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: 1-22-19 ZBA: 2019-28

Petition for:	Residential Fee		Commercial & Municipal Fee	
Variance		$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		$25	X	$25
Petitioner assumes all costs for Peer Review				

RECEIVED
TOWN CLERK'S OFFICE
WELLESLEY, MASS.
2019 JAN 22 P 12:31

Property Location: 45 Dana Road, Wellesley, MA 02482 Zoning District: Educational

Property located in a:

Historic District	☐ Yes	☒ No
Wetlands Protection Area	☐	☒
Water Supply Protection District	☐	☒

Applicable Section(s) of the Zoning Bylaw: 7, 16A, 22, 22A

Explanation of Request: To convert an existing natural grass field to synthetic turf and to re-align the entry drive.

Requested Relief:

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

OWNER OF PROPERTY: ~~45 Dana Road, Wellesley, MA 02482~~ Dana Hall School

MAILING ADDRESS: 45 Dana Road, Wellesley, MA 02482

PHONE: WORK: 781-489-1347 HOME: N/A

SIGNATURE OF OWNER: Chief Operating Officer

PETITIONER (If different than Owner): N/A

MAILING ADDRESS: N/A

PHONE: WORK: N/A HOME: N/A

ZONING BOARD OF APPEALS
SITE PLAN SUBMITTAL
TIMELINE

PRELIMINARY MEETING WITH DPW
(Preliminary Engineering & Landscape Plans)

OTHER MEETINGS AS REQUIRED WITH:
DRB, MLP, FIRE DEPT., WPC & BOH

ONE FULL SET OF ENGINEERING & LANDSCAPE PLANS TO DPW	**10 WEEKS PRIOR TO HEARING**
DPW RESPONSE TO APPLICANT ON PLANS	**10 DAYS AFTER RECEIPT OF PLANS**
13 COPIES OF SUBMITTAL TO THE ZBA	**6 WEEKS PRIOR TO HEARING**
PLANS MUST BE APPROVED BY DPW OR ZBA HEARING CONTINUED	**10 DAYS PRIOR TO HEARING**
ZBA HEARING	

Stantec

January 7, 2019
File: 210801346

Attention: Lenore R. Mahoney
Town of Wellesley
Zoning Board of Appeals
525 Washington Street
Wellesley, MA 02482

Reference – Zoning Board of Appeals Submission for Dana Hall School Athletic Field and Entry Drive Improvements

Dear Ms. Mahoney,

Please find the enclosed application for Zoning Board of Appeals for Approval for Major Construction Projects, filing fees, cut sheets, existing photos, drainage report, and site plan set. Please refer to the cover sheet of the plans for a full index of drawing set. As discussed at the meeting on December 12th, 2018, when you met with Stantec and Dana Hall School, they are proposing to convert the existing natural grass athletic field to a synthetic turf field and re-align their existing entry drive.

PROJECT NARRATIVE

The description below is part of the Zoning Board of Appeals application for the proposed Athletic Field and Entry Drive Improvements project for The Dana Hall School as shown on the included plans. Please refer to Sheet OSP-1 which shows locations of all work associated with this application.

The submitted plans indicate a synthetic turf field and entry drive re-alignment on The Dana Hall School Property along Grove Street, adjacent to the Shipley Center for Athletics Health and Wellness at 142 Grove Street. The current site consists of a natural grass athletic field and entry drive. The existing entry drive is in a location that restricts the ability for the school to host a competitive athletic event due to dimensional requirements for National Federation of State High School Association (NFHS). To meet these requirements, the school is proposing to shift the existing entry drive to the north by 85'. This is referred to in the plans as Phase 1 in the sequence events for the project. Following the construction of the Phase 1- Entry Drive project, the school proposes construction for Phase 2, which involves converting the existing natural grass athletic field to synthetic turf. This is proposed for safer playability during /after in climate weather and also to meet the dimensional requirements for NFHS.

DRIVEWAY, PARKING, AND SITE IMPROVEMENTS

The re-aligned entry drive will be 24' wide and is designed to be an improvement for entry of the campus. During construction the existing entry drive will remain as it currently exists, until the project is completed. There is no parking proposed for this project. The proposed site improvements consist of removal of existing trees in poor condition and planting of new trees to

blend in to the rural character of the existing campus. The Town of Wellesley standard for undesirable plants for landscape designs has been reviewed and this projects meets those standards. At the entrance, there is a proposed stone wall with embedded signage reading "Dana Hall School" on both sides of the entry drive. This is intended to give the school a more clear and deliberate entrance for visitors.

DRAINAGE

A new stormwater management system was designed to comply with standards of the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Standards, and with the Town of Wellesley Stormwater & Erosion Control Regulations. A corresponding Stormwater Report has been included in this package for review.

Currently, there is an on-site stormwater management system that captures runoff to catch basins that lead to the Towns system in Grove Street. The proposed stormwater management system features significant upgrades including a system designed to capture, treat, and recharge the entire impervious area within the proposed development. The systems include a mix of crushed stone trenches and crushed stone containing perforated pipe. The proposed system will overflow into the Towns system, similar to existing conditions, but peak runoff and volume will be reduced as a result of this project. Refer to the Stormwater Report dated 01/07/19 for more information.

LIGHTING

There will be a relocation of existing entry drive light poles due to the re-alignment of the entry drive. The existing light bollards along the pathway will be replaced with the same light pole as the entry drive, which is the campus standard. The fixtures will have a total cutoff of less than 90 degrees and will direct light onto the site. There will also be low voltage up lights that aim at the new entry sign. All proposed lighting will be LED and cut sheets of the proposed lighting is provided in this package. Refer to Sheet EL-1 and EL-2 for lighting layout and intended design.

SETBACKS

The Overall Site Plan (OSP-1) Zoning Setbacks Plan shows the proposed field and the required setbacks for the Educational District / 20,000 square foot district in Table 1 of the Zoning Bylaw. The plan illustrates that the proposed entry drive stone wall and sign does not confirm to the zoning setbacks, therefore the school will be seeking a special permit.

LAND DISTURBANCE

The site will need to be re-graded to accommodate an athletic field and relocated entry drive. The cut and fill analysis has been conducted to balance the site and minimize site disturbance, however there will be more than 5,000 s.f. of land disturbance.

Please let me know if you have any questions or concerns and I will be glad to assist you with any additional information.

Regards,

Josh Atkinson, RLA, ASLA
Landscape Architect
Phone: (617) 654-6003
josh.atkinson@stantec.com

Attachment:

(12) Zoning Board of Appeals Application, Development Prospectus, and Checklist
(12) Full Size Drawing Sets
(6) 11x17 Drawing Set
(12) Existing Site Photos
(12) Cut Sheets
(10) Stormwater Report
(1) ZBA check for Site Plan Approval without PSI
(1) Check for publication and Mailing Fees

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: 12/21/18

ZBA Number: 2019-28

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 a synthetic turf field and relocated entry drive.

Located at the property of the Dana Hall School at the entrance at 142 Grove Street

Within a Educational / 20,000 s.f. District (s).

The following plans are submitted:

1. Existing Site Features Plan — Plan # EX-1 (Title Block Number)
2. Site Development Plan — Plan # L-1
3. Plot Plan — Plan # OSP-1
4. Grading & Drainage Plan — Plan # L-2 and L-3
5. Utilities Site Plan — Plan # L-3
6. Landscaping/Parking Plan — Plan # L-4
7. Architectural Plans — Plan # N/A through _____
8. Subsurface Conditions Plan — Plan # Located in Stormwater Report
9. Utilities Detail Plans — Plan # D-4 through _____
   a. Structure Details — Plan # D-4
   b. Plumbing Details — Plan # N/A
   c. Electric Details — Plan # EL-2

(Ten full sized copies of each plan, seven 11inch by 17 inch copies of each plan, a check in the amount of $2,000 and $25 payable to the Town of Wellesley, and a check in the amount of N/A payable to the Town of Wellesley Fire Department (for Site Plan Approval without PSI).

OWNER OF RECORD: Dana Hall School
ADDRESS: 45 Dana Road, Wellesley, MA 02482
TELEPHONE NUMBER: 781-489-1347

PETITIONER:(If not Owner, relationship to owner) Charlie Breslin
ADDRESS: 45 Dana Road, Wellesley, MA 02482
TELEPHONE NUMBER: 781-489-1347

PROJECT CONTACT PERSON: Charlie Breslin
ADDRESS: 45 Dana Road, Wellesley, MA 02482
TELEPHONE NUMBER: 781-489-1347 FAX NUMBER: N/A

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	✓
b)	Surface drainage and topography with one foot contours	✓
c)	Property lines, zoning districts, adjacent roadways, historical or archeological features	✓
d)	Rights of way and easements (temporary and permanent)	✓
e)	Wetlands and floodplains	N/A
f)	Adjacent public, footpaths, trails and other natural or man-made features such as walls and fences	✓
g)	Plan to be Scale 1" = 40' or larger	✓
h)	Plan must be stamped, dated and signed by a Registered Land Surveyor in the Commonwealth of Massachusetts	✓
2. SITE PLAN DEVELOPMENT		
a)	Building locations, finish floor elevations at basement and first floor	N/A
b)	Grading detail for entire site with existing and proposed contours	✓
c)	Existing and proposed curb cuts, design as per Town Policy by Board of Selectmen dated 5/15/73	✓
d)	Property lines and easement lines	✓
e)	All elevations on the Town of Wellesley datum base	✓
f)	North directional arrows shall be provided and point due north	✓
g)	Plan must be stamped, dated and signed by a Registered Architect, Registered Land Surveyor or Professional Engineer in the Commonwealth of Massachusetts	✓
3. PLOT PLAN		
a)	Existing buildings and structures	✓
b)	Proposed structure(s) including all dimensions and distances from front, rear and side property lines	✓
c)	Area of lot or lots included in the project	✓
d)	Zoning district lines and portion of lot in different zoning district (if applicable)	✓
e)	Names of all abutters as they appear on the most recent tax list	✓
f)	The location of all permanent survey monuments	✓
g)	Not less than 3 permanent benchmarks, preferably triangulated, shall be shown	✓
h)	Plan must be stamped, dated and signed by a Registered Land Surveyor in the Commonwealth of Massachusetts	✓

4. GRADING AND DRAINAGE PLAN

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

5. UTILITIES SITE PLAN

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

6. LANDSCAPING/PARKING PLAN

a)	Proposed landscaping of property	✓
b)	Size, type and location of proposed plant materials with botanical names	✓
c)	Consider the impact for plantings at their maturity size as relates to sight distances	✓
d)	Landscaping plan shall be coordinated with the grading plan	✓
e)	Tree planting and shrub planting details	✓
f)	Hardscape details such as walkways and patios	✓
g)	See attached listing of undesirable plants as prepared by the Town Horticulturalist	✓
h)	Plan must be stamped, dated and signed by a Registered Landscape Architect in the Commonwealth of Massachusetts	✓
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.	✓
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

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

a)	Boring location with boring numbers	located in Stormwater Report	✓
b)	Boring logs		✓
c)	Ledge encountered and depth		N/A
d)	Water encountered and depth		✓
e)	Percolation test info (if applicable)		N/A

9. UTILITIES DETAIL PLAN

a)	Structure details	
	• Sanitary sewer manholes	✓
	• Drain manholes, detention structures, etc.	✓
	• Catchbasins (gas and oil separators required at parking lots)	✓
	• 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	N/A
	• Location service entrance	N/A
	• Size of Service	N/A
	• Meter location and switchgear arrangement	N/A
	• Provision for future expansion	N/A
	• Transformer size and facilities for pad or vault room	N/A
	• Data including load requirements	N/A

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	✓
b)	Title Blocks shall provide the name of project, job site location, architects and engineer responsible for plan contents, date and plan scale	✓
c)	All plans must be numbered and titled	✓
d)	All dates of revisions shall be included	✓
e)	Provide retaining wall design details	N/A
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	✓
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	✓
h)	Location of all mechanical systems must be shown	N/A

SUBMITTALS

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

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: 12/21/18

Year/Number: ~~2018~~ 2019-28

I. IDENTIFICATION

Petitioner: Dana Hall School

Address: 45 Dana Road, Wellesley, MA 02482

Telephone: 781-489-1347

Land Owner of Record: Dana Hall School

Location of Property: 142 Grove Street

Proposed Use of Property: Athletic Field

Zoning Districts: (Including all overlay districts) Educational / 20,000 s.f. 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? seeking special permit for free standing sign location setback, number of signs per lot, and maximum area allowed.

II. DESCRIPTION

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

1. Land Area Approximately 34.8 acres

2. Square footage of proposed construction footprint 141,327 s.f.

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: (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)

Standard N/A / N/A Compact N/A / N/A Handicapped N/A / N/A

Covered N/A / N/A Open N/A / N/A

Total (Existing and proposed) N/A

Total Number Required N/A

13. Number of handicapped sidewalk curb cuts provided 2

14. Lot coverage in square feet (%)	Before	After
1) Buildings	(222,129)	(222,129)
2) Drives & Parking	(290,097)	(293,969)
3) Other uses (identify uses and coverage)	(N/A)	(N/A)

15. Open Space

1) Landscaped area	(724,364)	(695,437)
2) Natural (i.e. woods, fields)	(20,000)	(20,000)
3) Recreational	(255,500)	(280,555)

A. Residential Construction

1. Number of Dwelling Units
   Efficiency N/A One Bedroom N/A Two Bedroom N/A
   Three Bedroom N/A Other N/A

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

3. Density in square feet of land per dwelling unit.
   Existing N/A Proposed N/A

4. Density in square feet of land per person:
   Existing N/A Proposed N/A

III. TRAFFIC IMPACT ANALYSIS AND DATA
(Explain basis for data entered)

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	N/A	N/A	N/A
Am Peak Hour	N/A	N/A	N/A
PM Peak Hour	N/A	N/A	N/A

b. Typical or Average Day

24-Hour	N/A	N/A	N/A
Am Peak Hour	N/A	N/A	N/A
PM Peak Hour	N/A	N/A	N/A

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

	24 Hour	AM Peak Hour	PM Peak Hour
Street N/A			
Street N/A			

3. Data compiled by: N/A

4. Date of data compilation: N/A

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):

N/A

N/A

List possible hazardous pedestrian and bicycle crossings:

N/A

6. Has a separate Traffic Study been submitted? Yes_____ No X

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

A. Estimated water consumption N/A gal/day

B. Number of Fire Hydrants - existing within 200 ft 1 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

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 N/A Service Amperage N/A

1. Estimated peak electrical consumption N/A kw

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

2. Estimated annual electric energy consumption N/A kw

3. Three Phase Service N/A Single Phase Service N/A

G. Are energy efficient appliances to be used? N/A

H. What R-Factors will be used in insulation and glazing for walls and ceilings? N/A

I. What energy source will be used for heating water?
Electric N/A Gas N/A Fuel Oil N/A Other N/A

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

K. Will the facility include an emergency electric generator?

Yes ____ No X

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

Yes ____ No ____

V. FIRE PROTECTION

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 N/A
Floodplains N/A

Will either be altered as a result of the project? N/A

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

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

1a. Current rate of peak runoff (1.00,3.15,10.62) cubic ft/second
b. Current volume of runoff (7698, 17099, 44204) cubic feet or acre-feet

2a. Post-development rate of peak runoff (0.92,2.80,8.20) cfs
b. Post-development volume of runoff (7145,14568,35634) cubic feet or acre-feet
(All rates/volumes are for (10-yr,25-yr,100-yr storm) respectively)

3. Describe measures to eliminate or minimize any increase in rate of runoff Refer to section 2.2 of the Stormwater Report.

4. Might the project result in significant changes in existing drainage patterns? Will any abutting or other property be adversely affected by the changes? No.

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?

It will improve the condition of the athletic field by being able to be used during the rainy season.

G. Does the proposed development involve outside lighting? Yes X No____
if YES, state height of lighting fixtures 10'

Will the outside lighting shine directly on abutting premises?
Yes____ No X

If YES, explain

Describe proposed steps to minimize this impact

All driveway and pathway light fixtures will be directed down to the pavement. The proposed lighting for the entry sign will be directed at sign, away from abutting properties.

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?

Phase 1: 409CY, Phase 2: 466CY

Where will this material be disposed? Landfill

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 X No____
If so, how many? 2

Do catch basins presently exist? Yes X No____
If so, how many? 2

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

D. Will water saving appliances be used or water conservation devices be used in all plumbing? Yes____No N/A

VIII. FINANCIAL IMPACT

A. Estimated Building Permit Valuation N/A

B. Estimated assessed value N/A

Stantec

Cut Sheets

1) Athletic Ball Netting

2) Light Fixtures (for Drive/Path and Sign)

3) Stone Wall Example

SPORTSFIELD SPECIALTIES
WWW.SPORTSFIELDSPECIALTIES.COM

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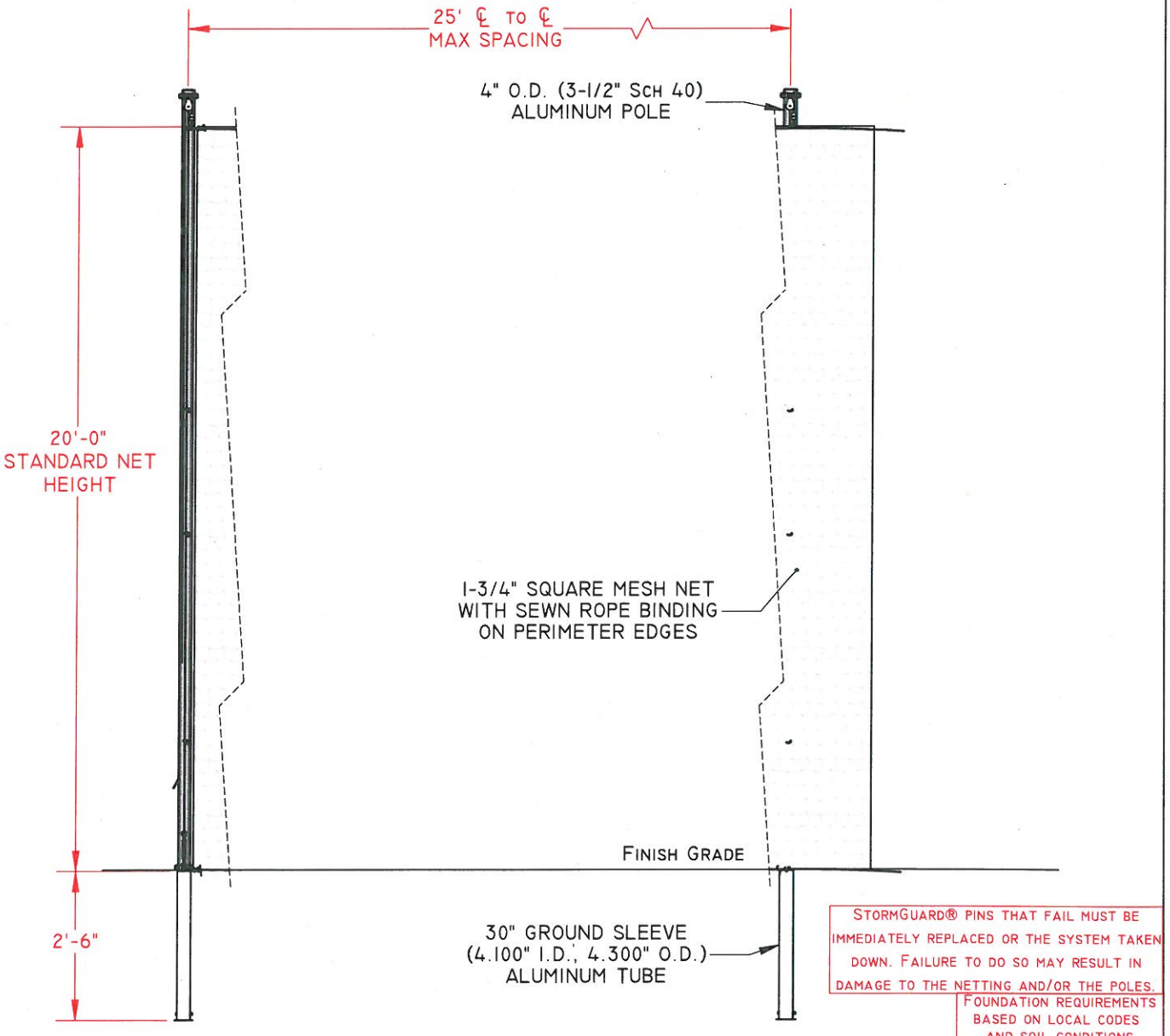
SPORTSFIELD SPECIALTIES, INC. STRONGLY RECOMMENDS THE REMOVAL OF ALL NETS PRIOR TO EXPOSURE TO WINTER WEATHER, INCLUDING SNOW AND/OR ICE STORMS. WHENEVER POSSIBLE, THE NETS SHOULD ALSO BE LOWERED PRIOR TO ANY EXTREME WIND EVENTS. REMOVAL/LOWERING OF THE NETS WILL MITIGATE ANY UNFORESEEN DAMAGE TO THE POLES, NETS AND/OR ATTACHMENT HARDWARE. STORING NETS IN A DRY, PEST FREE LOCATION WILL HELP EXTEND THE LIFE OF THE NETS. SPORTSFIELD SPECIALTIES, INC. WILL NOT BE HELD LIABLE OR ASSUME RESPONSIBILITY FOR ANY DAMAGE TO THE NETS, POLES AND/OR CORRESPONDING ATTACHMENT HARDWARE IF THE NETS ARE NOT REMOVED/LOWERED PRIOR TO THE ABOVE DESCRIBED WIND AND/OR WEATHER EVENTS.

STANDARD BLACK POWDER COATED FINISH



STORMGUARD® PINS THAT FAIL MUST BE IMMEDIATELY REPLACED OR THE SYSTEM TAKEN DOWN. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE NETTING AND/OR THE POLES.

FOUNDATION REQUIREMENTS BASED ON LOCAL CODES AND SOIL CONDITIONS

BSS420 - 20'H BALL SAFETY NETTING SYSTEM

NOT TO SCALE

SPORTSFIELD SPECIALTIES INC 12182018

Submitted by VANGUARD LIGHTING		Catalog Number:	Type:
vanguard LIGHTING	**Job Name:** DANA HALL SCHOOL AAL ADD Distributor: ELECTRIC SUPPLY-BURLINGTON (BURLINGTON)	UCM-WND-FLR-T3-32LED-5K-700-SLA7-BLK Notes:	VE15-49535

Universe® Collection Medium LED – UCM

TYPE

FEATURES

- DLC QPL Listed
- Reliable, uniform, glare free illumination
- Types II, III, IV, V and custom distributions
- 3000K, 4200K, 5100K CCT
- 0-10V dimming ready
- Integral surge suppression
- LifeShield™ thermal protection
- 13 standard powder coat finishes
- Upgrade Kits
- Contact factory for pre-2011 UCM's

SPECIFICATIONS

The first dimension is the height of fixtures. The second is for the opal lens

HOOD	HOOD ONLY	4 LUMINOUS WINDOWS (WND)	SOLID RINGS (SR)	VERTICAL SLOTS (VSL)	LUMINOUS RINGS (LUM)
ANGLED (ANG) *DIA: 20"/508mm*	*14.7"/373mm* *WT: 28.55 lbs* *EPA: .60*	*20.5"/520mm* *WT: 30.70 lbs* *EPA: .72*	*20.7"/526mm* *WT: 33.70 lbs* *EPA: .74*	*20.5"/521mm* *WT: 31.45 lbs* *EPA: .72*	*20.6"/523mm* *WT: 32.85 lbs* *EPA: .74*
BELL (BEL) *DIA: 24"/610mm*	*15.8"/401mm* *WT: 32 lbs* *EPA: .73*	*21.4"/543mm* *WT: 34.15 lbs* *EPA: .85*	*21.6"/549mm* *WT: 37.15 lbs* *EPA: .87*	*21.4"/543mm* *WT: 34.90 lbs* *EPA: .85*	*21.5"/546mm* *WT: 34.15 lbs* *EPA: .85*
FLARED (FLR) *DIA: 22"/559mm*	*14.5"/368mm* *WT: 28.85 lbs* *EPA: .53*	*19.8"/503mm* *WT: 31 lbs* *EPA: .65*	*20.1"/510mm* *WT: 34 lbs* *EPA: .67*	*19.8"/503mm* *WT: 31.75 lbs* *EPA: .65*	*20"/508mm* *WT: 33.15 lbs* *EPA: .67*
STRAIGHT (STR) *DIA: 24"/610mm*	*14"/355mm* *WT: 31.75 lbs* *EPA: .59*	*19.8"/503mm* *WT: 33.90 lbs* *EPA: .71*	*20"/508mm* *WT: 36.90 lbs* *EPA: .73*	*19.8"/503mm* *WT: 34.65 lbs* *EPA: .71*	*19.9"/505mm* *WT: 36.05 lbs* *EPA: .73*
SKIRTED BELL (SKB) *DIA: 24"/610mm*	*19.7"/500mm* *WT: 32.10 lbs* *EPA: .90*	*23.9"/607mm* *WT: 34.25 lbs* *EPA: 1.03*	*24.2"/615mm* *WT: 37.25 lbs* *EPA: 1.05*	*23.9"/607mm* *WT: 35 lbs* *EPA: 1.03*	*24.1"/612mm* *WT: 36.40 lbs* *EPA: 1.05*

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JOB
TYPE
NOTES

Submitted by VANGUARD LIGHTING			
vanguard LIGHTING	**Job Name:** DANA HALL SCHOOL AAL ADD Distributor: ELECTRIC SUPPLY-BURLINGTON (BURLINGTON)	**Catalog Number:** UCM-WND-FLR-T3-32LED-5K-700-SLA7-BLK Notes:	**Type:** VE15-49535

Universe® Collection Medium LED – UCM

TYPE

ORDERING INFORMATION

MODEL	1	2	3	4	5	6	7	
UCM								
	Luminous/Hood	Distribution	CCT	Drive Current	Color	Options	Controls	Mounting

1. LUMINOUS ELEMENTS/HOOD

HOOD ONLY
- ☐ ANG Angled
- ☐ BEL Bell
- ☐ FLR Flared
- ☐ STR Straight
- ☐ SKB Skirted Bell

LUMINOUS & HOOD

Four Luminous Windows
- ☐ WND-ANG
- ☐ WND-BEL
- ☐ WND-FLR
- ☐ WND-STR
- ☐ WND-SKB

Solid Rings
- ☐ SR-ANG
- ☐ SR-BEL
- ☐ SR-FLR
- ☐ SR-STR
- ☐ SR-SKB

Vertical Slots
- ☐ VSL-ANG
- ☐ VSL-BEL
- ☐ VSL-FLR
- ☐ VSL-STR
- ☐ VSL-SKB

Luminous Rings
- ☐ LUM-ANG
- ☐ LUM-BEL
- ☐ LUM-FLR
- ☐ LUM-STR
- ☐ LUM-SKB

Luminous Rings Color Option
- ☐ BL *(Blue inner lens)*
- ☐ RD *(Red inner lens)*
- ☐ GRN *(Green inner lens)*

2. DISTRIBUTION

MicroCore *Precision aimed optics*
- ☐ T2-32LED
- ☐ T3-32LED
- ☐ T4-32LED
- ☐ T5-32LED
- ☐ TL-32LED
- ☐ TR-32LED

3. COLOR TEMPERATURE
- ☐ 3K ☐ 4K ☐ 5K

4. DRIVE CURRENT
- ☐ 700 ☐ 450

5. COLOR
- ☐ AWT ☐ CRT
- ☐ BLK ☐ MAL
- ☐ MTB ☐ MDG
- ☐ DGN ☐ ATG
- ☐ DBZ ☐ LGY
- ☐ WRZ ☐ RAL/PREMIUM COLOR
- ☐ BRM ☐ CUSTOM COLOR
- ☐ VBL

6. OPTIONS

HOOD OPTIONS – *May choose one*
(The natural copper and stainless steel hoods are unfinished to develop a patina over time.
- ☐ COP *(Copper)*
- ☐ STS *(Stainless steel)*

LENS OPTIONS – *May choose one*
- ☐ FTG *(Clear flat glass lens)*
- ☐ SAG *(Clear sag glass lens. MicroCore only)*
- ☐ FLD *(Lightly diffused finish on flat glass lens)*
- ☐ HSS *(House side shield)*

OTHERS
- ☐ RCK *(Rock guard painted black)*
- ☐ SLC *(Luminous element remains unlit during normal operation)*

7. CONTROLS– *May choose one*
- ☐ PCA-C *(Rotatable photocell-Contemporary)*

SCP (Sensor Control Programmable) pole accessory is available to provide occupancy detection for outdoor applications meeting California Title 24. For complete spec sheet and ordering information, visit *www.aal.net/products/sensor_control_programmable/*

8. MOUNTING – *Must choose one*

POLE MOUNT

☐ SLA2	☐ SLA3
☐ SLA4	☐ SLA4-2
☐ SLA7	☐ SLA7-2
☐ SLA7(5)	☐ SLA7(5)-2
☐ SLA8D	☐ SLA9
☐ SLA9-2	☐ SLA10
☐ SLA10-2	☐ SLA16
☐ SLA16-2	☐ SLA17
☐ SLA17-2	☐ SLA17(5)
☐ SLA17(5)-2	☐ SLA18
☐ SLA18-2	☐ SLA20
☐ SLA20-2	☐ SLA20A
☐ SLA20A-2	☐ SLA20B
☐ SLA20B-2	☐ SLA20C
☐ SLA20C-2	☐ SLA20D
☐ SLA20D-2	☐ SLA22D
☐ SLA24	☐ SLA24-2
☐ SLA24(5)	☐ SLA24(5)-2
☐ TRA4	☐ TRA7
☐ TRA7-2	☐ TRA8
☐ TRA8-2	☐ TRA9
☐ TRA9-2	

WALL MOUNT

☐ WMA4	☐ WMA5
☐ WMA6	☐ WMA8
☐ WMA9D	☐ WMA10
☐ WMA11	☐ WMA12
☐ WMA16	☐ WMA17
☐ WMA18	☐ WMA20
☐ WMA22D	☐ WMA24
☐ WMA37	☐ WMA38
☐ WMA39	

Visit www.aal.net for Arms, Poles & Accessories Specification Guide

JOB
TYPE
NOTES

Submitted by VANGUARD LIGHTING		Catalog Number:	Type:
	Job Name: DANA HALL SCHOOL AAL ADD Distributor: ELECTRIC SUPPLY-BURLINGTON (BURLINGTON)	UCM-WND-FLR-T3-32LED-5K-700-SLA7-BLK Notes:	VE15-49535

Universe® Collection Medium LED – UCM

TYPE

LUMINAIRE PERFORMANCE

Optical System	Secondary Lens or Shield	Distribution	Light Engine	Ordering Code														Drive Current (ma)	System Watts
				3K					4K					5K					
				Delivered Lumens	Efficacy (lm/w)	Bug Rating			Delivered Lumens	Efficacy (lm/w)	Bug Rating			Delivered Lumens	Efficacy (lm/w)	Bug Rating			
						B	U	G			B	U	G			B	U	G		
MicroCore	No Lens (Standard)	TYPE 2	T2-32LED	4934	66	1	0	1	6202	83	2	0	2	6668	89	2	0	2	700	75
		TYPE 3	T3-32LED	4901	65	1	0	1	6159	82	2	0	2	6623	88	2	0	2		
		TYPE 4	T4-32LED	4937	66	1	0	2	6256	83	1	0	2	6701	89	1	0	2		
		TYPE 5	T5-32LED	4977	66	3	0	1	6254	83	3	0	1	6725	90	3	0	1		
		45° LEFT	TL-32LED	5023	67	1	0	2	6014	80	1	0	2	6609	88	1	0	2		
		45° RIGHT	TR-32LED	5023	67	1	0	2	6014	80	1	0	2	6609	88	1	0	2		
	House Side Shield	TYPE 4	T4-32LED-...-HSS	3724	50	0	0	2	4459	59	0	0	2	4900	65	0	0	2		
	No Lens (Standard)	TYPE 2	T2-32LED	3158	64	1	0	1	3969	81	1	0	1	4268	87	1	0	1	450	49
		TYPE 3	T3-32LED	3136	64	1	0	1	3942	80	1	0	1	4238	86	1	0	1		
		TYPE 4	T4-32LED	3160	64	0	0	1	4004	82	0	0	1	4289	88	0	0	1		
		TYPE 5	T5-32LED	3185	65	2	0	1	4002	82	2	0	1	4304	88	2	0	1		
		45° LEFT	TL-32LED	3215	66	0	0	1	3849	79	1	0	1	4230	86	1	0	2		
		45° RIGHT	TR-32LED	3215	66	0	0	1	3849	79	1	0	1	4230	86	1	0	2		
	House Side Shield	TYPE 4	T4-32LED-...-HSS	2383	49	0	0	1	2854	58	0	0	1	3136	64	0	0	1		

* DesignLights Consortium® Qualified Product

ELECTRICAL CHARACTERISTICS

Optical System	Ordering Code		Driver									Dimming							
			LED Drive mA	System Watts	Line Voltage		Amps AC		Min. Power Factor	Max THD (%)	Operating Temp. Range	Dimming Range	Source current out of 0-10V purple wire			Absolute voltage range on 0-10V (+) purple wire		
					VAC	HZ	120	277					Min	Typical	Max	Min	Typical	Max
MicroCore	32LED	700	700	75	120-277	50/60	0.63	0.27	≥.9	20	-30°C TO +40°C	10% TO 100%	0 MA	-	4 mA	-2.0 V	-	+15 V
		450	450	49			0.41	0.18										

LED COLOR

Consult factory for Amber, Turtle Friendly, Gulf Coast and Observatory applications.

	Ordering Code		
	3K	4K	5K
CCT Average	3000K	4200K	5100K
CRI Minimum	≥ 80	≥ 70	≥ 70
S/P Ratio	1.33	1.66	1.78

TM-21 LIFETIME CALCULATION

Optical System	Ordering Code	Ambient Environment °C	Projected Lumen Maintenance (% vs. Khrs)					Reported L70
			15	25	50	60	100	
MicroCore	32LED	15	93	91	87	84	78	>60Khrs
		25	93	91	87	85	78	
		40	93	91	87	85	78	

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JOB
TYPE
NOTES

Submitted by VANGUARD LIGHTING		Catalog Number:	Type:
	Job Name: DANA HALL SCHOOL AAL ADD Distributor: ELECTRIC SUPPLY-BURLINGTON (BURLINGTON)	UCM-WND-FLR-T3-32LED-5K-700-SLA7-BLK Notes:	VE15-49535

Universe® Collection Medium LED – UCM

TYPE

SPECIFICATIONS

HOUSING

- All housing components shall be die-cast aluminum, sealed with continuous silicone rubber gaskets.
- Hood and spacers shall be heavy gauge spun aluminum with hemmed edges for added rigidity.
- Luminous rings shall be clear acrylic with an internal lens.
- Standard configurations do not require a flat lens, optional lenses shall be tempered glass
- All internal and external hardware shall be stainless steel.
- Optical bezel finish shall match the luminaire housing.

OPTICAL

- Patent pending MicroCore™ LED modules shall independently aim each light emitting diode (LED) in both horizontal rotation and vertical tilt angle.
- LEDs shall be mounted to a metal printed circuit board assembly (PCBA) with a uniform conformal coating over the panel surface and electrical features.
- LED optics shall be clear injection molded PMMA acrylic.
- MicroCore™ PCBA and optic shall be sealed to a die-cast anodized aluminum heat sink with an injection molded silicone rubber gasket. IP66.
- Type 4 distribution with optional House Side Shield not available with clear or diffused glass lenses. Factory installed House Side Shield is optimized for Type 4 distribution and not recommended for use with Type 2 or 3 distribution and not available with type 5 distribution.

ELECTRICAL

- Luminaires shall have integral surge protection that shall be U.L. recognized and have a surge current rating of 10,000 Amps using the industry standard 8/20uSec wave and surge rating of 372J.
- Drivers shall be U.L recognized with an inrush current maximum of <20.0 Amps maximum at 230VAC.
- Drivers shall not be compatible with current sourcing dimmers, consult factory for current list of known compatible dimming systems, approved dimmers include Lutron Diva AVTV, Lutron Nova NFTV and NTFTV.
- LifeShield™ shall be provided with all configurations for added protection in the event of abnormally excessive high ambient temperature conditions.

CONTROLS

- SCP shall have an integral surge protection device with a currentt rating of 10,000 Amps using the industry standard 8/20uSec wave and sure rating of 372J
- Sensor not intended for use with additional photo-control, wireless control or dimming systems.

PHOTOCELL / EGRESS ADAPTERS

- Adapter(s) shall slip over a 4"/100mm DIA. pole with the luminaire or arm slipping over the adapter to add a total of 4.5"/114mm to the overall height. Adapter(s) shall be prewired, independently rotatable 359°, and have a cast access cover with an integral lens and lanyard.
- Photocell adapter shall include an internal twist lock receptacle. Photocell by others.
- Egress adapter shall require an auxiliary 120 volt supply for operation of an integral MR16 lamp in the event of emergency. The lamp may be aimed and locked into position with an adjustment range of 15°-45°. Adapter shall have a socket that accepts miniature bi-pin MR16 lamps up to 50 watts, lamp by others.

SERVICING

- Luminaire shall have tool-less service access to the gear compartment. Driver and surge suppressor shall be mounted to a prewired tray with quick disconnects that may be removed from the gear compartment.

ARM MOUNTING

- Luminaire shall be attached to the arm assembly with three stainless steel bolts. The connection shall be sealed with a silicone compression gasket.
- Post top arms and brackets shall slip over a 4"/100mm O.D. or a 5"/127mm as configured and secured with six stainless steel set screws.
- Wall mounted arms and brackets shall require mounting hardware by others.

FINISH

- Luminaire finish shall consist of a five stage pretreatment regimen with a polymer primer sealer, oven dry off, and top coated with a thermoset super TGIC polyester powder coat finish.
- Luminaire finish shall meet the AAMA 605.2 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance.

CERTIFICATION

- Luminaire shall be listed with ETL for outdoor, wet location use, UL1598, UL 8750 and Canadian CSA Std. C22.2 no.250.

WARRANTY / TERMS AND CONDITIONS OF SALE

Download:
http://www.hubbelllighting.com/resources/warranty/

JOB
TYPE
NOTES

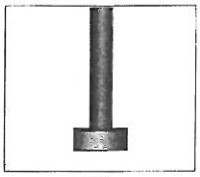
Submitted by VANGUARD LIGHTING			
vanguard LIGHTING	**Job Name:** DANA HALL SCHOOL AAL ADD Distributor: ELECTRIC SUPPLY-BURLINGTON (BURLINGTON)	**Catalog Number:** PR4-4R10-226-PTA-SBC-BLK Notes:	**Type:** VE15-49535

PR4 – Aluminum Pole

TYPE

4" ROUND (RD) POLE

1. BASE	2. POLE	3. OAH	4. COLOR



PR4

1. BASE	2. POLE	3. OAH	SHAFT	WT	MAXIMUM ALLOWABLE EPA (MPH) 85	90	100	110	120	130	140	150
☐ PR4	4R10-125	10' (3.1m)	4" RD x .125"	25	19.4	17.1	13.5	10.8	8.9	7.4	6.3	5.5
☐ PR4	4R12-125	12' (3.7m)	4" RD x .125"	28	15.3	13.4	10.5	8.3	6.7	5.6	4.7	4.0
☐ PR4	4R14-125	14' (4.3m)	4" RD x .125"	32	12.3	10.7	8.2	6.3	5.0	4.1	3.4	2.9
☐ PR4	4R16-125	16' (4.9m)	4" RD x .125"	35	10.0	8.6	6.4	4.8	3.6	2.9	2.4	2.0
☐ PR4	4R10-226	10' (3.1m)	4" RD x .226"	38	23.8	21.0	16.7	13.5	11.1	9.3	8.0	6.9
☐ PR4	4R12-226	12' (3.7m)	4" RD x .226"	44	19.2	16.9	13.3	10.6	8.6	7.2	6.1	5.3
☐ PR4	4R14-226	14' (4.3m)	4" RD x .226"	51	15.9	13.9	10.8	8.4	6.8	5.6	4.7	4.0
☐ PR4	4R16-226	16' (4.9m)	4" RD x .226"	57	12.4	12.3	9.4	7.3	5.7	4.7	4.0	3.3
☐ PR4	4R18-226	18' (5.5m)	4" RD x .226"	63	11.7	10.0	7.5	5.6	4.3	3.5	2.9	2.4
☐ PR4	4R20-226	20' (6.2m)	4" RD x .226"	70	9.5	8.1	5.9	4.2	3.1	2.4	1.9	1.6

Note: Overall height is measured to top of pole.

