:	18032.00-EXISTING_CON.dwg
DRAWN:	
CHECKED:	MEB

SHEET NO:
EX1.2

SITE PREPARATION LEGEND

- APPROXIMATE LIMIT OF WORK
- CONSTRUCTION ACCESS
- STRAW WATTLE
- REMOVE AND DISPOSE OF EXISTING DRAINAGE
- SILT SACK
- REMOVE AND RECYCLE EXISTING SYNTHETIC TURF CARPET AND INFILL (NOT TO BE REUSED ON SITE)
- REMOVE AND DISPOSE OF EXISTING CEMENT CONCRETE PAVEMENT
- POWERWASH TOP LAYER OF TRACK SURFACE, REFER TO SPECIFICATIONS
- PULVERIZE-IN-PLACE ASPHALT PAVEMENT

SITE PREPARATION NOTES

1. EXISTING CONDITIONS INFORMATION FOR THE TRACK AND FIELD AREA IS FROM THE SURVEY PREPARED BY LANDTECH CONSULTANTS OF 515 GROTON ROAD, WESTFORD, MA 01886 AND DATED OCTOBER 10, 2018 AND EXISTING CONDITIONS INFORMATION FOR THE THROWING AREA IS FROM A CAMPUS-WIDE SURVEY PROVIDED BY WELLESLEY COLLEGE. EXISTING DRAINAGE INFRASTRUCTURE IS FROM THE "FORMER HENRY WOOD'S SONS PAINT FACTORY PHASE II: WEST CAMPUS ATHLETIC COMPLEX SITE DEVELOPMENT" CONTRACTOR DRAWINGS DATED OCTOBER 15, 2001.
2. THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN ARE BASED ON THE EXISTING CONDITIONS REFERENCED ABOVE. THE CONTRACTOR SHALL COORDINATE WITH OWNER TO LOCATE THE OWNER'S PRIVATE UTILITIES. ADDITIONALLY, THE CONTRACTOR SHALL CONTACT THE PROPER LOCAL AUTHORITIES OR RESPECTIVE UTILITY COMPANIES TO CONFIRM THE LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. ANY DAMAGE DUE TO FAILURE OF THE CONTRACTOR TO CONTACT THE PROPER AUTHORITIES SHALL BE BORNE BY THE CONTRACTOR.
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5. TEST EXISTING SCOREBOARD SYSTEM PRIOR TO STARTING CONSTRUCTION. CONFIRM PROPER OPERATION AND MAINTAIN THROUGH COMPLETION OF CONSTRUCTION.
6. THE CONTRACTOR SHALL NOT WORK OUTSIDE OF THE APPROXIMATE LIMIT OF WORK UNLESS OTHERWISE NOTED OR DIRECTED BY THE LANDSCAPE ARCHITECT/CIVIL ENGINEER OR OWNER.
7. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CONDITIONS TO REMAIN THAT ARE DUE TO CONTRACTOR OPERATIONS.
8. ALL ITEMS TO BE REMOVED, THAT ARE NOT STOCKPILED FOR LATER REUSE ON THE PROJECT OR FOR DELIVERY TO THE OWNER, SHALL BE LEGALLY DISPOSED OF OFF SITE BY THE CONTRACTOR.
9. THE CONTRACTOR SHALL MAINTAIN OR ADJUST TO NEW FINISH GRADE (AS NECESSARY) ALL UTILITY AND SITE STRUCTURES SUCH AS MANHOLES, CATCH BASINS, AREA DRAINS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS UNLESS OTHERWISE NOTED OR DIRECTED BY THE LANDSCAPE ARCHITECT/CIVIL ENGINEER OR OWNER.
10. PROTECT AND MAINTAIN EXISTING ON-SITE DRAINAGE STRUCTURES AND PIPES UNLESS OTHERWISE NOTED.
11. THE CONTRACTOR SHALL INSTALL TEMPORARY CONSTRUCTION FENCING IF NECESSARY TO MAINTAIN A SECURE SITE. CONTRACTOR MUST TAKE APPROPRIATE MEASURES AT ALL TIMES TO MAINTAIN A SECURE SITE.
12. WITH LIMITED TRUCKING OF MATERIALS, A TRADITIONAL CONSTRUCTION ENTRANCE IS NOT REQUIRED. TRUCKS LEAVING THE SITE SHALL HAVE THEIR WHEELS WASHED PRIOR TO ENTERING TOWN ROADS. ANY TRACKING OUTSIDE THE CAMPUS SHALL BE STREET SWEPT AS NECESSARY.

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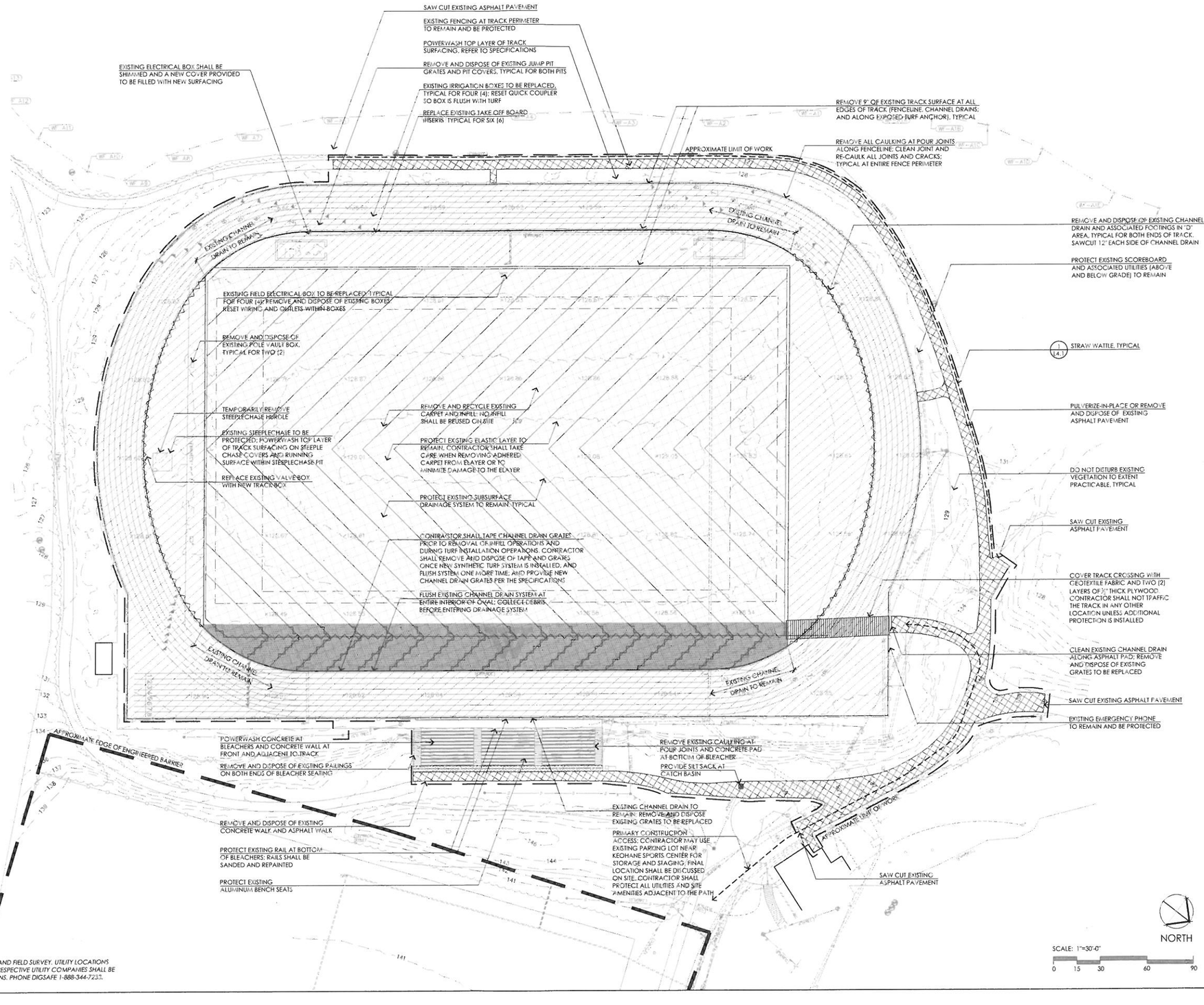

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REV.:
DRB - 11/30/2018
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SEAL: COMMONWEALTH OF MASSACHUSETTS — MEGAN E. BEZANSON CZYNSKI — No. 47260 — REGISTERED PROFESSIONAL ENGINEER

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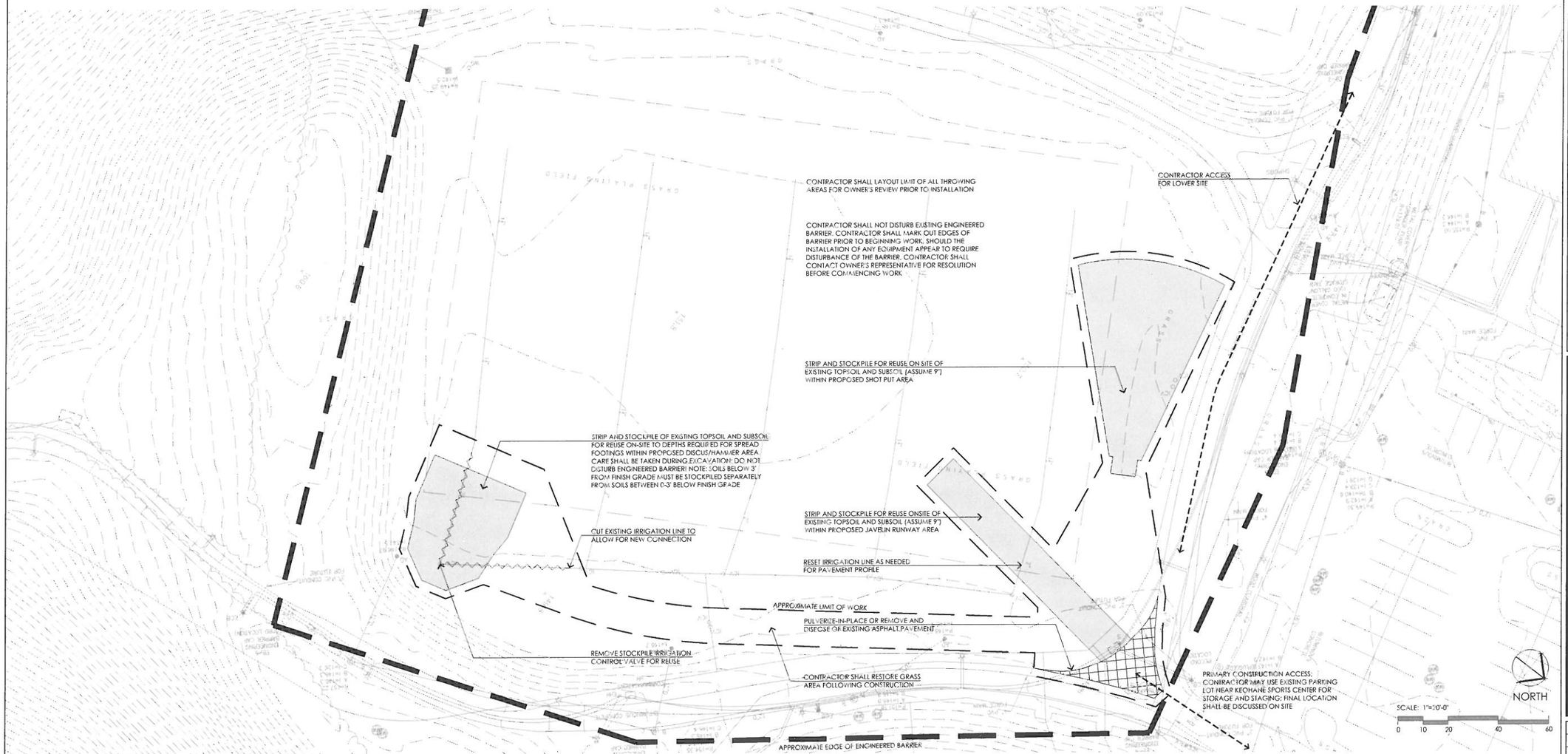
SITE PREPARATION PLAN SHEET I

SCALE:	AS NOTED
JOB NO:	18032.00
FILE:	18032.00-SP1.1-SP PLAN.dwg
DRAWN:	HCG
CHECKED:	MEB

SHEET NO: SP1.1



1 THROWING AREA SITE PREPARATION

SCALE: 1"=20'-0"

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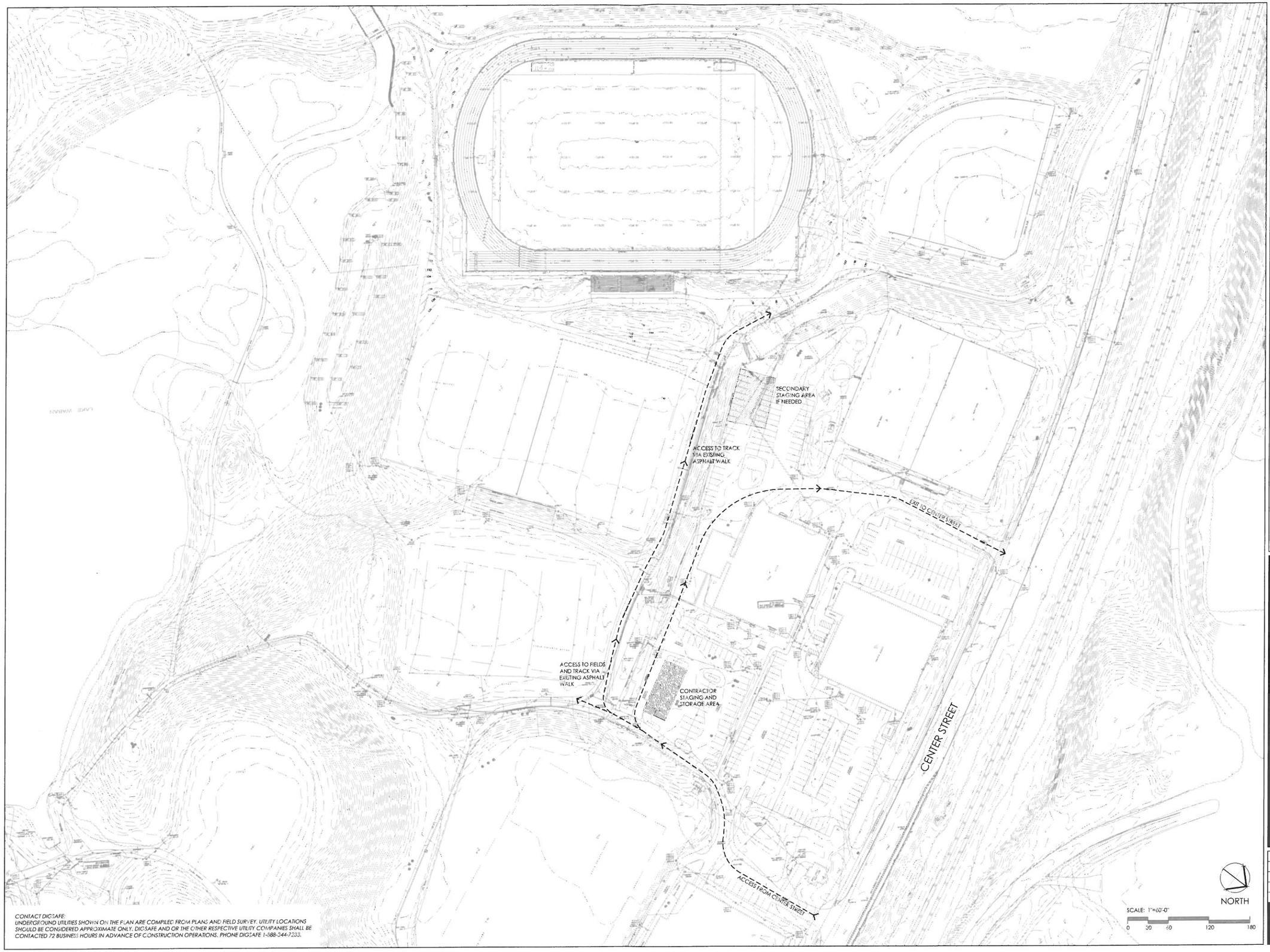
SITE PREPARATION PLAN SHEET II

SCALE:	AS NOTED
JOB NO:	18032.00
FILE:	18032.00-SP1.1-SP_PLAN.dwg
DRAWN:	HCG
CHECKED:	MEB

SHEET NO: SP1.2



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REGISTERED PROFESSIONAL ENGINEER

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CONTRACTOR STAGING PLAN

SCALE:	AS NOTED
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FILE:	18032.00-SP1.3.dwg
DRAWN:	HCG
CHECKED:	MEB

SHEET NO:
SP1.3

LAYOUT AND MATERIALS LEGEND

APPROXIMATE LIMIT OF WORK

INFILLED SYNTHETIC TURF SYSTEM

RESILIENT TRACK SURFACING

TRACK PAVING AND RESILIENT SURFACING

BITUMINOUS CONCRETE PAVEMENT

CEMENT CONCRETE PAVEMENT

STONE DUST PAVEMENT

LAYOUT AND MATERIALS NOTES

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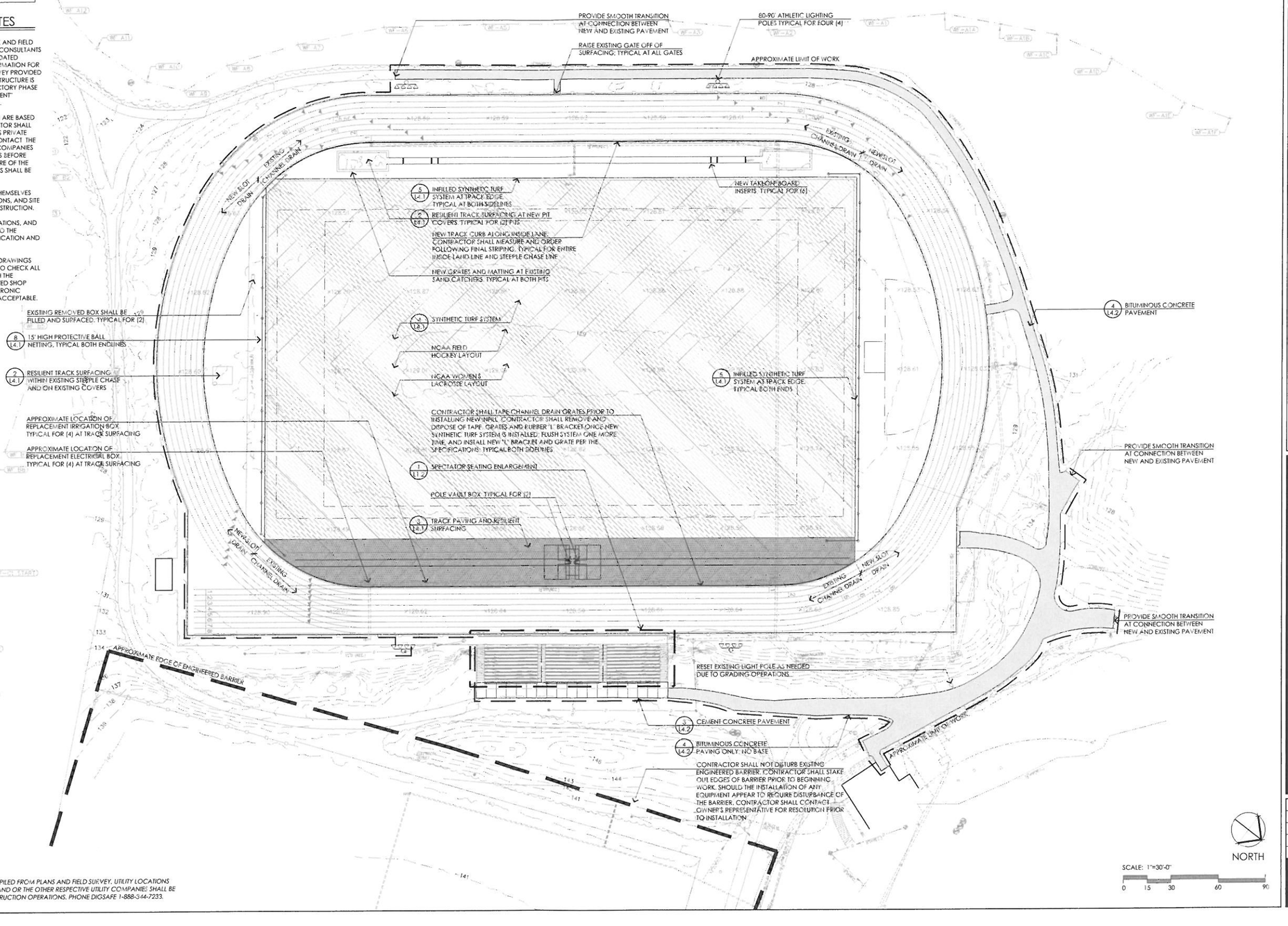
5. WHILE THE CONTRACTOR MAY USE THE ELECTRONIC DRAWINGS FOR LAYOUT PURPOSES, IT IS HIS/HER RESPONSIBILITY TO CHECK ALL LAYOUT IN THE FIELD TO CONFIRM CONFORMITY WITH THE PROJECT DRAWINGS, SPECIFICATIONS, AND APPROVED SHOP DRAWINGS AND SUBMITTALS. USE OF ONLY THE ELECTRONIC DRAWINGS WITHOUT A SITE CHECK OF LAYOUT IS UNACCEPTABLE.