4. COLOR

- ☐ AWT *(Arctic White)*
- ☐ BLK *(Black)*
- ☐ MTB *(Matte Black)*
- ☐ DGN *(Dark Green)*
- ☐ DBZ *(Dark Bronze)*
- ☐ WRZ *(Wheathered Bronse)*
- ☐ BRM *(Metallic Bronze)*
- ☐ VBL *(Verde Blue)*
- ☐ CRT *(Corten)*
- ☐ MAL *(Matte Aluminum)*
- ☐ MDG *(Medium Grey)*
- ☐ ATG *(Antique Green)*
- ☐ LGY *(Light Grey)*
- ☐ RAL/PREMIUM COLOR *(Provide RAL)*
- ☐ CUSTOM COLOR *(Provide color chip for matching)*

SPECIFICATIONS

Base shall be cast aluminum #356 alloy, free of any porosity, foreign materials, or cosmetic fillers. Base casting shall be heat treated to a T-6 condition, and of uniform wall thickness, with no warping or mold shifting.

WARNINGS

Caution must be exercised in the selection of a design wind speed when the pole is to be installed in a special wind region (as indicated by the wind map) or in an area where wind speed is unpredictable.

AAL recommends consulting a local engineer when the pole is to be installed in an area that may be subject to extreme weather and exposure

Poles installed on structures such as buildings and bridges may be subjected to vibration, oscillations, and other fatigue effects which are not covered by the AAL warranty.

The use of banners or other appendages can severely affect the loading of a pole. No banner or other appendage should be attached to an AAL pole unless approved by AAL.

If the products are to be used on an existing foundation or on other structures, the customer assumes all responsibility for the structural integrity of the existing foundation, anchorage or structures and all the consequences arising therefrom.

CAUTION

Poles should never be erected without the luminaire installed. Warranty is voided if the pole is erected without the luminaire. The warranty is voided if the pole is not grouted under the entire base after installation.

Anchor bolts shall be hot dip galvanized steel. Eight galvanized hex nuts and flat washers, and a bolt circle template shall be provided. Anchor bolt for poles are 3/4" x 24" x 3".

JOB _____

TYPE _____

NOTES _____

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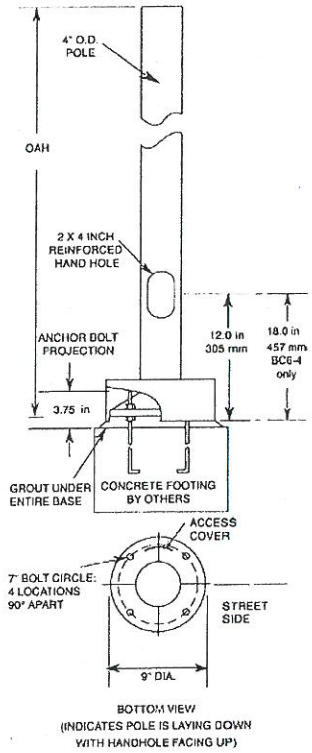
PR4 – Aluminum Pole

TYPE

4" ROUND (RD) POLE

DIMENSIONS



BOTTOM VIEW
(INDICATES POLE IS LAYING DOWN WITH HANDHOLE FACING UP)


EMERGENCY

lumière

DESCRIPTION

Eon 303-A1 is a compact, low profile, dimmable, ground mounted LED luminaire. It provides 360° rotation and 180° vertical aiming. Eon mounts directly to an ingrade junction box (supplied by others) and comes standard with a universal input LED driver (120 - 277V, 50/60 Hz). Dimming is achieved with a standard ELV, reverse phase dimming driver or an optional 0 - 10V dimming driver. Eon fixtures may be used indoors or outdoors and carry an IP66 rating.

Catalog #		Type
Project		
Comments		Date
Prepared by		

SPECIFICATION FEATURES

Material
The Luminaire is precision machined from corrosion-resistant 6061-T6 aluminum, Consult factory for additional premium material options.

Finish
Fixtures constructed from aluminum are double protected by a RoHS compliant chemical film undercoating and polyester powdercoat paint finish, surpassing the rigorous demands of the outdoor environment. A variety of standard colors are available. Aluminum fixtures can also be brushed and clear coat painted.

Brass, Bronze, Copper or Stainless Steel
Fixtures constructed from brass, bronze, copper or stainless steel are left unpainted to reveal the natural beauty of the material. Brass, bronze and copper will patina over time.

Gasket
A gasket is provided around 1/2 NPSM threaded stem to prevent water intrusion into jbox (supplied by others).

Lens
Clear, tempered glass lens, factory sealed with high temperature adhesive to prevent water intrusion and breakage due to thermal shock. EDGE LIT option: when specified with the EDGE option, the glass will be slightly thicker, clear, tempered and sealed in the same manner referenced above. The added glass thickness will offer a brighter line of light around the edge of the glass that will accentuate the fixture's aesthetics and styling. Diffused, tempered glass lens, factory sealed with high temperature adhesive to prevent water intrusion and breakage due to thermal shock.

Mounting
Eon 303 - A1 mounts directly to an ingrade junction box (supplied by others) via 1/2 NPSM threaded stem.

Hardware
Stainless steel hardware is standard to provide maximum corrosion resistance.

Electrical
Eon 303 - A1 comes standard with a universal input LED driver (120-277, 50/60Hz). The standard driver is ELV reverse phase dimmable. An optional 0 - 10V dimming driver is also available.

LED
LEDs are included and available in three color temperatures (2700K, 3000K & 4000K) and a variety of optics. Both color temperature and distribution must be specified when ordering - see reverse side for details and catalog logic.

Labels & Approvals
UL and cUL listed, standard wet label. IP66 rated.

Warranty
Lumiere warrants it's fixtures against defects in materials & workmanship for five (5) years. Auxiliary equipment such as transformers, ballasts and LED drivers carry the original manufacturer's warranty.

EON

303-A1

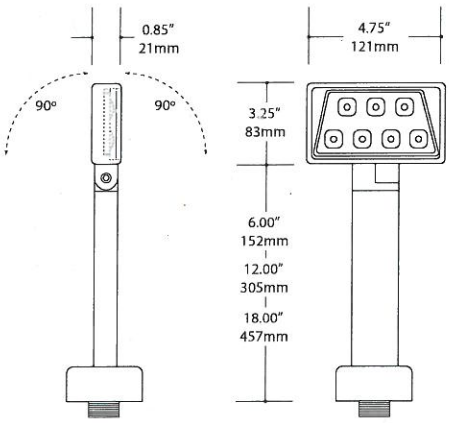
8.8W LED

LED

ACCENT/FLOOD

IP66

DIMENSIONS



Cooper Lighting
by EATON

LED INFORMATION

LED	Watts	Distribution	CBCP	°K	Life (hrs.)	Volts
T2, 2700K	8.5	Type II - Lateral Throw	401	2700	50000	120V - 277V, 50/60 Hz
T2, 3000K	8.5	Type II	431	3000	50000	120V - 277V, 50/60 Hz
T2, 4000K	8.5	Type II	607	4000	50000	120V - 277V, 50/60 Hz
T4, 2700K	8.5	Type IV - Forward Throw	374	2700	50000	120V - 277V, 50/60 Hz
T4, 3000K	8.5	Type IV	402	3000	50000	120V - 277V, 50/60 Hz
T4, 4000K	8.5	Type IV	566	4000	50000	120V - 277V, 50/60 Hz
T5X, 2700K	8.5	Type V - Flood	419	2700	50000	120V - 277V, 50/60 Hz
T5X, 3000K	8.5	Type V	450	3000	50000	120V - 277V, 50/60 Hz
T5X, 4000K	8.5	Type V	635	4000	50000	120V - 277V, 50/60 Hz

NOTES AND FORMULAS

- Apply appropriate light loss factors where necessary.
- Photometry is LM-79 compliant.
  *All test data performed using 4000K color temperature - 2700K and 3000K are calculated from 4000K.

ORDERING INFORMATION

Sample Number: 303 - A1 - LEDB1 - 3000 - UNV - T5X - BK

Series
303-A1 = LED single head adjustable ground mount

Quantity of Mini Lightbars
LEDB1 = Light Emitting Diode, Rev B., Single Mini Lightbar

Color Temperature
2700= 2700K
3000= 3000K
4000= 4000K

Input Voltage
UNV= Universal 120 - 277V, 50/60Hz

Optics
T2 = Type II, Lateral Throw
T4 = Type IV, Forward Throw
T5X = Type V, Extra Wide Flood
Consult Factory for Other Optics

Dimming
DIMELV = Trailing Edge Phase Dimming Driver
DIM10 = 0 - 10V Dimming Driver

Finish
Painted
BK = Black
BZ = Bronze
CS = City Silver
VE = Verde
WT = White
Premium Material
BA = Brushed Aluminum

Options
6= 6" Stem
12= 12" Stem
18= 18" Stem

Notes: * Consult your Cooper Lighting representative for additional options and finishes
* Direct burial junction box provided by others

Cooper Lighting by EATON

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Eaton's Cooper Lighting Business
1121 Highway 74 South
Peachtree City, GA 30269
P: 770-486-4800
www.cooperlighting.com

Stantec

Stormwater Report

Entry Drive and Synthetic Turf Field
Dana Hall School
45 Dana Road
Wellesley, MA 02482

January 8, 2019

Prepared for:

Wellesley Zoning Board of Appeals
Wellesley Town Hall
525 Washington Street
Wellesley, MA

Prepared by:

Stantec Planning and Landscape Architecture, P.C.
226 Causeway St., 6th Floor
Boston, MA 02114

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STORMWATER REPORT

Existing Conditions

Project Summary

Dana Hall School is proposing to construct a new synthetic turf field and entry drive re-alignment on The Dana Hall School Property along Grove Street. The current site consists of a natural grass athletic field and entry drive. The existing entry drive is in a location that restricts the ability for the school to host a competitive athletic event due to dimensional requirements for National Federation of State High School Associations (NFHS). To meet the field size requirements, the school is proposing to shift the existing entry drive to the north. This is referred to in the plans as Phase 1. Following the Construction of the entry drive, the school proposes a Phase 2, which is a synthetic turf field to be constructed for playability during /after storm events with the dimensional requirements for NFHS. Improvements to the existing stormwater management system are proposed as part of the Phase 1 and Phase 2 improvements.

A new stormwater management system was designed to comply with standards of the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Standards, and with the Town of Wellesley Stormwater & Erosion Control Regulations. A corresponding Stormwater Report has been included in this package for review.

Currently, there is an on-site stormwater management system that captures runoff in catch basins and a closed drainage system that connects to the Town's system in Grove Street. The proposed stormwater management system features significant upgrades including a system designed to capture, treat, and recharge area within the proposed limit of work. The systems include a mix of crushed stone trenches containing perforated pipe and a stone profile under the synthetic turf athletic system. Stormwater on the synthetic turf athletic field infiltrates directly through the playing surface and is stored in the 8" stone profile below the field where stormwater exfiltrates through the subgrade. 12" flat drains, spaced 20' on center, convey stormwater from the stone profile toward the sides of the field into 12" collector pipes in stone trenches before exiting the field through and outlet control structure. The proposed system will overflow into the Town's system, similar to existing conditions, but peak runoff and volume will be reduced as a result of this project.

All supporting figures can be found within Appendix A. All supporting calculations can be found in Appendix D. The Site Preparation Plans for Phases 1 and 2 for the proposed stormwater management system (system) can be found in Appendix G. The Operation and Maintenance Plan and Log for the proposed system can be found in Appendix I. All elevations noted within this report reference the North American Vertical Datum of 1988 (NAVD 88) unless otherwise noted.

1.0 EXISTING CONDITIONS

1.1 SITE LOCATION

The 3.2-acre Project Site is limited to a portion of the Dana Hall School Campus, located just south of the Main Entry Drive off of Grove Street, in Wellesley, Massachusetts. The Site is located on the western portion of campus at the corner of Grove Street and Dana Drive *(Appendix A – Figure 2 – Locus Map)*.

1.2 SITE TOPOGRAPHY

The topography of the Site is generally sloping south to north ranging in elevation from 140.00'± to 130.00'± (*Appendix A – Figure 1 – USGS Map*) (*Appendix A – Figure 8 – Existing Hydrologic Conditions*).

1.3 SITE WATERSHED

The Site is located within the Charles River Watershed. The Site is not located within a wetland area *(Appendix A - Figure 3 – Resource Areas)*. The Site does not discharge to a Public Water Supply or a Surface Water Protection Zone *(Appendix A - Figure 6 – Protected Areas)*. The Site does not discharge to Outstanding Resource Waters *(Appendix A - Figure 3 – Resource Areas)*. The Site is located within a floodplain.

1.4 SITE PEDOLOGY

The Natural Resources Conservation Service (NRCS) Soil Survey of Middlesex County, Massachusetts indicates that the soil on Site is composed predominately of Merrimac Fine Sandy Loam (Map Units 254A and 254B). Both Map units of Merrimac Fine Sandy Loam are assigned a Hydrologic Soil Group (HSG) rating of "A" indicating that the soils are well draining and have a low potential for runoff (*Appendix C – Natural Resources Conservation Service (NRCS) Soil Resource Report*).

Geotechnical Services, Inc. conducted a subsurface investigation on December 1, 2014. This program involved the advancement of twelve geotechnical borings to depths ranging from 0 to 10 feet below existing grade. The borings were taken in the approximate location of the proposed synthetic turf field, just south of the main entrance to the School campus. The result of the subsurface exploration program indicated that the Site generally consists of a surficial layer of topsoil overlying sand fill, blast rock fill, and natural deposits of sand. The Geotechnical Engineering Report documenting the Site's subsurface condition can be found in Appendix C.

The results of the subsurface exploration program indicated that the observed soils are generally consistent with the NRCS Soil Survey for the Site categorized as Hydrologic Soil Group (HSG) rating of "A."

1.5 SITE GROUNDWATER

Groundwater was observed in several of the probes upon completion. Where encountered, the groundwater was observed between 8 to 9-ft below grade. In G-7, groundwater was observed at 6-ft below grade. It should be noted that this probe location is in the vicinity of the existing stormwater collection system located beneath the field. The

probes were performed on December 1, 2014, and as a result, an estimated seasonal high groundwater elevation of 130 is assumed. Recharge systems are limited to the footprint of the proposed synthetic turf athletic field. In that areas, groundwater maintains at least 5 feet of separation from the bottom of any recharge system.

2.0 MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS

The following documents the Project's compliance with all ten standards for stormwater management as defined by the Massachusetts Department of Environmental Protection's (MassDEP) *Stormwater Management Standards*. The requirements for documenting compliance can be found within MassDEP's *Massachusetts Stormwater Handbook*.

2.1 STANDARD 1 – UNTREATED DISCHARGE

Standard 1 states that "no new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth."

All stormwater runoff generated by or draining onto the Site will be captured, detained, and/or infiltrated. no untreated stormwater discharged directly to wetlands of waters of the commonwealth. Both the required and provided level of stormwater runoff treatment can be found on page 2.8, Standard 4 – Water Quality. The project will have one design point into the municipal stormwater system, matching existing conditions, and will have no new stormwater conveyances (outfalls) to wetlands or waters of the Commonwealth.

Therefore, the Project complies with Standard 1.

2.2 STANDARD 2 – PEAK RATE ATTENUATION

Standard 2 states that "stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates."

The proposed stormwater management system is designed to accommodate all storms up to and including the 10, 25, and 100-year, 24-hour event. In doing so, the post-development peak discharge rates do not exceed the pre-development peak discharges rates. The following sections outline the methodology and design criteria used in the development of a hydrologic model that best represents the Site in the pre- and post-conditions. Summary model output data serves as documentation of peak rate attenuation for the Project.

2.2.1 Methodology and Design Criteria

Site drainage analysis was performed using the Soil Conservation Service (SCS) TR-55 and TR-20 methodologies as facilitated by the computer program HydroCAD 10.00 (HydroCAD) by HydroCAD Software Solutions, LLC. Utilizing the HydroCAD software, a hydrologic model was developed to generate peak runoff rates for both the existing and proposed conditions of the Site. Design criteria for the hydrologic model included subcatchments, design points, soil conditions, curve numbers, time of concentration, and design storms.

Subcatchment Areas

For both the existing and proposed hydrologic conditions, the Site was divided into subcatchment areas based on the general flow direction of stormwater runoff. Each subcatchment, either directly or indirectly, discharging to the design point as identified below.

Design Point

Design points, which serve as comparison points for the peak discharge rates of the pre- and post-development hydrologic conditions, were established at either the Site's property line or at a hydrologic point of interest. In total, one design point was established for the Site.

- **DP1**: Located on the Northwest portion of the site, there is one design point that all runoff eventually discharges to. The design point is the municipal stormwater system in Grove Street. Upgradient of the design point, there are catch basins which collect stormwater from the entry road, pedestrian pathways, existing natural grass field, and lawn areas. Additionally, an open-air detention pond exists adjacent to the project site. None of the project site contributes to the detention pond, yet, when the pond overflows, it enters the same municipal catchment system that the project site is connected to.

Soil Conditions

The soil conditions are as described in Section 1.4 of this report.

Curve Numbers

Curve numbers were developed for each subcatchment drainage area based on the different use categories and hydrologic soil group types. Based on the soil conditions outlined in Section 1.4, a hydrologic soil group classification of "HSG A" was utilized for hydrologic models and calculations. The curve numbers were based on the SCS TR-55 methodology and can be found in the attached HydroCAD report.

Time of Concentration

The Time of Concentration (Tc) for each subcatchment was determined by finding the time necessary for runoff to travel from the most hydrologically distant point in the subcatchment to the point of concentration. The travel path was drawn based on the topography of the Site and the time was calculated using the TR-55 Method and HydroCAD. The minimum Tc value of 6.0 minutes was selected as the most conservative value for the Site.

Design Storms

For both the existing and proposed hydrologic conditions, the hydrologic model analyzed the Site's performance during the 10-, 25-, and 100-year frequency rainfall events per the Wellesley Zoning Board of Appeals design requirements. The events were based on the Type-III, 24-hour duration storm. Rainfall depths corresponding to the selected storm events can be found in *Table 1 – Design Storm Events* and were acquired from the Town of Weston Stormwater & Erosion Control Regulations, dated March 14, 2012, Section 7.0.A.2.a.i. A summary of the design storms can be found in *Table 1 – Design Storm Events*.

Table 1 – Design Storm Events

Storm Event	Rainfall Depth (inches)
10-year	4.79
25-year	6.04
100-year	8.60

2.2.2 Existing Hydrologic Conditions

The following assumptions were made for the existing hydrologic conditions analysis:

- Whenever possible, the property line, and/or a line outside the limit of proposed work, was delineated as the watershed boundary.
- The total watershed area for the proposed conditions corresponds to the total watershed area for the existing conditions.
- The hydrologic analysis extends beyond the limit of work to account for additional areas tributary to the design point.

For the existing conditions analysis, the Site was divided into four subcatchment areas *(Appendix A - Figure 8 – Existing Hydrologic Conditions*). The peak discharge rates for the pre-development conditions were analyzed at all four design points. The following provides a general description of each subcatchment:

Subcatchment EX1

Subcatchment EX1 is composed of an existing drive aisle, unconnected impervious walkways, an existing athletic field north of the entry drive, and landscaped areas, which is all directed to a subcatchment on the east side of the athletic field. Stormwater runoff from this subcatchment is directed into the municipal stormwater system in Grove Street identified in the hydrologic model as "DP1." This subcatchment also includes areas outside of the limit of work to account for additional areas tributary to the design point.

Subcatchment EX2

Subcatchment EX2 is composed of an existing pedestrian walkway, grassed areas, and the eastern half of the existing athletic field south of the entry drive. Stormwater runoff from this subcatchment is directed into the municipal stormwater system in Grove Street identified in the hydrologic model as "DP1."

Subcatchment EX3

Subcatchment EX3 is composed of the western half of the existing athletic field south of the entry drive, and the bottom portion of the entry drive. Stormwater runoff from this subcatchment is directed into the street which then directed into the municipal stormwater system in Grove Street identified in the hydrologic model as "DP1."

A summary of the existing subcatchments can be found in *Table 2 – Existing Subcatchment Summary.*

Table 2 – Existing Subcatchment Summary

Subcatchment Area I.D.	Area (sf)	Time of Concentration, Tc (min.)	Curve Number, CN
EX1	172,394	14.50	47
EX2	78,020	11.20	46
EX3	35,341	6.3	40
TOTAL	**285,755**	**N/A**	**46**

2.2.3 Proposed Hydrologic Conditions

The following assumptions were made for the proposed hydrologic conditions analysis:

- Whenever possible, the property line, and/or a line outside the limit of proposed work, was delineated as the watershed boundary.
- The total watershed area for the proposed conditions corresponds to the total watershed area for the existing conditions.

For the proposed hydrologic conditions analysis, the Site was divided into three subcatchment areas *(Appendix A - Figure 9 – Proposed Hydrologic Conditions)*. The peak discharge rates for the post-development conditions were analyzed at one design point. The following provides a general description of each subcatchment:

Subcatchment PR1

Subcatchment PR1 is composed of the entry drive, unconnected impervious walkways, an existing athletic field north of the entry drive, and landscaped areas, which is all directed to a subcatchment on the west side of the athletic field. Stormwater runoff from this subcatchment is directed into the municipal stormwater system in Grove Street identified in the hydrologic model as "DP1." This subcatchment also includes areas outside of the limit of work to account for additional areas tributary to the design point.

Subcatchment PR2

Subcatchment PR2 is composed of the entire synthetic turf athletic field south of the entry drive, and some. Stormwater runoff from this subcatchment is directed into the stone base of the synthetic turf profile, identified in the hydrologic model as "P2." "P2" has been designed to retain and infiltrate all stormwater discharging to it for storms up to an including the 100-year storm event.

Subcatchment PR3

Subcatchment PR3 is composed of a pedestrian walkway, grassed areas, and some disconnected impervious areas west of the athletic field south of the entry drive. runoff from this subcatchment is directed into infiltration trenches underneath the synthetic turf athletic field, "P1." "P1" has been designed to retain and infiltrate all stormwater discharging to it for the 10-year storm event. For the 25- and 100-year storm events, water will overtop a weir in and outlet control structure and eventually outlet into the municipal stormwater system in Grove Street identified in the hydrologic model as "DP1."

A summary of the existing subcatchments can be found in *Table 3 – Proposed Subcatchment Summary*.

Table 3 – Proposed Subcatchment Summary

Subcatchment Area I.D.	Area (sf)	Time of Concentration, Tc (min.)	Curve Number, CN
PR1	167,661	14.50	48
PR2	93,544	6.0	91
PR3	24,550	6.0	53
Total	**285,755**	**N/A**	**63**

The peak discharge runoff rates were calculated for the 10-, 25-, and 100-year storm events for both proposed and existing conditions to demonstrate that proposed peak runoff rates do not exceed existing at all design points. The results of this comparison can be found in *Table 4 – Peak Discharge Runoff Rates.*

Table 4 – Peak Discharge Runoff Rates

Design Point		10-Year Storm (4.79")	25-Year Storm (6.04")	100-Year Storm (8.60")
DP1	Existing Rate (cfs)	1.00	3.15	10.62
	Proposed Rate (cfs)	0.92	2.80	8.70

The proposed peak discharge runoff rates do not exceed the existing peak discharge runoff rates for the 10-, 25-, and 100-year storm events.

Therefore, the Project complies with Standard 2.

2.3 STANDARD 3 – STORMWATER RECHARGE

Standard 3 states that the "loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook."

The proposed stormwater management system meets and exceeds the requirement for stormwater recharge as described in the Massachusetts Stormwater Handbook. The following tables document the proposed stormwater management system's compliance with Standard 3.

A summary of the drawdown within 72 hours can be found in *Table 5 – 72 Hour Drawdown.*

Table 5 – 72 Hour Drawdown

Infiltration BMP	K (in/hr)	Bottom Area (sf)	Drawdown Time (hr)
Underground Basin (UB1)	2.40	7,920	1.18

A summary of the provided Recharge Volume can be found in *Table 6 – Required Recharge Volume.*

Table 6 – Required Recharge Volume

Infiltration BMP	Contributing Impervious Area (sf)	Required Recharge Volume (cf)	Provided Recharge Volume (cf)
Underground Basin (UB1)	7,843	1,862	4,407

The required recharge volume was calculated based on impervious areas within the limit of work. Although the hydrologic watershed includes areas outside of the limit of work, the drainage patters of all areas outside the limit of work are unaffected by the project. Therefore, the adjustment factor for required recharge volume is only adjusted by areas that do not contribute to the recharge system but are within the limit of work.

Supporting calculations for the proposed design can be found in Appendix D.

2.4 STANDARD 4 – WATER QUALITY

Standard 4 states that "Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids."

Standard 4 is met when a project complies with all the following criteria:

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 determined in accordance with the Massachusetts Stormwater Handbook; and
3. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook

The proposed stormwater management system meets requirement for water quality as described in the Massachusetts Stormwater Handbook. The following sections document the proposed stormwater management system's compliance with Standard 4. Supporting calculations for the proposed design can be found in Appendix D.

2.4.1 Long-Term Pollution Prevention Plan

A long-term pollution prevention plan for the Project is included as part of the Operation and Maintenance Plan and can be found in Appendix H.

2.4.2 Required Water Quality Volume

The Massachusetts Stormwater Handbook requires a water quality treatment volume equal to the product of 1/2-inch and the total impervious area if the Site discharges to/from any of the following areas:

- From a Land Use with Higher Potential Pollutant Load
- From an area with an infiltration rate greater than 2.4 in/hr
- To a Zone II or Interim Wellhead Protection area
- To/near a Critical Area

For all other discharge conditions, the required water quality treatment volume is equal to the product of one-half inch and the total impervious area.

As documented within this report, the Site meets the condition of an area with an infiltration rate less than 2.41 in/hr with an infiltration rate of 2.40 in/hr. Therefore, the Project is required to treat a water quality volume depth of 1/2-inch. Supporting calculations can be found in Appendix D.

2.4.3 Provided Water Quality Volume

A summary of the provided Water Quality Volume can be found in *Table 7 – Water Quality Volume Summary.*

Table 7 – Water Quality Volume Summary

Infiltration BMP	Contributing Impervious Area (sf)	Required Water Quality Volume (cf)	Provided Water Quality Volume (cf)
Underground Basin (UB1)	7,843	10,663	27,821

The proposed stormwater management system provides a water quality volume that exceeds the required water quality volume. Therefore, the Project complies with the required water quality volume component of Standard 4.

2.4.4 TSS Removal

The Massachusetts Stormwater Handbook requires that stormwater management systems remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

The existing site consisted of the entry drive, athletic fields, impervious pathways, and lawn areas draining directly to area drains with limited treatment. In proposed conditions, TSS removal is significantly improved through the proposed stormwater management features.

The TSS pretreatment and treatment removal rates are met through three "treatment trains." Each treatment train is composed of a series of pre-treatment and/or treatment BMPs that reduce TSS loading prior to discharge. The proposed treatment trains are described in the following:

Table 8 – TSS Removal Summary

The treatment trains are described as follows:

Treatment Train #1

Treatment Train #1 consists of the entry drive, unconnected impervious walkways, an existing athletic field north of the entry drive, and landscaped areas. In existing conditions and proposed conditions this area sheet flows through lawn areas before entering a catch basin on the west side of the existing natural grass athletic field north of the entry drive. All stormwater runoff from additional impervious areas within the limit of work sheet flows through a vegetated buffer for a pretreatment of 25% TSS removal and is directed into a natural swale west of the existing natural grass athletic field north of the entry drive for TSS removal. Additionally, a catch basin insert will be added to the existing catch basin on the west side of the existing natural grass athletic field north of the entry drive for an additional 80% TSS removal before entering the Town's system.

Treatment Train #2

Treatment Train #2 consists of a pedestrian walkway, grassed areas, and some disconnected impervious areas west of the athletic field south of the entry drive. In existing conditions, this area sheet flows through lawn areas before entering an area drain directly connected to the municipal stormwater system (DP1). In proposed conditions a catch basin with a hood will be installed to provide 25% pre-treatment TSS removal prior to discharging to the infiltration trench (P1) for a total of 80% TSS removal before it outlets to the municipal stormwater network. Treatment of the stormwater runoff from the impervious pathways east of the synthetic turf field is greatly improved compared to existing conditions.

Treatment Train #3

Treatment Train #1 consists of the synthetic turf athletic field and small areas of adjacent disconnected impervious and landscaped areas. This area will not require pre-treatment TSS removal and 80% TSS removal will be provided in "P2."

Treatment Train	Provided Pre-Treatment TSS Removal (%)	Contributing Impervious Area	Provided TSS Removal (%)
Treatment Train #1	25%	9,245	85%
Treatment Train #2	25%	5,943	80%
Treatment Train #3	NA	1900	80%
Total Weighted TSS Removal			82%

2.5 STANDARD 5 – LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS (LUHPPL)

Standard 5 states that "for land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable."

The Site is not considered a LUHPPL, as defined by the Massachusetts Department of Environmental Protection. Therefore, Standard 5 is not applicable to the Project.

2.6 STANDARD 6 – CRITICAL AREAS

Standard 6 states that "Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook."

Critical areas include any one of the following, as defined by the Massachusetts Department of Environmental Protection:

- Outstanding Resource Waters
- Special Resource Waters
- Zone I Recharge Areas
- Zone II Recharge Areas
- Interim Wellhead Protection Areas
- Zone A Recharge Areas
- Bathing Beaches
- Cold-water Fisheries
- Shellfish Growing Areas

The proposed stormwater management system does not discharge near or to any of the above listed critical areas. Therefore, the Project complies with Standard 6.

2.7 STANDARD 7 – REDEVELOPMENT PROJECTS

Standard 7 states that "a redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions."

A project may be classified as a redevelopment if it meets any one of the following criteria:

1. Maintenance and improvement of existing roadways, including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving.
2. Development, rehabilitation, expansion and phased projects on previously developed sites, provided the redevelopment results in no net increase in impervious area.
3. Remedial projects specifically designed to provide improved stormwater management, such as projects to separate storm drains and sanitary sewers and stormwater retrofit projects.

The proposed project is not a redevelopment project. Therefore, Standard 7 is not applicable to the Project.

2.8 STANDARD 8 – EROSION AND SEDIMENTATION CONTROL PLAN

Standard 8 states that "a plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented."

An erosion and sedimentation control plan can be found in Appendix G. This plan establishes erosion and sedimentation control and pollutant sources during land disturbance and construction activities. Additionally, because the Project will disturb more than one acre of land, it will require a Construction General Permit (CGP) through the United States Environmental Protection Agency (US EPA). The CGP will require a Stormwater Pollution Prevention Plan (SWPPP) prior to earth disturbance activities. The SWPPP will provide additional detail as to the erosion control measures that will be implemented on-site.

Therefore, the Project complies with Standard 8.

2.9 STANDARD 9 – OPERATION AND MAINTENANCE PLAN

Standard 9 states that "a long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed."

An operation and maintenance plan can be found in Appendix H. This plan outlines long-term operation and maintenance procedures for non-structural BMPs, structural BMPs, and the overall Site that will allow the proposed stormwater management system to function as designed.

Therefore, the Project complies with Standard 9.

2.10 STANDARD 10 – ILLICIT DISCHARGES

Standard 10 states that "all illicit discharges to the stormwater management system are prohibited." As stated in the Massachusetts Stormwater 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.

Proponents of projects within Wetlands jurisdiction must demonstrate compliance with this requirement by submitting to the issuing authority an Illicit Discharge Compliance Statement verifying that no illicit discharges exist on the project area and by including in the pollution prevention plan measures to prevent illicit discharges to the stormwater management system."

It is with full understanding that the SWPPP for the Upper School Academic Building & Quad project will identify allowable non-stormwater discharges and the measures used to eliminate or reduce them and describe how they will be prevented from becoming contaminated.

Standard 10 also states that "The Illicit Discharge Compliance Statement must be accompanied by a project area map that is drawn to scale and that identifies the location of any systems for conveying stormwater on the project area and shows that these systems do not allow the entry of any illicit discharges into the stormwater management

system. The project area map shall identify the location of any systems for conveying wastewater and/or groundwater on the project area 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 Application for Administrative Site Plan Approval is a plan numbered L-200 and entitled "Grading and Utility Plan." This plan displays the proposed location of each stormwater management component, as well as other utilities (both existing and proposed) for the Project. This plan also conforms to requirements of a "project area map" to accompany the Illicit Discharge Compliance Statement.

The Illicit Discharge Compliance Statement for the Project is as follows:

Illicit Discharge Compliance Statement

Per the requirements of Standard 10 of the Massachusetts Stormwater Management Standards, it shall be stated that no illicit discharges are proposed as part of the Meeting House Project located on land off Carlson Avenue in Newton, Massachusetts, as described herein this stormwater report.

APPENDIX

Appendix A FIGURES

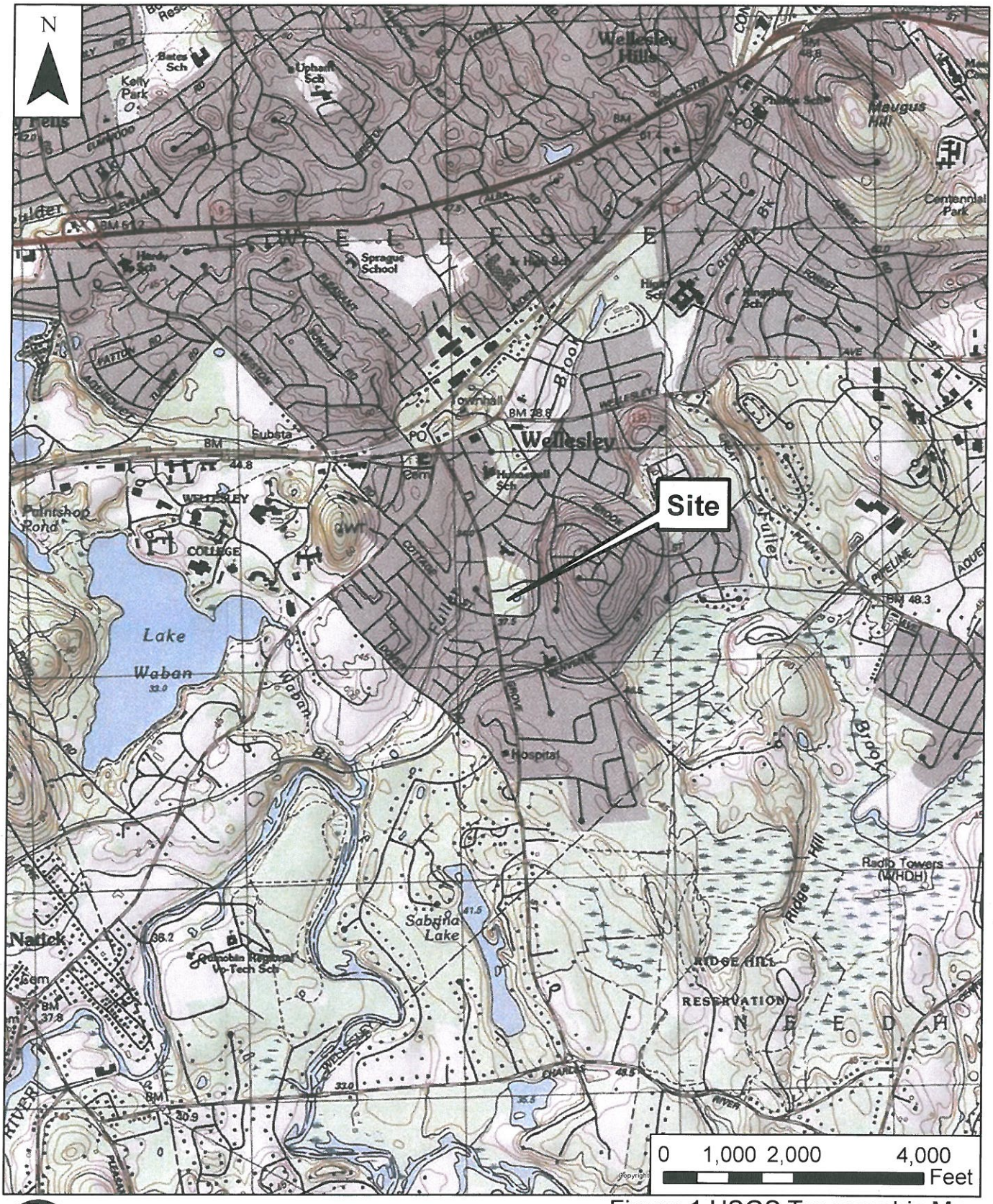

Figure 1 USGS Topographic Map
Dana Hall School
Wellesley, MA
January 2019

Stantec

226 Causeway Street
Boston, MA 02114

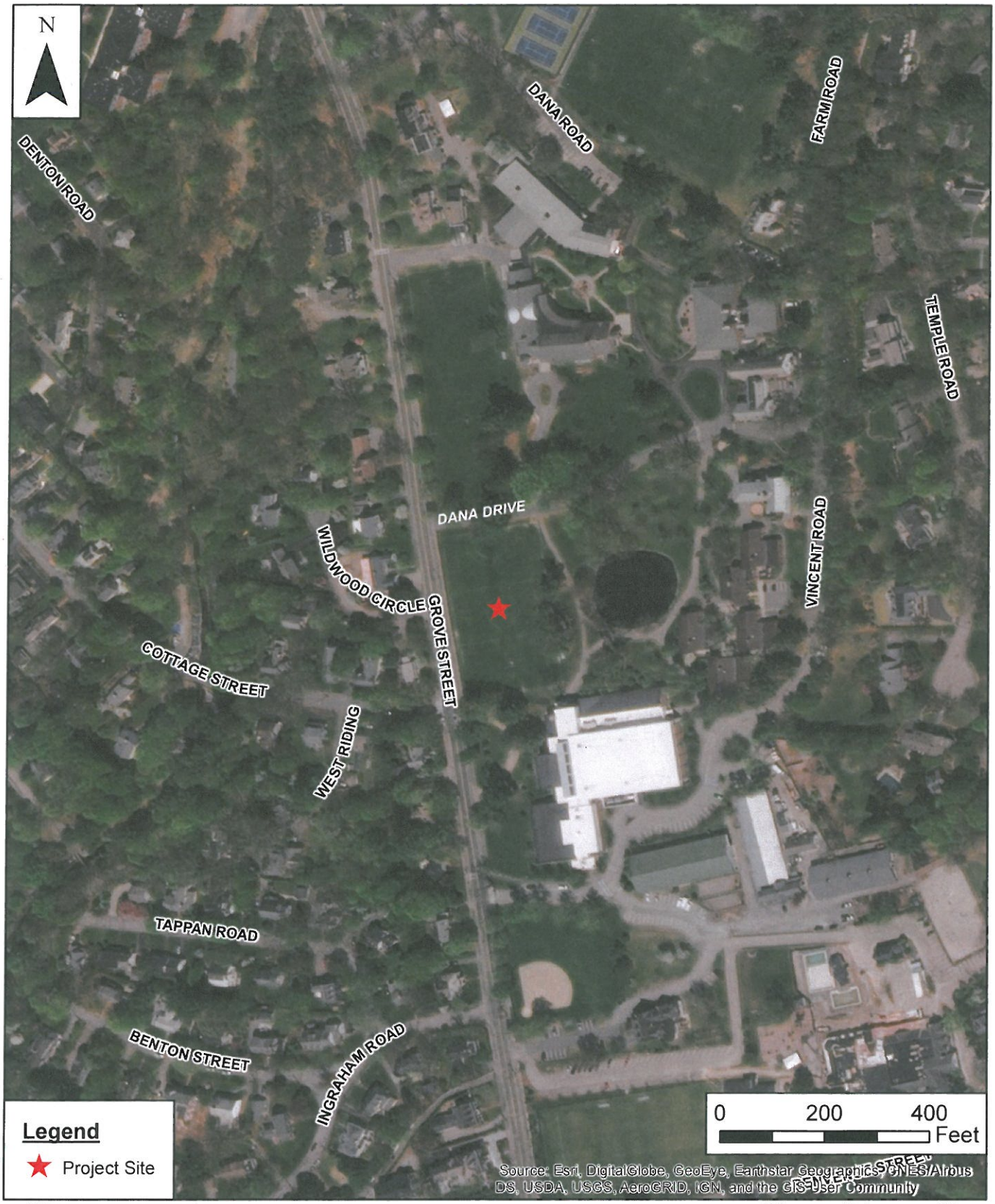

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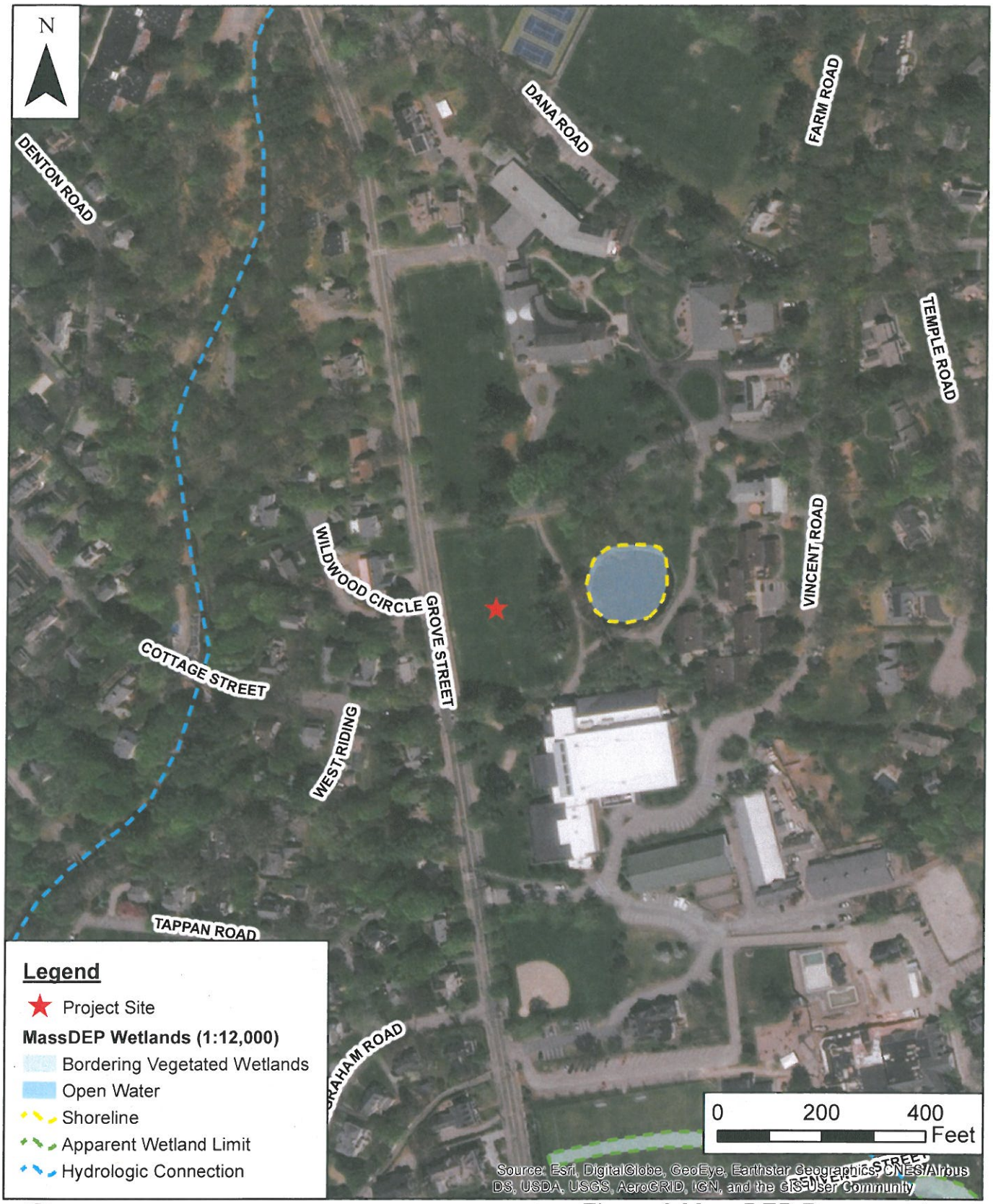
Figure 2 Locus Map
Dana Hall School
Wellesley, MA
January 2019