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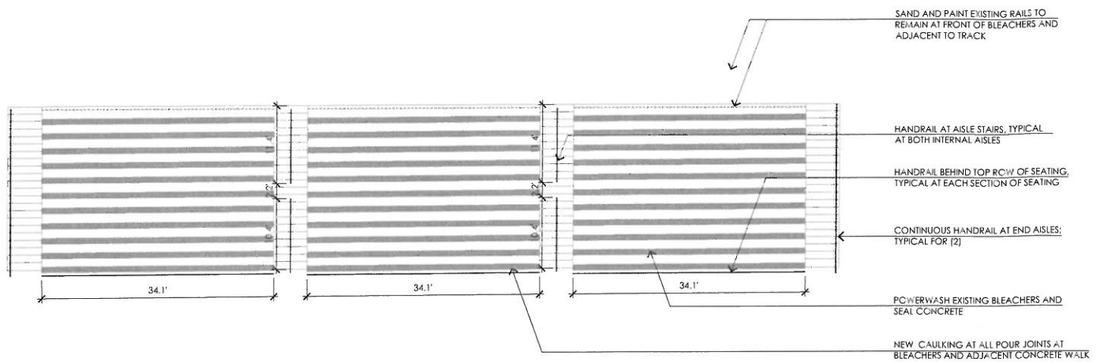
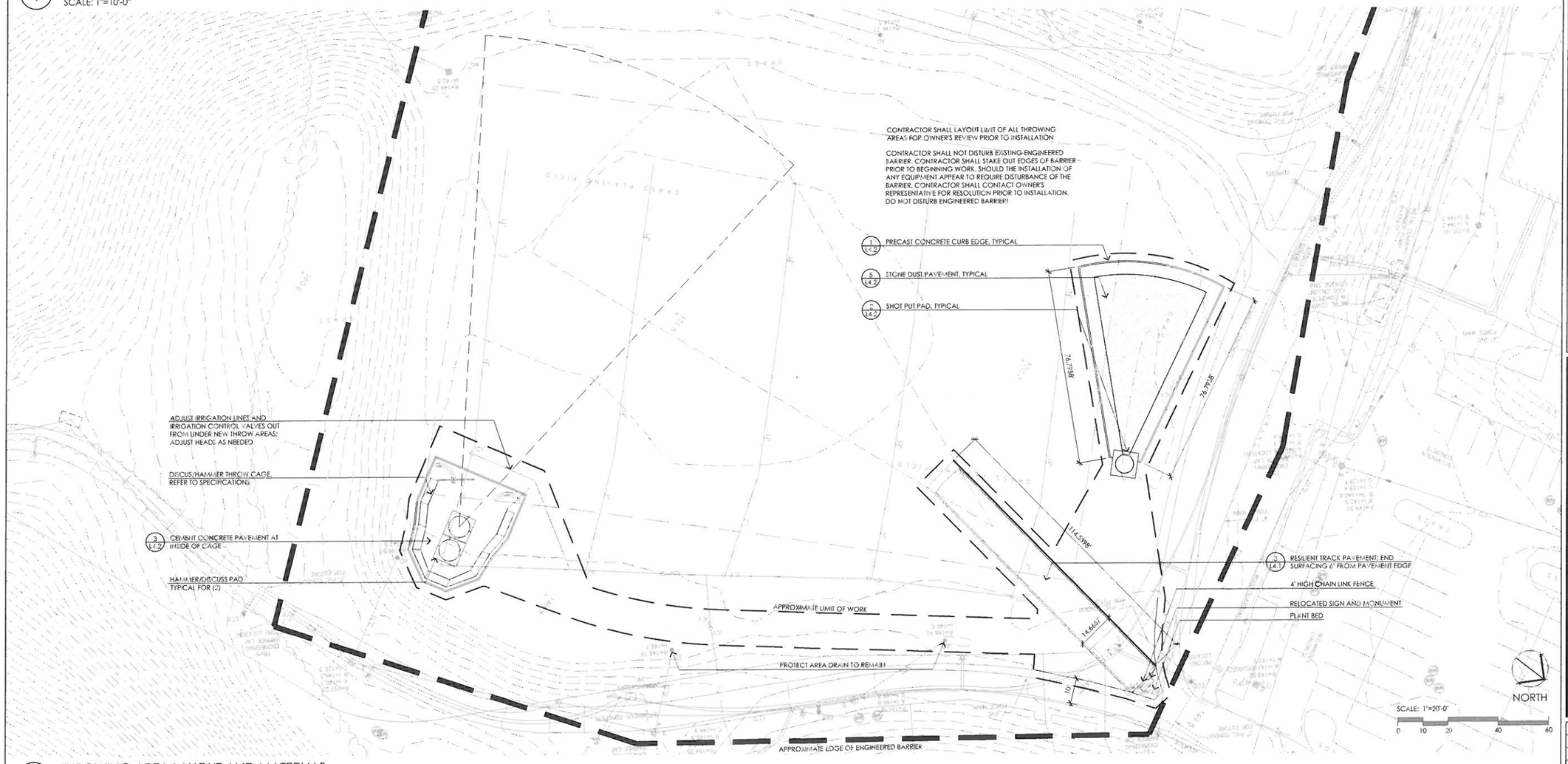
LAYOUT AND MATERIALS PLAN - SHEET 1

SCALE:	AS NOTED
JOB NO:	18032.00
FILE:	18032.00-L1.1-LM PLAN.dwg
DRAWN:	HCG
CHECKED:	MEB
SHEET NO:	L1.1



1 SPECTATOR SEATING ENLARGEMENT

SCALE: 1"=10'-0"



2 THROWING AREA LAYOUT AND MATERIALS

SCALE: 1"=20'-0"

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SEAL: COMMONWEALTH OF MASSACHUSETTS MEGAN E. BLOZYNSKI No. 47264 REGISTERED PROFESSIONAL ENGINEER

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LAYOUT AND MATERIALS PLAN - SHEET II

SCALE:	AS NOTED
JOB NO:	18032.00
FILE:	18032.00-L1.1-LM. PLAN.dwg
DRAWN:	HCG
CHECKED:	MEB

SHEET NO: L1.2

GRADING LEGEND

APPROXIMATE LIMIT OF WORK	— — — — —
EXISTING 1' CONTOURS	
EXISTING 5' CONTOURS	
PROPOSED 1' CONTOURS	XXX
PROPOSED INTERVAL CONTOUR/RIDGELINE	XXX.XX
PROPOSED SLOPE DIRECTION	
EXISTING SPOT GRADE	
PROPOSED SPOT GRADE	+XXX.XX

GRADING NOTES

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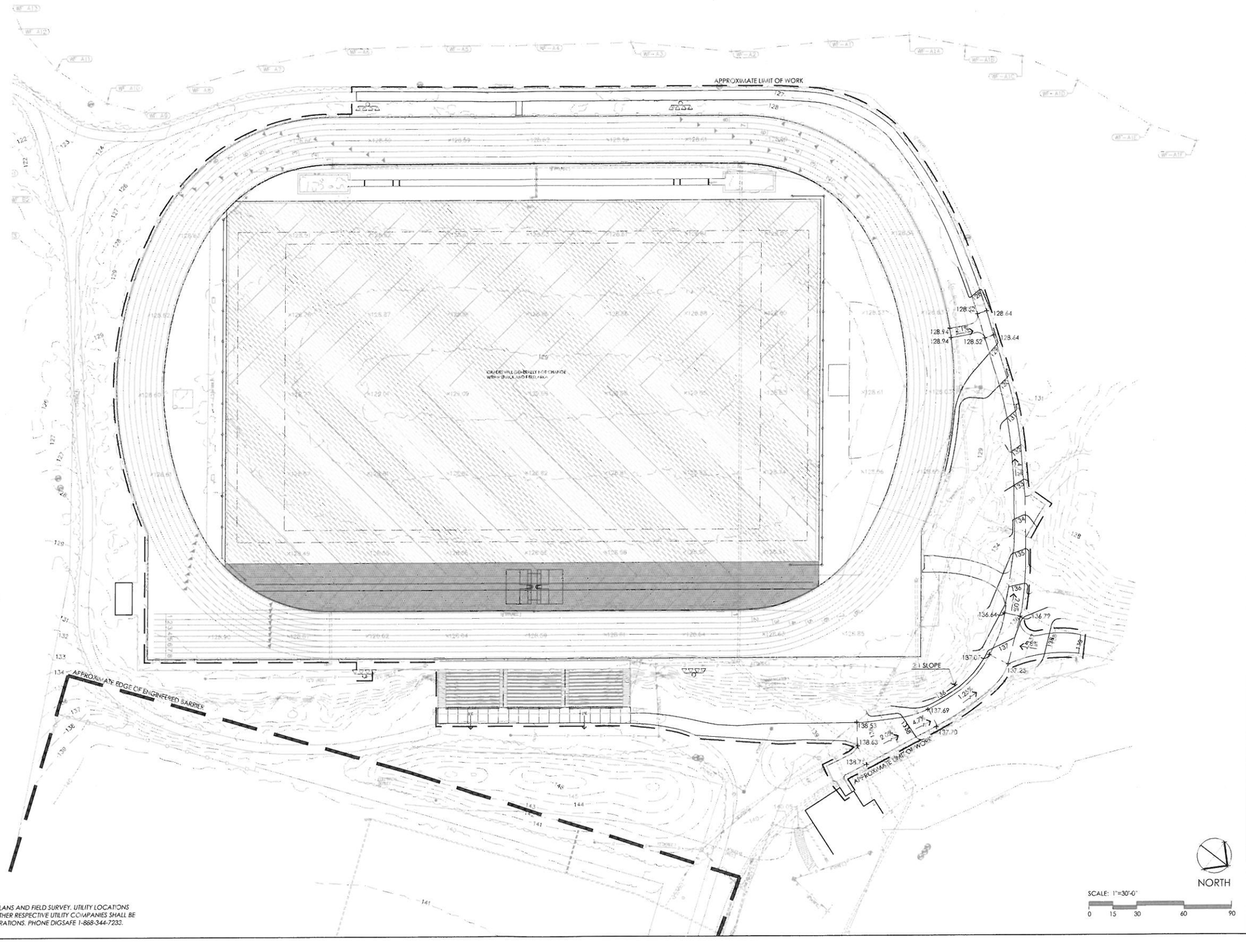

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REV:
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SEAL: COMMONWEALTH OF MASSACHUSETTS — MEGAN E. BUCZYNSKI — CIVIL — No. 47366 — REGISTERED PROFESSIONAL ENGINEER

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GRADING PLAN

SCALE:	AS NOTED
JOB NO:	18032.00
FILE:	18032.00-L2.1-G_PLAN.dwg
DRAWN:	HCG
CHECKED:	MEB
SHEET NO:	L2.1

DRAINAGE LEGEND

APPROXIMATE LIMIT OF WORK	— — — — —
HDPE PERFORATED DRAIN LINE	XX" D. PERF
HDPE SOLID DRAIN LINE	XX" D
OUTLET CONTROL STRUCTURE	◎

DRAINAGE NOTES

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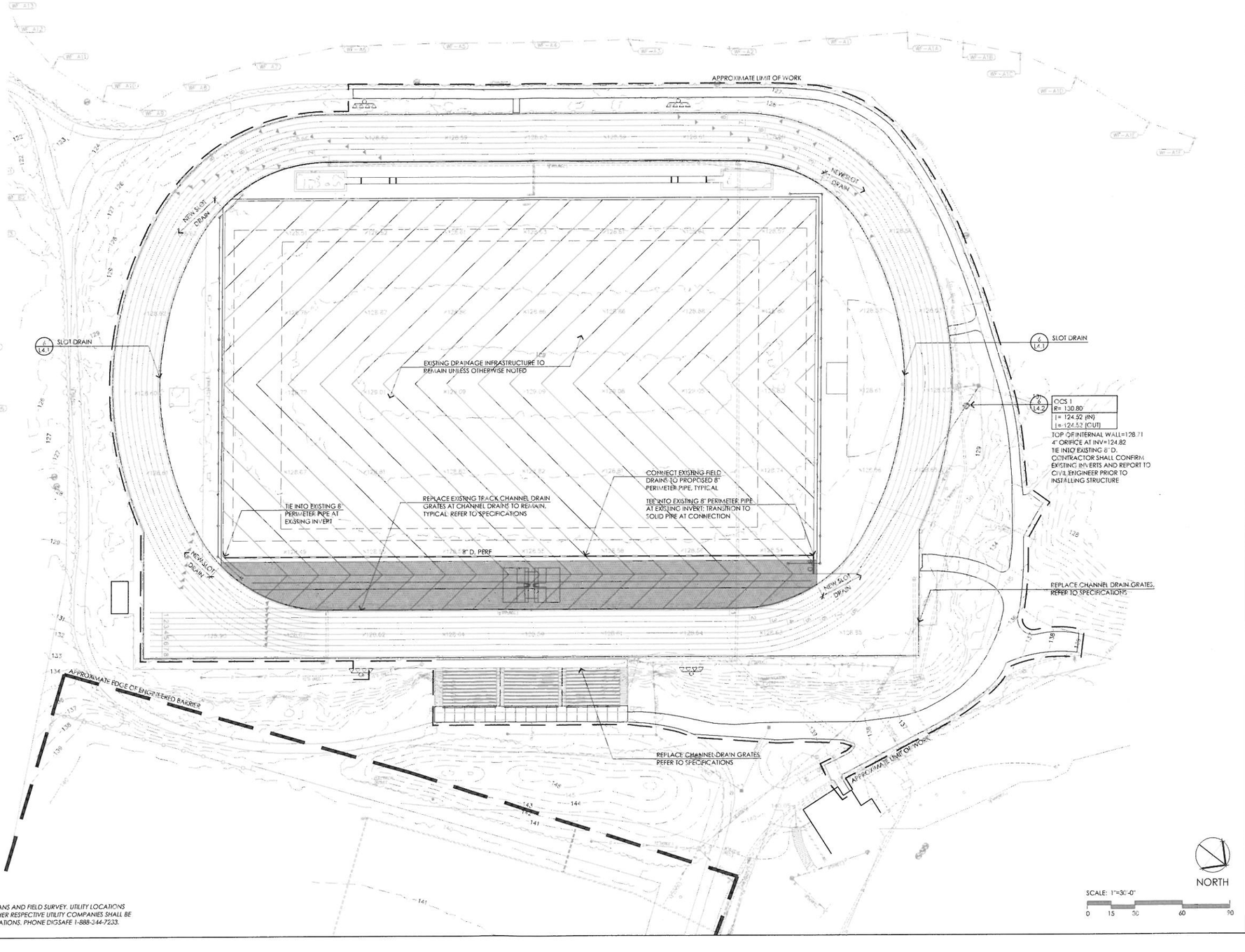
2. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MAY BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES.
3. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
4. CONTRACTOR SHALL ADJUST TO NEW FINISH GRADE, AS NECESSARY ALL UTILITY AND SITE STRUCTURES SUCH AS: LIGHT POLES, SIGN POLES, MANHOLES, CATCH BASINS, INLETS, CLEAN-OUTS HAND HOLES, WATER AND GAS GATES, HYDRANTS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS WHETHER SPECIFICALLY NOTED ON PLANS OR NOT. THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE AND SEWER STRUCTURES AS NECESSARY FOR CHANGES IN FINISH GRADE.
5. ENSURE ALL EXISTING (TO REMAIN), AND PROPOSED MANHOLE COVERS PROPERLY IDENTIFY UTILITY SERVICED.
6. PROTECT AND MAINTAIN EXISTING ON-SITE DRAINAGE STRUCTURES AND PIPES UNLESS OTHERWISE NOTED.
7. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION, AT THE CONTRACTOR'S EXPENSE.



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DRB - 11/30/2018
SPR - 12/04/2018

SEAL: COMMONWEALTH OF MASSACHUSETTS — MEGAN E. BUCZYNSKI — CIVIL — No. 47096 — REGISTERED PROFESSIONAL ENGINEER

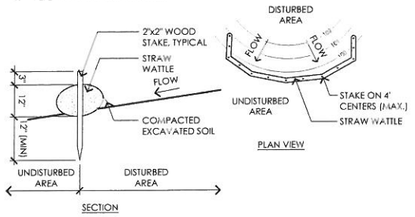
Permitting Documents - November 30, 2018

DRAINAGE PLAN

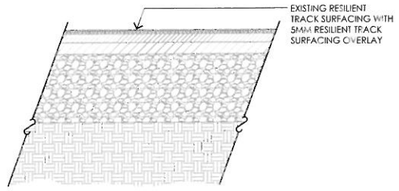
SCALE:	AS NOTED
JOB NO:	18032.00
FILE:	18032.00-L3.1-UT. PLAN.dwg
DRAWN:	HCG
CHECKED:	MEB
SHEET NO:	L3.1

NOTES:

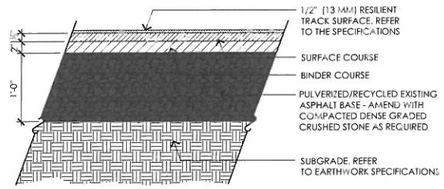
1. REFER TO DETAIL 6/SP1.2 NOTES.