Data Source: Bureau of Geographic Information (MassGIS), Digital Services Group, Executive Office of Technology Services and Security, Commonwealth of Massachusetts



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Boston, MA 02114

Figure 3 MassDEP Resource Areas
Dana Hall School
Wellesley, MA
January 2019

Data Source: Bureau of Geographic Information (MassGIS), Digital Services Group, Executive Office of Technology Services and Security, Commonwealth of Massachusetts

Stantec

226 Causeway Street
Boston, MA 02114

Figure 4 Flood Map
Dana Hall School
Wellesley, MA
January 2019

Data Source: Bureau of Geographic Information (MassGIS), Digital Services Group, Executive Office of Technology Services and Security, Commonwealth of Massachusetts

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Figure 5 Critical Areas
Dana Hall School
Wellesley, MA
January 2019

Data Source: Bureau of Geographic Information (MassGIS), Digital Services Group, Executive Office of Technology Services and Security, Commonwealth of Massachusetts

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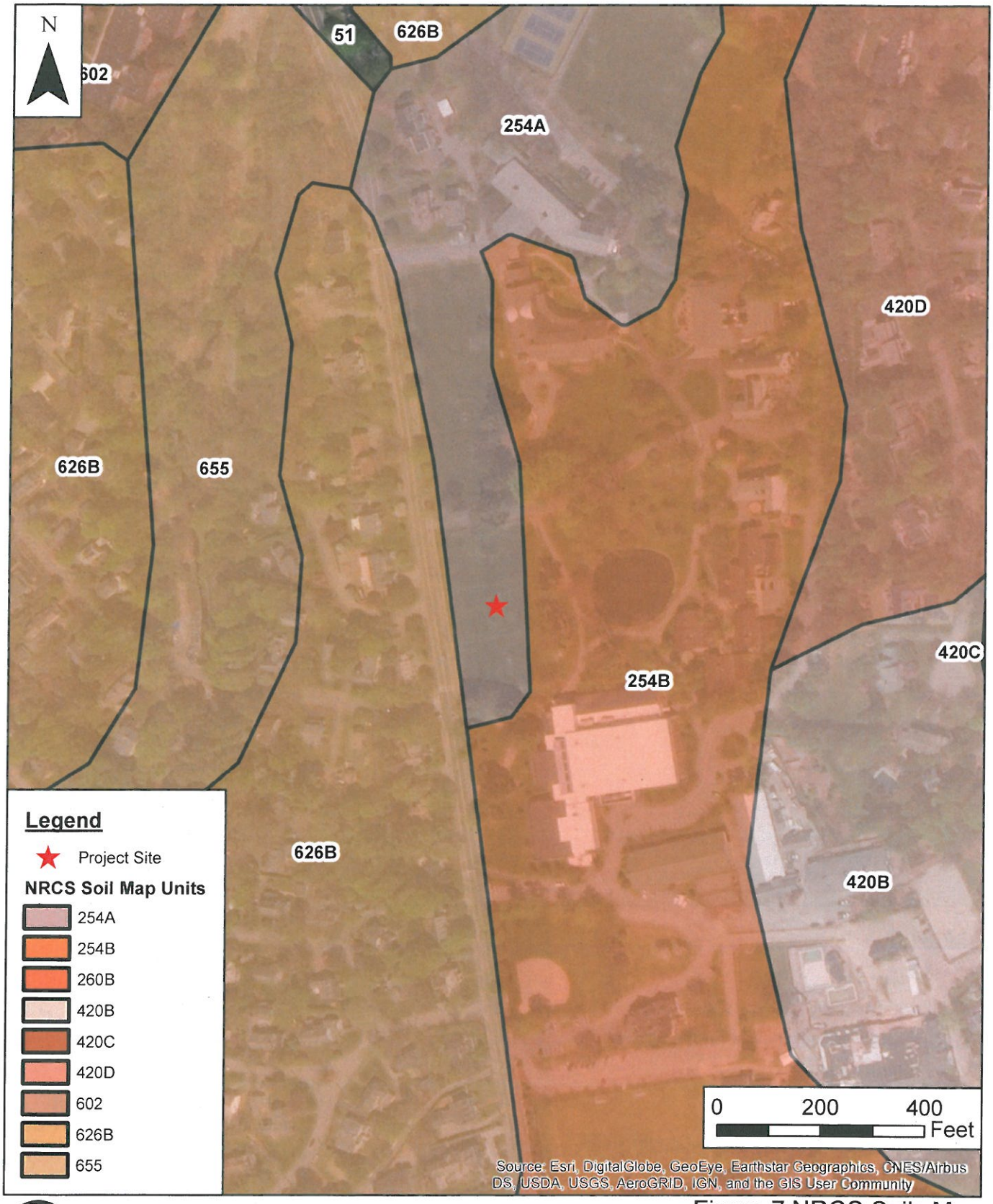
Boston, MA 02114

Notes:
1. NHESP: Natural Heritage & Endangered Species Program
2. Potential Vernal Pools are not certified by the NHESP and do not receive protection under the Massachusetts Wetlands Protection Act.

Figure 6 Protected Areas
Dana Hall School
Wellesley, MA
January 2019

Data Source: Bureau of Geographic Information (MassGIS), Digital Services Group, Executive Office of Technology Services and Security, Commonwealth of Massachusetts



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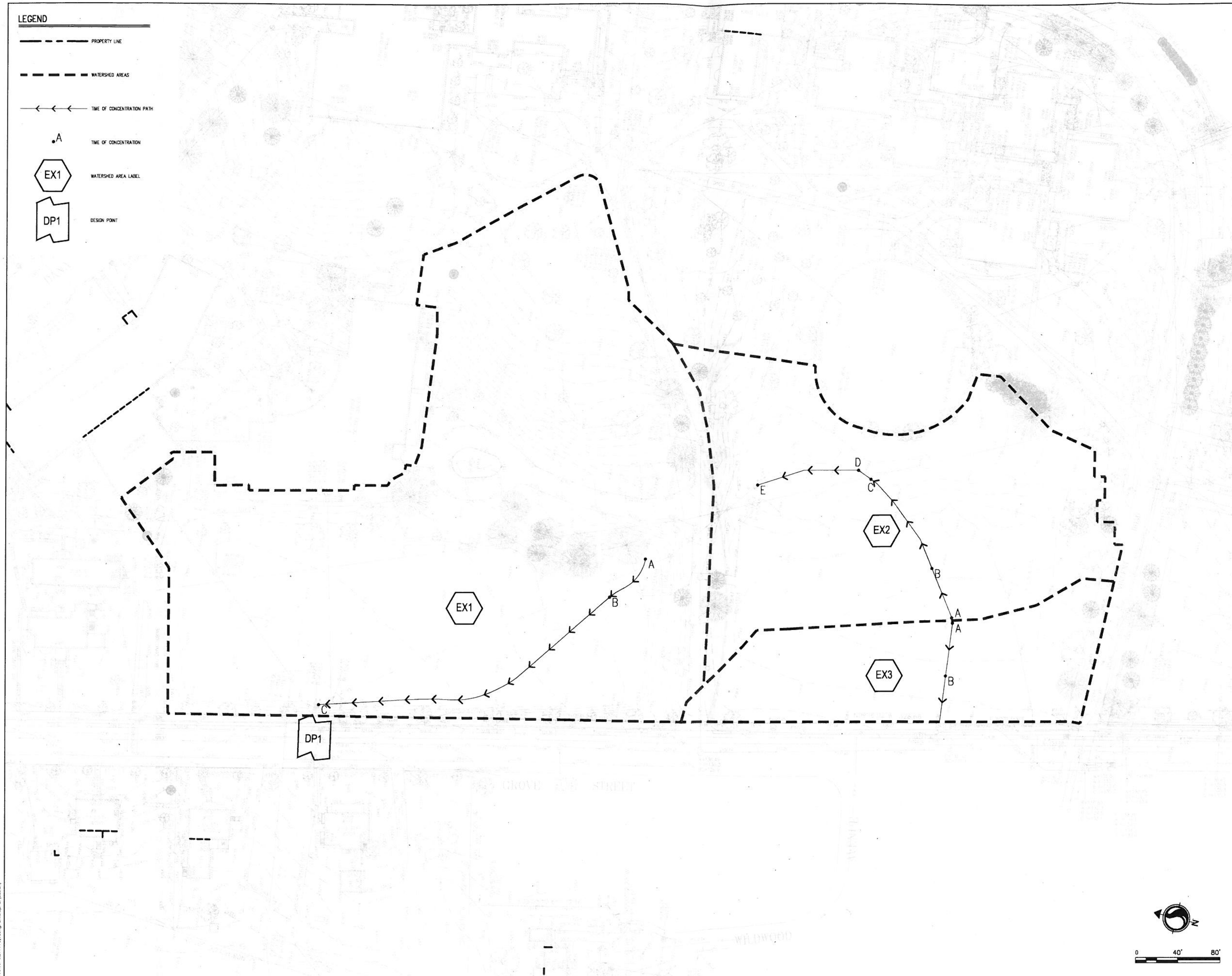
Boston, MA 02114

Figure 7 NRCS Soils Map
Dana Hall School
Wellesley, MA
January 2019

Data Source: Bureau of Geographic Information (MassGIS), Digital Services Group, Executive Office of Technology Services and Security, Commonwealth of Massachusetts



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Landscape Architecture P.C.
226 Causeway St.
Boston MA 02114 U.S.A.
Tel. 617.523.8103
Fax. 617.523.4333
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Legend

Notes

	By	Appd.	MM.DD.YY
PERMIT SET	JW	JA	12.21.18

Issued

File Name: 210801597_Existing Conditions.dwg

Dwn. Chkd. Dsgn. MM.DD.YY

Permit-Seal

Client/Project

DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS

Wellesley, MA

Title

EXISTING HYDROLOGIC CONDITIONS

Project No.	Scale
210801597	AS SHOWN

Sheet

of

Drawing No.

FIGURE 8

LEGEND

PROPERTY LINE

LIMIT OF WORK

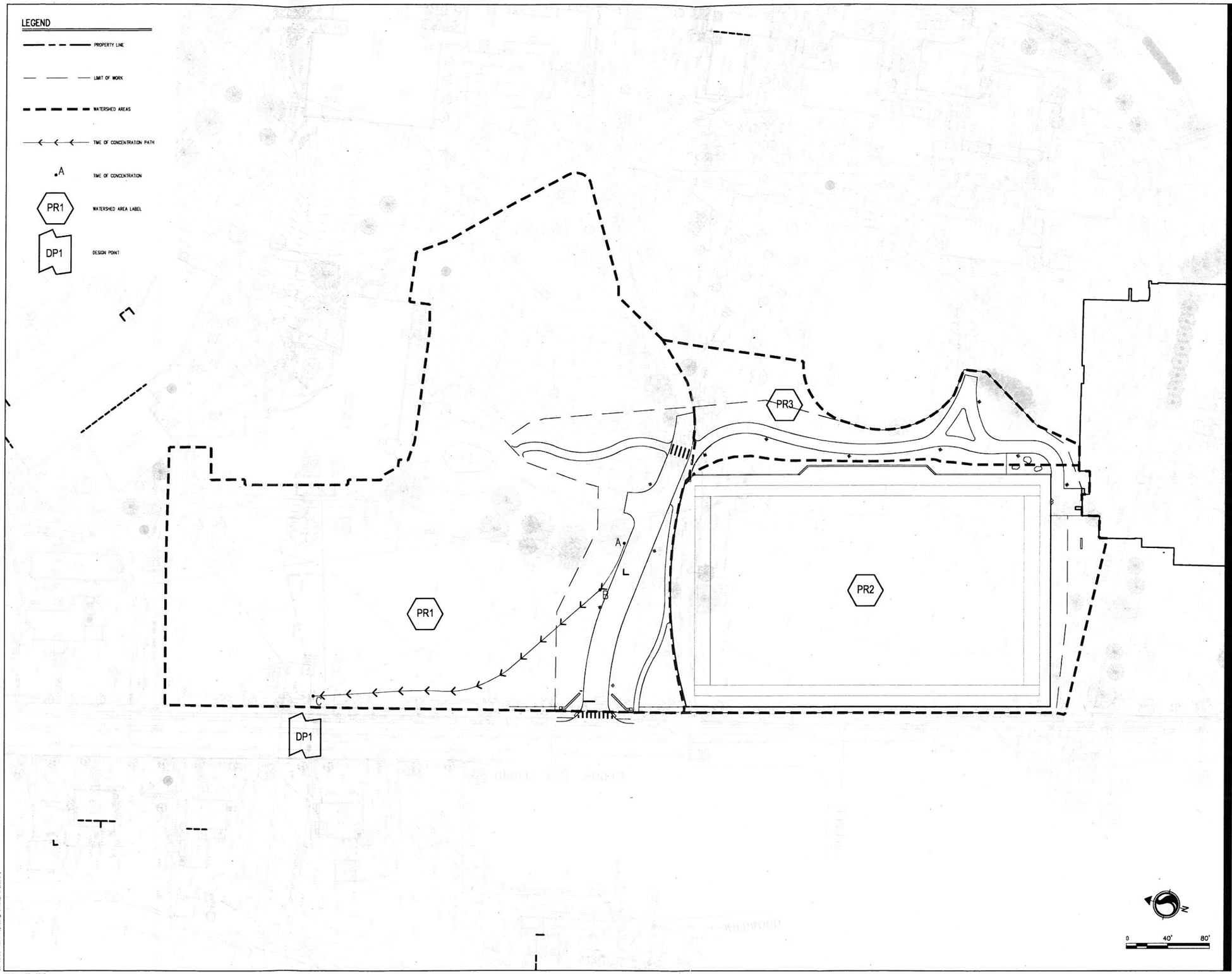
WATERSHED AREAS

TIME OF CONCENTRATION PATH

A — TIME OF CONCENTRATION

PR1 — WATERSHED AREA LABEL

DP1 — DESIGN POINT



0 40' 80'

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Legend

Notes

PERMIT SET	JW	JA	12.21.18
Issued	By	Appd.	MM.DD.YY

File Name: 210801597_Proposed Conditions.dwg

Dwn.	Chkd.	Dsgn.	MM.DD.YY

Permit-Seal

Client/Project
DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS
Wellesley, MA

Title
PROPOSED HYDROLOGIC CONDITIONS

Project No. 210801597
Scale AS SHOWN
Sheet
of
Drawing No. FIGURE 9

ORIGINAL SHEET - ARCH D

Appendix B GEOTECHNICAL REPORT

B.1 GEOTECHNICAL REPORT, PREAPARED BY GEOTECHNICAL SERVICES, INC.

GEOTECHNICAL REPORT

DANA HALL SCHOOL ATHLETIC FIELD
45 DANA ROAD
WELLESLEY, MASSACHUSETTS

January 2, 2015

GSI Project No. 214230

Prepared for:

Mr. Chris Huntress
Huntress Associates, Inc.
17 Tewksbury Street
Andover, MA 01810

Prepared by:

Geotechnical Services, Inc.
55 North Stark Highway
Weare, NH 03281

Geotechnical Services Inc.

Geotechnical Engineering ◣ Environmental Studies ◣ Materials Testing ◣ Construction Monitoring

GSI GEOTECHNICAL SERVICES INC.

Geotechnical Engineering | Environmental Studies | Materials Testing | Construction Monitoring

January 2, 2015

Mr. Chris Huntress
Huntress Associates, Inc.
17 Tewksbury Street
Andover, MA 01810

Advanced via Email: chris@huntressassociates.com

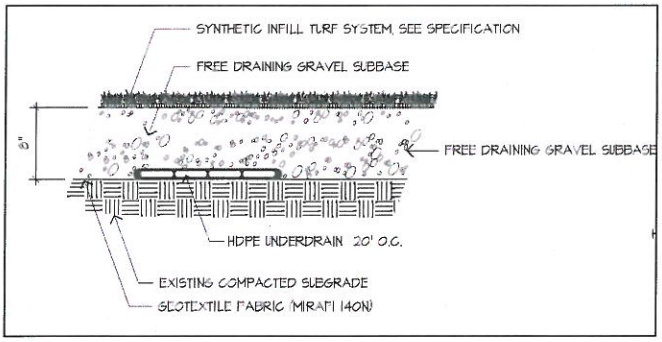
RE: Geotechnical Investigation Report
Dana Hall School Athletic Field
Wellesley, Massachusetts
GSI Project No. 214230

Dear Mr. Huntress:

Geotechnical Services, Inc. (GSI) is pleased to submit this report on the proposed design-development of the synthetic turf athletic field at the Dana Hall School in Wellesley, MA. The report consists of the subsurface data obtained through implementation of an exploration program, evaluation of the subsurface data, a summary of our understanding of the proposed development, and the results of an assessment for earthwork design options. In addition, issues identified as pertinent to the construction of the planned facilities are discussed. The work has been undertaken in accordance with our proposal letter, dated October 30, 2014 and your subsequent authorization. The content of this report is subject to the **Limitations** stated in Appendix A.

PROJECT UNDERSTANDING

The project site is located at 45 Dana Road in Wellesley, MA (See Figure 1, Project Locus). We understand that the planned athletic field renovation will replace the existing grass turf located off of Grove Street a just south of the main entrance to the School campus. A grading plan was not available at the time this report was prepared; however, the overall site is generally flat. We understand that the existing athletic field was constructed using a significant amount of blast rock fill that was generated during construction of one of the existing buildings on the School Campus.



Detail 1 - Typical Synthetic Turf System

At the time this report was prepared, the proposed design of the synthetic turf system and the overall grading for the field was not finalized for our review; however, we assume that the synthetic turf systems will have a typical cross section shown in Detail 1 consisting of the synthetic turf infill, an 8-in. thick layer of free draining gravel Subbase and a geotextile fabric placed over the existing subgrade soils. The grading for the new synthetic field is assumed to match that of the existing grades with the possibility of re-grading on the order of up to 2-ft (cut/fill).

SUBSURFACE INVESTIGATION

Twelve (12) soil probes, designated as G-1 to G-12, were performed at the site on December 1, 2014 by New England Boring Contractors, Inc. located in Derry, NH. The probes with made using a Geoprobe soil probing machine which collect continuous soil samples from 0 to 10-ft below the existing grade. The Geoprobes were observed by the GSI engineer and the soils encountered were classified in accordance with the Burmister Classification system. The approximate locations of the Geoprobes are shown on Figures 2, Exploration Location Plan. The finalized logs for the Geoprobes are included in Appendix B. Photographs of the collected soil samples

were taken and are provided as Appendix C. Representative portions of each sample retrieved were saved in plastic bags with identification, and delivered to the GSI Soils Laboratory. The samples were re-examined and field classifications were reviewed. The soil samples will be stored at the GSI laboratory during the course of the project design-development, and will be shipped to your designated address or discarded upon your notification.

SUBSURFACE CONDITIONS

The subsurface conditions encountered in the investigation indicate that the site is underlain by the following soil units/deposits, described in order of increasing depth:

Topsoil: All of the probes encountered the Topsoil layer at the ground surface. The Topsoil layer generally consists of organic silty soils. The thickness of this soil unit is typically 5 to 12-in. A thicker layer of organic soils was encountered in **G-1** where the organic soils (Loam Fill) extended to 3.6-ft below grade..

Sand Fill: A Sand Fill layer was encountered beneath the Topsoil layer in G-3, G-4, G-6, G-7 and G-10. The thickness of the Sand Fill was generally 6-in.

Blast Rock Fill: Blast Rock Fill was encountered in all of the probe locations except G-12. The Blast Rock Fill generally consists of brow to gray, fine to medium SAND and GRAVEL. The Blast Rock Fill extended to at least 10-ft were the probes were terminated. In G-11, the Blast Rock Fill was approximately 4-ft thick.

Sand: Naturally deposited Sand was encountered in G-11 and G-12. The Sand deposit generally consists of fine to medium Sand with varying amounts of silt.

Groundwater: Groundwater was observed in several of the probes upon completion. Where encountered, the groundwater was observed between 8 to 9-ft below grade. In G-7, groundwater was observed at 6-ft below grade. It should be noted that this probe location is in the vicinity of the existing stormwater collection system located beneath the field. Groundwater levels should be expected to vary with season, precipitation, snowmelt, and other factors. As a result, groundwater levels encountered during construction may differ from those encountered in the explorations.

GEOTECHNICAL DESIGN RECOMMENDATIONS

General

As a general guideline, foundation design and construction must conform to the applicable provisions of the Massachusetts Building Code, 8th Edition (Building Code).

Athletic Field Subgrade

Grading plans for the field renovation were not available at the time this report was prepared; however, we assume that minimal site grading (cutting and filling on the order of 2 ft or less) will be required to prepare the fields for the planned construction.

We anticipate that the construction of the new athletic field will involve the following; stripping off the existing Topsoil, removing/relocating any existing utilities (irrigation system, stormwater collection system, and any other utilities), grading the field to the planned rough grade, proof-rolling the subgrade and constructing the synthetic turf systems. The Sand Fill and Blast Rock Fill are suitable for support of the synthetic turf systems provided the subgrade is prepared using the recommendation provided herein. The **organic Loam Fill** soils encountered in G-1 are considered unsuitable for support of the planned field and will need to excavated and replaced with compacted Granular Fill.

In addition to the above recommendations, a 4-in. layer of **Granular Fill (Subbase)** may be required between the Blast Rock Fill subgrade and the Synthetic Turf System to act as a leveling/cushion layer against possible oversize cobbles and boulders commonly found in Blast Rock Fills which can create an uneven surface.

CONSTRUCTION CONSIDERATIONS

General

In general, all excavation work, dewatering, and other construction activities should conform to the requirements of OSHA and all other applicable regulations. The site soils would typically be classified as Type C based on OSHA 29 CFR 1926.

Excavation

Construction will involve stripping off the Topsoil, Loam Fill and any other unsuitable soils, adding or cutting fill to achieve design grades, and constructing the synthetic field. We anticipate that most of the site grading can be accomplished with conventional earth-moving equipment.

Temporary cut soil slopes should, typically, be stable if constructed no steeper than about 1.5H:1V. Some sloughing and raveling should be anticipated in temporary earth slopes.

Construction Dewatering

Based on the available subsurface data it is anticipated that during the general site work, no significant dewatering measures will be necessary to conduct the construction "in-the-dry." The Contractor should take measures to prevent stormwater from entering into excavated areas, and be prepared to remove ponded surface water by means of localized sumps and pumps. The Contractor should select whichever dewatering procedures may be effective to maintain dry, stable excavation bottoms.

Existing Utilities and Foundations of Former Structures

Unknown and/or undocumented subsurface features, structures, and utilities may be present within the project site. The unknown structures and piping, should be anticipated during excavation work, and will need to be carefully removed to limit disturbance to underlying soil deposits and backfilled with compacted Granular Fill prior to construction of the planned field and track.

Preparation and Protection of Bearing Surfaces

Final excavation should be conducted in a manner that minimizes disturbance to the subgrade soils when excavating for bearing surfaces. All final excavation and footing construction should be conducted in-the-dry. We recommend that the exposed subgrade soils be observed in the field by a geotechnical engineer to confirm the projected soil bearing conditions. It may be necessary to over-excavate and replace weak, disturbed or otherwise unacceptable foundation bearing materials.

Following excavation to bearing grades, exposed soil surfaces should be re-compacted (proofrolled) prior to placing engineered fill, or constructing foundations, with a minimum of four passes with a heavy vibratory roller or other heavy vibratory compaction equipment.

If subgrade protection difficulties are encountered due to surface or groundwater, various methods can be utilized:

- Leave subgrades high until immediately before forming and concreting to minimize the time the subgrade is exposed.
- Over excavate footings by 8 in. using a smooth edged bucket and backfill to the design bearing elevation using compacted Granular Fill.

Each such encounter is probably best resolved individually in the field upon observation of the subgrade conditions.

Compaction

Minimum compaction requirements refer to percentages of the maximum dry density determined in accordance with ASTM D1557. Recommended compaction requirements are as follows:

Location	Minimum Compaction Requirements
Beneath athletic field	95 %
Other Landscaped areas	90 % nominal compaction

Filling and Backfilling

Placement of compacted soil fills should not be conducted when air temperatures are low enough (approximately 30 degrees F, or below) to cause freezing of the moisture in the fill during or before placement. Fill materials should not be placed on snow, ice or uncompacted frozen soil. Compacted fill should not be placed on frozen soil. No fill should be allowed to freeze prior to compaction. At the end of each day's operations, the last lift of fill, after compaction, should be rolled by a smooth-wheeled roller to eliminate ridges of uncompacted soil.

Soil Materials

- ***Granular Fill***

  Granular Fill should consist of clean, sand and gravel, free of organic material, snow ice, or other objectionable materials and should be well-graded within the following limits:

Sieve Size	Percent Passing by Weight
6 inch	100
No. 4	30-90
No. 40	10-50
No. 200	0-12

  Granular Fill should be placed in 9-inch loose lift thickness, unless otherwise specified. Cobbles exceeding 6 inch in size should be screened and removed prior to compaction. Compaction equipment should be selected to meet the requirements of that particular location in earthwork operation, thus the Contractor should provide both vibratory and static rollers, as well as hand-guided vibratory plate compactors. Where vibratory plate compactor is used the loose lift thickness should not exceed 6 inch. A minimum of four systematic passes of the compaction equipment should be implemented to compact each lift.

- ***Free Draining Granular Fill***

  Free Draining Granular Fill should consist of clean sand and gravel meeting the following gradation requirements (note: this recommendation may be superseded by the synthetic turf manufacturer's gradation requirements for free draining subbase material):

Sieve Size	Percent Passing by Weight
1-inch	100
No. 4	60-90
No. 200	0-8

CONSTRUCTION MONITORING

It is recommended that a geotechnical engineer or technician qualified by training and experience be present during construction to:

- Confirm that soils used as fill and backfill are in accordance with the contract requirements.
- Observe and test placement and compaction of Granular Fill and other compacted fills.
- Observe preparation of field and pavement bearing surfaces.

Monitoring by experienced personnel will be important to the efficiency and integrity of the geotechnical aspects of the project construction. It is recommended that GSI be retained to provide the recommended monitoring services during construction. This will enable us to observe compliance with the design concepts, help resolve construction problems and to facilitate design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

PLAN REVIEW

It is recommended that GSI be provided the opportunity to review the final plans in order to confirm that the recommendations made in this report were interpreted and implemented as intended.

CLOSURE

GSI appreciates the opportunity for participating in this early phase of the project, and looks forward to our continuing association during its subsequent phases towards its successful completion. In the mean time, please do not hesitate to contact us, if you have any questions on the content of this report.

Very truly yours,

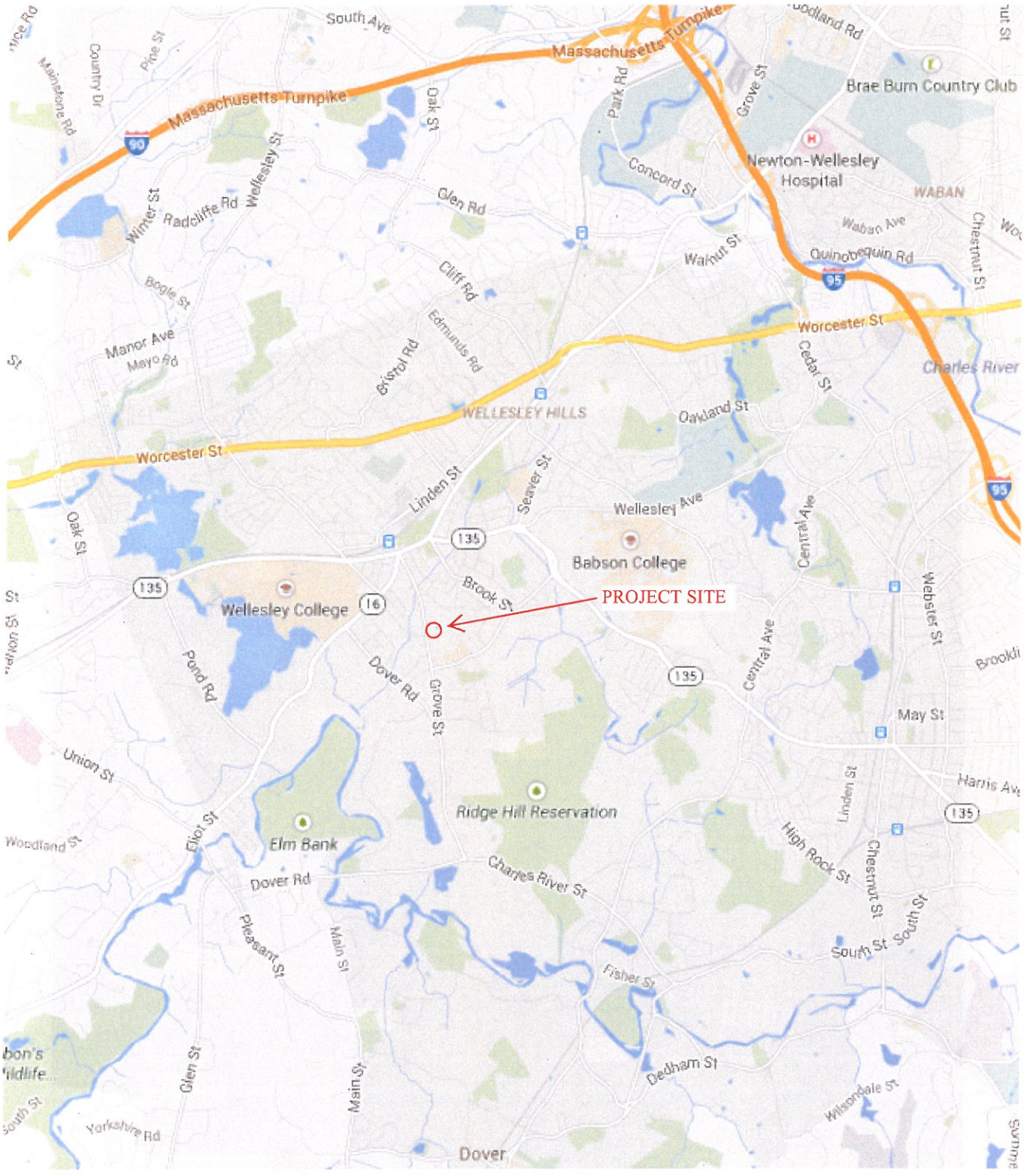
GEOTECHNICAL SERVICES, INC.

Glen V. Zolaez, P.E.
Project Manager

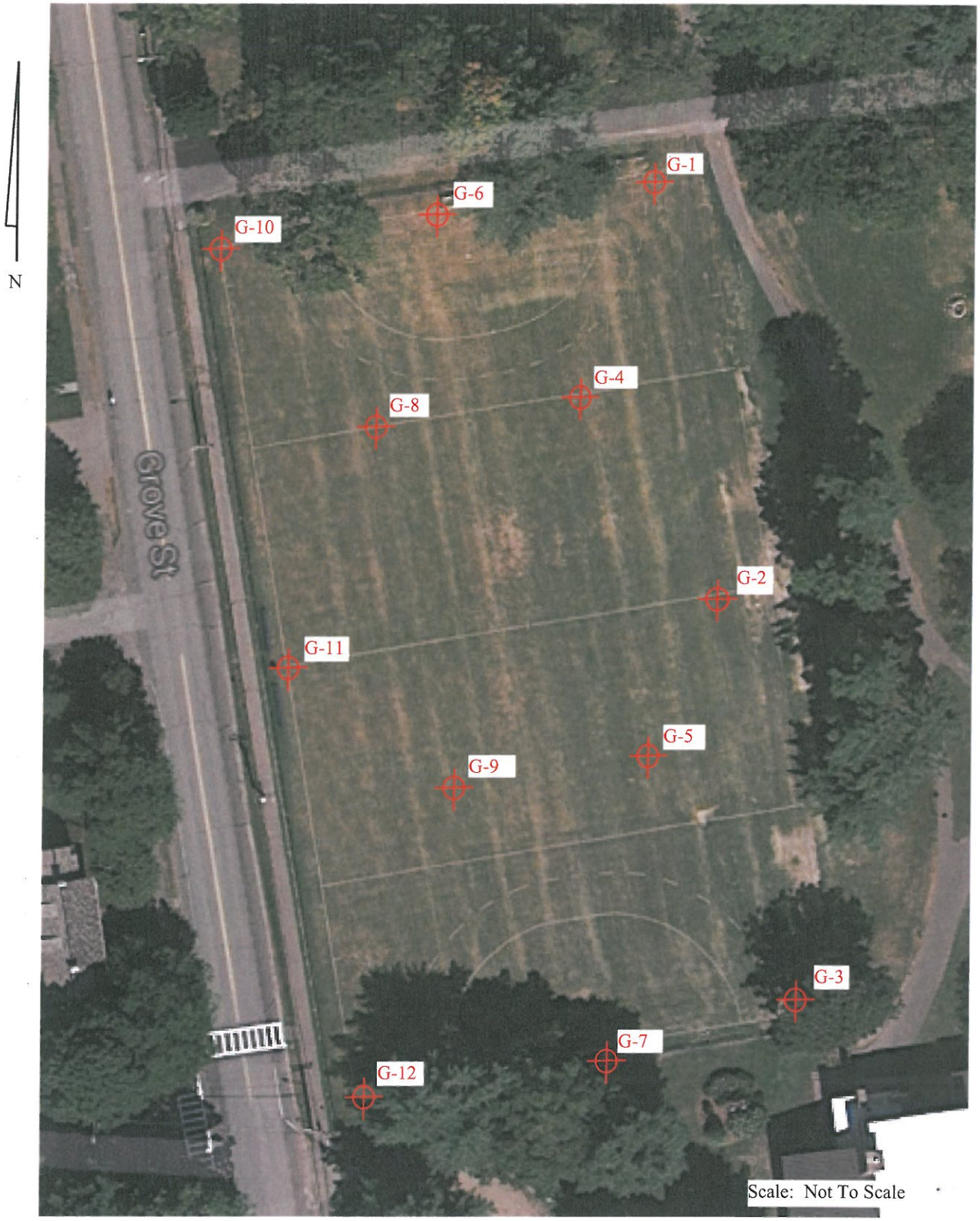
Harry K. Wetherbee, P.E.
Principal Engineer

Figure 1. Project Locus
Figure 2. Exploration Location Plan

Appendix A. Limitations
Appendix B. Geoprobe Logs
Appendix C. Photographs



GSI	FIGURE 1–PROJECT LOCUS
	DANA HALL ATHLETIC FIELD WELLESLEY, MA GSI PROJECT NO. 214230



LEGEND:

G-1 GEOPROBE I.D. AND APPROX. LOCATION

GSI

FIGURE 2–EXPLORATION LOCATION PLAN

DANA HALL ATHLETIC FIELD
WELLESLEY, MA
GSI PROJECT NO. 214230

APPENDIX A

LIMITATIONS

LIMITATIONS

Explorations

1. The analyses, recommendations and designs submitted in this report are based in part upon the data obtained from preliminary subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.

3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

Review

4. It is recommended that this firm be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the recommendations provided herein.

5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of the report modified or verified in writing by Geotechnical Services, Inc.

Construction

6. It is recommended that this firm be retained to provide geotechnical engineering services during the earthwork phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

Use of Report

7. This report has been prepared for the exclusive use of Huntress Associates, Inc. in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

8. This report has been prepared for this project by Geotechnical Services, Inc. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to evaluation considerations only.

APPENDIX B

GEOPROBE LOGS

TEST BORING LOG

Boring No. G-1

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type: ☐ Safety Hammer ☐ Doughnut ☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample No.	Sample Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	42				0.8	Topsoil
									Dark brown, silty fine SAND, little organics (Loam Fill)
								3.6	
5		G2	5-10	45					Brown to Gray, f/m SAND and GRAVEL (Blast Rock Fill)
10									Bottom of Exploration at 10-ft. No groundwater observed upon completion.
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-1

Geotechnical Services, Inc. " 55 North Stark Highway Tel. 603.529.7766 Fax. 603.529.7080 " 30 Newbury Street, Boston, MA 02116 Tel. 617.455.4248 Fax. 617.745.4308

TEST BORING LOG

Boring No. G-2

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type:
☐ Safety Hammer
☐ Doughnut
☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample Data No.	Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	42				1	Topsoil
									Brown to gray, f/m SAND and GRAVEL, little silt (Blast Rock Fill)
5		G2	5-10	45					
									Soils wet at 8-ft, possible groundwater at 8-ft.
10									Bottom of Exploration at 10-ft.
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-2

Geotechnical Services, Inc. " 55 North Stark Highway Tel. 603.529.7766 Fax. 603.529.7080 " 30 Newbury Street, Boston, MA 02116 Tel. 617.455.4248 Fax. 617.745.4308

TEST BORING LOG

Boring No. G-3

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type: ☐ Safety Hammer ☐ Doughnut ☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample Data No.	Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	34				0.5	Topsoiul
								1	Brown, f/c SAND, tr. gravel
								2	Dark brown, silty fine SAND, tr. gravel
									Brown to gray, f/m SAND and GRAVEL, little silt (Blast Rock Fill)
5		G2	5-10	30					
									Soils wet at 9-ft, possible groundwater at 9-ft.
10									Bottom of Exploration at 10-ft.
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-3

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TEST BORING LOG

Boring No. G-4

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type: ☐ Safety Hammer ☐ Doughnut ☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample No.	Sample Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	50				1.3	Topsoil
								1.5	Brown, f/c SAND, little to trace silt
									Brown/gray, GRAVEL and f/m SAND (Blast Rock Fill)
5		G2	5-10	43					
									Soils wet at 9-ft, possible groundwater at 9-ft.
10									Bottom of Exploration at 10-ft.
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-4

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TEST BORING LOG

Boring No. G-5

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type:
☐ Safety Hammer
☐ Doughnut
☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample No.	Sample Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	46				1	Topsoil
									Brown/gray, GRAVEL and f/m SAND (Blast Rock Fill)
5		G2	5-10	36					
									Soils wet at 9-ft, possible groundwater at 9-ft.
10									Bottom of Exploration at 10-ft.
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-5

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TEST BORING LOG

Boring No. G-6

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type: ☐ Safety Hammer ☐ Doughnut ☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample Data No.	Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	34				1	Topsoil
								1.5	Brown, f/m SAND, tr. silt
									Brown, f/m SAND and GRAVEL
5		G2	5-10	42					Brown, f/m SAND and GRAVEL
									Orange/ brown, f/m SAND, little to trace silt
10									Bottom of Exploration at 10-ft.
									No groundwater encountered.
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-6

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TEST BORING LOG

Boring No. G-7

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type: ☐ Safety Hammer ☐ Doughnut ☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample Data: No.	Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	26				1	Topsoil
								1.8	Brown f/m SAND, tr. silt
									Brown, silty, f/m SAND, tr. gravel
5		G2	5-10	32					Soils wet at 6-ft, possible groundwater at 6-ft.
									Note: Probe location near existing stormwater collection system located within the field
10									Bottom of Exploration at 10-ft.
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-7

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TEST BORING LOG

Boring No. G-8

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type:
☐ Safety Hammer
☐ Doughnut
☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample Data: No.	Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	42				1	Topsoil
									Brown/gray, GRAVEL and f/m SAND (Blast Rock Fill)
5		G2	5-10	49					
10									Bottom of Exploration at 10-ft. No groundwater encountered.
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-8

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TEST BORING LOG

Boring No. G-9

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type:
☐ Safety Hammer
☐ Doughnut
☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample No.	Sample Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	40				0.8	Topsoil
									Brown/gray, GRAVEL and f/m SAND (Blast Rock Fill)
5		G2	5-10	46					
10									Bottom of Exploration at 10-ft. No groundwater encountered.
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-9

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TEST BORING LOG

Boring No. G-10

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type:
☐ Safety Hammer
☐ Doughnut
☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample Data No.	Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	32					Topsoil
								1.3	
								2	Brown, fine SAND, little silt
									Gray to Brown, f/m SAND and GRAVEL with occasional pockets/layers of gray blast rock fill
5		G2	5-10	60					
10									Bottom of Exploration at 10-ft.
									No groundwater encountered.
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-10

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TEST BORING LOG

Boring No. G-11

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type:
☐ Safety Hammer
☐ Doughnut
☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample No.	Sample Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	42				0.8	Topsoil
									Gray, GRAVEL, some f/m sand (Blast Rock Fill)
								4	
5		G2	5-10	54					Brown, f/m SAND, little coarse sand, silt
									More gravelly in bottom 1-ft of sample
10									Bottom of Exploration at 10-ft.
									No groundwater encountered.
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-11

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TEST BORING LOG

Boring No. G-12

Page 1 of 1

Project	Dana Hall Athletic Field	Project No.	214230	Elevation	N/A
Location	Wellesley, MA	Inspector	G. Zoladz	Datum	See Plan
Client	Huntress Associates	Project Manager	G. Zoladz	Start	12/8/2014
Contractor	NEBC	Checked By		Finish	12/8/2014
Driller	T. Sabo	Drill Rig	Geoprobe	Model	B53

Item:	Auger	Casing	Sampler	Core Barrel
Type	-	-	-	-
Inside Diameter (in.)	-	-	-	-
Hammer Weight (lb)	-	-	-	
Hammer Fall (in.)	-	-	-	

☐ Truck ☐ Skid
☑ Track ☐ ATV
☐ Bomb. ☐ Geophone
☐ Tripod ☐ Other

Hammer Type:
☐ Safety Hammer
☐ Doughnut
☐ Automatic

☐ Winch ☐ Cat Head ☐ Roller Bit ☐ Cutting Head

Depth (ft)	Casing (Blows/ft)	Sample Data: No.	Depth (ft)	Rec. (in.)	SPT (Blows/ 6-in.)	Rock RQD (%)	PID Rdg. (ppm)	Stratum Change (ft)	Soil-Rock Visual Classification and Description (Soils - Burmister System) (Rock - U.S. Corps of Engineers System)
0		G1	0-5	42				0.5	Topsoil
									Brown, f/m SAND, little to no silt
5		G2	5-10	54					
									Note: Sample moist at 9-ft.
10									Bottom of Exploration at 10-ft.
									Possible groundwater at 9-ft
15									
20									
25									

Water Level Data

Date	Time	Depth (ft) to: Bott. of Casing	Bott. of Hole	Water

Sample Identification
O = Open Ended
U = Undisturbed
S = Split Spoon
C = Rock Core
G = Geoprobe

Cohesive Soils N-Value
0 to 2: Very Soft
2 to 4: Soft
4 to 8: Medium Stiff
8 to 15: Stiff
15 to 30 Very Stiff
Over 30: Hard

Granular Soils N- Value
0 to 4: Very Loose
4 to 10: Loose
11 to 30: Medium Dense
31 to 50: Dense
Over 50: Very Dense

Trace (0 to 5%), Little (10 to 20%), Some (20 to 35%), And (35 to 50%)

Notes:

G-12

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APPENDIX C

PHOTOGRAPHS

Photo 1 G-1 Sample No. 1 (0 to 5-ft)

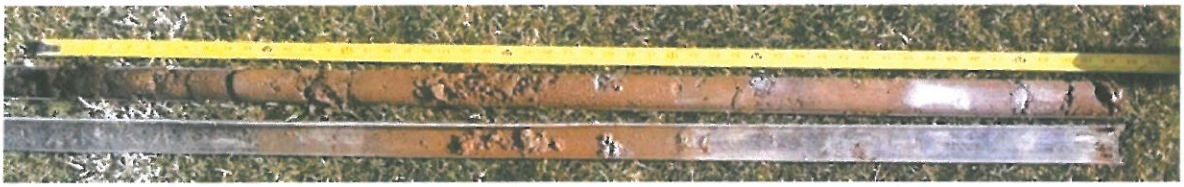


Photo 2 G-1 Sample No. 2 (5 to 10-ft)

Photo 3 G-2 Sample No. 1 (0 to 5-ft)

Photo 4 G-2 Sample No. 2 (5 to 10-ft)

Photo 5 G-3 Sample No. 1 (0 to 5-ft)

Photo 6 G-3 Sample No. 2 (5 to 10-ft)

Photo 7 G-4 Sample No. 1 (0 to 5-ft)

Photo 8 G-4 Sample No. 2 (5 to 10-ft)

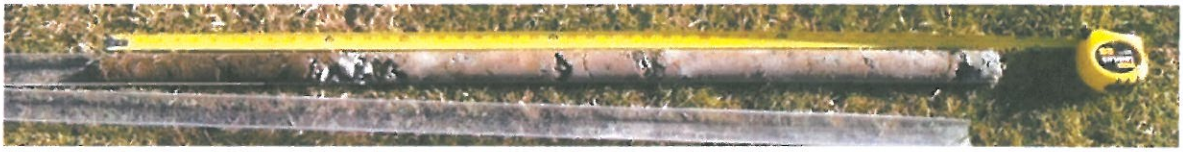


Photo 9 G-5 Sample No. 1 (0 to 5-ft)

Photo 10 G-5 Sample No. 2 (5 to 10-ft)

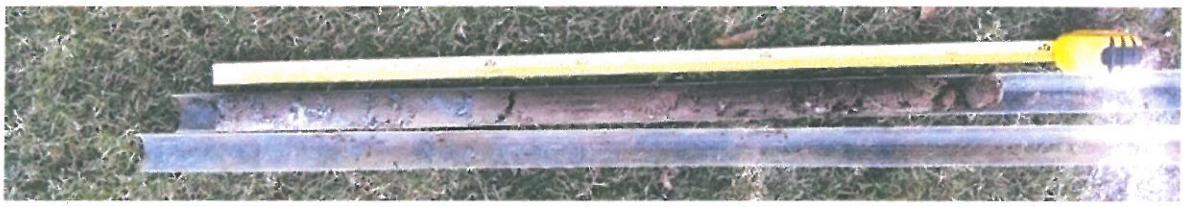


Photo 11 G-6 Sample No. 1 (0 to 5-ft)

Photo 12 G-6 Sample No. 2 (5 to 10-ft)

Photo 13 G-7 Sample No. 1 (0 to 5-ft)

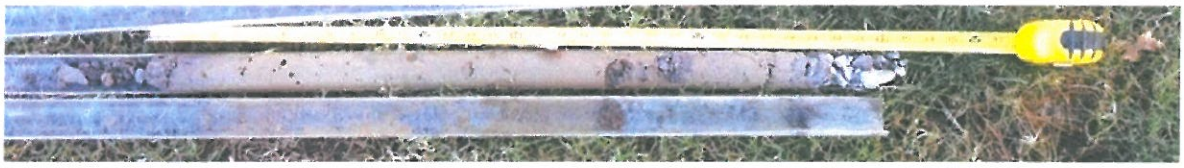


Photo 14 G-7 Sample No. 2 (5 to 10-ft)

Photo 15 G-8 Sample No. 1 (0 to 5-ft)

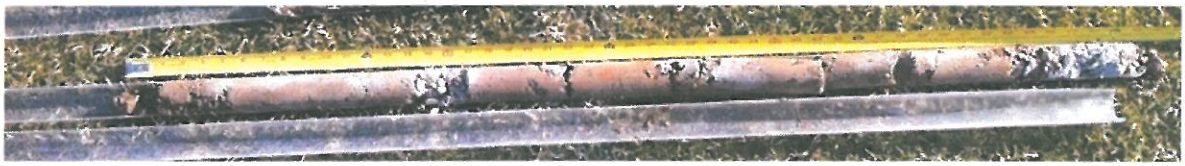


Photo 16 G-8 Sample No. 2 (5 to 10-ft)

Photo 17 G-9 Sample No. 1 (0 to 5-ft)

Photo 18 G-9 Sample No. 2 (5 to 10-ft)

Photo 19 G-10 Sample No. 1 (0 to 5-ft)

Photo 20 G-10 Sample No. 2 (5 to 10-ft)

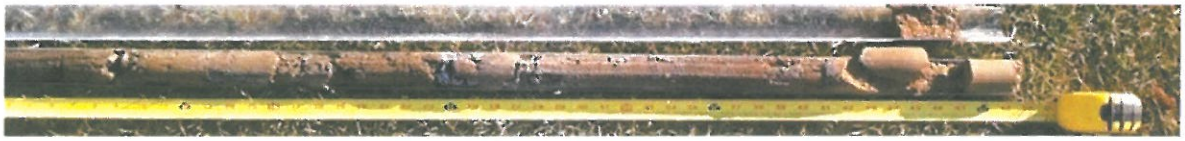


Photo 21 G-11 Sample No. 1 (0 to 5-ft)

Photo 22 G-11 Sample No. 2 (5 to 10-ft)

Photo 23 G-12 Sample No. 1 (0 to 5-ft)

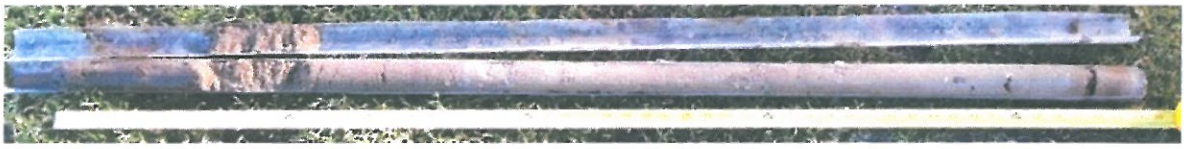


Photo 24 G-12 Sample No. 2 (5 to 10-ft)

Appendix C SOILS INFORMATION

C.1 NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL RESOURCE REPORT

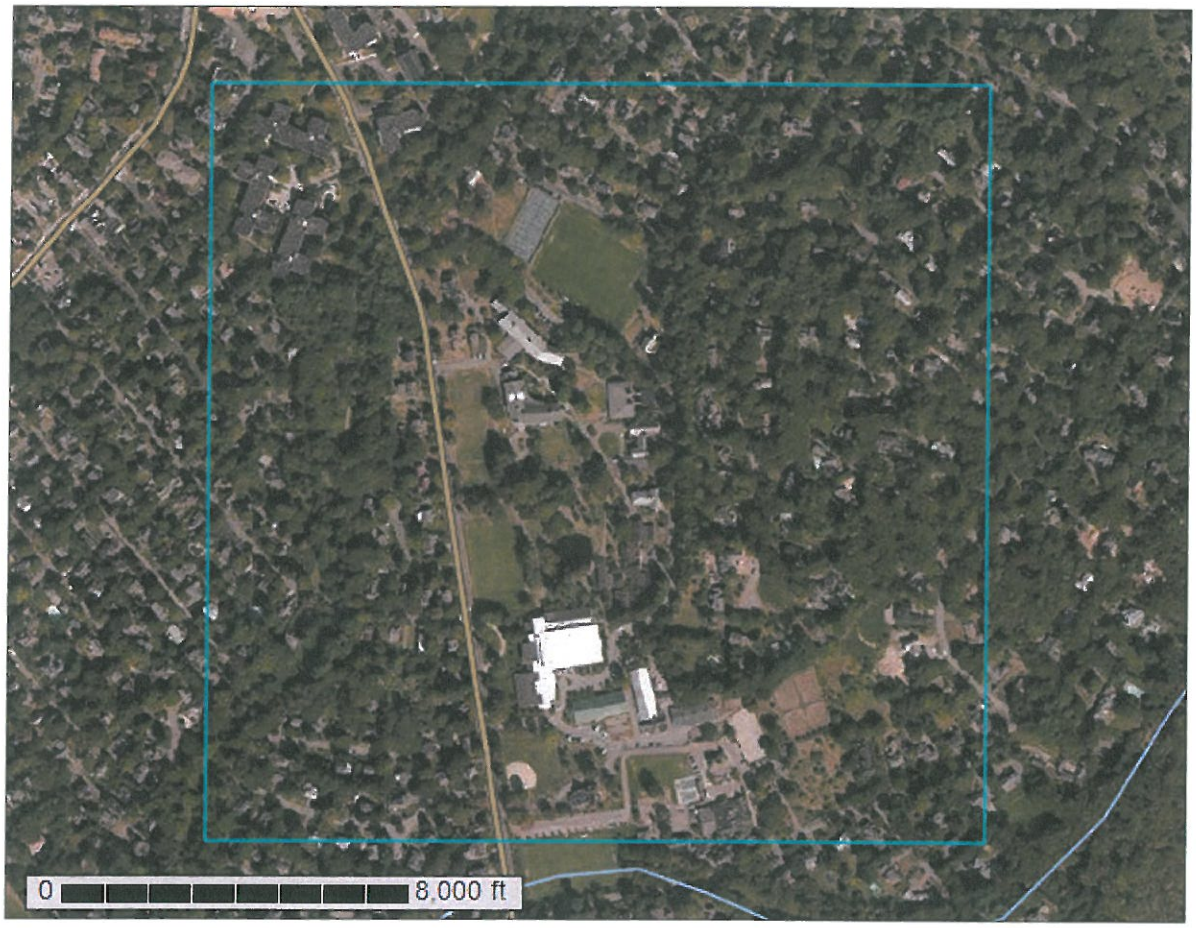
United States Department of Agriculture

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 18, 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

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

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 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
51	Swansea muck, 0 to 1 percent slopes	3.2	2.0%
254A	Merrimac fine sandy loam, 0 to 3 percent slopes	10.5	6.7%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	24.1	15.4%
260B	Sudbury fine sandy loam, 2 to 8 percent slopes	0.1	0.1%
420B	Canton fine sandy loam, 3 to 8 percent slopes	12.1	7.7%
420C	Canton fine sandy loam, 8 to 15 percent slopes	25.8	16.5%
420D	Canton fine sandy loam, 15 to 35 percent slopes	24.7	15.7%
422D	Canton fine sandy loam, 15 to 35 percent slopes, extremely stony	0.9	0.6%
602	Urban land, 0 to 15 percent slopes	9.0	5.7%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	33.9	21.6%
655	Udorthents, wet substratum	12.7	8.1%
Totals for Area of Interest		**157.0**	**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

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

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

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix D SUPPORTING DRAINAGE CALCULATIONS

D.1 REQUIRED RECHARGE VOLUME

D.2 DRAWDOWN CALCULATIONS

D.3 WATER QUALITY VOLUME

Stantec Planning and Landscape Architecture P.C.
226 Causeway Street
Boston, MA 02114
Tel: (617) 523-8103
Fax: (617) 523-4333

D.1 Recharge Volume Calculations

Project:	Dana Hall	Project #:	210801597
Location:	Wellesley, MA		
Calculated by:	CL	Date:	1/7/2019
Checked by:	GR	Revised:	
Title:	D.1 Recharge Volume Calculations		

D.1 Recharge Volume Calculations

Objective: To size a groundwater recharge system that will approximate the annual recharge of pre-development conditions

Methodology: MA Department of Environmental Protection (DEP) Stormwater Management (Volume Three). Utilize the Static Method for the sizing of the infiltration BMPs.

Design Criteria:

Recharge Requirements

Hydrologic Soil Group	Volume to Recharge	
A	0.60	inches times Total Imp. Area
B	0.35	inches times Total Imp. Area
C	0.25	inches times Total Imp. Area
D	0.10	inches times Total Imp. Area

In accordance with the above Recharge Requirements table, 0.25 inches times the total impervious area of the proposed site is to be recharged to the groundwater table.

Recharge Volume Required:

Recharge Volume

Total Impervious Area (sf) =	17,088
Required Volume to be Recharged (cf) =	854

Capture Area Adjustment

MODIFIED INFILTRATION/DETENTION BASIN "P3"

Contributing Impervious Area (PR4) =	7,843	sf
Impervious Area Draining to Infiltration BMP =	7,843	sf
Impervious Area Draining to Non-Infiltration BMP =	9,245	
Required Volume Adjustment Factor =	2.18	
Adjusted Required Volume to be Recharged =	1,862	cf

Recharge Volume Provided:

Static Method

MODIFIED INFILTRATION/DETENTION BASIN "P3"

Required Recharge Volume =	1,861.53	cf
System Bottom Surface Area =	7,920.00	sf
System Outlet Elevation =	137.00	ft
System Storage Capacity =	4,407.00	cf

Therefore, the modified infiltration/detention basin "P3" meets the minimum requirements of Static Method.

Cumulative Storage = 4,407 > 1,862

Therefore, the Project complies with the Standard 3 requirement for groundwater recharge.

Note:
1. System storage capacity obtained from HydroCAD model. Refer to Storage Table within Appendix G for system storage capacity.

Stantec Planning and Landscape Architecture P.C.
226 Causeway Street
Boston, MA 02114
Tel: (617) 523-8103
Fax: (617) 523-4333

D.2 Drawdown Calculations

Project:	Dana Hall	Project #:	210801597
Location:	Wellesley, MA		
Calculated by:	CL	Date:	1/7/2019
Checked by:	GR	Revised:	10/24/2018
Title:	D.2 Drawdown Calculations		

D.2 Drawdown Calculations

Objective: To ensure that all infiltration BMPs drawdown within 72 hours of a rain event.

Methodology: MA Department of Environmental Protection (DEP) Stormwater Management (Volume Three)

Design Criteria: A design saturated hydraulic conductivity of 0.27 in/hr is to be used for drawdown calculations. The saturated hydraulic conductivity value was taken from the Rawls Rate for a Hydrologic Soil Group "C" type soil.

$$\text{Drawdown Time} = \frac{Rv}{(K \times \text{Bottom Area})}$$

Where: Rv = Required Recharge Volume
K = Permeability Rate

Drawdown Time:

72-Hour Drawdown Summary

Infiltration BMP	Rv (cf)	K (in/hr)	Bottom Area (sf)	Drawdown Time (hr)
MODIFIED INFILTRATION/DETENTION BASIN "P3"	1,862	2.40	7,920	1.18

The infiltration BMP drawns down within 72 hours. Therefore, the Project complies with 72-hour drawdown requirement for Standard 3.

Stantec Planning and Landscape Architecture P.C.
226 Causeway Street
Boston, MA 02114
Tel: (617) 523-8103
Fax: (617) 523-4333

D.3 Water Quality Volume Calculations

Project:	Dana Hall	Project #:	210801597
Location:	Wellesley, MA		
Calculated by:	CL	Date:	1/7/2019
Checked by:	GR	Revised:	
Title:	D.3 Water Quality Volume Calculations		

D.3 Water Quality Volume Calculations

Objective: To provide water quality volume (WQV) that meets the requirements for total suspended solids removal of the "Massachusetts Stormwater Handbook"

Methodology: MA Department of Environmental Protection (DEP) Stormwater Management (Volume Three)

Design Criteria: Required Water Quality Volume (cf) = 0.5 inch x Contributing Impervious Area (sf)

Water Quality Volume Required:

	SITE	
Contributing Impervious Area =		7,843 sf
Required WQV = (0.5 inch x Contributing Impervious Area) ÷ 12 =		327 cf

Water Quality Volume Provided:

	SITE
Required WQV =	326.79 cf
System Outlet Elevation =	137.00 ft
System Storage Capacity =	4,407.00 cf

System Storage Capacity	>	WQV

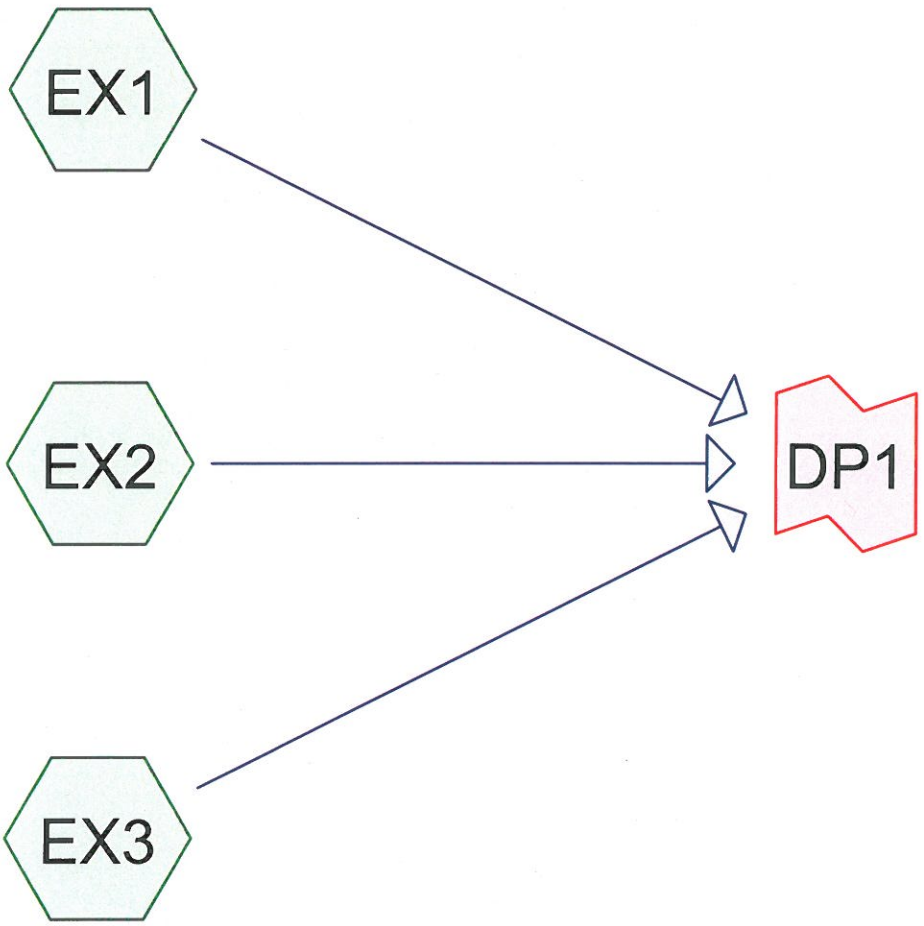
Cumulative Storage = 4,407 > 327

Therefore, the Project complies with the Water Quality Volume requirement for Standard 4.

Note:
1. System storage capacities obtained from HydroCAD model. Refer to Storage Tables within Appendix G for system storage capacities.

Appendix E EXISTING HYDROLOGIC CONDITIONS

E.1 EXISTING HYDROLOGIC CONDITIONS



Subcat Reach Pond Link

Routing Diagram for Existing Conditions
Prepared by {enter your company name here}, Printed 1/4/2019

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
13,227	49	50-75% Grass cover, Fair, HSG A (EX1, EX2)
243,353	39	>75% Grass cover, Good, HSG A (EX1, EX2, EX3)
21,290	98	Paved parking, HSG A (EX1, EX3)
7,885	98	Unconnected pavement, HSG A (EX2)

Summary for Subcatchment EX1:

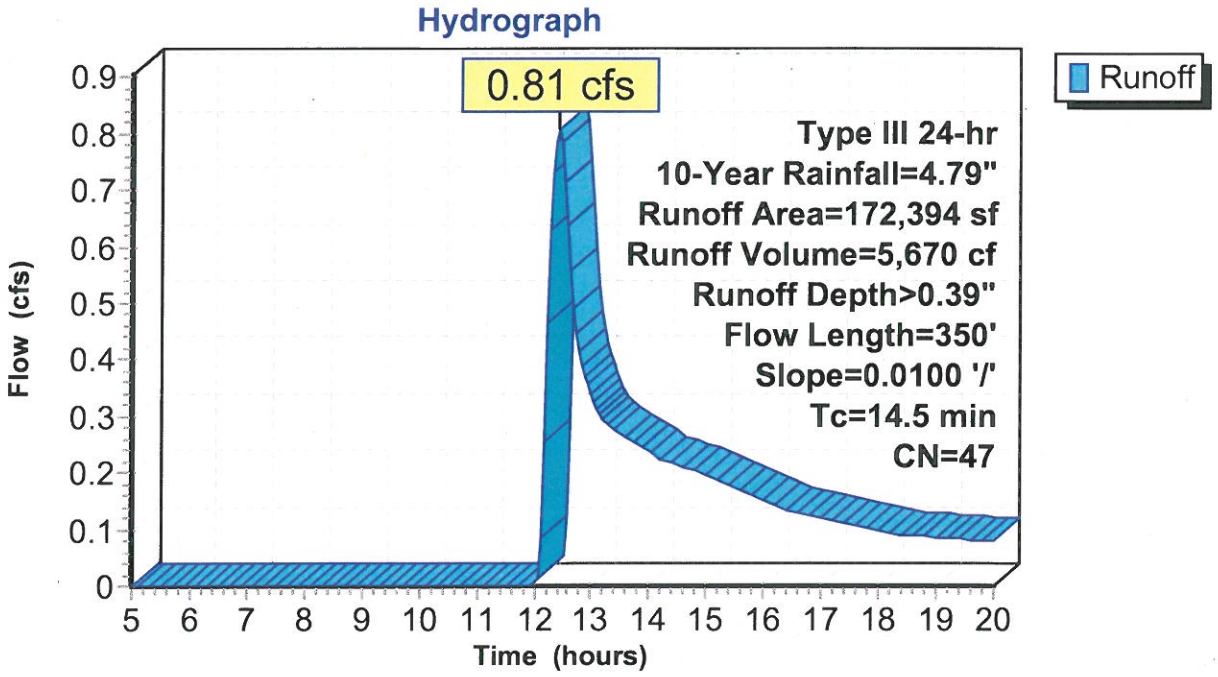
Runoff = 0.81 cfs @ 12.42 hrs, Volume= 5,670 cf, Depth> 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.79"

Area (sf)	CN	Description
20,742	98	Paved parking, HSG A
143,425	39	>75% Grass cover, Good, HSG A
8,227	49	50-75% Grass cover, Fair, HSG A
172,394	47	Weighted Average
151,652		87.97% Pervious Area
20,742		12.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
7.1	300	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.5	350	Total			

Subcatchment EX1:



Summary for Subcatchment EX2:

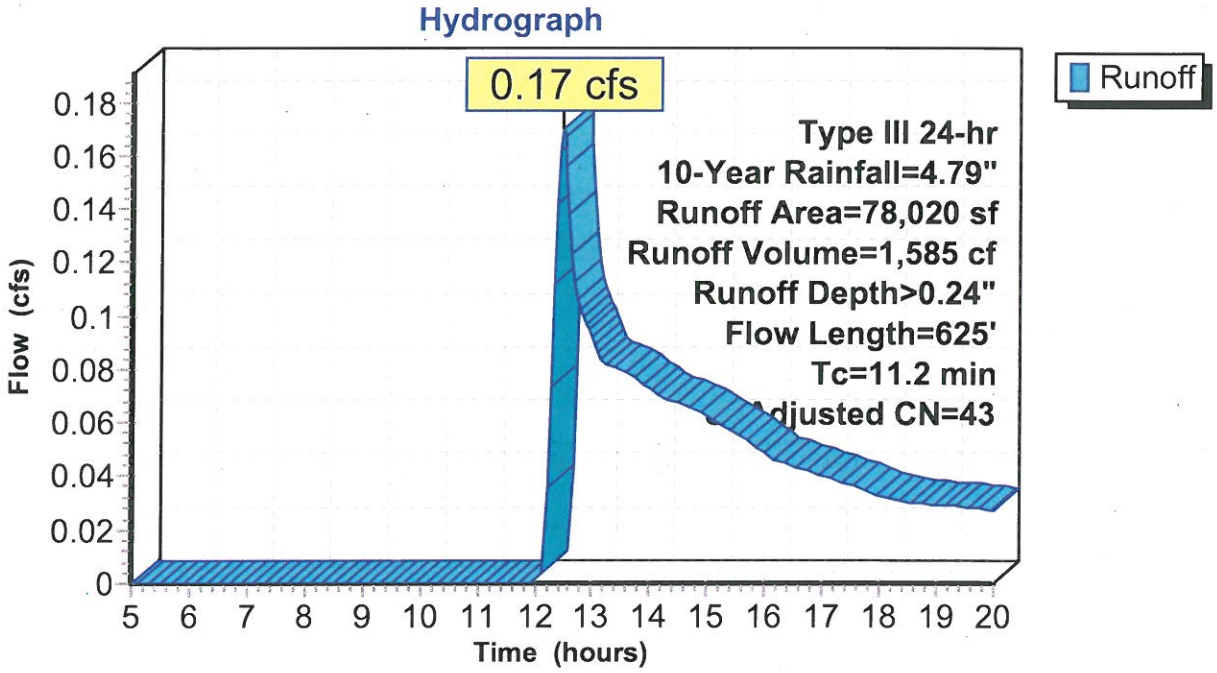
Runoff = 0.17 cfs @ 12.46 hrs, Volume= 1,585 cf, Depth> 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.79"

Area (sf)	CN	Adj	Description
65,135	39		>75% Grass cover, Good, HSG A
7,885	98		Unconnected pavement, HSG A
5,000	49		50-75% Grass cover, Fair, HSG A
78,020	46	43	Weighted Average, UI Adjusted
70,135			89.89% Pervious Area
7,885			10.11% Impervious Area
7,885			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
1.7	103	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0200	2.87		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
2.4	100	0.0100	0.70		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
1.4	360	0.0100	4.35	2.37	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.012 Corrugated PP, smooth interior
11.2	625	Total			

Subcatchment EX2:



Summary for Subcatchment EX3:

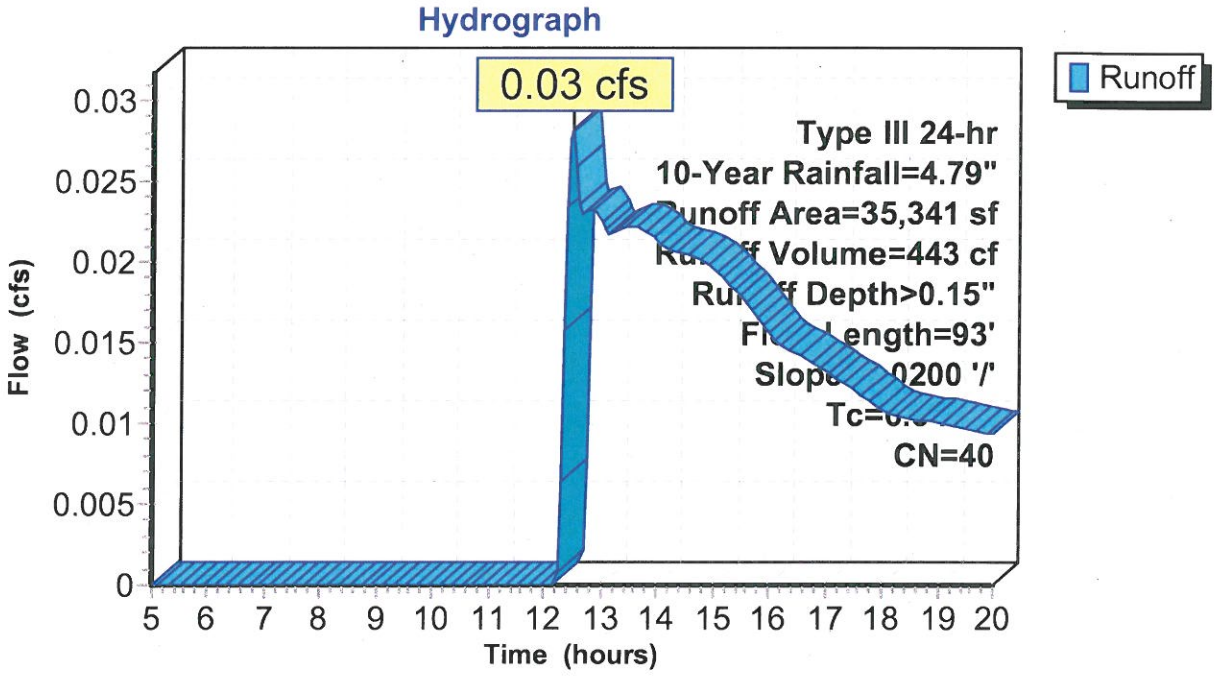
Runoff = 0.03 cfs @ 12.48 hrs, Volume= 443 cf, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.79"

Area (sf)	CN	Description
548	98	Paved parking, HSG A
34,793	39	>75% Grass cover, Good, HSG A
35,341	40	Weighted Average
34,793		98.45% Pervious Area
548		1.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
0.7	43	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.3	93	Total			

Subcatchment EX3:

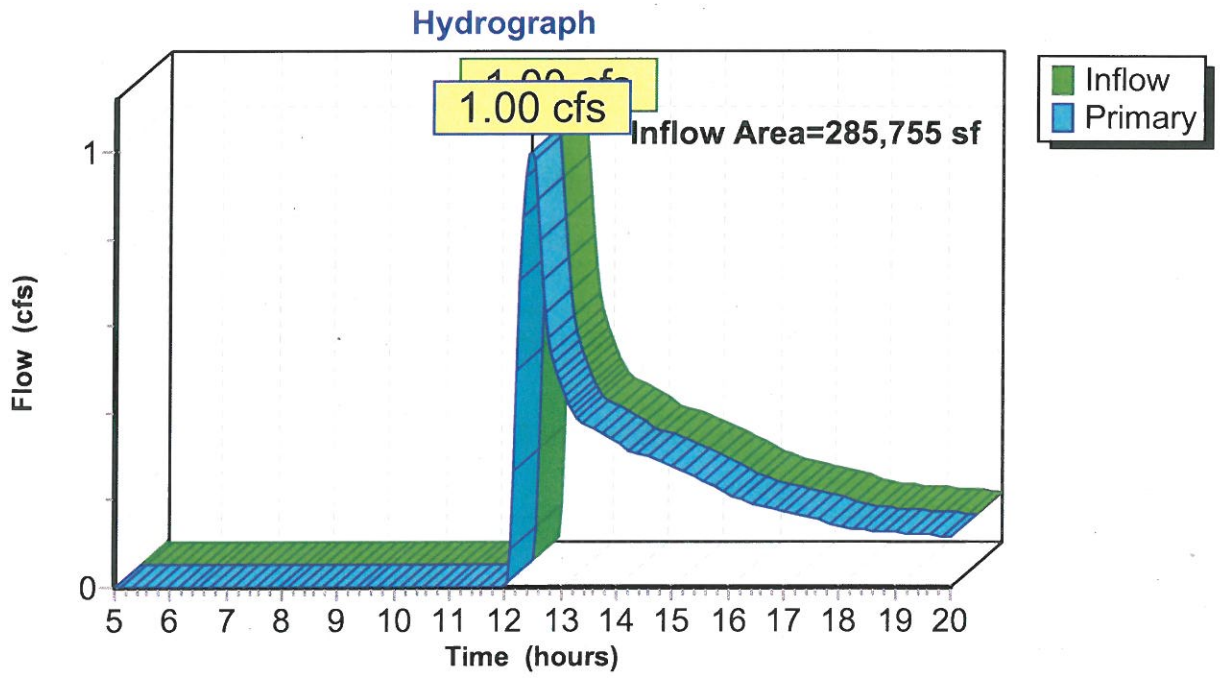


Summary for Link DP1:

Inflow Area = 285,755 sf, 10.21% Impervious, Inflow Depth > 0.32" for 10-Year event
Inflow = 1.00 cfs @ 12.43 hrs, Volume= 7,698 cf
Primary = 1.00 cfs @ 12.43 hrs, Volume= 7,698 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP1:



Summary for Subcatchment EX1:

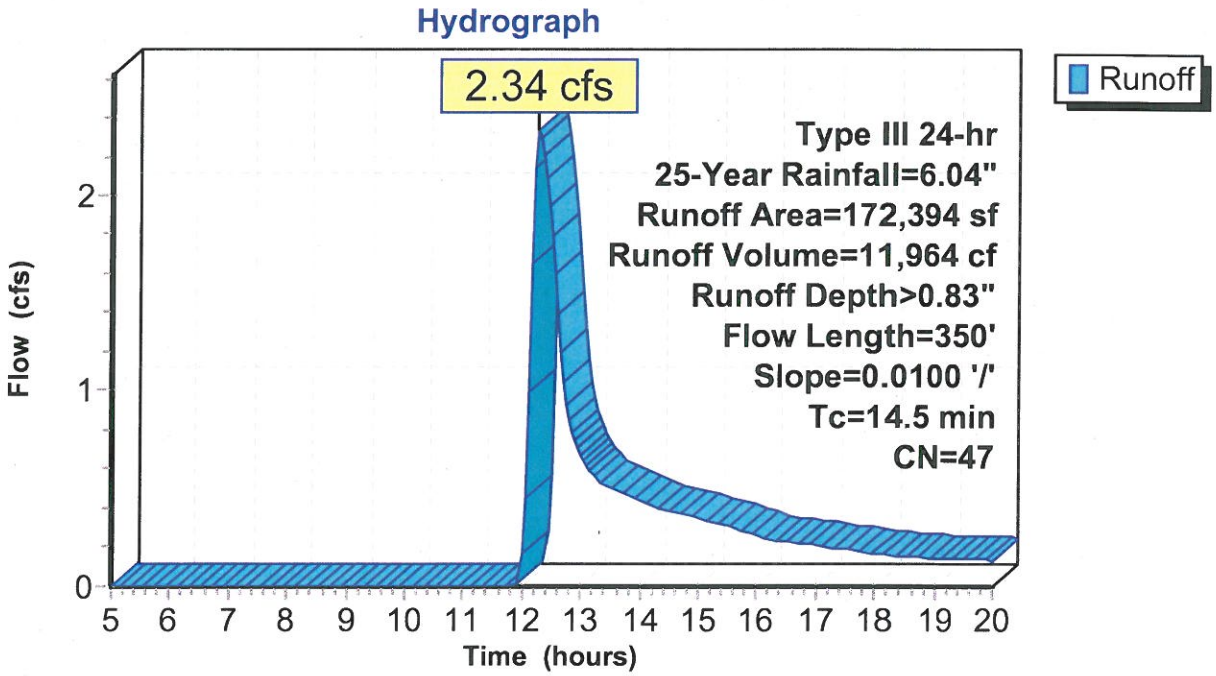
Runoff = 2.34 cfs @ 12.27 hrs, Volume= 11,964 cf, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.04"