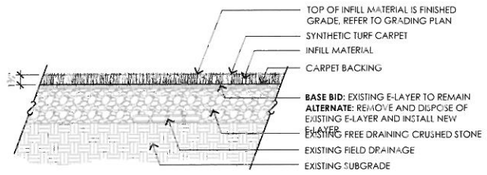
1 STRAW WATTLE
NOT TO SCALE



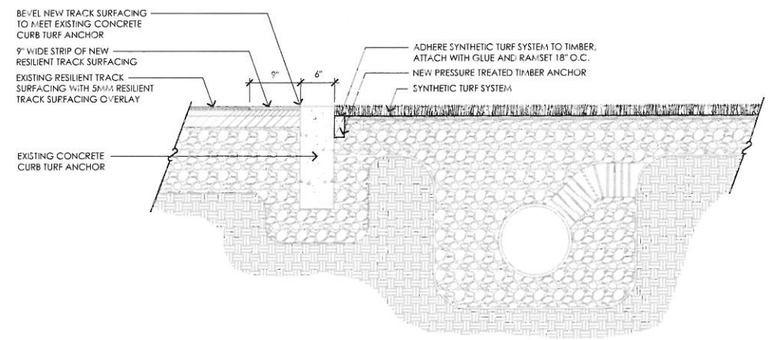
2 RESILIENT TRACK SURFACING
NOT TO SCALE



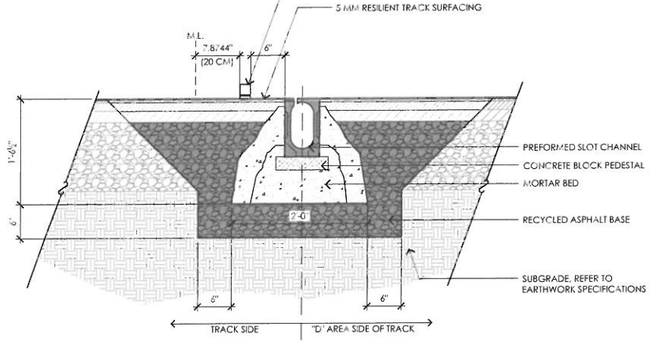
3 TRACK PAVING AND RESILIENT SURFACING
NOT TO SCALE



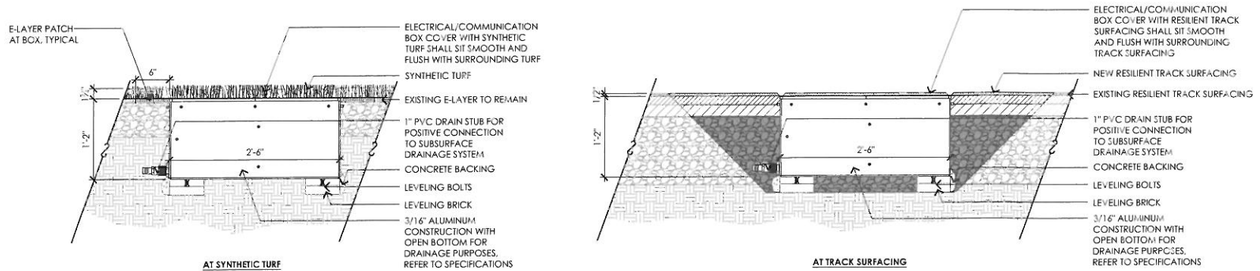
4 SYNTHETIC TURF
NOT TO SCALE



5 SYNTHETIC TURF SYSTEM AT EXISTING TURF ANCHOR
NOT TO SCALE



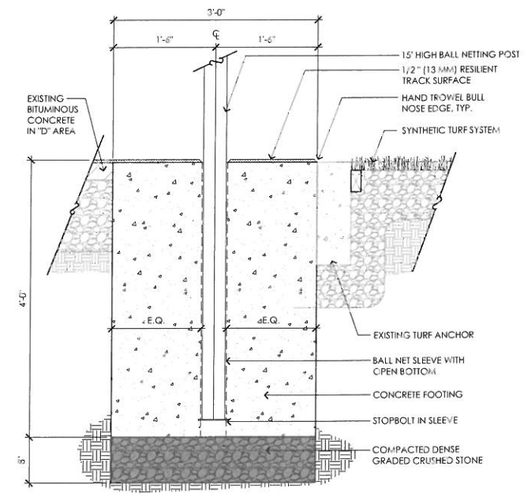
6 SLOT DRAIN IN "D" AREA
NOT TO SCALE



7 ELECTRICAL/COMMUNICATION BOX AT SYNTHETIC TURF AND TRACK SURFACING
NOT TO SCALE

NOTES:

1. BALL NET FOUNDATION SHOWN FOR GENERAL INTENT AND PRICING PURPOSES ONLY. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE COMMONWEALTH OF MASSACHUSETTS AND AN APPROPRIATELY SIZED FOUNDATION WHICH COMPLIES WITH THE ENGINEER AND MANUFACTURER'S RECOMMENDATIONS.
2. BALL NET SLEEVES SHALL BE INSTALLED IN THE TRACK "D" AREA IN A MANNER THAT ALLOWS SLEEVE CAPS TO BE INSTALLED FLUSH WITH THE TOP OF THE RESILIENT TRACK SURFACING WHEN THE BALL NET POSTS ARE DOWN.
3. CONTRACTOR MAY AT HIS DISCRETION HAVE THE CONCRETE SIT LOWER AND INSTALL ASPHALT TO DIRECTLY BELOW THE TRACK SURFACING, REGARDLESS OF WHAT METHOD IS USED. THE FINAL SURFACING SHALL BE FLUSH AND SMOOTH WITH SURROUNDING AREAS.



8 15' HIGH PROTECTIVE BALL NETTING SYSTEM FOOTING
NOT TO SCALE

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WELLESLEY COLLEGE ATHLETIC ACCESSIBILITY RENOVATIONS

REV.:
DRB - 11/30/2018
SPR - 12/04/2018

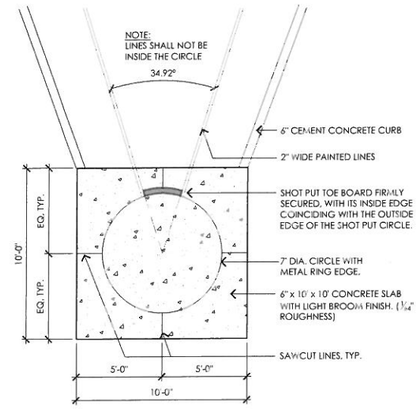
SEAL: COMMONWEALTH OF MASSACHUSETTS MEGAN E. BUCZYNSKI No. 37606 REGISTERED PROFESSIONAL ENGINEER

Permitting Documents - November 30, 2018

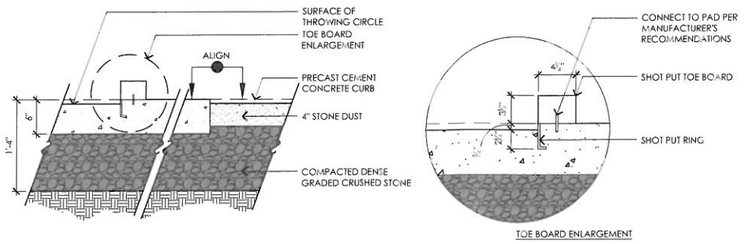
DETAIL SHEET I

SCALE:	AS NOTED
JOB NO:	18032.00
FILE:	18032.00-L01-DET 1.dwg
DRAWN:	AEB
CHECKED:	MEB

SHEET NO: L4.1



1 SHOT PUT PAD (LAYOUT)
NOT TO SCALE

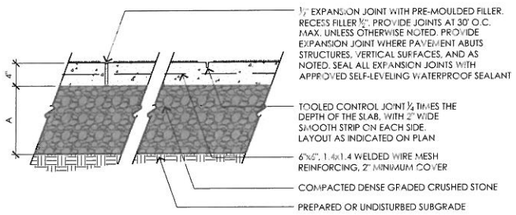


2 SHOT PUT PAD / STONE DUST DETAIL
NOT TO SCALE

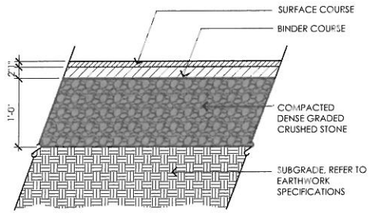
NOTE:

1. PROVIDE LIGHT BROOM FINISH PERPENDICULAR TO FLOW OF TRAFFIC

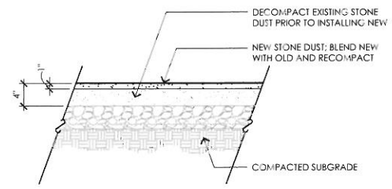
	TYPE 1	TYPE 2
A	6"	12"



3 CEMENT CONCRETE PAVEMENT
NOT TO SCALE



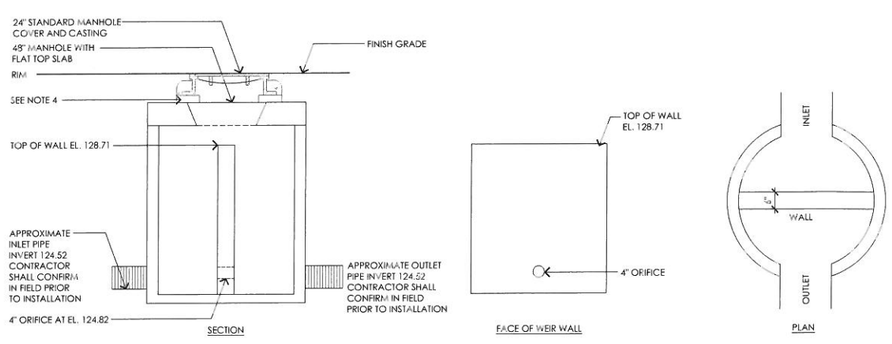
4 BITUMINOUS CONCRETE PAVEMENT
NOT TO SCALE



5 STONE DUST PAVING
NOT TO SCALE

NOTES:

1. ALL SECTIONS SHALL BE DESIGNED FOR H5-20 LOADING.
2. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 1" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. ADJUST RIM WITH CLAY BRICK AND MORTAR TO SIT FLUSH WITH FINISH GRADE