Area (sf)	CN	Description
20,742	98	Paved parking, HSG A
143,425	39	>75% Grass cover, Good, HSG A
8,227	49	50-75% Grass cover, Fair, HSG A
172,394	47	Weighted Average
151,652		87.97% Pervious Area
20,742		12.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
7.1	300	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.5	350	Total			

Subcatchment EX1:



Summary for Subcatchment EX2:

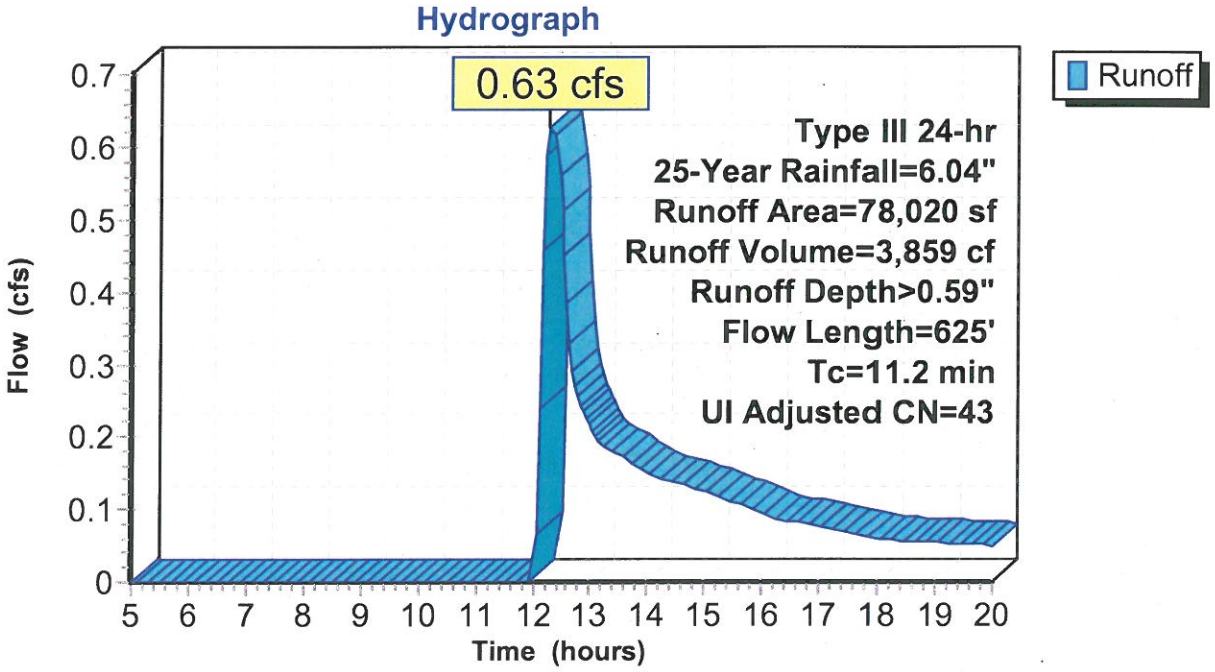
Runoff = 0.63 cfs @ 12.29 hrs, Volume= 3,859 cf, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.04"

Area (sf)	CN	Adj	Description
65,135	39		>75% Grass cover, Good, HSG A
7,885	98		Unconnected pavement, HSG A
5,000	49		50-75% Grass cover, Fair, HSG A
78,020	46	43	Weighted Average, UI Adjusted
70,135			89.89% Pervious Area
7,885			10.11% Impervious Area
7,885			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
1.7	103	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0200	2.87		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
2.4	100	0.0100	0.70		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
1.4	360	0.0100	4.35	2.37	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.012 Corrugated PP, smooth interior
11.2	625	Total			

Subcatchment EX2:



Summary for Subcatchment EX3:

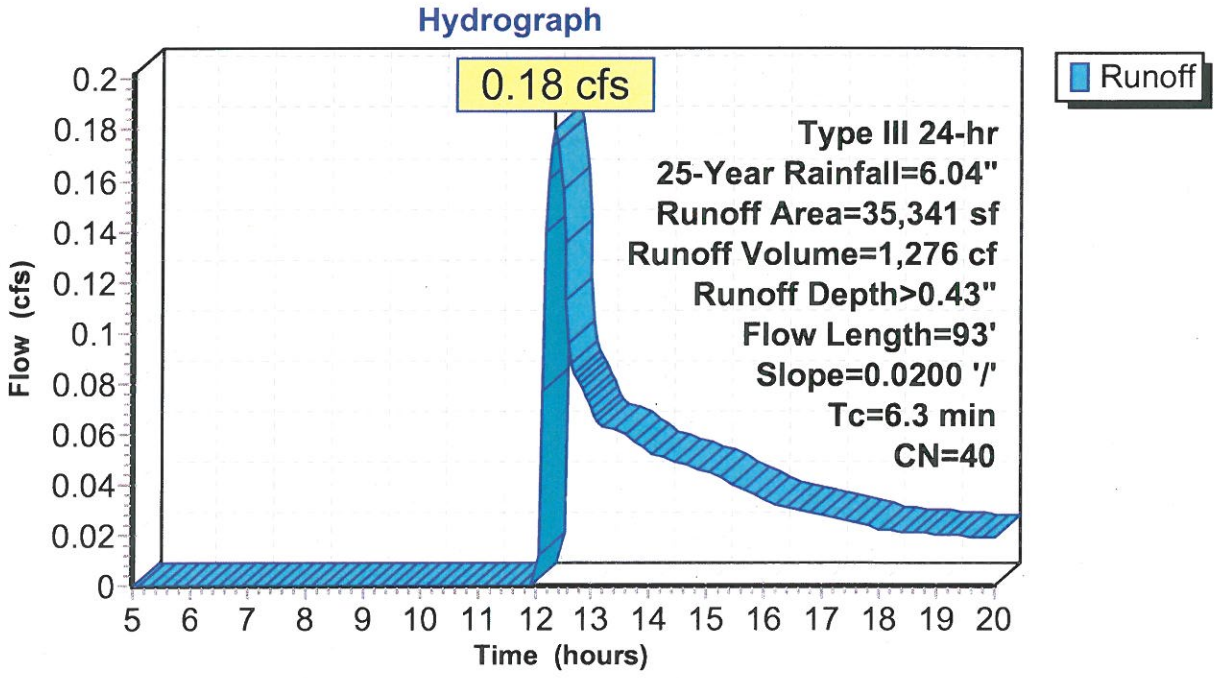
Runoff = 0.18 cfs @ 12.32 hrs, Volume= 1,276 cf, Depth> 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.04"

Area (sf)	CN	Description
548	98	Paved parking, HSG A
34,793	39	>75% Grass cover, Good, HSG A
35,341	40	Weighted Average
34,793		98.45% Pervious Area
548		1.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
0.7	43	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.3	93	Total			

Subcatchment EX3:

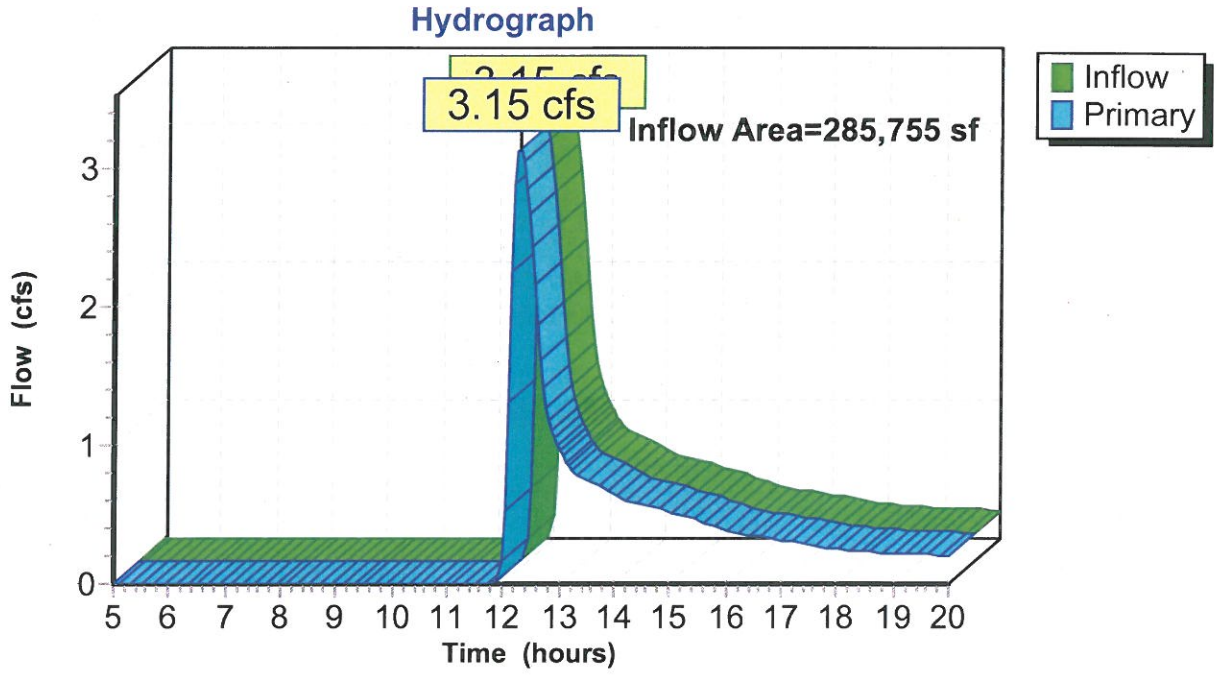


Summary for Link DP1:

Inflow Area = 285,755 sf, 10.21% Impervious, Inflow Depth > 0.72" for 25-Year event
Inflow = 3.15 cfs @ 12.27 hrs, Volume= 17,099 cf
Primary = 3.15 cfs @ 12.27 hrs, Volume= 17,099 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP1:



Summary for Subcatchment EX1:

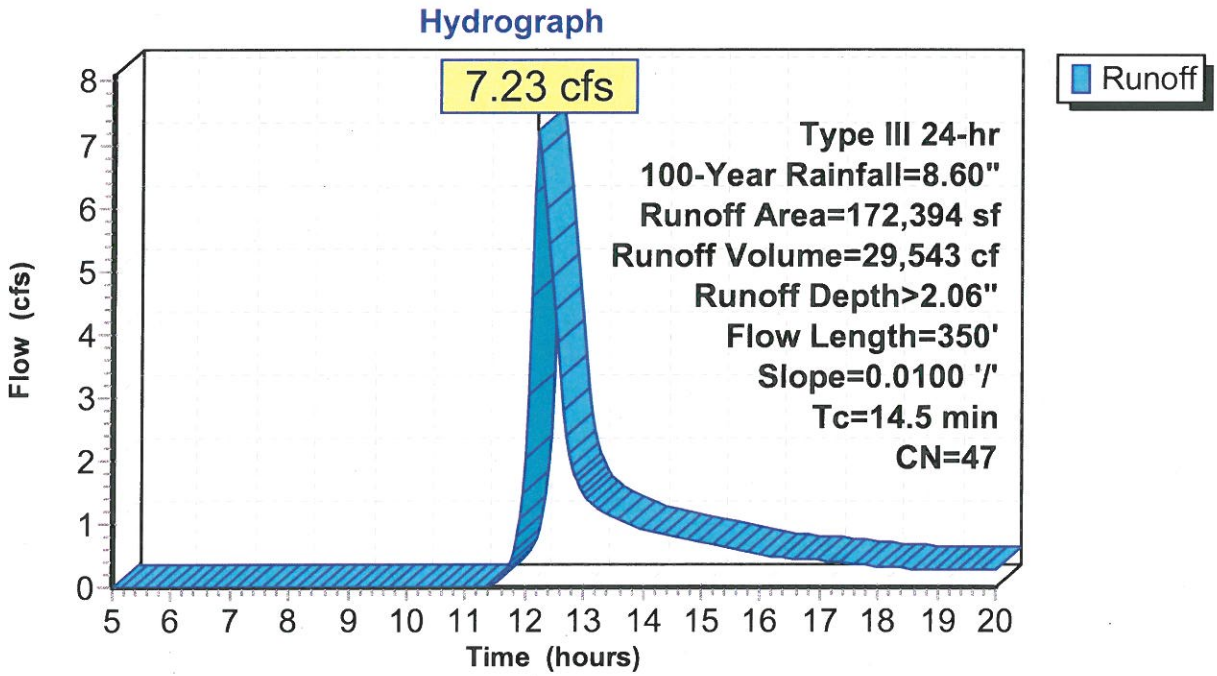
Runoff = 7.23 cfs @ 12.22 hrs, Volume= 29,543 cf, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.60"

Area (sf)	CN	Description
20,742	98	Paved parking, HSG A
143,425	39	>75% Grass cover, Good, HSG A
8,227	49	50-75% Grass cover, Fair, HSG A
172,394	47	Weighted Average
151,652		87.97% Pervious Area
20,742		12.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
7.1	300	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.5	350	Total			

Subcatchment EX1:



Summary for Subcatchment EX2:

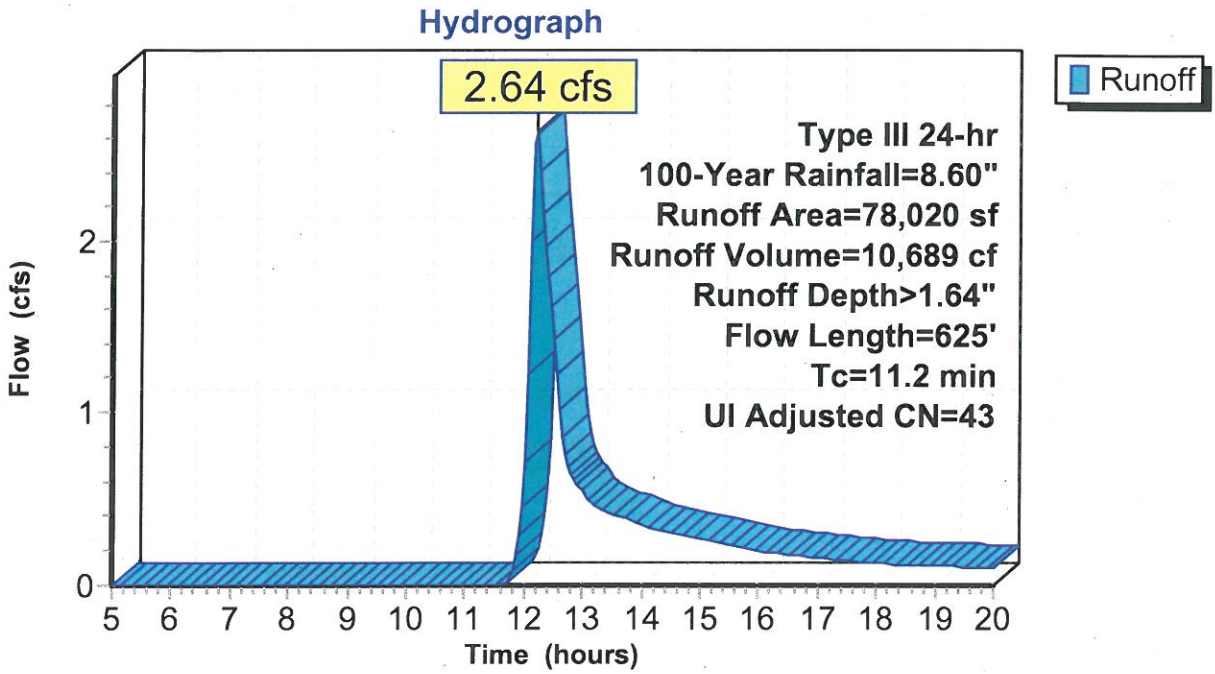
Runoff = 2.64 cfs @ 12.19 hrs, Volume= 10,689 cf, Depth> 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.60"

Area (sf)	CN	Adj	Description
65,135	39		>75% Grass cover, Good, HSG A
7,885	98		Unconnected pavement, HSG A
5,000	49		50-75% Grass cover, Fair, HSG A
78,020	46	43	Weighted Average, UI Adjusted
70,135			89.89% Pervious Area
7,885			10.11% Impervious Area
7,885			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
1.7	103	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0200	2.87		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
2.4	100	0.0100	0.70		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
1.4	360	0.0100	4.35	2.37	**Pipe Channel,** 10.0" Round Area= 0.5 sf Perim= 2.6' r= 0.21' n= 0.012 Corrugated PP, smooth interior
11.2	625	Total			

Subcatchment EX2:



Summary for Subcatchment EX3:

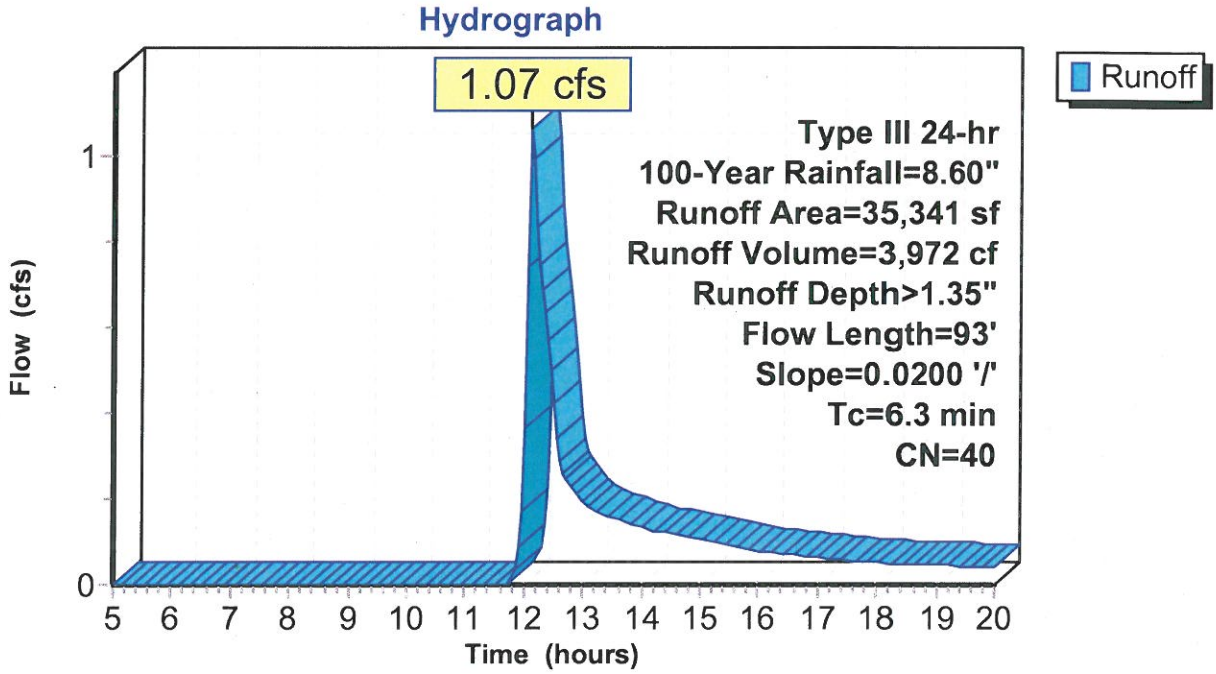
Runoff = 1.07 cfs @ 12.12 hrs, Volume= 3,972 cf, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.60"

Area (sf)	CN	Description
548	98	Paved parking, HSG A
34,793	39	>75% Grass cover, Good, HSG A
35,341	40	Weighted Average
34,793		98.45% Pervious Area
548		1.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.19"
0.7	43	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.3	93	Total			

Subcatchment EX3:

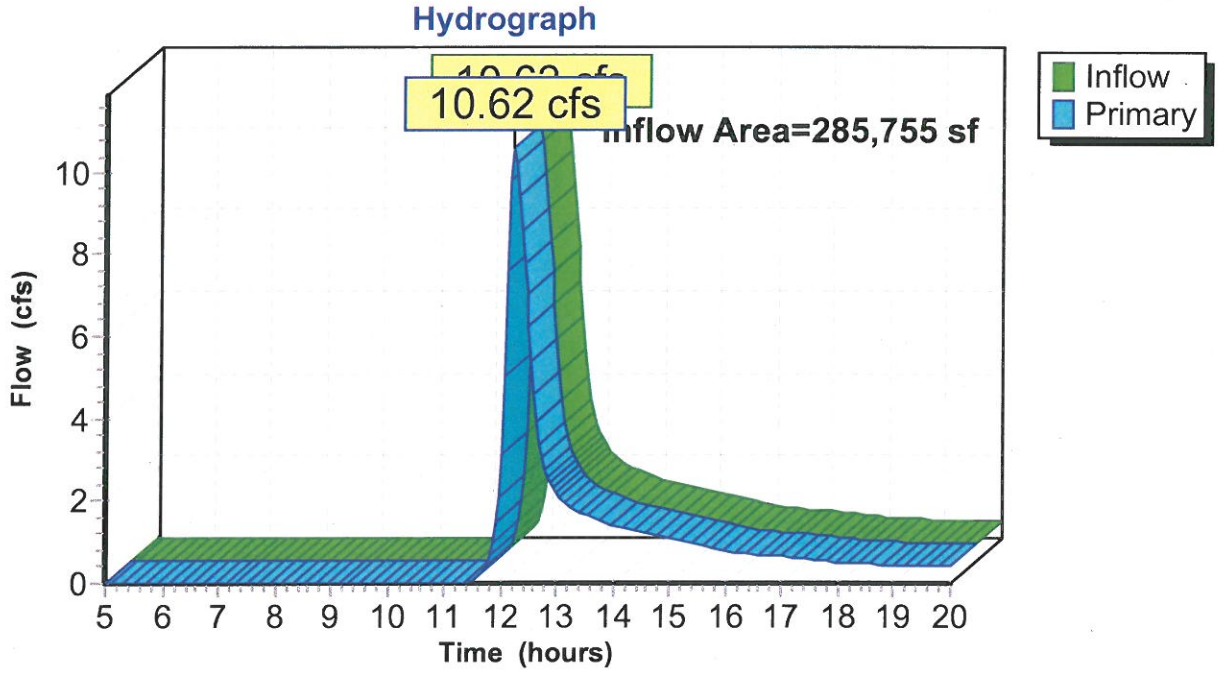


Summary for Link DP1:

Inflow Area = 285,755 sf, 10.21% Impervious, Inflow Depth > 1.86" for 100-Year event
Inflow = 10.62 cfs @ 12.21 hrs, Volume= 44,204 cf
Primary = 10.62 cfs @ 12.21 hrs, Volume= 44,204 cf, Atten= 0%, Lag= 0.0 min

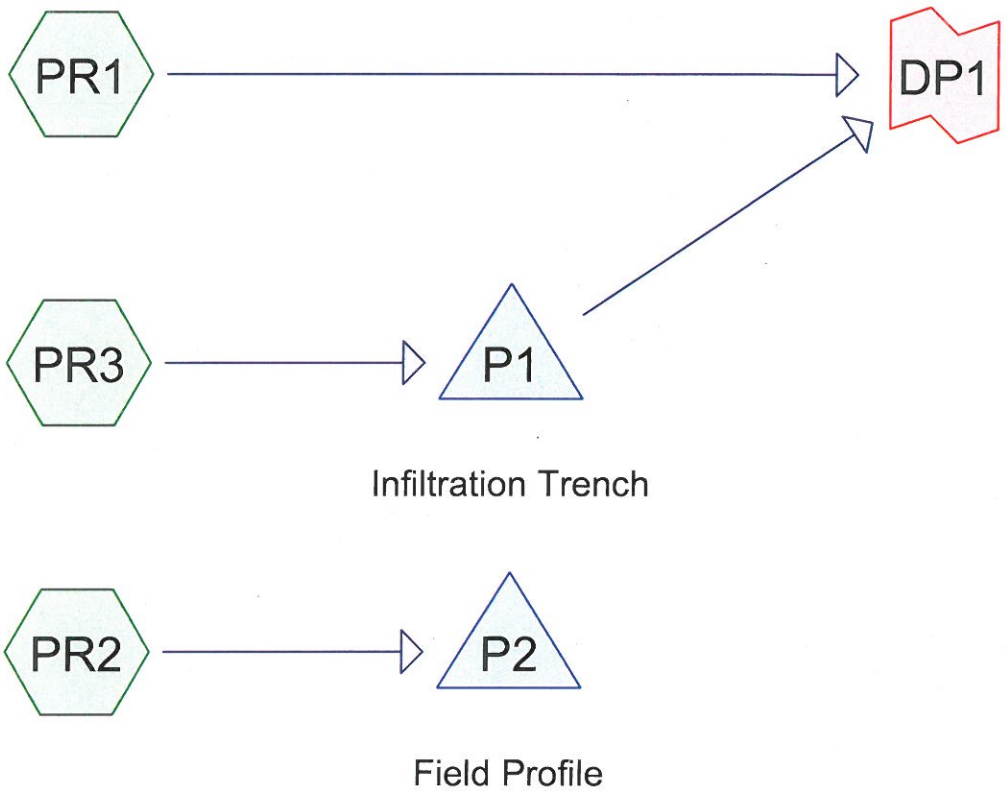
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP1:



Appendix F PROPOSED HYDROLOGIC CONDITIONS

F.1 PROPOSED HYDROLOGIC CONDITIONS



Subcat Reach Pond Link

Routing Diagram for Proposed Conditions
Prepared by {enter your company name here}, Printed 1/7/2019
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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
173,042	39	>75% Grass cover, Good, HSG A (PR1, PR2, PR3)
79,782	98	Field (PR2)
31,031	98	Paved parking, HSG A (PR1, PR3)
1,900	98	Unconnected pavement, HSG A (PR2)

Summary for Subcatchment PR1:

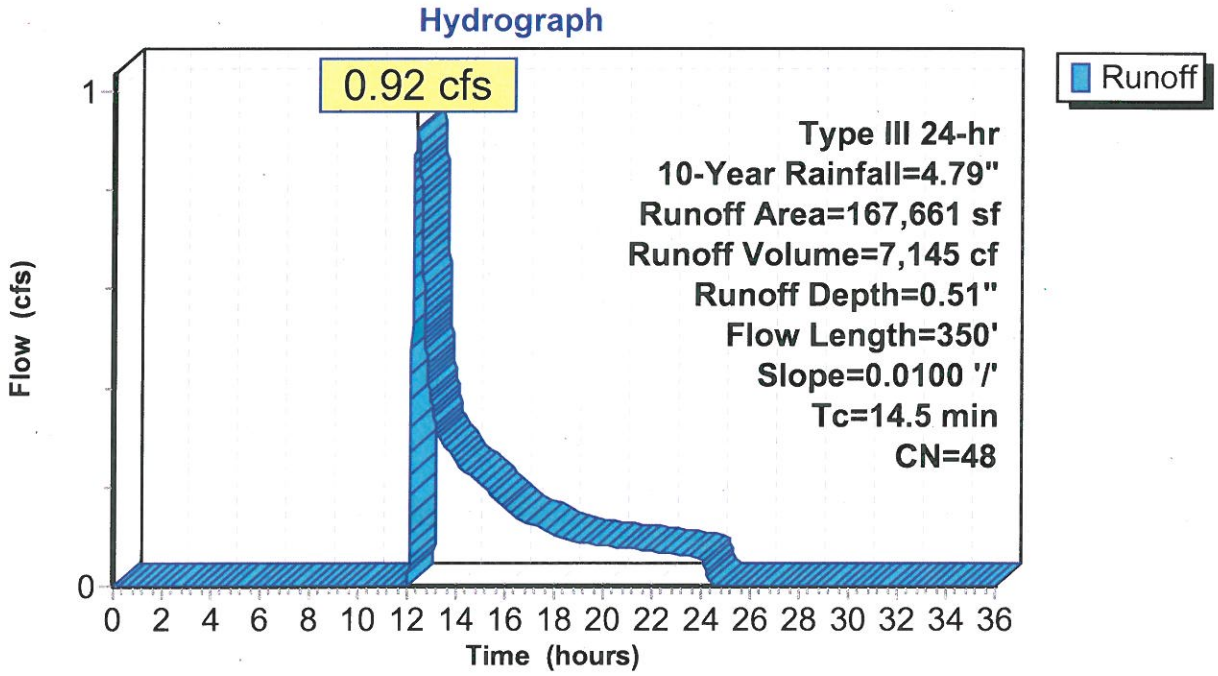
Runoff = 0.92 cfs @ 12.39 hrs, Volume= 7,145 cf, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.79"

Area (sf)	CN	Description
142,573	39	>75% Grass cover, Good, HSG A
25,088	98	Paved parking, HSG A
167,661	48	Weighted Average
142,573		85.04% Pervious Area
25,088		14.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.19"
7.1	300	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.5	350	Total			

Subcatchment PR1:



Summary for Subcatchment PR2:

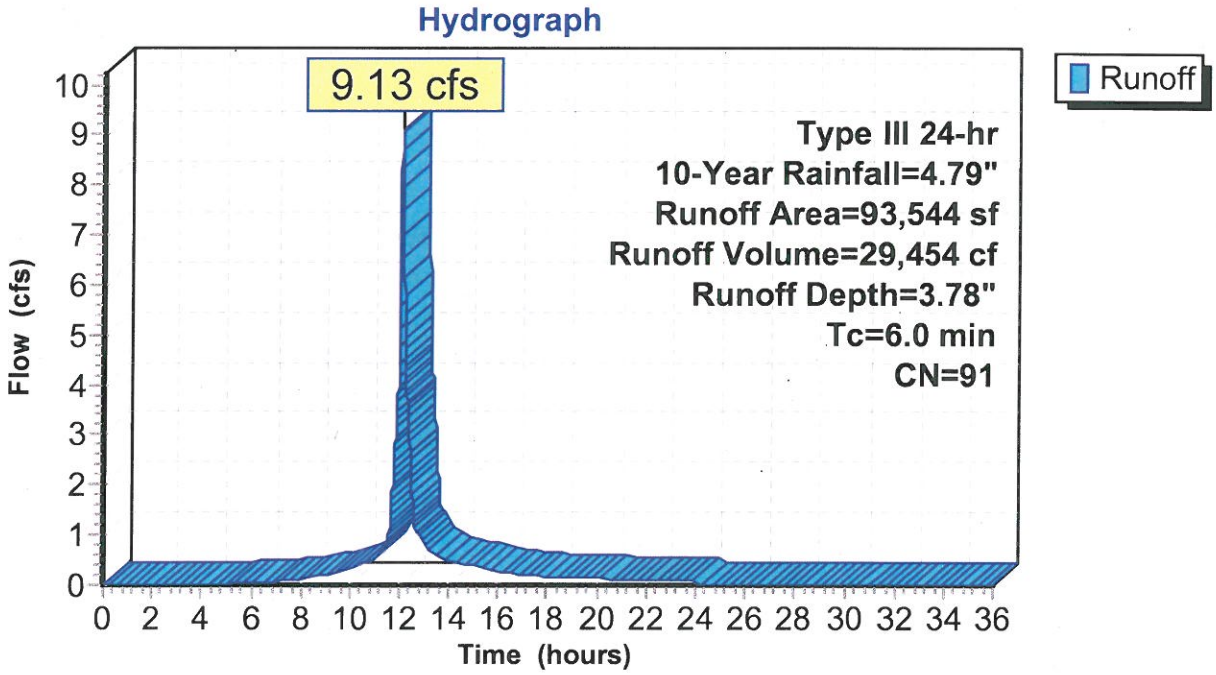
Runoff = 9.13 cfs @ 12.08 hrs, Volume= 29,454 cf, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.79"

	Area (sf)	CN	Description
	11,862	39	>75% Grass cover, Good, HSG A
	1,900	98	Unconnected pavement, HSG A
*	79,782	98	Field
	93,544	91	Weighted Average
	11,862		12.68% Pervious Area
	81,682		87.32% Impervious Area
	1,900		2.33% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PR2:



Summary for Subcatchment PR3:

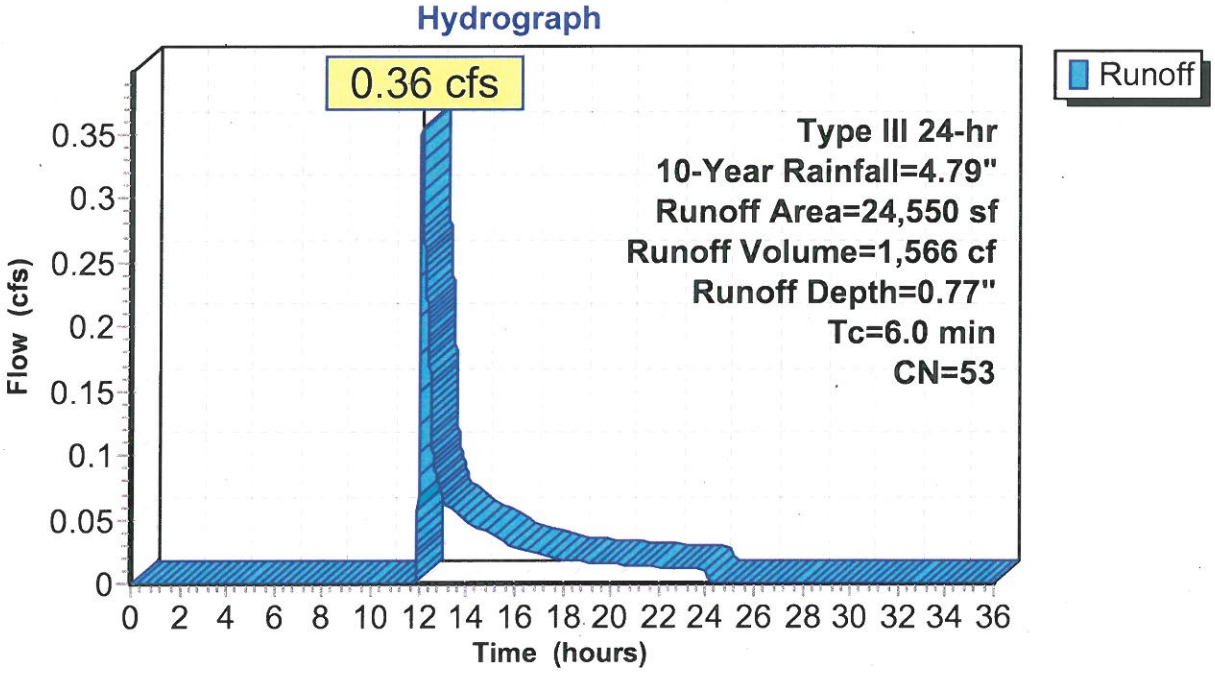
Runoff = 0.36 cfs @ 12.11 hrs, Volume= 1,566 cf, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.79"

Area (sf)	CN	Description
5,943	98	Paved parking, HSG A
18,607	39	>75% Grass cover, Good, HSG A
24,550	53	Weighted Average
18,607		75.79% Pervious Area
5,943		24.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PR3:



Summary for Pond P1: Infiltration Trench

Inflow Area = 24,550 sf, 24.21% Impervious, Inflow Depth = 0.77" for 10-Year event
Inflow = 0.36 cfs @ 12.11 hrs, Volume= 1,566 cf
Outflow = 0.14 cfs @ 12.05 hrs, Volume= 1,566 cf, Atten= 60%, Lag= 0.0 min
Discarded = 0.14 cfs @ 12.05 hrs, Volume= 1,566 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 136.75' @ 12.51 hrs Surf.Area= 2,580 sf Storage= 193 cf

Plug-Flow detention time= 7.1 min calculated for 1,566 cf (100% of inflow)
Center-of-Mass det. time= 7.1 min (912.6 - 905.5)

Volume	Invert	Avail.Storage	Storage Description
#1	136.50'	1,732 cf	**3.00'W x 860.00'L x 2.50'H Prismatoid** 6,450 cf Overall - 675 cf Embedded = 5,775 cf x 30.0% Voids
#2	137.00'	675 cf	**12.0" Round Pipe Storage** Inside #1 L= 860.0'
		2,408 cf	Total Available Storage

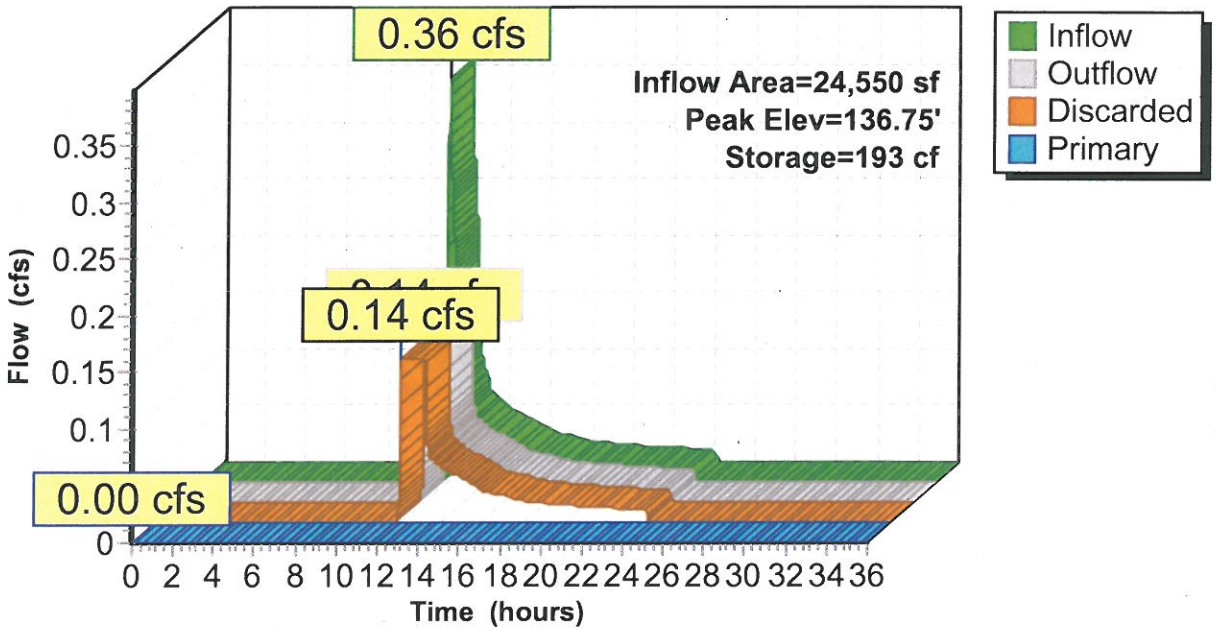
Device	Routing	Invert	Outlet Devices
#1	Discarded	136.50'	**2.400 in/hr Exfiltration over Surface area**
#2	Primary	137.00'	**5.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Discarded OutFlow Max=0.14 cfs @ 12.05 hrs HW=136.53' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=136.50' (Free Discharge)
↑—**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond P1: Infiltration Trench

Hydrograph



Summary for Pond P2: Field Profile

Inflow Area = 93,544 sf, 87.32% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 9.13 cfs @ 12.08 hrs, Volume= 29,454 cf
Outflow = 4.40 cfs @ 11.98 hrs, Volume= 29,454 cf, Atten= 52%, Lag= 0.0 min
Discarded = 4.40 cfs @ 11.98 hrs, Volume= 29,454 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 138.61' @ 12.24 hrs Surf.Area= 79,200 sf Storage= 2,497 cf

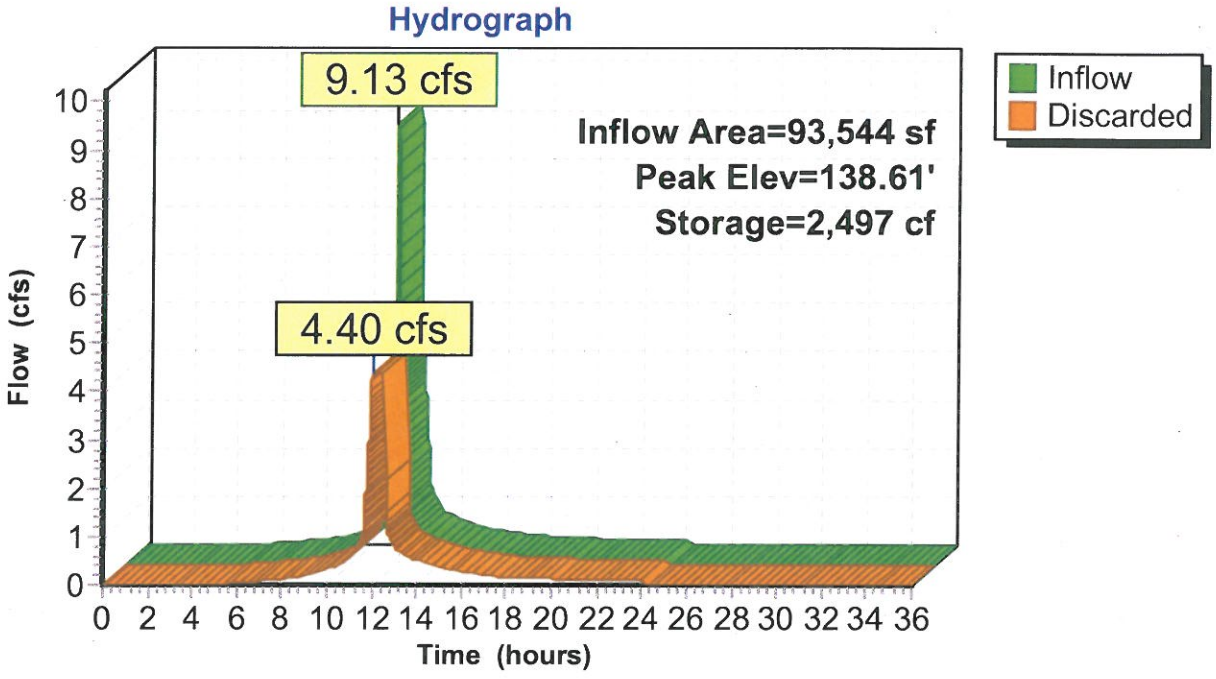
Plug-Flow detention time= 2.4 min calculated for 29,446 cf (100% of inflow).
Center-of-Mass det. time= 2.4 min (790.7 - 788.3)

Volume	Invert	Avail.Storage	Storage Description
#1	138.50'	15,919 cf	**220.00'W x 360.00'L x 0.67'H Prismatoid** 53,064 cf Overall x 30.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.50'	**2.400 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=4.40 cfs @ 11.98 hrs HW=138.51' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 4.40 cfs)

Pond P2: Field Profile

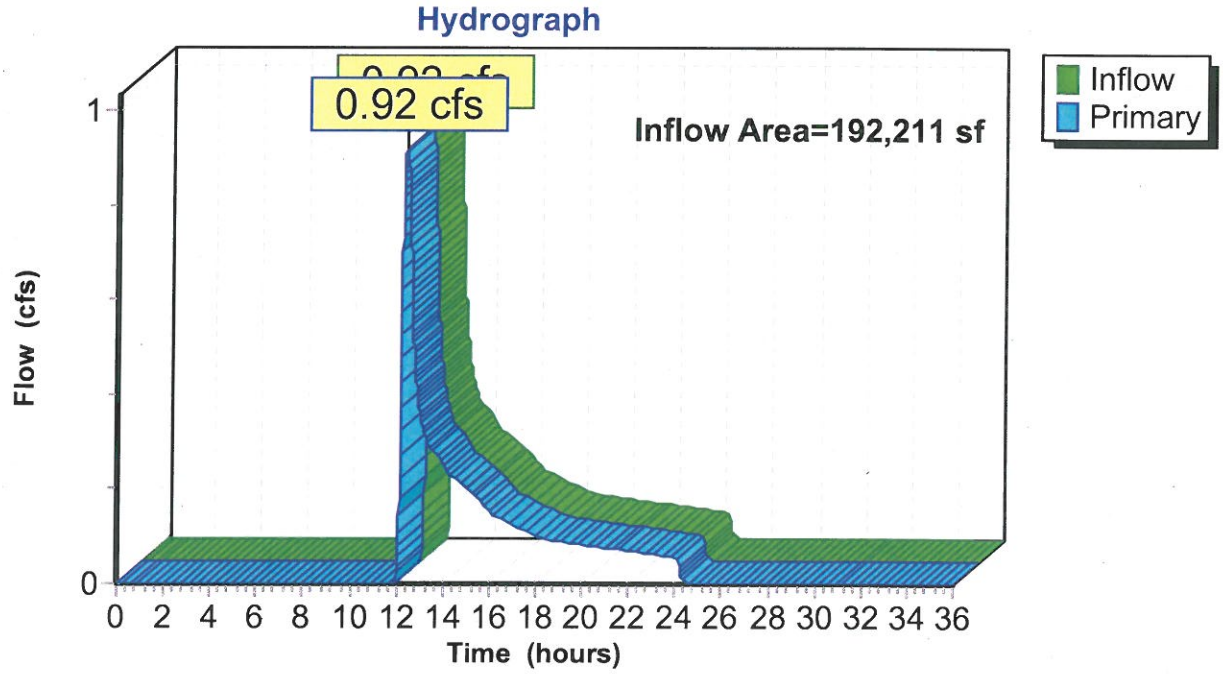


Summary for Link DP1:

Inflow Area = 192,211 sf, 16.14% Impervious, Inflow Depth = 0.45" for 10-Year event
Inflow = 0.92 cfs @ 12.39 hrs, Volume= 7,145 cf
Primary = 0.92 cfs @ 12.39 hrs, Volume= 7,145 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link DP1:



Summary for Subcatchment PR1:

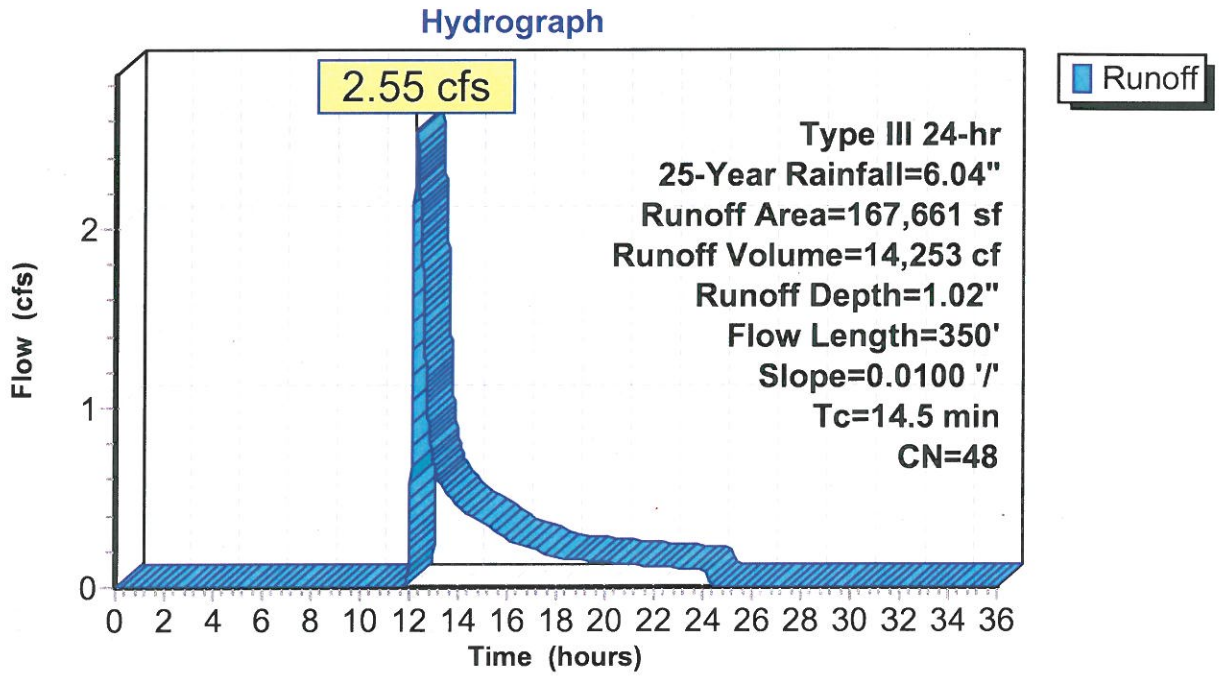
Runoff = 2.55 cfs @ 12.26 hrs, Volume= 14,253 cf, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.04"

Area (sf)	CN	Description
142,573	39	>75% Grass cover, Good, HSG A
25,088	98	Paved parking, HSG A
167,661	48	Weighted Average
142,573		85.04% Pervious Area
25,088		14.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.19"
7.1	300	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.5	350	Total			

Subcatchment PR1:



Summary for Subcatchment PR2:

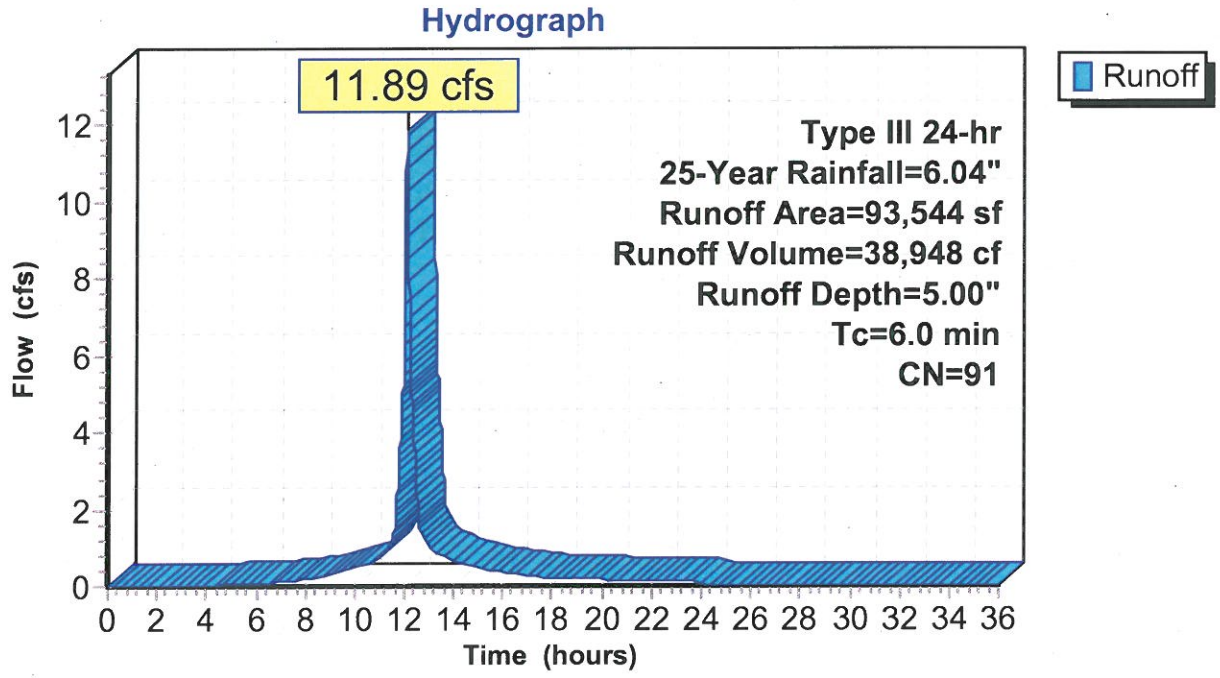
Runoff = 11.89 cfs @ 12.08 hrs, Volume= 38,948 cf, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.04"

	Area (sf)	CN	Description
	11,862	39	>75% Grass cover, Good, HSG A
	1,900	98	Unconnected pavement, HSG A
*	79,782	98	Field
	93,544	91	Weighted Average
	11,862		12.68% Pervious Area
	81,682		87.32% Impervious Area
	1,900		2.33% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PR2:



Summary for Subcatchment PR3:

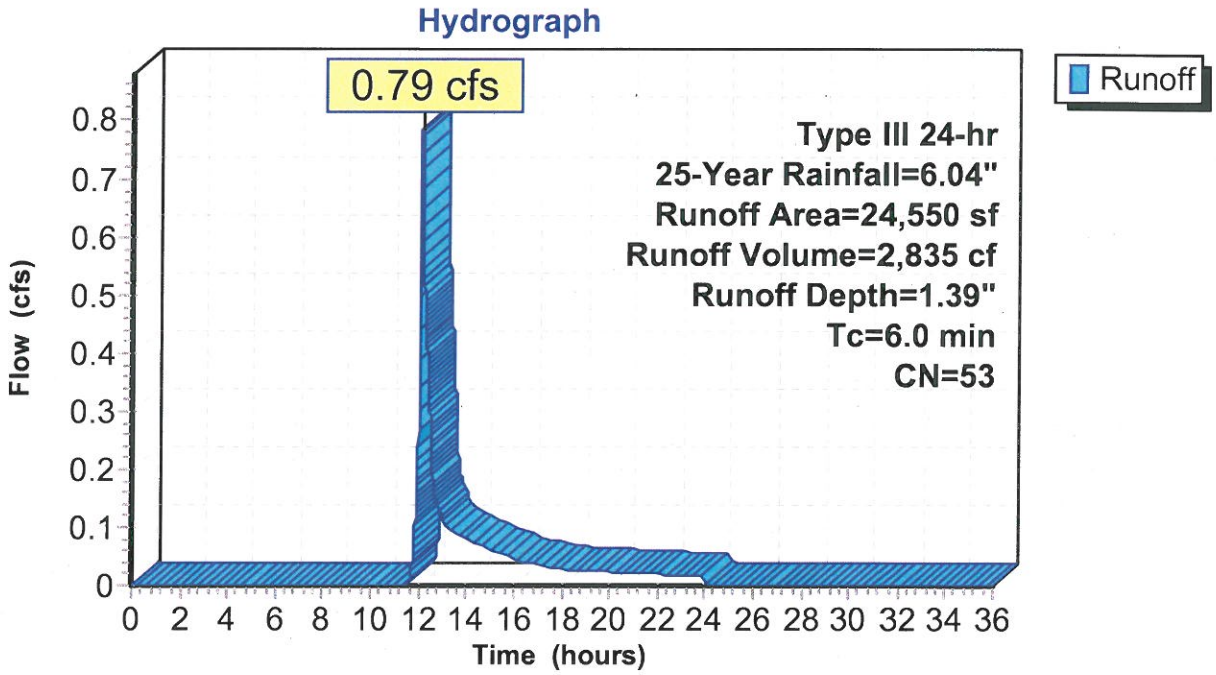
Runoff = 0.79 cfs @ 12.10 hrs, Volume= 2,835 cf, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.04"

Area (sf)	CN	Description
5,943	98	Paved parking, HSG A
18,607	39	>75% Grass cover, Good, HSG A
24,550	53	Weighted Average
18,607		75.79% Pervious Area
5,943		24.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PR3:



Summary for Pond P1: Infiltration Trench

Inflow Area = 24,550 sf, 24.21% Impervious, Inflow Depth = 1.39" for 25-Year event
Inflow = 0.79 cfs @ 12.10 hrs, Volume= 2,835 cf
Outflow = 0.43 cfs @ 12.32 hrs, Volume= 2,835 cf, Atten= 46%, Lag= 12.8 min
Discarded = 0.14 cfs @ 11.94 hrs, Volume= 2,521 cf
Primary = 0.28 cfs @ 12.32 hrs, Volume= 315 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 137.07' @ 12.32 hrs Surf.Area= 2,580 sf Storage= 452 cf

Plug-Flow detention time= 16.8 min calculated for 2,834 cf (100% of inflow)
Center-of-Mass det. time= 16.8 min (899.8 - 883.0)

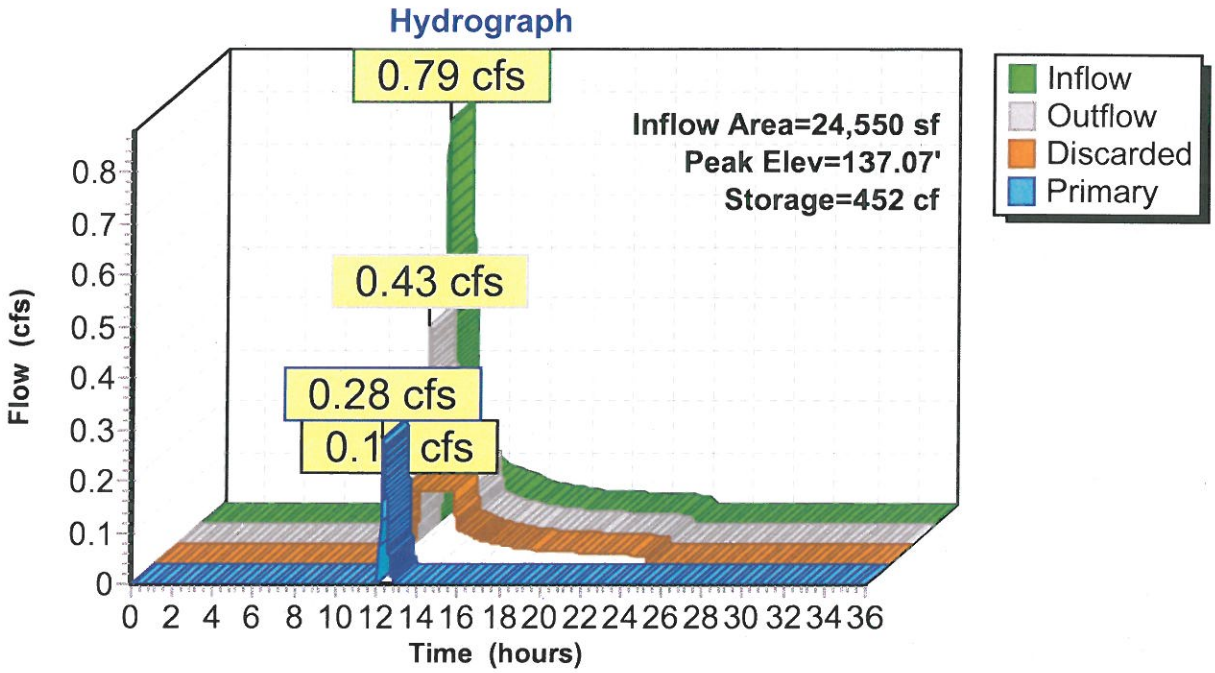
Volume	Invert	Avail.Storage	Storage Description
#1	136.50'	1,732 cf	**3.00'W x 860.00'L x 2.50'H Prismatoid** 6,450 cf Overall - 675 cf Embedded = 5,775 cf x 30.0% Voids
#2	137.00'	675 cf	**12.0" Round Pipe Storage** Inside #1 L= 860.0'
		2,408 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	136.50'	**2.400 in/hr Exfiltration over Surface area**
#2	Primary	137.00'	**5.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Discarded OutFlow Max=0.14 cfs @ 11.94 hrs HW=136.53' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.28 cfs @ 12.32 hrs HW=137.07' (Free Discharge)
↑—**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.28 cfs @ 0.84 fps)

Pond P1: Infiltration Trench



Summary for Pond P2: Field Profile

Inflow Area = 93,544 sf, 87.32% Impervious, Inflow Depth = 5.00" for 25-Year event
Inflow = 11.89 cfs @ 12.08 hrs, Volume= 38,948 cf
Outflow = 4.40 cfs @ 11.90 hrs, Volume= 38,948 cf, Atten= 63%, Lag= 0.0 min
Discarded = 4.40 cfs @ 11.90 hrs, Volume= 38,948 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 138.70' @ 12.33 hrs Surf.Area= 79,200 sf Storage= 4,859 cf

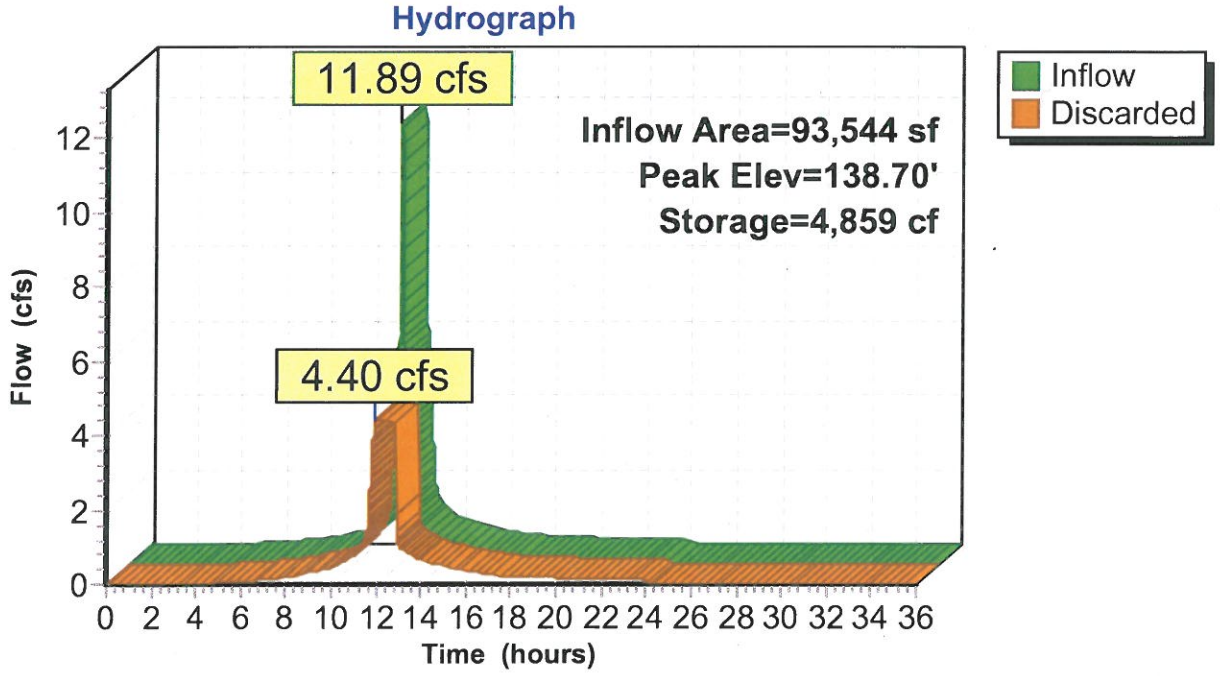
Plug-Flow detention time= 4.8 min calculated for 38,938 cf (100% of inflow)
Center-of-Mass det. time= 4.8 min (785.6 - 780.8)

Volume	Invert	Avail.Storage	Storage Description
#1	138.50'	15,919 cf	**220.00'W x 360.00'L x 0.67'H Prismatoid** 53,064 cf Overall x 30.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.50'	**2.400 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=4.40 cfs @ 11.90 hrs HW=138.51' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 4.40 cfs)

Pond P2: Field Profile

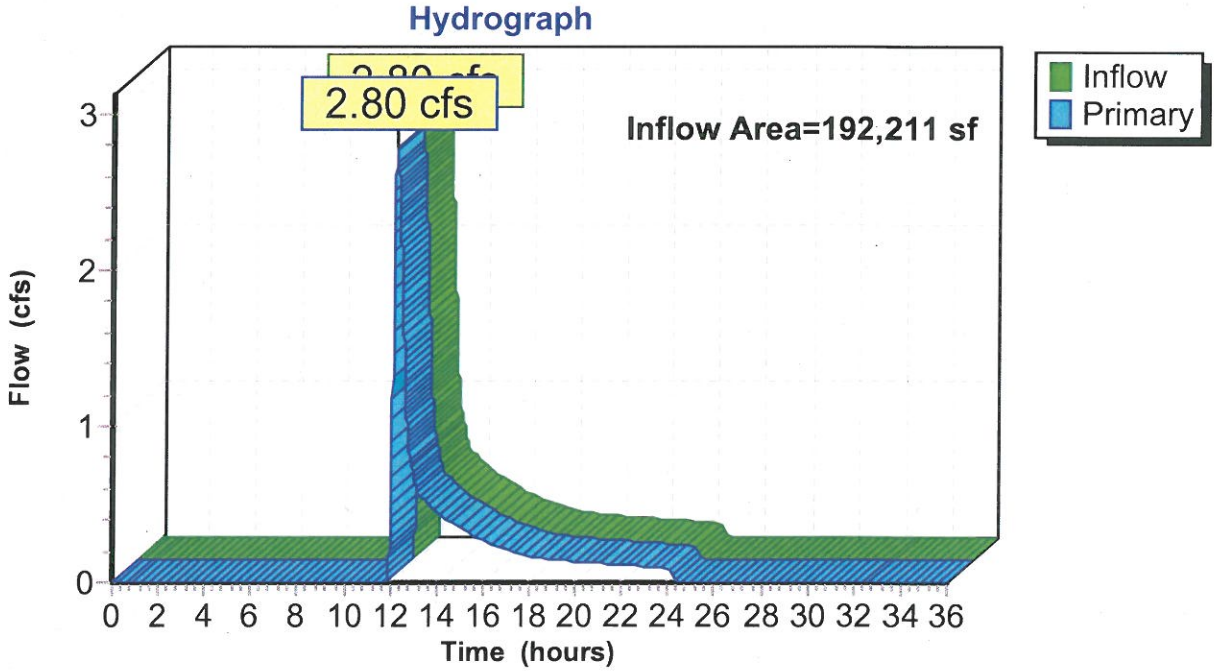


Summary for Link DP1:

Inflow Area = 192,211 sf, 16.14% Impervious, Inflow Depth = 0.91" for 25-Year event
Inflow = 2.80 cfs @ 12.27 hrs, Volume= 14,568 cf
Primary = 2.80 cfs @ 12.27 hrs, Volume= 14,568 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link DP1:



Summary for Subcatchment PR1:

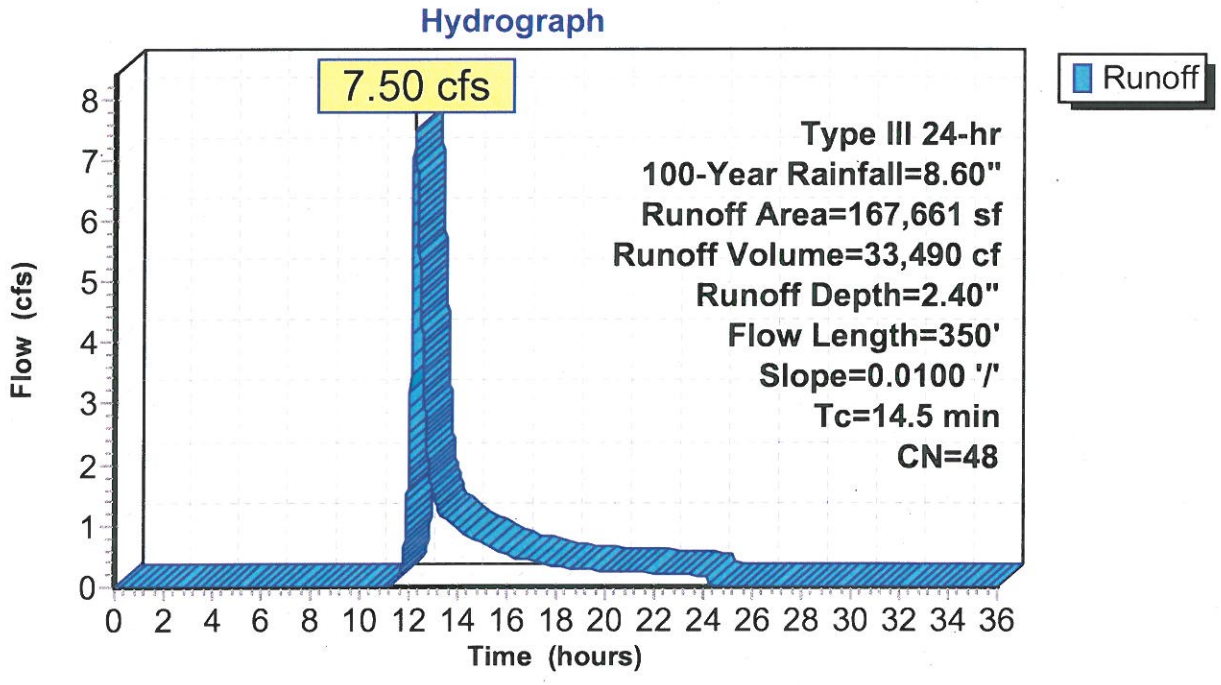
Runoff = 7.50 cfs @ 12.22 hrs, Volume= 33,490 cf, Depth= 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.60"

Area (sf)	CN	Description
142,573	39	>75% Grass cover, Good, HSG A
25,088	98	Paved parking, HSG A
167,661	48	Weighted Average
142,573		85.04% Pervious Area
25,088		14.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.19"
7.1	300	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.5	350	Total			

Subcatchment PR1:



Summary for Subcatchment PR2:

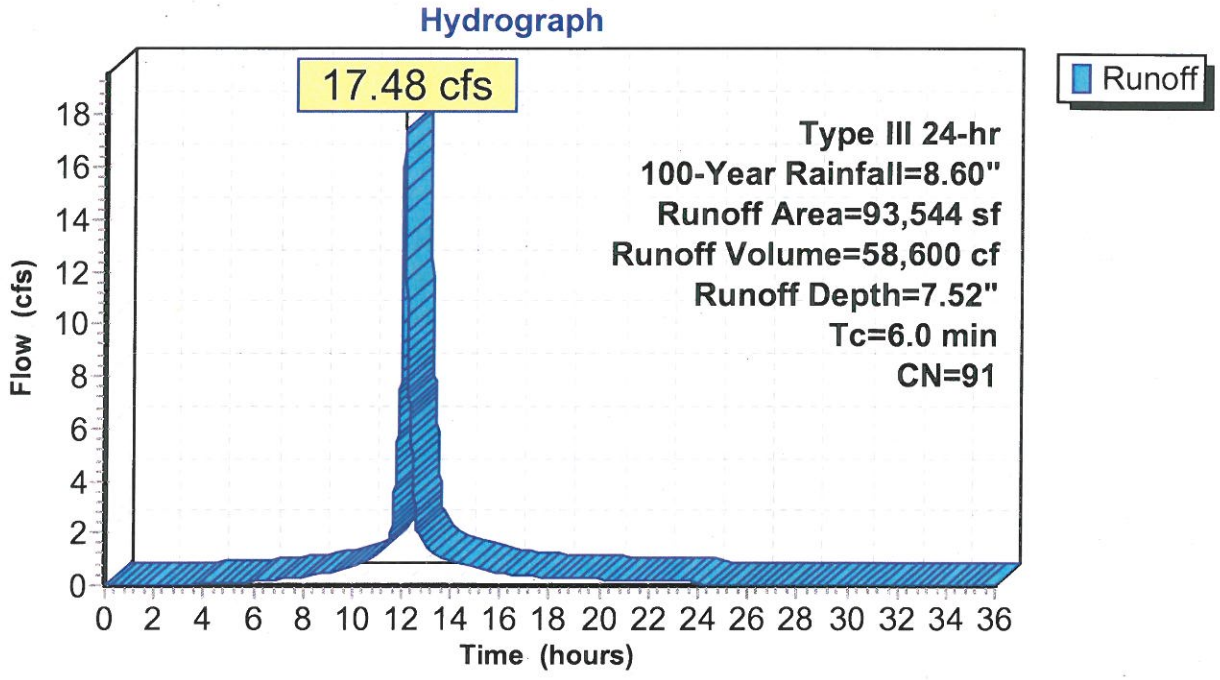
Runoff = 17.48 cfs @ 12.08 hrs, Volume= 58,600 cf, Depth= 7.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.60"

	Area (sf)	CN	Description
	11,862	39	>75% Grass cover, Good, HSG A
	1,900	98	Unconnected pavement, HSG A
*	79,782	98	Field
	93,544	91	Weighted Average
	11,862		12.68% Pervious Area
	81,682		87.32% Impervious Area
	1,900		2.33% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PR2:



Summary for Subcatchment PR3:

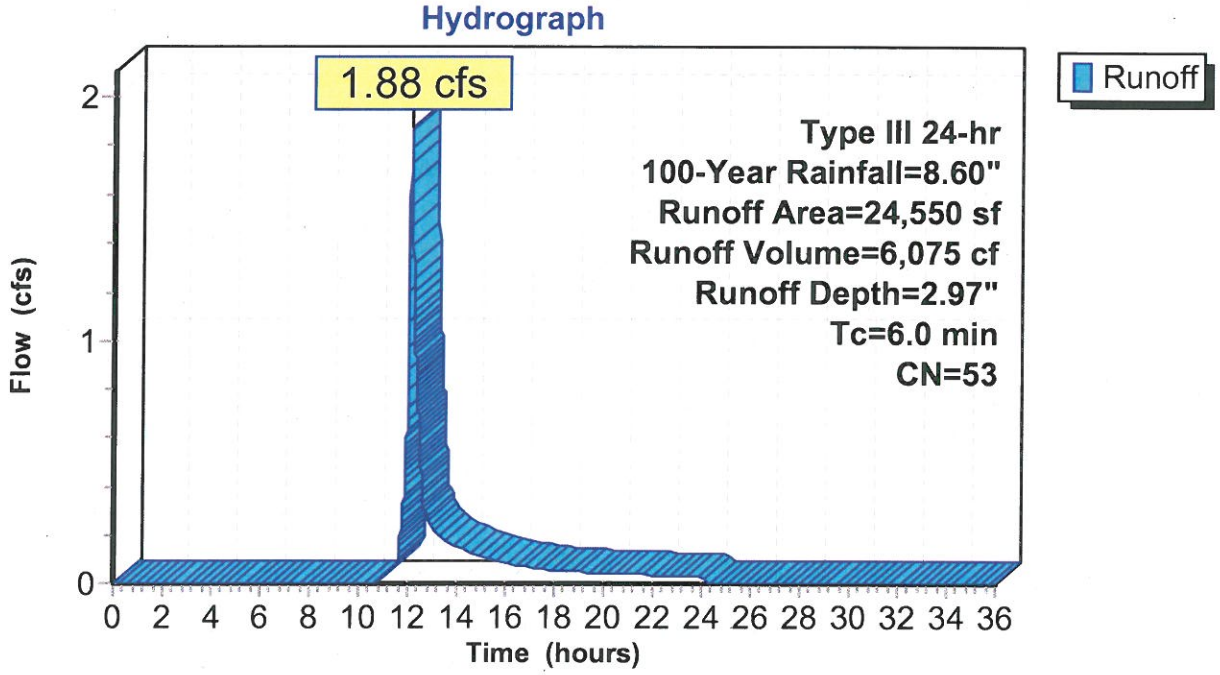
Runoff = 1.88 cfs @ 12.09 hrs, Volume= 6,075 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.60"

Area (sf)	CN	Description
5,943	98	Paved parking, HSG A
18,607	39	>75% Grass cover, Good, HSG A
24,550	53	Weighted Average
18,607		75.79% Pervious Area
5,943		24.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment PR3:



Summary for Pond P1: Infiltration Trench

Inflow Area = 24,550 sf, 24.21% Impervious, Inflow Depth = 2.97" for 100-Year event
Inflow = 1.88 cfs @ 12.09 hrs, Volume= 6,075 cf
Outflow = 1.73 cfs @ 12.13 hrs, Volume= 6,075 cf, Atten= 8%, Lag= 2.2 min
Discarded = 0.14 cfs @ 11.69 hrs, Volume= 3,930 cf
Primary = 1.58 cfs @ 12.13 hrs, Volume= 2,144 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 137.21' @ 12.13 hrs Surf.Area= 2,580 sf Storage= 622 cf

Plug-Flow detention time= 16.9 min calculated for 6,075 cf (100% of inflow)
Center-of-Mass det. time= 16.9 min (875.1 - 858.2)

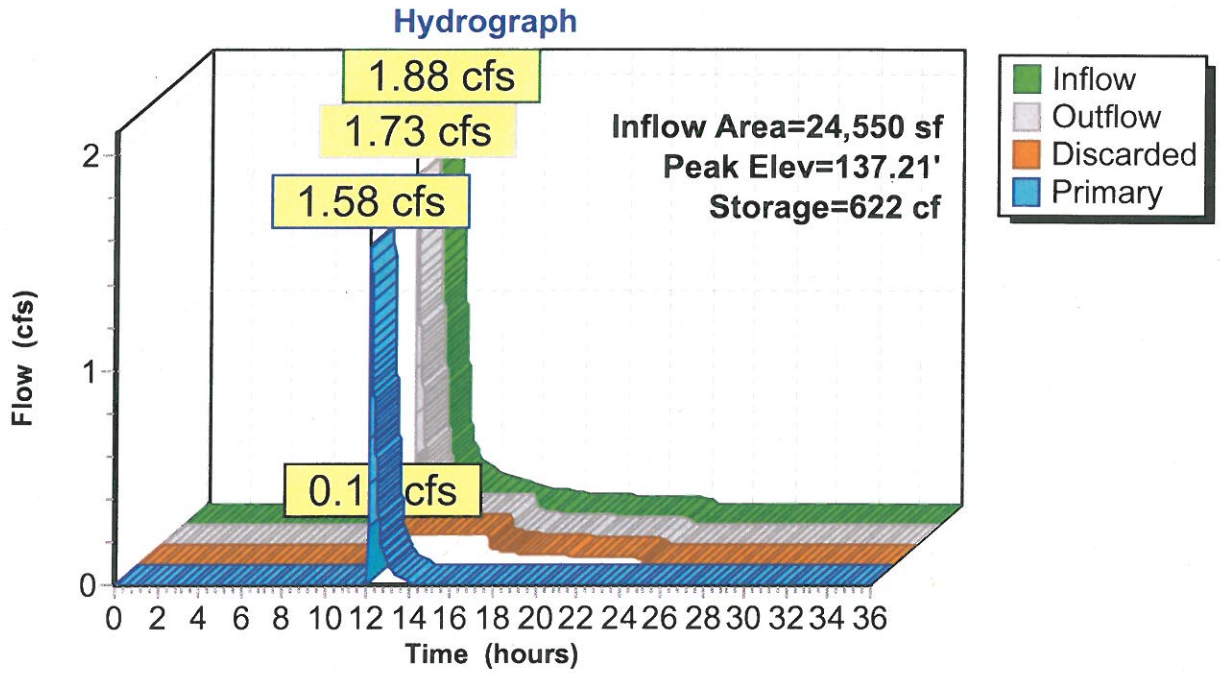
Volume	Invert	Avail.Storage	Storage Description
#1	136.50'	1,732 cf	**3.00'W x 860.00'L x 2.50'H Prismatoid** 6,450 cf Overall - 675 cf Embedded = 5,775 cf x 30.0% Voids
#2	137.00'	675 cf	**12.0" Round Pipe Storage** Inside #1 L= 860.0'
		2,408 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	136.50'	**2.400 in/hr Exfiltration over Surface area**
#2	Primary	137.00'	**5.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.62 (C= 3.28)

Discarded OutFlow Max=0.14 cfs @ 11.69 hrs HW=136.53' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=1.58 cfs @ 12.13 hrs HW=137.21' (Free Discharge)
↑—**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 1.58 cfs @ 1.50 fps)

Pond P1: Infiltration Trench



Summary for Pond P2: Field Profile

Inflow Area = 93,544 sf, 87.32% Impervious, Inflow Depth = 7.52" for 100-Year event
Inflow = 17.48 cfs @ 12.08 hrs, Volume= 58,600 cf
Outflow = 4.40 cfs @ 11.76 hrs, Volume= 58,600 cf, Atten= 75%, Lag= 0.0 min
Discarded = 4.40 cfs @ 11.76 hrs, Volume= 58,600 cf

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 138.98' @ 12.45 hrs Surf.Area= 79,200 sf Storage= 11,358 cf