6 OUTLET CONTROL STRUCTURE
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WELLESLEY COLLEGE ATHLETIC ACCESSIBILITY RENOVATIONS

REV.:
DRB - 11/30/2018
SPR - 12/04/2018

SEAL:
COMMONWEALTH OF MASSACHUSETTS
MEGAN E. BUCKMINSKI
CIVIL
No. 47906
REGISTERED PROFESSIONAL ENGINEER

Permitting Documents - December 4th, 2018

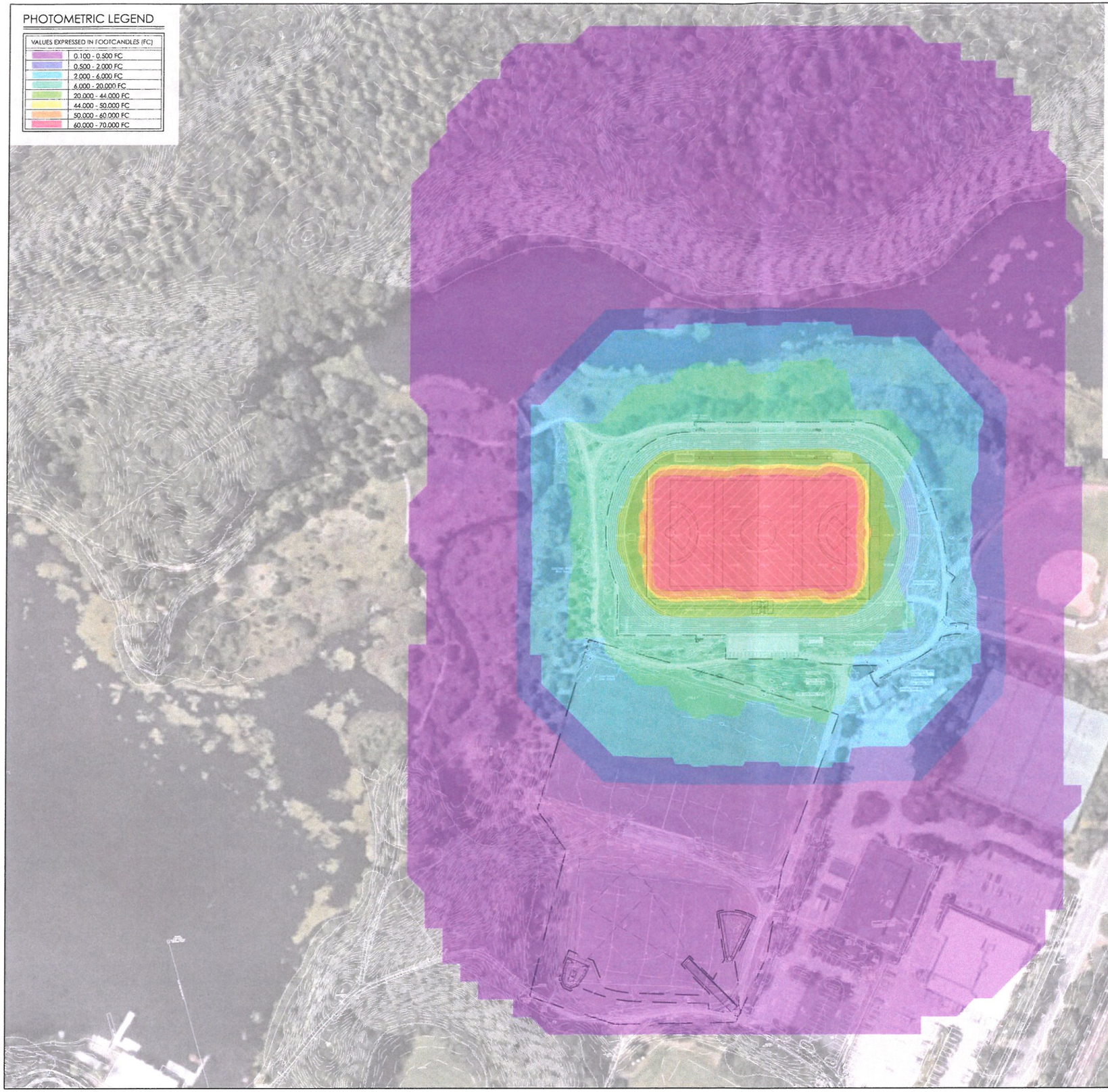
DETAIL SHEET II

SCALE:	AS NOTED
JOB NO:	18032.00
FILE:	18032.00-L3.2-DET 2.dwg
DRAWN:	AEB
CHECKED:	MEB

SHEET NO:
L4.2

PHOTOMETRIC LEGEND

VALUES EXPRESSED IN FOOTCANDLES (FC)	
	0.100 - 0.500 FC
	0.500 - 2.000 FC
	2.000 - 6.000 FC
	6.000 - 20.000 FC
	20.000 - 44.000 FC
	44.000 - 50.000 FC
	50.000 - 60.000 FC
	60.000 - 70.000 FC



Recommended Light Levels

Recommended Light Levels (Illuminance) for Outdoor and Indoor Venues

This is an instructor resource with information to be provided to students as the instructor sees fit. Light Level or Illuminance, is the amount of light measured in a plane surface (or the total luminous flux incident on a surface, per unit area). The work plane is where the most important tasks in the room or space are performed.

Measuring Units of Light Level - Illuminance

Illuminance is measured in foot candles *(ftcd, fc, fcd)* or lux (in the metric SI system). A *foot candle* is actually *one lumen of light density per square foot; one lux* is *one lumen per square meter*.

- *1 lux = 1 lumen / sq meter = 0.0001 phot = 0.0929 foot candle (ftcd, fcd)*
- *1 phot = 1 lumen / sq centimeter = 10000 lumens / sq meter = 10000 lux*
- *1 foot candle (ftcd, fcd) = 1 lumen / sq ft = 10.752 lux*

Common Light Levels Outdoors from Natural Sources

Common light levels outdoor at day and night can be found in the table below:

Condition	Illumination (ftcd)	(lux)
Sunlight	10,000	107,527
Full Daylight	1,000	10,752
Overcast Day	100	1,075
Very Dark Day	10	107
Twilight	1	10.8
Deep Twilight	.1	1.08
Full Moon	.01	.108
Quarter Moon	.001	.0108
Starlight	.0001	.0011
Overcast Night	.00001	.0001

Common Light Levels Outdoors from Manufactured Sources

The nomenclature for most of the types of areas listed in the table below can be found in the City of Los Angeles, Department of Public Works, Bureau of Street Lighting's "DESIGN STANDARDS AND GUIDELINES" at the URL address under **References** at the end of this document.

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Wellesley, Massachusetts

WELLESLEY COLLEGE ATHLETIC ACCESSIBILITY RENOVATIONS

REV:
DRB - 11/30/2018
SPR - 12/04/2018

SEAL:

Permitting Documents - November 30, 2018

PHOTOMETRIC PLAN

SCALE:	AS NOTED
JOB NO.	18032.00
FILE:	18032.00-P1.1-PHOTOMET.dwg
DRAWN:	HCG
CHECKED:	MEB

SHEET NO: P1.1

LIGHTING FIXTURE SCHEDULE - LED

TYPE	MANUFACTURERS	CATALOG NUMBER	DESCRIPTION	COLOR	CRI	LUMENS	INPUT		REMARKS
							WATTS	VOLTS	

NOTES:

1. NOTES 2-10 APPLY TO ALL APPLICABLE LIGHTING FIXTURES. THE REMARKS COLUMN SHALL NOTE ADDITIONAL REQUIREMENTS.
2. FIXTURES SPECIFIED WITH CATALOG NUMBERS ARE THE BASIS OF DESIGN AND ESTABLISH QUALITY LEVEL FOR EQUAL FIXTURES FROM MANUFACTURERS LISTED WITHOUT CATALOG NUMBERS. WHERE ONLY ONE MANUFACTURER LISTED, THERE SHALL BE NO SUBSTITUTION.
3. VERIFY EXACT MOUNTING CONDITIONS AND PROVIDE APPROPRIATE ACCESSORIES AND HARDWARE TO ACCOMMODATE REQUIREMENTS.
4. FIXTURE TYPE INDICATED ONCE ON A CONTINUOUS ROW SHALL BE TYPICAL OF ALL FIXTURES IN THE ROW UNLESS NOTED OTHERWISE.
5. CONTINUOUS ROWS OF FIXTURES SHALL BE PROVIDED WITH ALL NECESSARY HARDWARE AND FILLERS TO PROVIDE THE EXACT LENGTHS AS INDICATED ON THE PLANS. FIXTURES IN SOFFITS SHALL BE CONTINUOUS END TO END.
6. FIXTURES WITH MAXIMUM THD OF 15%, PF GREATER THAN 90%. DRIVERS SHALL BE UL LISTED.
7. EFFICIENCY SHALL BE GREATER THAN THAT REQUIRED TO ENSURE THAT THE VALUE LISTED FOR INPUT WATTS IS NOT EXCEEDED.
8. MINIMUM CRI SHALL BE 80.
9. PROVIDE EXIT SIGNS WITH ARROWS AND MOUNTING ACCESSORIES AS INDICATED ON THE PLANS.
10. DRIVERS SHALL HAVE FULL RANGE DIMMING CAPABILITIES FROM 10% TO 100% UNLESS NOTED OTHERWISE.
11. BATTERY BACKED DRIVERS SHALL PROVIDE A MINIMUM OF 50% OF THE FIXTURE LUMENS FOR 90 MINUTES. DRIVERS SHALL UL LISTED AND HAVE A 5 YEAR WARRANTEE.