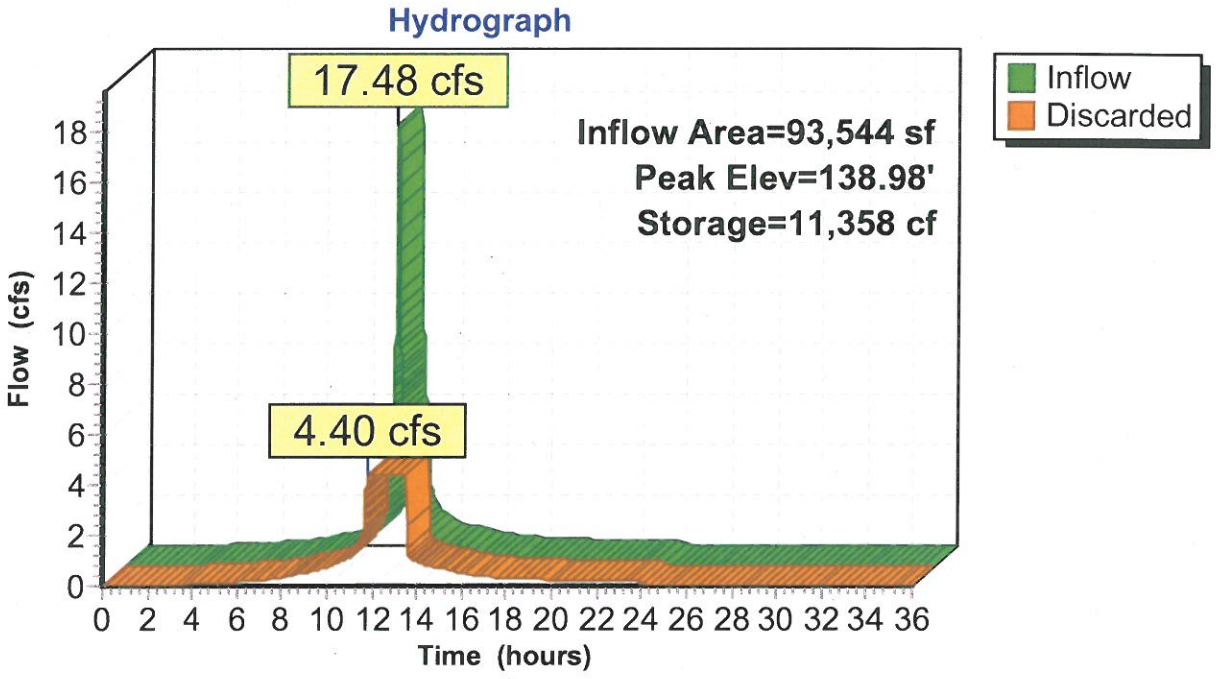
Plug-Flow detention time= 12.2 min calculated for 58,584 cf (100% of inflow)
Center-of-Mass det. time= 12.2 min (782.8 - 770.6)

Volume	Invert	Avail.Storage	Storage Description
#1	138.50'	15,919 cf	**220.00'W x 360.00'L x 0.67'H Prismatoid** 53,064 cf Overall x 30.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	138.50'	**2.400 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=4.40 cfs @ 11.76 hrs HW=138.51' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 4.40 cfs)

Pond P2: Field Profile

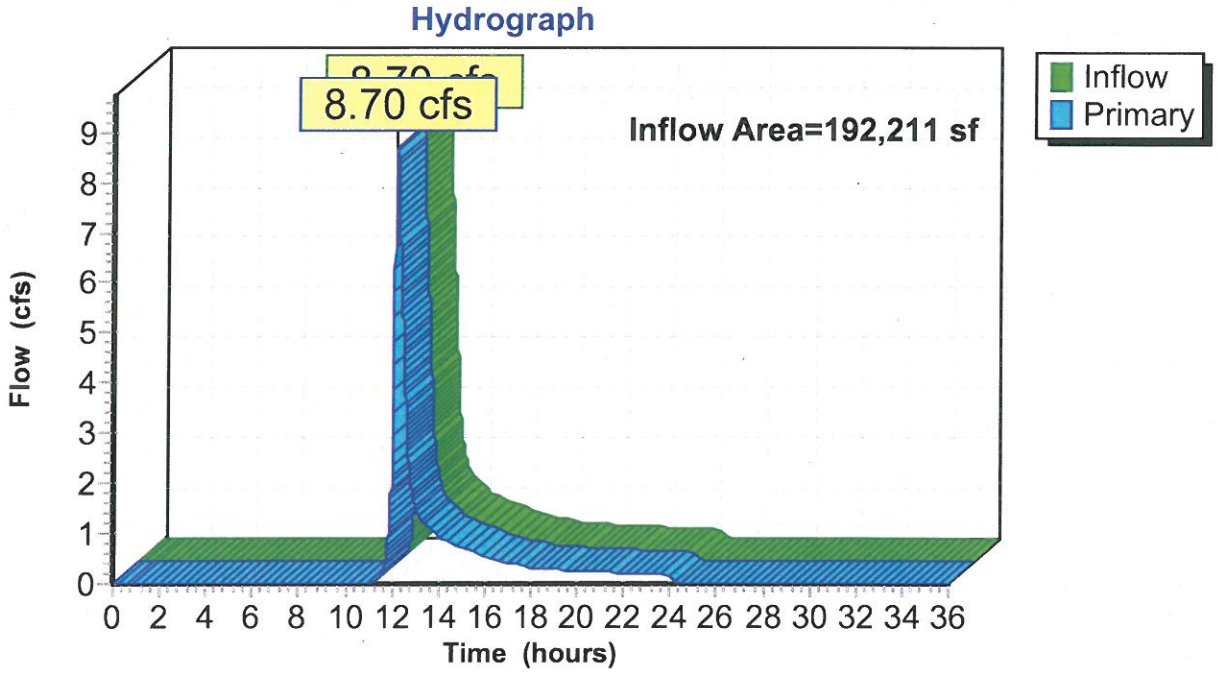


Summary for Link DP1:

Inflow Area = 192,211 sf, 16.14% Impervious, Inflow Depth = 2.22" for 100-Year event
Inflow = 8.70 cfs @ 12.20 hrs, Volume= 35,634 cf
Primary = 8.70 cfs @ 12.20 hrs, Volume= 35,634 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

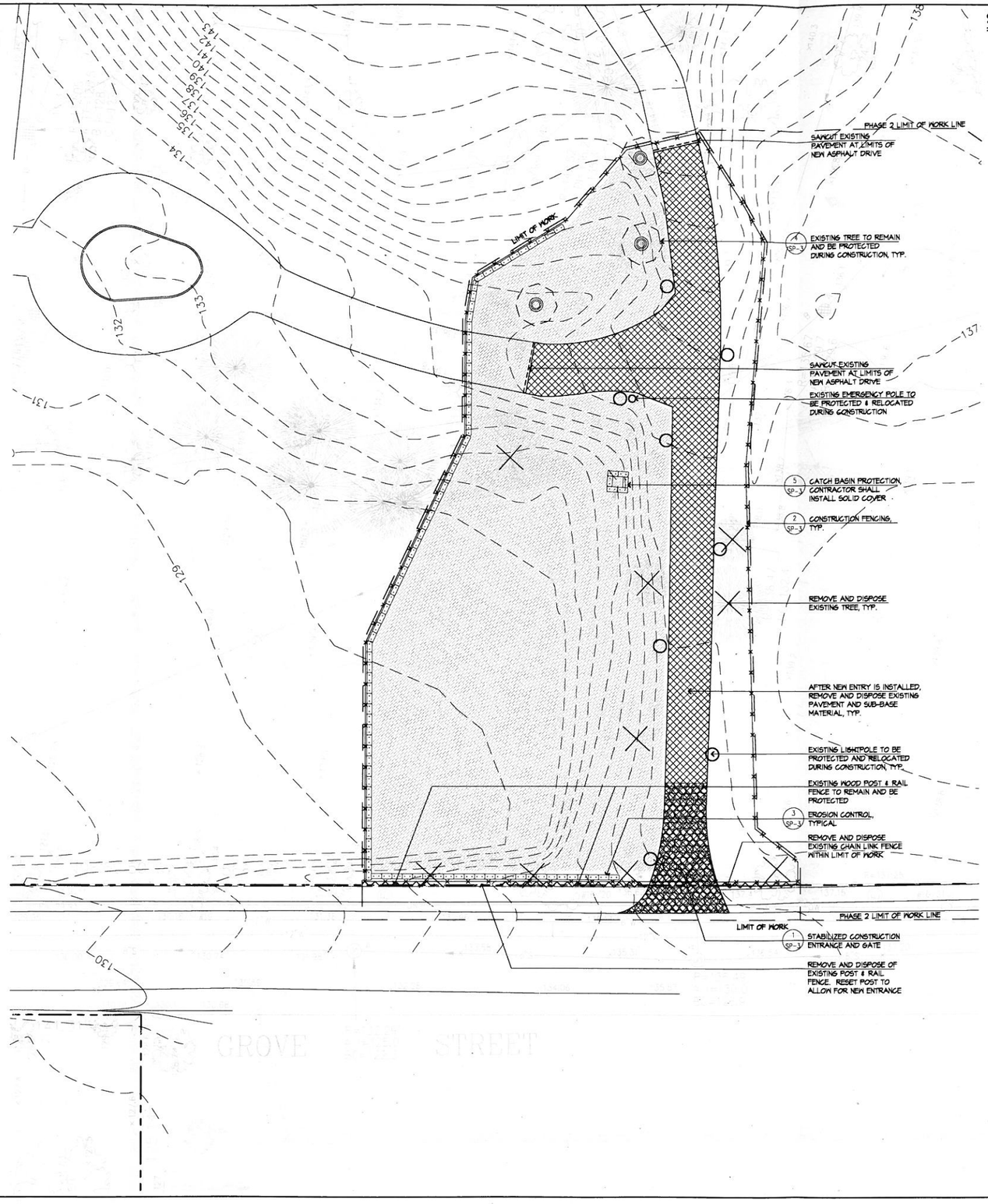
Link DP1:



Appendix G EROSION AND SEDIMENTATION CONTROLS

G.1 SITE PREPARATION PLAN – PHASE 1

G.2 SITE PREPARATION PLAN – PHASE 2



SITE PREPARATION NOTES

1. EXISTING CONDITIONS INFORMATION IS REPRODUCED FROM THE SURVEY PREPARED BY NITSCH ENGINEERING OF BOSTON, MA AND IS DATED MAY 4 2015.
2. WITHIN THE LIMIT OF THE WORK LINE AS NOTED ON THE SITE PREPARATION PLANS, REMOVE AND DISCARD ALL CONCRETE PAVEMENT, BITUMINOUS CONCRETE PAVEMENT, BRICK PAVEMENT, TOP SOIL, MULCH, TRASH, DEAD TREES AND STUMPS, SHRUBBERY, CHAIN LINK FENCE POSTS, RAILS, FABRIC, GATES, FOOTINGS AND ALL APPURTENANCES, BOLLARDS, POSTS, CONCRETE FOOTINGS AND FOUNDATIONS, WALLS AND CURBS UNLESS OTHERWISE NOTED.
3. THE OWNER'S REPRESENTATIVE SHALL BE CONSULTED AND WILL REVIEW THE WORK ON SITE WITH THE CONTRACTOR BEFORE ANY WORK SHALL COMMENCE.
4. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER'S REPRESENTATIVE PRIOR TO STARTING WORK.
5. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CONDITIONS TO REMAIN THAT ARE DUE TO CONTRACTOR OPERATIONS.
6. ALL ITEMS TO BE REMOVED THAT ARE NOT STOCKPILED FOR LATER REUSE ON THE PROJECT OR DELIVERED TO THE OWNER SHALL BE LEGALLY DISPOSED OF OFF SITE BY THE CONTRACTOR.
7. THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED ON THE SURVEY REFERENCED ABOVE. THE CONTRACTOR SHALL CONTACT DIGSAFE AND 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.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS EFFORTS OF THE DEMOLITION WITH ALL TRADES.
9. THE CONTRACTOR SHALL COORDINATE ALL ADJUSTMENT OR ABANDONMENT OF UTILITIES WITH THE RESPECTIVE UTILITY COMPANY.
10. THE CONTRACTOR SHALL MAINTAIN OR ADJUST TO NEW FINISH GRADE AS NECESSARY ALL UTILITY AND SITE STRUCTURES SUCH AS LIGHT POLES, SIGN POLES, MAN HOLES, CATCH BASINS, HAND HOLES, WATER AND GAS GATES, HYDRANTS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS UNLESS OTHERWISE NOTED OR DIRECTED BY THE OWNER'S REPRESENTATIVE.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- REMOVE AND DISPOSE OF EXISTING PAVEMENT AND SU
- STRIP AND STOCKPILE EXISTING TOPSOIL
- TREE PROTECTION
- LIGHTPOLE TO BE PROTECTED AND RELOCATED
- CONSTRUCTION FENCE
- STABILIZED CONSTRUCTION ENTRANCE
- EROSION CONTROL
- EXISTING TREE TO BE REMOVED
- SAWCUT LINE
- CATCH BASIN PROTECTION

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226 Causeway St.
Boston MA 02114 U.S.A.
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Fax. 617.523.4333
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Legend

Notes

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PERMIT SET	JW	JA	12.21.18

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File Name: 210801597_siteprep_phase 1_permit.dwg	Dwn.	Chkd.	Dsgn.	MM.DD.YY

Permit-Seal

Client/Project
DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS
Wellesley, MA

Title
SITE PREPARATION PLAN- PHASE 1

Project No.	Scale	
210801597	AS SHOWN	
Sheet		Drawing No.
4 of	16	SP-1

ORIGINAL SHEET - ARCH D

SITE PREPARATION NOTES

1. EXISTING CONDITIONS INFORMATION IS REPRODUCED FROM THE SURVEY PREPARED BY NITSCH ENGINEERING OF BOSTON, MA AND IS DATED MAY 4 2015.
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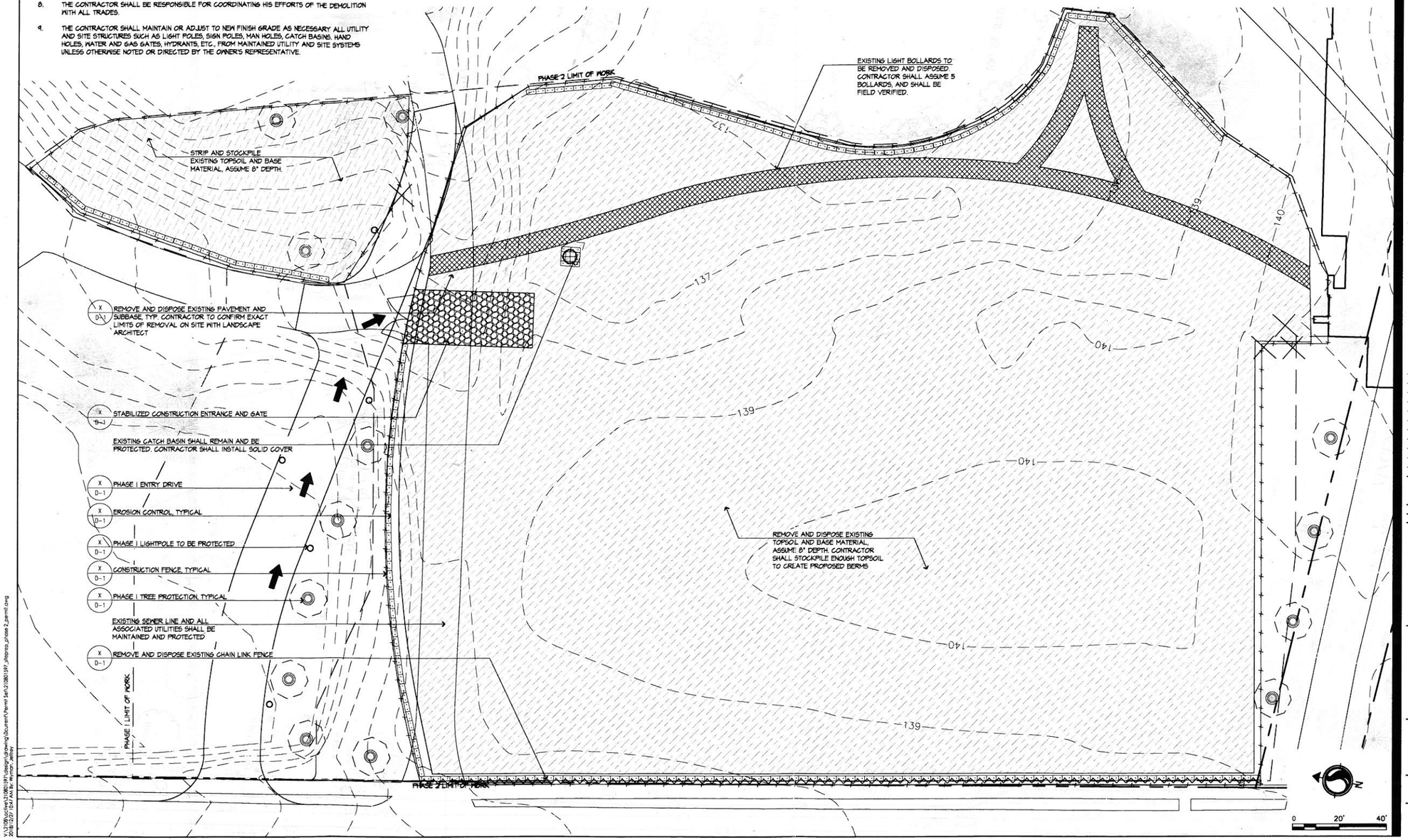
9. THE CONTRACTOR SHALL MAINTAIN OR ADJUST TO NEW FINISH GRADE AS NECESSARY ALL UTILITY AND SITE STRUCTURES SUCH AS LIGHT POLES, SIGN POLES, MAN HOLES, CATCH BASINS, HAND HOLES, WATER AND GAS GATES, HYDRANTS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS UNLESS OTHERWISE NOTED OR DIRECTED BY THE OWNER'S REPRESENTATIVE.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- BITUMINOUS CONCRETE PAVEMENT REMOVAL
- REMOVE AND DISPOSE EXISTING TOPSOIL
- TREE PROTECTION
- LIGHTPOST TO BE PROTECTED
- 8' CONSTRUCTION FENCE
- STABILIZED CONSTRUCTION ENTRANCE
- SILT FENCE WITH STRAW MATTLES
- REMOVE AND DISPOSE EXISTING TREE
- REMOVE AND DISPOSE EXISTING AREA DRAIN
- CONSTRUCTION ACCESS



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Permit-Seal

Client/Project
DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS
Wellesley, MA

Title
SITE PREPARATION PLAN - PHASE 2

Project No.	Scale	
210801597	AS SHOWN	
Sheet		Drawing No.
5 of 16		SP-2

Appendix H OPERATION AND MAINTENANCE PLAN & LOG

H.1 OPERATION AND MAINTENANCE PLAN

H.2 OPERATION AND MAINTENANCE LOG

Stantec

Operation & Maintenance Plan

Dana Hall School Entry Drive and Synthetic Turf Field

January 8, 2019

Prepared for:

Wellesley Zoning Board of Appeals
Wellesley Town Hall
525 Washington Street
Wellesley, MA

Prepared by:

Stantec Planning and Landscape Architecture, P.C.
226 Causeway St., 6th Floor
Boston, MA 02114

Table of Contents

1.0 GENERAL INFORMATION

1.1 INTRODUCTION

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 project area. The Plan is in accordance with the requirements of the Town of Wellesley Stormwater and Erosion Control Regulations. An Operations and Maintenance Log is included at the end of this document.

The Stormwater Management System Owner is:

Dana Hall School
45 Dana Road
Wellesley, MA 02482

Dana Hall School will perform the inspections and maintenance as outlined in the Operations and Maintenance Plan with their own maintenance personnel.

2.0 MAINTENANCE AGREEMENT

2.1 RESPONSIBLE FOR OPERATION AND MAINTENANCE (24/7 CONTACT)

To be determined.

2.2 RESPONSIBLE FOR FINANCING MAINTENANCE AND EMERGENCY REPAIRS

To be determined.

2.3 INSPECTION AND MAINTENANCE LOG

An inspection and maintenance log is provided as an attachment to the Operation and Maintenance Plan.

3.0 OPERATION AND MAINTENANCE PLAN

Non-structural pollutant controls include encouraging the use of salt substitutes for maintenance of parking and roadway areas, sweeping of driveways and parking areas on a regular basis, and use of slow-release organic fertilizers on landscaped areas to limit the amount of nutrients that could enter downstream resource areas. Structural pollutant controls include catch basins equipped with deep sumps and hoods, a water quality swale to treat and convey runoff, a water quality unit designed to separate gas, oil, and suspended solids from stormwater, and a subsurface infiltration system.

3.1 NON-STRUCTURAL POLLUTANT CONTROLS

The proposed stormwater management system is designed to protect the runoff water quality through the removal of sediment and pollutants. Non-structural pollutant controls used to separate and capture stormwater pollutants are described below.

3.1.1 Pavement Maintenance

Long-term management practices will include regular sweeping of driveways and parking areas. The sweeping/vacuuming program will remove contaminants directly from paved surfaces to prevent their release into the drainage system. Street sweeping/vacuuming has been shown to be an effective initial treatment for reducing pollutant loadings in stormwater.

3.1.2 Standard Asphalt Pavement Maintenance

Sweep or vacuum standard asphalt pavement areas at least two times per year with a commercial cleaning unit and properly dispose of removed material.

Recommended sweeping schedule:

- Oct/Nov
- Apr/May

More frequent sweeping of paved surfaces will result in less accumulation in catch basins, less cleaning of subsurface structures, and less disposal costs.

3.1.3 Deicing Chemicals

Use of road salt (sodium chloride) for maintenance of parking and roadway areas will be limited, and use of salt substitutes, such as calcium magnesium acetate (CMA), will be encouraged. These practices will limit the amount of dissolved pollutants in runoff and minimize potential impacts of deicing chemicals on downstream resource areas.

3.1.4 Fertilizer

Slow-release organic fertilizers will be used in the landscaped areas to limit the amount of nutrients that could enter downstream resource areas. Fertilizer use will be reduced once proposed landscaping is established.

3.2 STRUCTURAL POLLUTANT CONTROLS

The proposed stormwater management system is designed to protect runoff water quality through the removal of sediment and pollutants. Minimum operation and maintenance requirements for the structural pollutant controls used to separate and capture stormwater pollutants are described below.

3.2.1 Catch Basins

Catch basins on Site will be equipped with deep sumps (minimum 4-feet) and hooded outlets to trap debris, sediments, and floating contaminants, which are the largest constituents of urban runoff. These practices, in coordination with minimal use of sand and street sweeping, comprises a multi-level source control approach that prevents sand, sediment, and litter from entering the drainage basins and ultimately the resource area. Regular maintenance and cleaning of catch basins will assure adequate performance of these structures.

The proper removal of sediments and associated pollutants and trash occurs only when catch basin inlets and sumps are cleaned out regularly. The more frequent the cleaning, the less likely sediments will be re-suspended and subsequently discharged. In addition, frequent cleaning also results in more volume available for future deposition and enhances the overall performance. As noted in the pavement O&M section, more frequent sweeping of paved surfaces will result in less accumulation in catch basins, less cleaning of subsurface structures, and less disposal costs.

Inspections and Cleaning

- All catch basins shall be inspected at least four times per year and at the end of the foliage and snow-removal seasons.
- Sediment and/or floatable pollutants must also be removed four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. All sediment/pollutants shall be disposed of at an approved offsite facility in accordance with all applicable regulations.
- Any structural damage or other indication of malfunction will be reported to the site manager and repaired as necessary
- During colder periods, the catch basin grates must be kept free of snow and ice.
- During warmer periods, the catch basin grates must be kept free of leaves, litter, sand, and debris.

3.2.2 Drainage Manholes

Drainage manholes shall be inspected to remove any sediment build up and to remove any obstructions to the runoff flow. Special care shall be taken to inspect the orifices and above the weir for any potential obstructions.

Inspections and Cleaning

- All drainage manhole structures shall be inspected at least four times per year and at the end of the foliage and snow-removal seasons.
- Sediment must also be removed four times per year. All sediment/pollutants shall be disposed of at an approved offsite facility in accordance with all applicable regulations.
- Any structural damage or other indication of malfunction will be reported to the site manager and repaired as necessary.

3.2.3 Vegetated Areas

Although not a structural component of the drainage system, the maintenance of vegetated areas may affect the functioning 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-install plant material in bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming.
- Plant alternative shrubs or perennials in the event of unsuccessful establishment.

Initial Post-Construction Inspection

During the initial period of vegetation establishment pruning and weeding are required twice in first year by contractor or owner. Any dead vegetation/plantings found after the first year will be replaced. Proper mulching is mandatory and regular watering may be required initially to ensure proper establishment of new vegetation.

Long-Term Maintenance

The planted areas will be inspected on a semi-annual basis and any litter removed. Weeds and invasive plant species will be removed by hand. Maintain planted areas adjacent to pavement to prevent soil washout. Immediately clean any soil deposits on pavement. Leaf litter and other detritus shall be removed twice per year. If needed to maintain aesthetic appearance, perennial plantings may be trimmed at the end of the growing season.

Trees and shrubs will be inspected twice per year to evaluate health and attended to as necessary. Seeded ground cover or grass areas shall not receive mulching. Re-install plant material in bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming. Plant alternative shrubs or perennials in the event of unsuccessful establishment.

Fertilizer usage will be avoided. If deemed necessary, slow release fertilizer will be used. Fertilizer will be used to begin the establishment of vegetation in bare or damaged areas, but will not be applied on a regular basis unless necessary. 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-install plant material in bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming.
- Plant alternative shrubs or perennials in the event of unsuccessful establishment.

Pesticide/Herbicide Usage

The Redevelopment Project will require that landscaping maintenance contractors implement a program to test soils at the site annually and to limit the amount of fertilizer, pesticides, and herbicides to only what is needed to maintain healthy plant materials and landscaped areas.

No pesticides or herbicides are to be used unless a single spot treatment is required for a specific control application.

Fertilizer usage will be avoided. If deemed necessary, slow release fertilizer will be used, and applied only in the minimum amounts recommended by the manufacturer. Once applied, the fertilizer will be worked into the soil to limit exposure to stormwater. Storage will be in a covered area; and the contents of any partially used bags will be transferred to a sealable, plastic bin to avoid spills.

Fertilizer will be used to begin the establishment of vegetation in bare or damaged areas, but will not be applied on a regular basis unless necessary.

Records of soil management, application dates, planting dates, preventive measures, treatments, and other appropriate information should be kept. This information will be used as a reference when fertilizer/pesticide/herbicide management decisions in the future.

3.3 SPILL PREVENTION AND CONTROL PLAN

The Property Manager 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, dust pans, 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 the hazardous substances.
3. The Owner and Property Manager 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.
5. Please review the "Spill Containment Plan" for location of basin overflow locations within the vegetated swales to be capped within the vicinity of the spill.

The Property Manager 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.

3.4 GOOD HOUSEKEEPING

The following measures will be employed to control potential sources of contamination and prevent pollution at 700 Brookline Avenue:

3.4.1 Deicing

To prevent increased pollutant concentrations in stormwater discharges, the amount of road salt applied will be controlled.

3.4.2 Snow Storage/Disposal

Snow storage/disposal will be allowed in landscaped islands and underutilized parking spaces. Areas designated for snow storage within the limits of the porous pavement will require additional street sweeping to ensure that the pavement system does not clog following periods of snow melting.

3.4.3 Materials Management/Housekeeping Practices

The following product-specific practices will be followed on-site. Recommendations are provided for petroleum products, fertilizers, solvents, paints, and other hazardous substances, and concrete.

Petroleum Products

No vehicle maintenance or handling of petroleum products will occur on site. No petroleum products or asphalt substances will be stored on-site.

Solvents, Paints, and other Hazardous Substances

All containers will be tightly sealed and stored indoors when not required for use. Excess materials will not be discharged to the storm sewer system, but will be properly disposed according to manufacturer's instructions or state and local regulations. Outside storage on the property will be prohibited.

3.4.4 Spill Prevention Practices

The Redevelopment Project will implement a spill prevention program that will include stormwater contamination assessment, flow diversion, record keeping, internal reporting, employee training, and preventive maintenance. The following specific practices will be followed for spill control, notification, and cleanup.

- Manufacturer's recommended methods for spill cleanup for any chemicals used or stored on site will be clearly posted and site personnel will be informed of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials may include, as appropriate, shovels, wheel barrows, brooms, dust pans, mops, rags, gloves, goggles, kitty litter or Speedi-Dry, sand, sawdust, and plastic and metal trash containers specifically designated for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material in excess of reportable quantities, as established in the Massachusetts Contingency Plan (MCP), will be reported to the Massachusetts Department of Environmental Protection Division of Hazardous Waste [(617) 292-5851 or (978) 661-7679].

Dana Hall School Entry Drive and Synthetic Turf Field

Operation and Maintenance Log

Structural Best Management Practice	Action	Date Completed	Completed By	Condition	Additional Action	Date Completed	Completed By	Comments
Standard Asphalt Pavement • Inspect monthly • Sweep twice per year (Oct/Nov & Apr/May)	Inspect							
	Inspect							
Area Drains • Inspect four times per year in the first year • Inspect twice annually • Clean when sump is 50% full.	Inspect							
	Inspect							
Drain Manholes • Inspect four times a year • Remove sediment four times per year • Clean when sump is 50% full	Inspect							
	Inspect							
	Inspect							
	Inspect							
	Inspect							
Subsurface Infiltration Trenches • Clean at least once per year by flushing • If sediment accumulates greater than 1" deep it must be vacuumed out	Inspect							
	Inspect							
Overall Site Inspection • (Inspect once the first year and then every three years after)	Inspect							
	Inspect							

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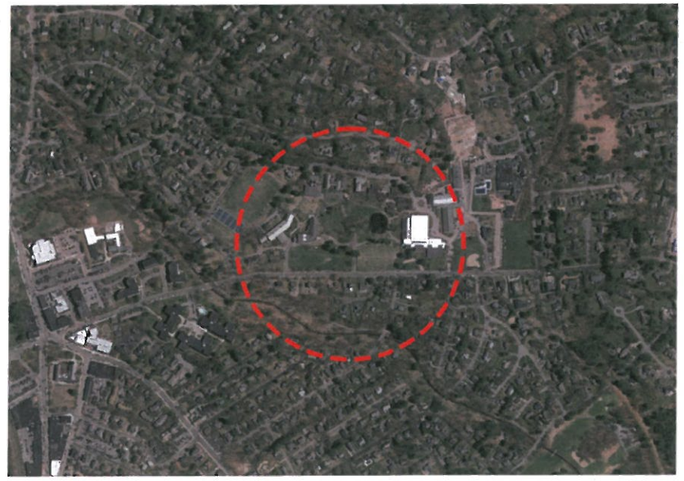
DANA HALL SCHOOL
PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS



LOCUS PLAN
1"=500'

OWNER

DANA HALL SCHOOL
45 DANA RD,
WELLESLEY, MA 02482
781-235-3010

LANDSCAPE ARCHITECT / CIVIL ENGINEER

STANTEC PLANNING AND LANDSCAPE ARCHITECTURE P.C.
226 CAUSEWAY STREET
BOSTON, MA 02114
617.523.8103

SURVEYOR

NITSCHE ENGINEERING, INC.
2 CENTER PLAZA, SUITE 430
BOSTON, MA 02108

DRAWING INDEX

DECEMBER 21, 2018

Project Number: 210801597

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Landscape Architecture P.C.
226 Causeway St.
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Legend

Notes

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Permit-Seal

Client/Project
DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS
Wellesley, MA

Title
CONSTRUCTION ACCESS PLAN

Project No.	Scale	
210801597	AS SHOWN	
Sheet		Drawing No.
1 of 16		CP-1

EXISTING CONDITIONS NOTES

1. EXISTING CONDITIONS INFORMATION IS REPRODUCED FROM THE SURVEY PREPARED BY NITSCH ENGINEERING OF BOSTON, MA AND IS DATED MAY 4, 2015.

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Issued	By	Appd.	MM.DD.YY

File Name: 210801597_existing_conditions_permit.dwg
Dwn. Chkd. Dsgn. MM.DD.YY

Permit-Seal

MASSACHUSETTS JONATHAN P. ATKINSON 3857 REGISTERED LANDSCAPE ARCHITECT

Client/Project
DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS
Wellesley, MA

Title
EXISTING CONDITIONS

Project No.	Scale	
210801597	AS SHOWN	
Sheet		Drawing No.
2 of 16		EX-1

ORIGINAL SHEET - ARCH D

District	10,000 sq. ft.	15,000 sq. ft.	20,000 sq. ft.
Minimum Frontage	60 ft.	60 ft.	60 ft.
Minimum Front Yard Width	60 ft.	60 ft.	60 ft.
Minimum Front Yard Depth (Setback)	30 ft.*	30 ft.*	30 ft.*
Minimum Side Yard Width	20 ft.	20 ft.	20 ft.
Minimum Rear Yard Depth	10 ft.	15 ft.	20 ft.

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Landscape Architecture P.C.
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Notes

	By	Appd.	MM.DD.YY
PERMIT SET	JW	JA	12.21.18

Issued

File Name: 210801597_overall_site_plan.dwg

Dwn. Chkd. Dsgn. MM.DD.YY

Permit-Seal

MASSACHUSETTS JOSHUA P. ATKINSON NO. 3012 REGISTERED LANDSCAPE ARCHITECT

Client/Project

DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS

Wellesley, MA

Title

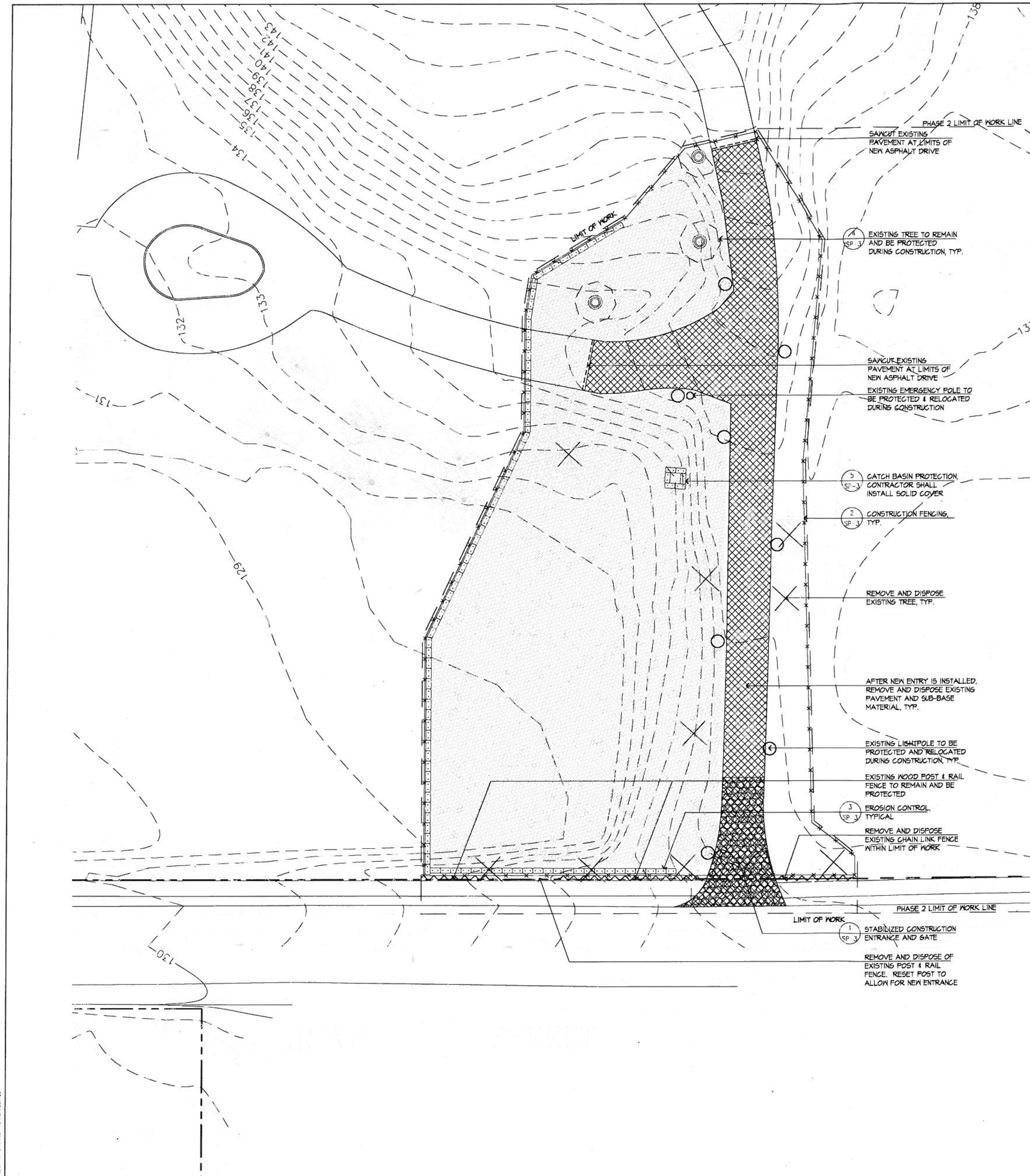
OVERALL SITE PLAN

Project No. 210801597

Scale AS SHOWN

Sheet 3 of 16

Drawing No. OSP-1



SITE PREPARATION NOTES

1. EXISTING CONDITIONS INFORMATION IS REPRODUCED FROM THE SURVEY PREPARED BY NITSCH ENGINEERING OF BOSTON, MA AND IS DATED MAY 4 2015.
2. WITHIN THE LIMIT OF THE WORK LINE AS NOTED ON THE SITE PREPARATION PLANS, REMOVE AND DISCARD ALL CONCRETE PAVEMENT, BITUMINOUS CONCRETE PAVEMENT, BRICK PAVEMENT, TOP SOIL, MULCH, TRASH, DEAD TREES AND STUMPS, SHRUBBERY, CHAIN LINK FENCE POSTS, RAILS, FABRIC, GATES, FOOTINGS AND ALL APPURTENANCES, BOLLARDS, POSTS, CONCRETE FOOTINGS AND FOUNDATIONS, WALLS AND CURBS UNLESS OTHERWISE NOTED.
3. THE OWNER'S REPRESENTATIVE SHALL BE CONSULTED AND WILL REVIEW THE WORK ON SITE WITH THE CONTRACTOR BEFORE ANY WORK SHALL COMMENCE.
4. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER'S REPRESENTATIVE PRIOR TO STARTING WORK.
5. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CONDITIONS TO REMAIN THAT ARE DUE TO CONTRACTOR OPERATIONS.
6. ALL ITEMS TO BE REMOVED THAT ARE NOT STOCKPILED FOR LATER REUSE ON THE PROJECT OR DELIVERED TO THE OWNER SHALL BE LEGALLY DISPOSED OF OFF SITE BY THE CONTRACTOR.
7. THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED ON THE SURVEY REFERENCED ABOVE. THE CONTRACTOR SHALL CONTACT DIGSAFE AND 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.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS EFFORTS OF THE DEMOLITION WITH ALL TRADES.
9. THE CONTRACTOR SHALL COORDINATE ALL ADJUSTMENT OR ABANDONMENT OF UTILITIES WITH THE RESPECTIVE UTILITY COMPANY.
10. THE CONTRACTOR SHALL MAINTAIN OR ADJUST TO NEW FINISH GRADE AS NECESSARY ALL UTILITY AND SITE STRUCTURES SUCH AS LIGHT POLES, SIGN POLES, MAN HOLES, CATCH BASINS. HAND HOLES, WATER AND GAS GATES, HYDRANTS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS UNLESS OTHERWISE NOTED OR DIRECTED BY THE OWNER'S REPRESENTATIVE.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- REMOVE AND DISPOSE OF EXISTING PAVEMENT AND SU
- STRIP AND STOCKPILE EXISTING TOPSOIL
- TREE PROTECTION
- LIGHTPOLE TO BE PROTECTED AND RELOCATED
- CONSTRUCTION FENCE
- STABILIZED CONSTRUCTION ENTRANCE
- EROSION CONTROL
- EXISTING TREE TO BE REMOVED
- SAWCUT LINE
- CATCH BASIN PROTECTION