WIRING DEVICE LEGEND

- 5 / GFI — DUPLEX RECEPTACLE, GROUNDING TYPE, RATED 20A, 125V
  "5"- INDICATES CIRCUIT NUMBER
  "GFI"- INDICATES INTEGRAL GROUND FAULT CIRCUIT INTERRUPTER
  "WP" - INDICATES WEATHERPROOF
- DOUBLE DUPLEX RECEPTACLE, GROUNDING TYPE, RATED 20A, 125V
- J — JUNCTION BOX

POWER DISTRIBUTION

- 208Y/120 VOLT PANELBOARD, SURFACE MOUNTED
  REFER TO PANEL SCHEDULE ON DRAWING EX.XX
- T3 — DRY TYPE TRANSFORMER
  "T3" - INDICATES KVA RATING OF TRANSFORMER
  REFER TO DRY TYPE TRANSFORMER SCHEDULE

EXISTING EQUIPMENT LEGEND

XM	EXISTING EQUIPMENT TO REMAIN
X	EXISTING EQUIPMENT TO BE REMOVED
XR	EXISTING EQUIPMENT TO BE RELOCATED
XN	NEW LOCATION OF EXISTING RELOCATED EQUIPMENT
NR	EXISTING EQUIPMENT TO BE REMOVED AND NEW EQUIPMENT TO BE INSTALLED ON EXISTING BRANCH/FEEDER
	EXISTING EQUIPMENT FOR INFORMATION ONLY- INDICATED BY SYMBOL WITH LIGHT AND OUT OF FUNCTION LINE TYPE
	EXISTING EQUIPMENT TO BE REWORKED- INDICATED BY SYMBOL WITH DASHED AND IN FUNCTION LINE TYPE

ONE LINE SYMBOLS LEGEND

- XXAS / XXAF — DISCONNECT SWITCH, FUSED
  "XXAF" INDICATES FUSE RATING "XXAS" INDICATES SWITCH SIZE
- XXAF / XXAT — CIRCUIT BREAKER, FIXED
  "XXAF" INDICATES FRAME SIZE "XXAT" INDICATES TRIP
- GROUND CONNECTION
- TRANSFORMER
- R21A — PANELBOARD

SITE LEGEND

- EM — ELECTRIC MANHOLE
- EH — ELECTRIC HAND HOLE
- UE — UNDERGROUND ELECTRIC
- A / # — UNDERGROUND SECTION, REFER TO SECTION DETAIL
  "A" INDICATES DETAIL LETTER
  "#" INDICATES DRAWING NUMBER

LIGHTING FIXTURE LEGEND

- F1 / 2 — POLE MOUNTED SPORTS LIGHTING FIXTURE.
  'F1' INDICATES FIXTURE TYPE
  '2' INDICATES CIRCUIT NUMBER

BRANCH CIRCUIT & FEEDER LEGEND

- BRANCH CIRCUIT OR FEEDER CONCEALED IN FINISHED AREAS
- BRANCH CIRCUIT OR FEEDER, CONCEALED IN OR UNDER FLOOR SLAB
- BRANCH CIRCUIT OR FEEDER TURNING UP TOWARDS OBSERVER
- BRANCH CIRCUIT OR FEEDER TURNING DOWN AWAY FROM OBSERVER
- CONDUIT STUBBED ABOVE CEILING
- R22A-1,3,5 — BRANCH CIRCUIT HOME RUN TICKS INDICATE QUANTITY OF CONDUCTORS, GROUND CONDUCTORS ARE NOT INDICATED. NO TICKS INDICATES 2#12 & 1#12G IN 3/4"C MINIMUM. R22A-1,3,5 INDICATES PANEL AND CIRCUIT DESIGNATION FROM WHICH HOMERUN SHALL ORIGINATE. EACH CIRCUIT SHALL BE 20A-1P (20AMP SINGLE POLE) UNLESS NOTED OTHERWISE.
- H42B-1 100A-3P / 6 — FEEDER HOMERUN. REFER TO LEGEND OF FEEDER SIZES FOR CONDUCTOR AND RACEWAY REQUIREMENTS DESIGNATED INSIDE TAG. H42B-1 INDICATES PANEL AND CIRCUIT NUMBER DESIGNATION FROM WHICH HOME RUN SHALL ORIGINATE, 100A-3P INDICATES 100 AMPERE, 3 POLE CIRCUIT BREAKER.
- FLEXIBLE CONNECTION TO EQUIPMENT. RACEWAY AND CONDUCTOR RATING TO MATCH ASSOCIATED BRANCH CIRCUIT OR FEEDER

MOTOR & CONTROLS LEGEND

- 60AS / 60AF — FUSED DISCONNECT SWITCH, 3-POLE, IN NEMA TYPE 1 ENCLOSURE, UNLESS OTHERWISE NOTED.
  "3R" - INDICATES NEMA TYPE 3R ENCLOSURE
  "60AS" - INDICATES 60AMP SWITCH
  "50AF" - INDICATES 50AMP FUSES

ABBREVIATIONS

A/AMP	AMPERE	KWH	KILOWATT HOURS
AC	ALTERNATING CURRENT	LTG	LIGHTING
ADA	AMERICAN WITH DISABILITIES ACT	MCB	MAIN CIRCUIT BREAKER
AF	AMPERE FRAME	MEC	MASSACHUSETTS ELECTRICAL CODE
AFF	ABOVE FINISHED FLOOR	M/G	MOTOR/GENERATOR SET
AFG	ABOVE FINISHED GRADE	MH	MANHOLE
AIC	AMPERE INTERRUPTING CAPACITY	MLO	MAIN LUGS ONLY
AL	ALUMINUM	MTD	MOUNTED
AT	AMPERE TRIP	MTG	MOUNTING
ATS	AUTOMATIC TRANSFER SWITCH	NC	NORMALLY CLOSED CONTACT
AWG	AMERICAN WIRE GAUGE	NEC	NATIONAL ELECTRICAL CODE
B	BURIED	NO	NORMALLY OPEN CONTACT
C	CONDUIT	NTS	NOT TO SCALE
CA	CABLE	#	NUMBER
CATV	CABLE TELEVISION	OPD	OVER CURRENT PROTECTION DEVICE
CCTV	CLOSED CIRCUIT TELEVISION SYSTEM	POS	PROVIDED UNDER OTHER SECTIONS
CB	CIRCUIT BREAKER	PVC	POLYVINYL CHLORIDE
CKT	CIRCUITS	PWR	POWER
CPU	CENTRAL PROCESSING UNIT	RGS	RIGID GALVANIZED STEEL
℄	CENTERLINE	RMS	ROOT MEAN SQUARE VALUE
dB	DECIBEL	RPM	REVOLUTIONS PER MINUTE
DC	DIRECT CURRENT	SPD	SURGE PROTECTIVE DEVICE
DWG	DRAWING	SN	SOLID NEUTRAL
EC	ELECTRICAL CONTRACTOR	SWBD	SWITCHBOARD
EMT	ELECTRIC METALLIC TUBING	TB	TERMINAL BLOCK
FDR	FEEDER	TEL	TELEPHONE
FLMT	FLEXIBLE LIQUID TIGHT METALLIC TUBING	TERMN	TERMINAL
FREQ	FREQUENCY	TSP	TWISTED SHIELDED-PAIR
GEC	GROUNDING ELECTRODE CONDUCTOR	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSER
GFI	GROUND FAULT INTERRUPTING	TYP	TYPICAL
GND	GROUND	UG	UNDERGROUND
HH	HANDHOLE	UNO	UNLESS NOTED OTHERWISE
HP	HORSEPOWER	UPS	UNINTERRUPTIBLE POWER SUPPLY
HVAC	HEATING, VENTILATING AND AIR CONDITIONING	UTP	UNSHIELDED TWISTED-PAIR
HZ	HERTZ	V	VOLTS
IG	ISOLATED GROUND	VA	VOLT-AMPERE
JB	JUNCTION BOX	VSD	VARIABLE SPEED DRIVE
KVA	KILOVOLT-AMPERE	W	WATTS
KW	KILOWATT	WP	WEATHERPROOF

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WELLESLEY COLLEGE ATHLETIC ACCESSIBILITY RENOVATIONS

REV.:

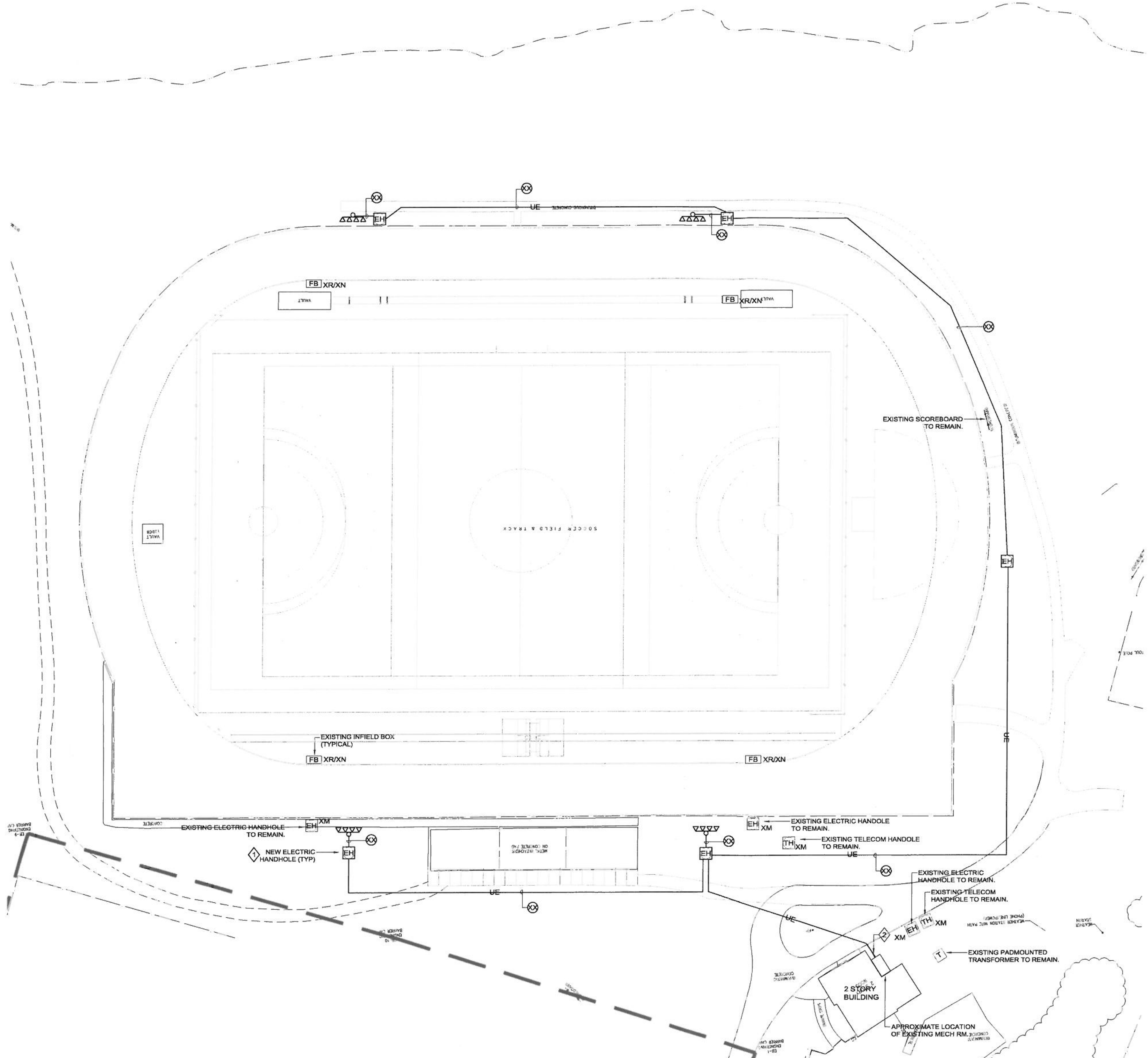
SEAL:

Plan Review - November 30, 2018

ELECTRICAL LEGEND, NOTES & ABBREVIATIONS

SCALE:	NTS
JOB NO:	0180616
FILE:	
DRAWN:	MVM
CHECKED:	KEG

SHEET NO: E0.0



CONTACT DIGSAFE:
UNDERGROUND UTILITIES SHOWN ON THE PLAN ARE COMPILED FROM PLANS AND FIELD SURVEY. UTILITY LOCATIONS SHOULD BE CONSIDERED APPROXIMATE ONLY. DIGSAFE AND OR THE OTHER RESPECTIVE UTILITY COMPANIES SHALL BE CONTACTED 72 BUSINESS HOURS IN ADVANCE OF CONSTRUCTION OPERATIONS. PHONE DIGSAFE 1-888-344-7233.

POWER NOTES:

1. REFER TO DRAWING E0.00 FOR LEGEND, SYMBOLS AND GENERAL NOTES.

2. REFER TO CIVIL/LANDSCAPE DRAWINGS FOR EXACT LOCATION OF HANDHOLES, LIGHT FIXTURES, ETC.

3. CIRCUIT NUMBERS ARE DIAGRAMMATIC. EXACT NUMBERS SHALL BE DETERMINED IN THE FIELD AND REFLECTED ON AS-BUILT DOCUMENTATION BY THE ELECTRICAL CONTRACTOR. THE ASSOCIATED CIRCUIT NUMBERS THAT ARE APPLIED TO EACH DEVICE AND PIECE OF EQUIPMENT INFERS INTERCONNECTING BRANCH CIRCUITRY. INTERCONNECTING BRANCH WIRING SHALL BE SIZED EQUAL TO THE HOMERUN UNLESS NOTED OTHERWISE.

4. VOLTAGE DROP HAS BEEN CONSIDERED IN THE DESIGN OF ALL BRANCH CIRCUITRY AND FEEDER SIZES BASED UPON THE ILLUSTRATED EQUIPMENT LAYOUTS AND SHORTEST CONDUCTOR/RACEWAY ROUTING. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR DEVIATIONS TAKEN THAT WILL INCREASE CONDUCTOR/RACEWAY ROUTING LENGTHS.

KEYNOTES

1	SEE DETAIL E505 ON DRAWING E2.0 FOR ADDITIONAL INFORMATION.
2	PROVIDE FOUNDATION SEALS (LINK SEAL) AT ALL FOUNDATION PENETRATIONS.
3	
4	
5	
6	
7	
8	
9	

NOTES:

1 REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR ADDITIONAL INFORMATION.

DUCT BANK CONDUIT SCHEDULE

TAG	DESCRIPTION	CONDUIT	CONDUCTORS
X	X	X	X

NOTES:

1. ALL CONDUIT SHALL BE DIRECT BURIED UNLESS OTHERWISE INDICATED. REFER TO DETAIL ON DRAWING E2.0 FOR ADDITIONAL INFORMATION
2. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION INCLUDING BUT NOT LIMITED TO DUCT BANK REINFORCEMENT REQUIRED UNDER PAVED AREAS INTENDED FOR VEHICULAR TRAFFIC AND AT MANHOLE/BUILDING INTERFACES.
3. ALL CONDUCTORS INSTALLED IN DUCT SHALL BE SUITABLE FOR WET LOCATIONS.
4. ALL CONDUIT SHALL BE PVC SCHEDULE 40.
5. PROVIDE ALL EMPTY/SPARE CONDUIT WITH NYLON PULL STRING.

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WELLESLEY COLLEGE ATHLETIC ACCESSIBILITY RENOVATIONS

REV.:

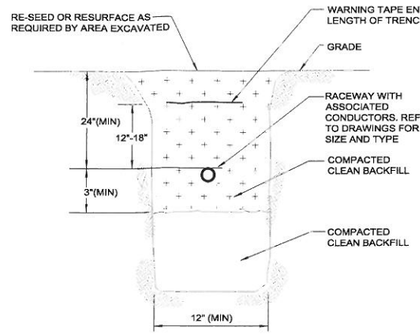
SEAL:

Plan Review - November 30, 2018

ELECTRICAL SITE PLAN

SCALE:	1" = 30'-0"
JOB NO:	0180616
FILE:	
DRAWN:	MVM
CHECKED:	KEG

SHEET NO: E1.0



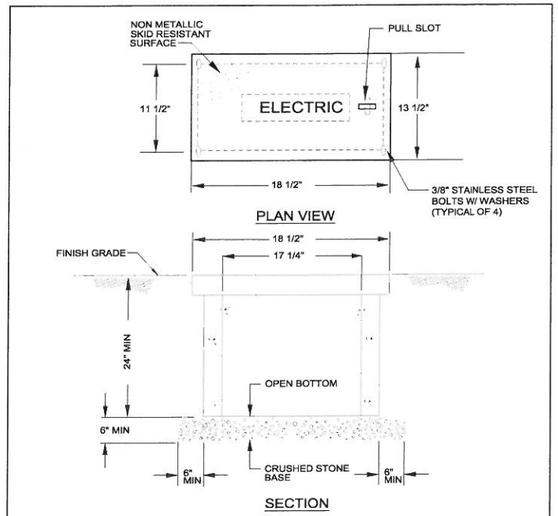
NOTES:
1. THIS DETAIL IS INTENDED TO ILLUSTRATE REQUIREMENTS WHICH EXCEED THOSE REQUIRED BY NEC TABLE 300-5.

2. WARNING TAPE SHALL BE DETECTABLE TYPE FOIL BACKED 4MIL POLYETHYLENE WITH FADE RESISTANT "BURIED ELECTRIC LINE BELOW" A MINIMUM OF 18 INCHES ABOVE THE BURIED SERVICE. TAPE SHALL BE EQUAL TO T&B NAF-0708.

3. ALL ROADWAY CROSSING SHALL BE ENCASED WITH A MINIMUM OF 2 INCHES OF CONCRETE (TOP BOTTOM AND SIDES) EXTENDING A MINIMUM OF 2 FEET BEYOND EACH SIDE OF CROSSING.

4. ALL CONDUIT RISERS SHALL UTILIZE LONG RADIUS GALVANIZED RIGID STEEL SWEEPS.

RDK BURIED CONDUIT DETAIL E513

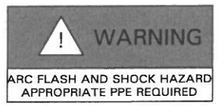


NOTES:
1. THIS IS A TYPICAL DETAIL. REFER TO DRAWING FOR ACTUAL DIMENSIONS OF HANDHOLE WHICH MAY DEVIATE FROM THESE DIMENSIONS. REFER TO THE SITE PLAN FOR QUANTITY OF CONDUITS AND THE "SERVICE" REQUIRED ON THE COVER.

2. THIS HANDHOLE IS INTENDED FOR NON-DELIBERATE VEHICULAR TRAFFIC ONLY, ANSI TIER 22 (22,500 POUND DESIGN LOAD)

3. HANDHOLE SHALL BE PREFABRICATED POLYMER CONCRETE AGGREGATE EQUAL TO QUAZITE OR EQUAL PRE CAST CONCRETE CONSTRUCTION.

RDK TYPICAL PREFABRICATED HANDHOLE DETAIL E505



NOTES:

1. REFER TO SPECIFICATIONS FOR ADDITIONAL NAMEPLATE REQUIREMENTS.

2. PROVIDE ON ALL IN-LINE METER SOCKETS, SWITCHBOARDS, DISTRIBUTION PANELS, PANELBOARDS AND MOTOR CONTROL CENTERS IN ACCORDANCE WITH NEC 110.16.

RDK TYPICAL FLASH PROTECTION WARNING LABEL E305

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WELLESLEY COLLEGE
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WELLESLEY COLLEGE ATHLETIC ACCESSIBILITY RENOVATIONS

REV.:

SEAL:

Plan Review - November 30, 2018
ELECTRICAL DETAILS

SCALE:	NTS
JOB NO:	0180616
FILE:	
DRAWN:	MVM
CHECKED:	KEG

SHEET NO: E2.0