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Permit-Seal

Client/Project

DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS

Wellesley, MA

Title

SITE PREPARATION PLAN- PHASE 1

Project No.	Scale
210801597	AS SHOWN

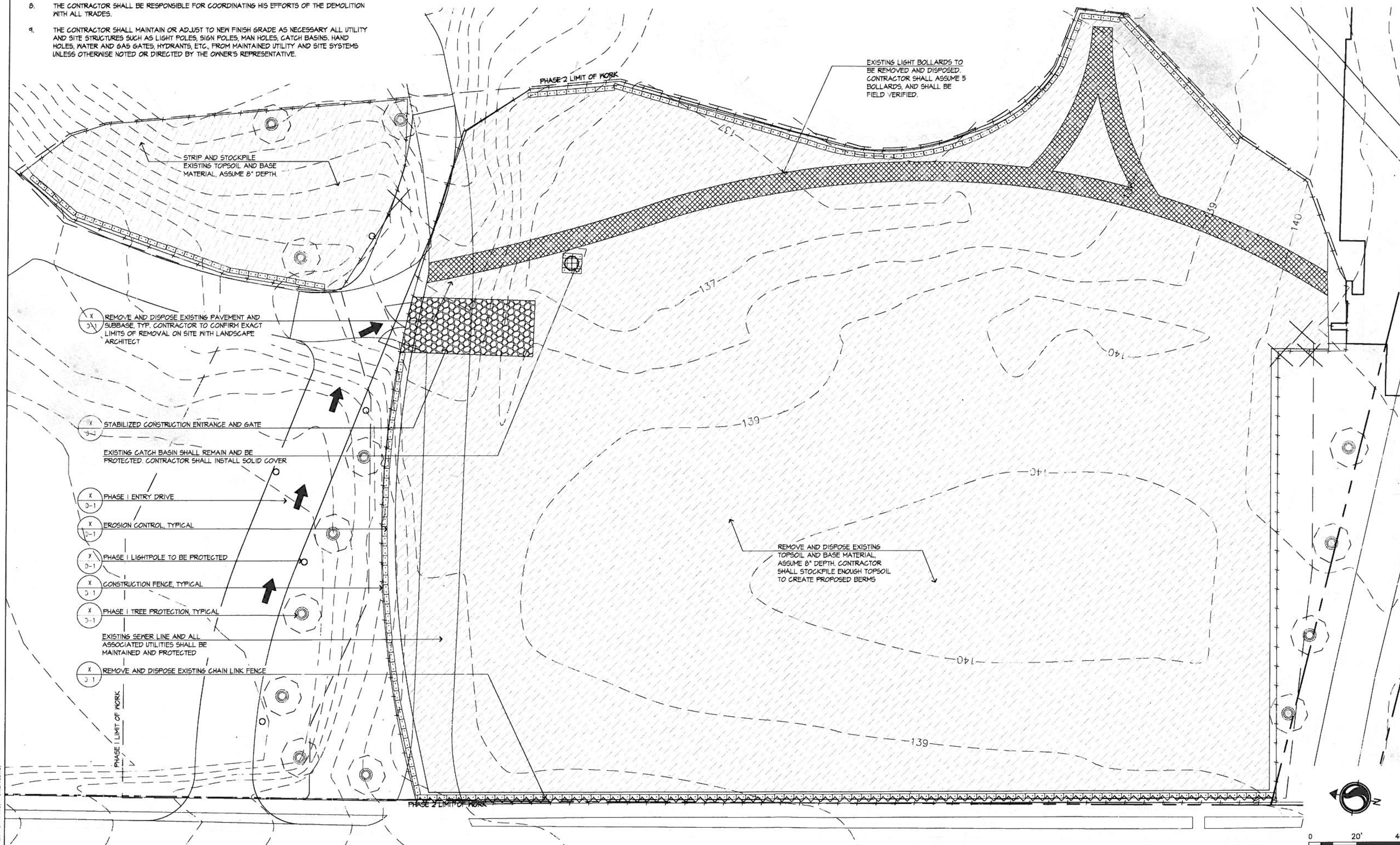
Sheet 4 of 16 — Drawing No. SP-1

SITE PREPARATION NOTES

1. EXISTING CONDITIONS INFORMATION IS REPRODUCED FROM THE SURVEY PREPARED BY NITSCH ENGINEERING OF BOSTON, MA AND IS DATED MAY 4 2015.
2. WITHIN THE LIMIT OF THE WORK LINE AS NOTED ON THE SITE PREPARATION PLANS, REMOVE AND DISCARD ALL CONCRETE PAVEMENT, BITUMINOUS CONCRETE PAVEMENT, BRICK PAVEMENT, TOP SOIL, MULCH, TRASH, DEAD TREES AND STUMPS, SHRUBBERY, CHAIN LINK FENCE POSTS, RAILS, FABRIC, GATES, FOOTINGS AND ALL APPURTENANCES, BOLLARDS, POSTS, CONCRETE FOOTINGS AND FOUNDATIONS, WALLS AND CURBS UNLESS OTHERWISE NOTED.
3. THE OWNER'S REPRESENTATIVE SHALL BE CONSULTED AND WILL REVIEW THE WORK ON SITE WITH THE CONTRACTOR BEFORE ANY WORK SHALL COMMENCE.
4. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER'S REPRESENTATIVE PRIOR TO STARTING WORK.
5. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CONDITIONS TO REMAIN THAT ARE DUE TO CONTRACTOR OPERATIONS.
6. ALL ITEMS TO BE REMOVED THAT ARE NOT STOCKPILED FOR LATER REUSE ON THE PROJECT OR DELIVERED TO THE OWNER SHALL BE LEGALLY DISPOSED OF OFF SITE BY THE CONTRACTOR.
7. THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED ON THE SURVEY REFERENCED ABOVE. THE CONTRACTOR SHALL CONTACT DIGSAFE AND 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.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS EFFORTS OF THE DEMOLITION WITH ALL TRADES.
9. THE CONTRACTOR SHALL MAINTAIN OR ADJUST TO NEW FINISH GRADE AS NECESSARY ALL UTILITY AND SITE STRUCTURES SUCH AS LIGHT POLES, SIGN POLES, MAN HOLES, CATCH BASINS. HAND HOLES, WATER AND GAS GATES, HYDRANTS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS UNLESS OTHERWISE NOTED OR DIRECTED BY THE OWNER'S REPRESENTATIVE.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- BITUMINOUS CONCRETE PAVEMENT REMOVAL
- REMOVE AND DISPOSE EXISTING TOPSOIL
- TREE PROTECTION
- LIGHTPOST TO BE PROTECTED
- 8' CONSTRUCTION FENCE
- STABILIZED CONSTRUCTION ENTRANCE
- SILT FENCE WITH STRAW WATTLES
- REMOVE AND DISPOSE EXISTING TREE
- REMOVE AND DISPOSE EXISTING AREA DRAIN
- CONSTRUCTION ACCESS



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Client/Project

DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS

Wellesley, MA

Title

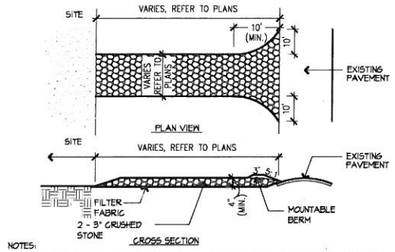
SITE PREPARATION PLAN - PHASE 2

Project No. 210801597

Scale AS SHOWN

Sheet 5 of 16

Drawing No. SP-2

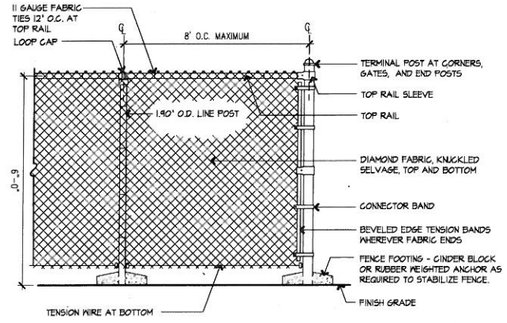


NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY. BERM SHALL BE PERMITTED. PERIODIC INSPECTION AND MAINTENANCE SHALL BE PROVIDED AS NEEDED.

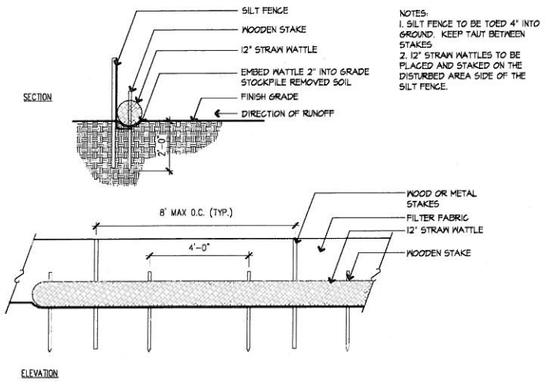
1 STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE



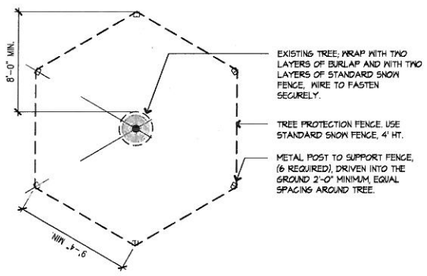
2 CONSTRUCTION FENCE

NOT TO SCALE



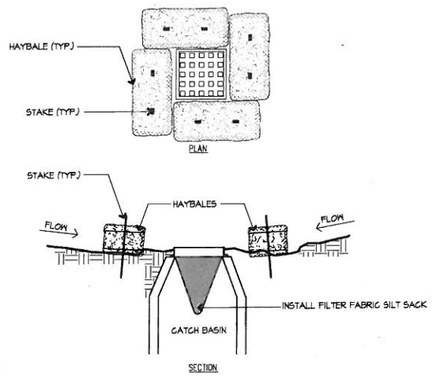
3 EROSION CONTROL

NOT TO SCALE



4 TREE PROTECTION

NOT TO SCALE



5 CATCH BASIN PROTECTION

NOT TO SCALE

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Client/Project

DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS

Wellesley, MA

Title

SITE PREPARATION DETAILS

Project No.	Scale	
210801597	AS SHOWN	
Sheet		Drawing No.
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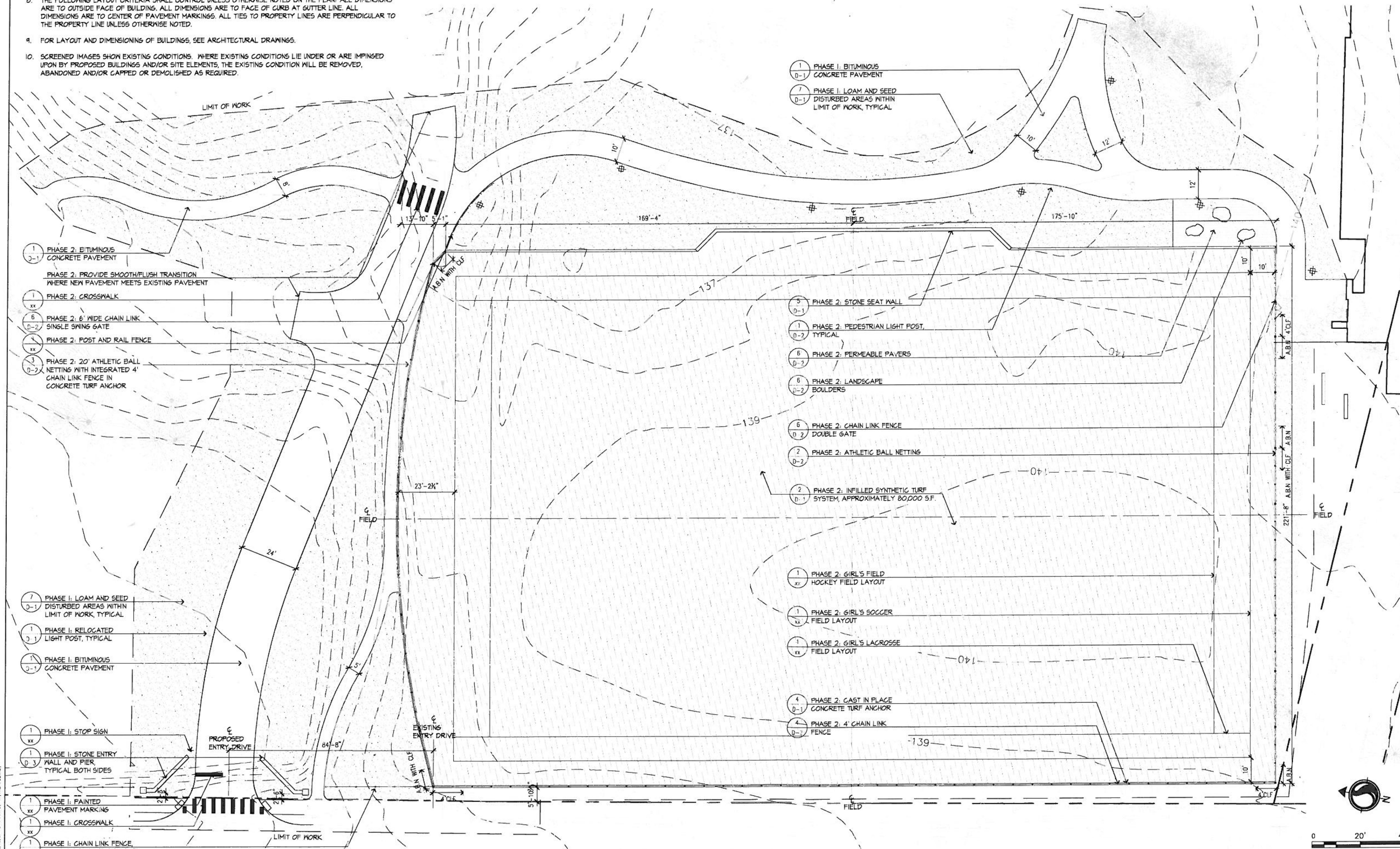
LAYOUT AND MATERIAL NOTES

1. EXISTING CONDITIONS INFORMATION IS REPRODUCED FROM THE SURVEY PREPARED BY NITSCH ENGINEERING OF BOSTON, MA AND IS DATED MAY 4 2015.
2. THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN ARE BASED ON THE SURVEY REFERENCED ABOVE. THE CONTRACTOR SHALL NOTIFY DIGSAFE AND 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.
3. CONTRACTOR(s) SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH ALL CONSTRUCTION DOCUMENTS, SPECIFICATIONS, AND SITE CONDITIONS PRIOR TO BIDDING AND PRIOR TO CONSTRUCTION.
4. ANY DISCREPANCIES BETWEEN DRAWINGS, SPECIFICATIONS, AND SITE CONDITIONS SHALL BE REPORTED IMMEDIATELY TO THE OWNER'S REPRESENTATIVE FOR CLARIFICATION AND RESOLUTION PRIOR TO BIDDING OR CONSTRUCTION.
5. ALL WORK CONDUCTED WITHIN PUBLIC RIGHT-OF-WAYS SHALL CONFORM TO THE REQUIREMENTS AND SPECIFICATIONS OF THE CITY OF XXXXX AND THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION (MASSDOT).
6. SEE ARCHITECTURAL DRAWINGS FOR EXACT BUILDING DIMENSIONS AND ALL DETAILS CONTIGUOUS TO THE BUILDING, INCLUDING SIDEWALKS, RAMPS, UTILITY ENTRANCE LOCATIONS, WALL PACKS, CONCRETE DOOR PADS, ROOF DRAINS, ETC.
7. ACCESSIBLE CURB RAMPS SHALL BE PER THE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD (AAB) AND THE AMERICANS WITH DISABILITIES ACT (ADA) ACCESSIBILITY GUIDELINES, WHICHEVER IS MORE STRINGENT.
8. THE FOLLOWING LAYOUT CRITERIA SHALL CONTROL UNLESS OTHERWISE NOTED ON THE PLAN: ALL DIMENSIONS ARE TO OUTSIDE FACE OF BUILDING. ALL DIMENSIONS ARE TO FACE OF CURB AT GUTTER LINE. ALL DIMENSIONS ARE TO CENTER OF PAVEMENT MARKINGS. ALL TIES TO PROPERTY LINES ARE PERPENDICULAR TO THE PROPERTY LINE UNLESS OTHERWISE NOTED.
9. FOR LAYOUT AND DIMENSIONING OF BUILDINGS, SEE ARCHITECTURAL DRAWINGS.
10. SCREENED IMAGES SHOW EXISTING CONDITIONS. WHERE EXISTING CONDITIONS LIE UNDER OR ARE IMPINGED UPON BY PROPOSED BUILDINGS AND/OR SITE ELEMENTS, THE EXISTING CONDITION WILL BE REMOVED, ABANDONED AND/OR CAPPED OR DEMOLISHED AS REQUIRED.

LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- LIGHT POST
- LOAM AND SEED
- BITUMINOUS CONCRETE WALKWAY
- PERMEABLE PAVERS
- INFILLED SYNTHETIC TURF SYSTEM
- CHAIN LINK FENCE
- ATHLETIC BALL NETTING
- POST AND RAIL FENCE
- STONE WALL



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MASSACHUSETTS JOSHUA P. ATKINSON NO. 3012 REGISTERED LANDSCAPE ARCHITECT

Client/Project

DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS

Wellesley, MA

Title

LAYOUT AND MATERIALS PLAN

Project No. 210801597

Scale AS SHOWN

Sheet 7 of 16

Drawing No. L-1

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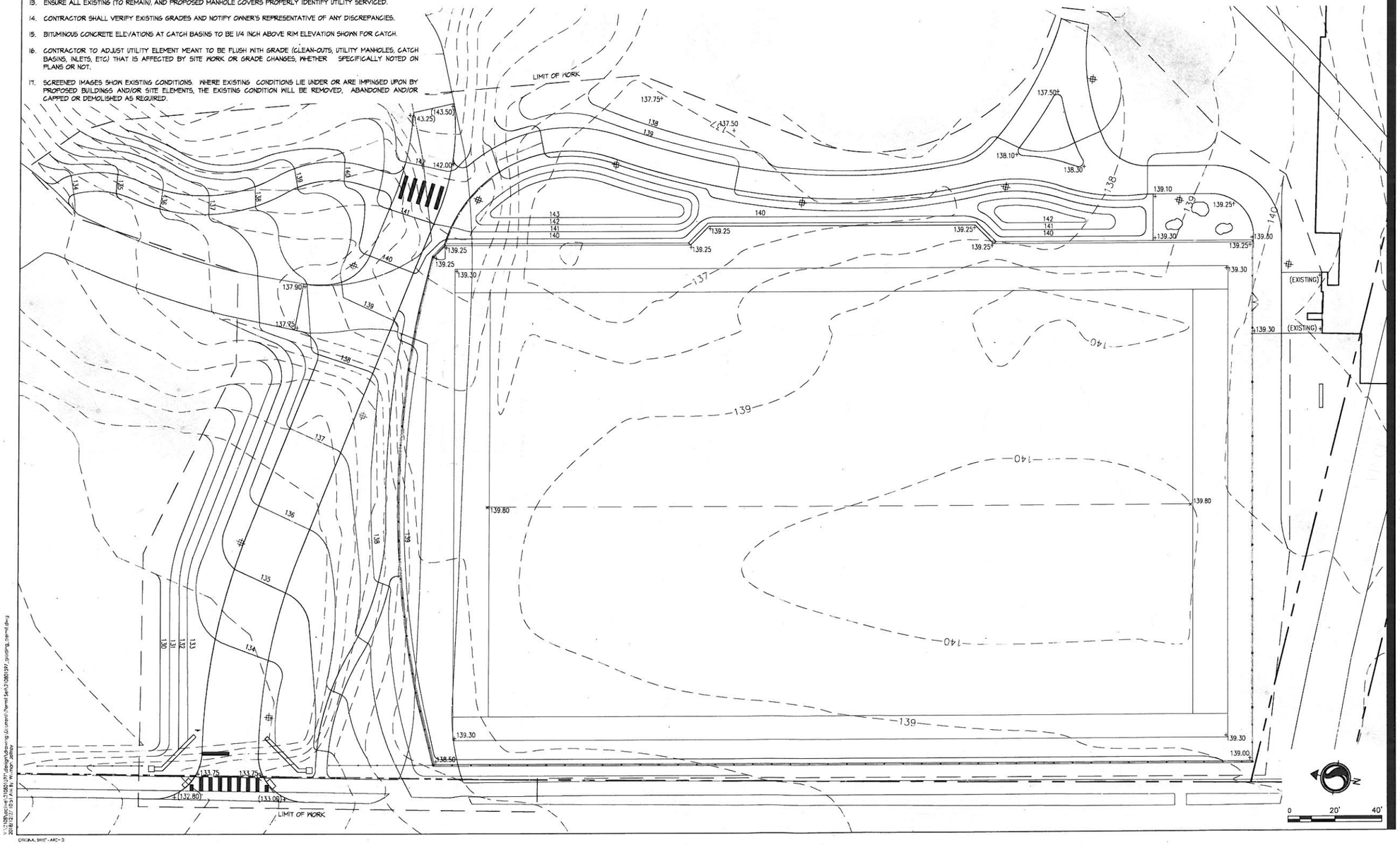
ORIGINAL SHEET - ARC-D

GRADING NOTES

1. EXISTING CONDITIONS INFORMATION IS REPRODUCED FROM THE SURVEY PREPARED BY NITSCH ENGINEERING OF BOSTON, MA AND IS DATED MAY 4, 2015.
2. PRIOR TO THE START OF ANY EXCAVATION FOR THE PROJECT, BOTH ON AND OFF THE SITE, THE CONTRACTOR SHALL NOTIFY DIGSAFE AND BE PROVIDED WITH A DIGSAFE NUMBER INDICATING THAT ALL EXISTING UTILITIES HAVE BEEN LOCATED AND MARKED.
3. WHERE PROPOSED GRADES MEET EXISTING GRADES, CONTRACTOR SHALL BLEND GRADES TO PROVIDE A SMOOTH TRANSITION BETWEEN EXISTING AND NEW WORK. PONDING AT TRANSITION AREAS WILL NOT BE ALLOWED.
4. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL BUILDING FOUNDATIONS, STRUCTURES AND PLANTING BEDS.
5. MAXIMUM SLOPE IN DISTURBED AREAS SHALL NOT EXCEED 3:1, UNLESS OTHERWISE NOTED.
11. THE CONTRACTOR SHALL MEET THE REQUIREMENTS OF 521 CMR OF THE ARCHITECTURAL ACCESS BOARD REGULATIONS. ALL GRADES ON WALKWAYS, RAMPS, CURB CUTS AND PARKING AREAS AS DEFINED BY 521 CMR SHALL COMPLY WITH THE MAXIMUM ALLOWABLE GRADES. GRADES SHALL BE MEASURED AT TWO FOOT INTERVALS. CROSS SLOPES ON ALL WALKS, PATHS OF TRAVEL AND ACCESSIBLE ROUTES AS DEFINED IN 521 CMR SHALL NOT EXCEED 1.5%. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT IMMEDIATELY IF DISCREPANCIES ARISE BETWEEN THE ACTUAL GRADES SHOWN ON THE PLANS AND THE MAXIMUM ALLOWABLE GRADES INDICATED IN 521 CMR.
12. ALL WALKWAYS SHALL BE GRADED TO A MAXIMUM 4.5% RUNNING SLOPE (PARALLEL TO THE DIRECTION OF TRAVEL). THE CROSS PITCH OF ALL WALKWAYS, PATHS AND PLAZAS SHALL NOT EXCEED 1.5% (PERPENDICULAR TO THE DIRECTION OF TRAVEL). THE SLOPE OF ALL RAMPS AND SIDE SLOPES OF HANDICAP CURB CUTS AS DEFINED BY SECTION 21.1 OF 521 CMR SHALL BE CONSTRUCTED AT 7.5% MAXIMUM. RAMPS AS DEFINED IN SECTION 24.1 OF 521 CMR SHALL BE CONSTRUCTED TO A MAXIMUM SLOPE OF 7.5%.
13. ENSURE ALL EXISTING (TO REMAIN), AND PROPOSED MANHOLE COVERS PROPERLY IDENTIFY UTILITY SERVICED.
14. CONTRACTOR SHALL VERIFY EXISTING GRADES AND NOTIFY OWNER'S REPRESENTATIVE OF ANY DISCREPANCIES.
15. BITUMINOUS CONCRETE ELEVATIONS AT CATCH BASINS TO BE 1/4 INCH ABOVE RIM ELEVATION SHOWN FOR CATCH.
16. CONTRACTOR TO ADJUST UTILITY ELEMENT MEANT TO BE FLUSH WITH GRADE (CLEAN-OUTS, UTILITY MANHOLES, CATCH BASINS, INLETS, ETC) THAT IS AFFECTED BY SITE WORK OR GRADE CHANGES, WHETHER SPECIFICALLY NOTED ON PLANS OR NOT.
17. SCREENED IMAGES SHOW EXISTING CONDITIONS. WHERE EXISTING CONDITIONS LIE UNDER OR ARE IMPINGED UPON BY PROPOSED BUILDINGS AND/OR SITE ELEMENTS, THE EXISTING CONDITION WILL BE REMOVED, ABANDONED AND/OR CAPPED OR DEMOLISHED AS REQUIRED.

GRADING LEGEND

— — —	PROPERTY LINE
—— ——	LIMIT OF WORK LINE
110	PROPOSED CONTOUR MAJOR LINE
112	PROPOSED CONTOUR MINOR LINE
(133.00)	EXISTING SPOTGRADE
133.00	PROPOSED SPOTGRADE



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Client/Project
DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS
Wellesley, MA

Title
GRADING PLAN

Project No.	Scale	
210801597	AS SHOWN	
Sheet		Drawing No.
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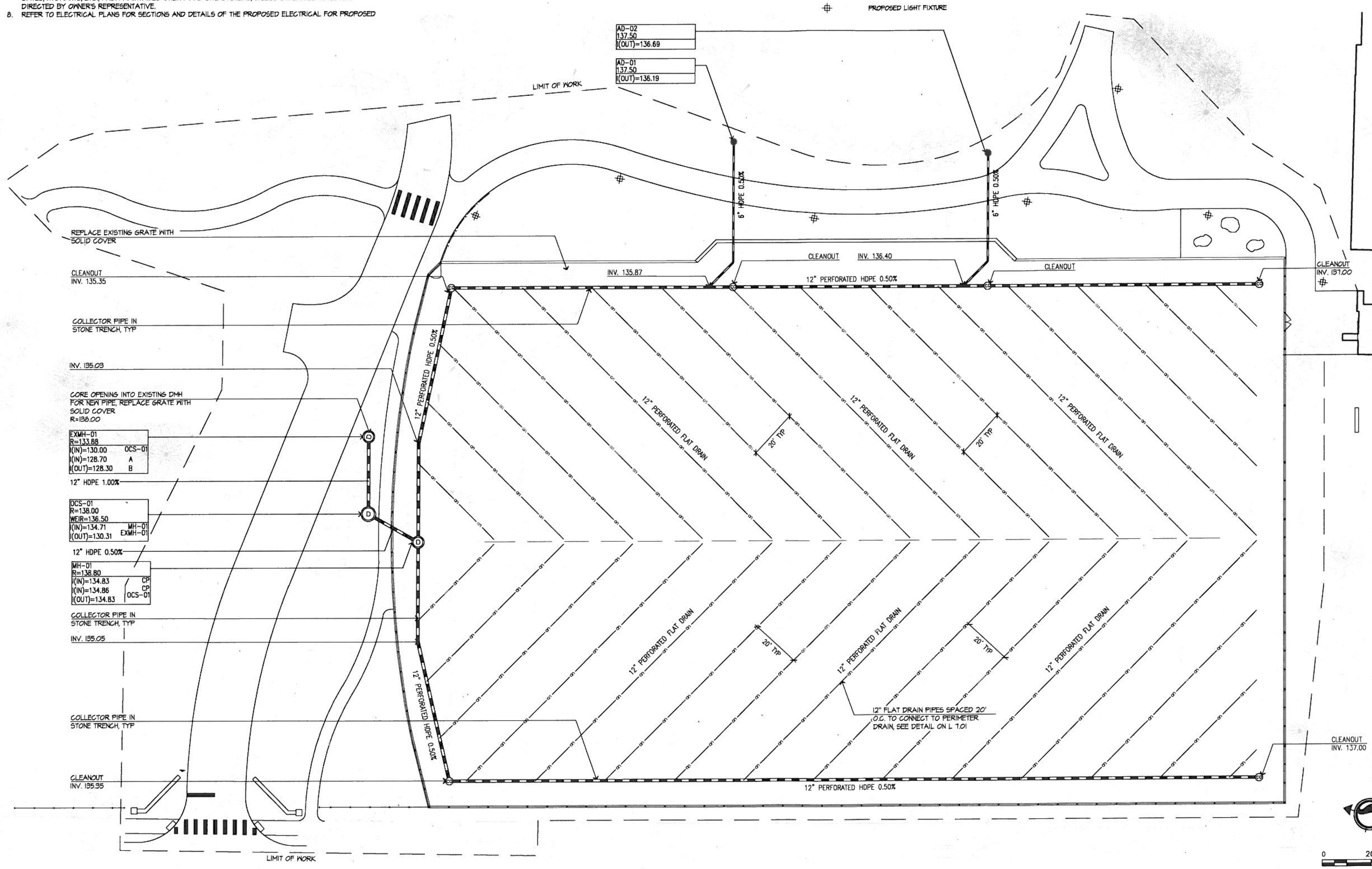
ORIGINAL SHEET - ARCH D

UTILITY NOTES

1. EXISTING CONDITIONS INFORMATION IS REPRODUCED FROM THE SURVEY PREPARED BY NITSCH ENGINEERING OF BOSTON, MA AND IS DATED MAY 4 2015.
2. PRIOR TO THE START OF ANY EXCAVATION FOR THE PROJECT, BOTH ON AND OFF THE SITE, THE CONTRACTOR SHALL NOTIFY DIGSAFE AND BE PROVIDED WITH A DIGSAFE NUMBER INDICATING THAT ALL EXISTING UTILITIES HAVE BEEN LOCATED AND MARKED.
3. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL BUILDING FOUNDATIONS, STRUCTURES AND PLANTING BEDS.
4. CONTRACTOR SHALL ADJUST UTILITY ELEMENT MEANT TO BE FLUSH WITH GRADE (CLEAN-OUTS, UTILITY MANHOLES, CATCH BASINS, INLETS, ETC.) THAT IS AFFECTED BY SITE WORK OR GRADE CHANGES, WHETHER SPECIFICALLY NOTED ON PLANS OR NOT.
5. 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.
6. 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.
7. CONTRACTOR SHALL MAINTAIN, OR ADJUST TO NEW FINISH GRADE, AS NECESSARY ALL UTILITY AND SITE STRUCTURES SUCH AS: LIGHT POLES, SIGN POLES, MANHOLES, CATCH BASINS, HAND HOLES, WATER AND GAS GATES, HYDRANTS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS, UNLESS OTHERWISE NOTED OR DIRECTED BY OWNER'S REPRESENTATIVE.
8. REFER TO ELECTRICAL PLANS FOR SECTIONS AND DETAILS OF THE PROPOSED ELECTRICAL FOR PROPOSED BUILDING.
9. 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.
10. THE LOCATION, SIZE, DEPTH, AND SPECIFICATIONS FOR CONSTRUCTION OF PRIVATE UTILITY SERVICES SHALL BE INSTALLED ACCORDING TO THE REQUIREMENTS PROVIDED BY, AND APPROVED BY, THE RESPECTIVE UTILITY COMPANY (GAS, TELEPHONE, ELECTRICAL.) THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF THE UTILITY CONNECTIONS WITH THE RESPECTIVE COMPANIES PRIOR TO ANY UTILITY CONSTRUCTION.
11. PROTECT AND MAINTAIN ALL EXISTING ON-SITE DRAINAGE STRUCTURES AND PIPES UNLESS OTHERWISE NOTED.
12. ENSURE ALL EXISTING (TO REMAIN), AND PROPOSED MANHOLE COVERS PROPERLY IDENTIFY UTILITY SERVICED.
13. CONTRACTOR SHALL VERIFY EXISTING GRADES AND NOTIFY OWNER'S REPRESENTATIVE OF ANY DISCREPANCIES.
14. BITUMINOUS CONCRETE ELEVATIONS AT CATCH BASINS TO BE 1/4 INCH ABOVE RIM ELEVATION SHOWN FOR CATCH.
15. SCREENED IMAGES SHOW EXISTING CONDITIONS. WHERE EXISTING CONDITIONS LIE UNDER OR ARE IMPINGED UPON BY PROPOSED BUILDINGS AND/OR SITE ELEMENTS, THE EXISTING CONDITION WILL BE REMOVED, ABANDONED AND/OR CAPPED OR DEMOLISHED AS REQUIRED.

UTILITY LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- CROWN RIDGE LINE
- UD — PERFORATED FLAT DRAIN, REFER TO PLAN FOR SIZE
- HDPE PIPE
- DRAIN MANHOLE (DMH)
- OUTLET CONTROL STRUCTURE (OCS)
- AREA DRAIN (AD)
- CLEAN OUT
- CP — COLLECTOR PIPE
- HDPE — HIGH DENSITY POLYETHYLENE PIPE
- PROPOSED LIGHT FIXTURE



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COMMONWEALTH OF MASSACHUSETTS
FRANK HOLMES
CIVIL
No. 40203
REGISTERED PROFESSIONAL ENGINEER

Client/Project
DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS
Wellesley, MA

Title
UTILITY PLAN

Project No.	Scale
210801597	AS SHOWN

Sheet		Drawing No.
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PLANTING NOTES

1. EXISTING CONDITIONS INFORMATION IS REPRODUCED FROM THE SURVEY PREPARED BY NITSCH ENGINEERING OF BOSTON, MA AND IS DATED MAY 4 2015.
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3. CONTRACTOR SHALL BEGIN MAINTENANCE IMMEDIATELY AFTER PLANTING AND WILL CONTINUE UNTIL FINAL WRITTEN ACCEPTANCE OF PLANT MATERIAL.
4. CONTRACTOR SHALL VERIFY ALL TREE REMOVALS WITH OWNER'S REPRESENTATIVE PRIOR TO CONSTRUCTION START.
5. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL BUILDING FOUNDATIONS, STRUCTURES, AND PLANTING BEDS.
6. MAXIMUM SLOPE WITHIN DISTURBED AREAS SHALL NOT EXCEED 3:1, UNLESS OTHERWISE NOTED.
7. THE LANDSCAPE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE ALL PLANTINGS SHOWN ON THIS DRAWING.
8. ALL MATERIALS SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION.
9. ALL PLANTS SHALL BEAR THE SAME RELATIONSHIP TO FINISH GRADE AS TO ORIGINAL GRADES BEFORE DIGGING.
10. ALL PLANTS TO BE BALLED IN BURLAP OR CONTAINERIZED.
11. MULCH FOR PLANTED AREAS TO BE AGED PINE BARK: PARTIALLY DECOMPOSED, DARK BROWN IN COLOR AND FREE OF WOOD CHIPS THICKER THAN 1/4 INCH.
12. PLANTING SOIL MIX: LOAM THOROUGHLY INCORPORATED WITH ROTTED MANURE PROPORTIONED 5 C.Y. TO 1 C.Y. OR EQUIVALENT. FERTILIZER ADDED PER RECOMMENDED RATES OF SOILS ANALYSIS.
13. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL PLANT MATERIALS FOR ONE (1) FULL YEAR FROM DATE OF ACCEPTANCE.
14. ALL PLANT MATERIALS ARE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT, AT THE NURSERY, AND AT THE SITE.
15. ALL AREAS OF THE SITE WHICH HAVE BEEN DISTURBED AND NOT OTHERWISE DEVELOPED SHALL BE LOAMED AND SEEDED WITH A MINIMUM DEPTH OF 6" DEPTH TOPSOIL.
16. PLANTS INSTALLED UNDER EXISTING TREE CANOPY SHALL BE HAND-DUG; CONTRACTOR SHALL AVOID DAMAGING EXISTING TREE ROOTS, CONSULT ARBORIST.

PLANTING LEGEND

- DECIDUOUS TREE
- SPECIMEN TREE
- ORNAMENTAL TREE
- EVERGREEN TREE
- EVERGREEN SHRUBS
- GROUNDCOVER AND/OR PERENNIAL MASSING
- LAWN SEED

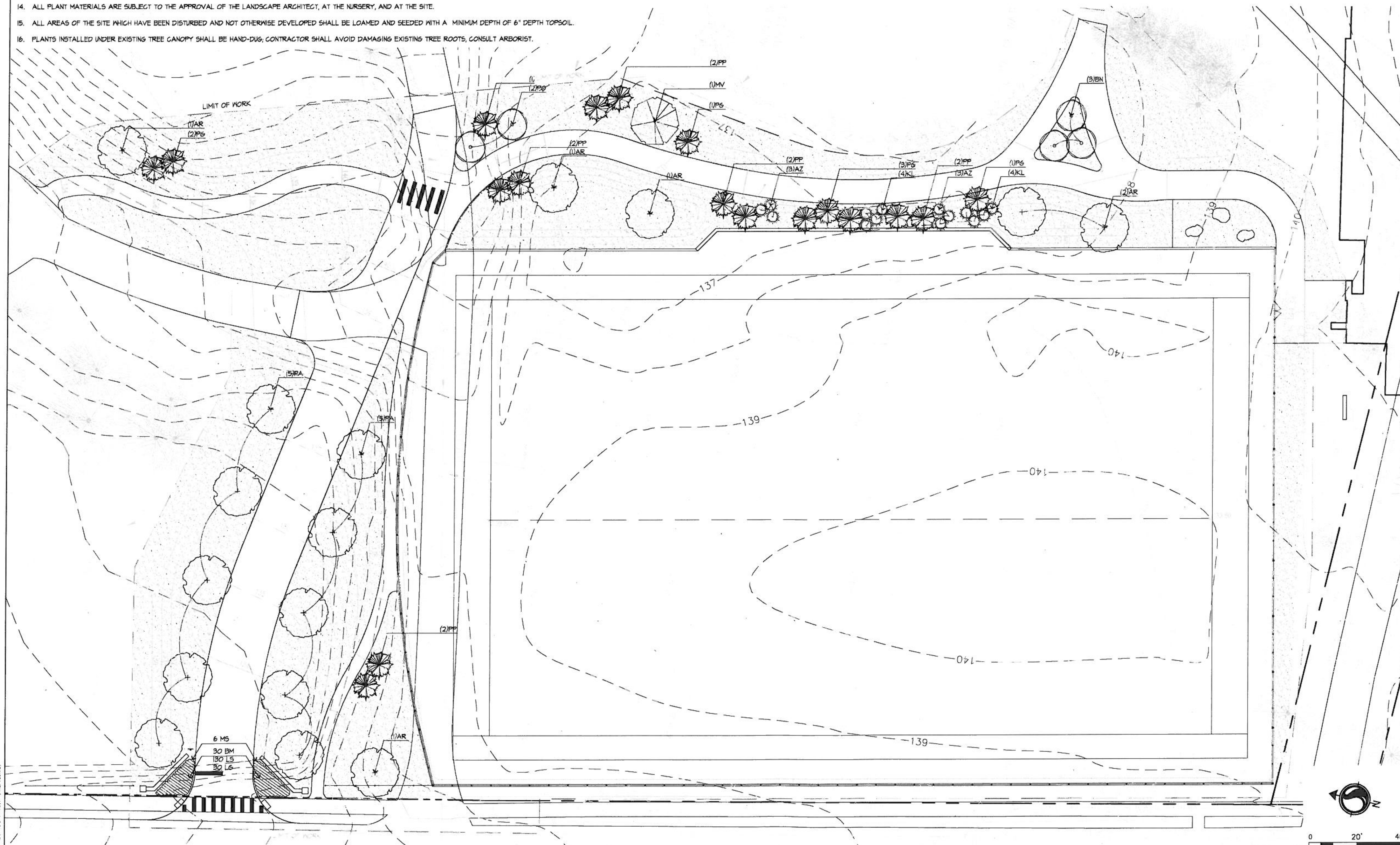
PLANT SCHEDULE

DECIDUOUS TREES					
SYM	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
BN	3	BETULA NIGRA 'HERITAGE'	MULTI-STEM RIVERBIRCH	3-3.5" CAL.	TRIPLE CLUMP
AR	6	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY MAPLE	3-3.5" CAL	
PA	10	PLATANUS X ACERIFOLIA	LONDON PLANE TREE	3-3.5" CAL	
PO	2	PRUNUS 'OKAME'	OKAME CHERRY	3-3.5" CAL	
MV	1	MAGNOLIACEA VIRGINIANA	SWEET BAY MAGNOLIA	3-3.5" CAL	

EVERGREEN TREES					
SYM	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
PG	6	PICEA GLAUCA	WHITE SPRUCE	6-8' HT.	
PP	10	PICEA PUNGENS	COLORADO SPRUCE	6-8' HT.	

EVERGREEN SHRUBS					
SYM	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
AZ	6	AZALEA 'DELAWARE VALLEY'	WHITE AZALEA	2-2 1/2' B&B	
KL	8	KALMIA LATIFOLIA	MOUNTAIN LAUREL	3 1/2-4' B&B	

PERENNIALS, GRASSES, FERNS, AND GROUNDCOVERS					
SYM	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
LS	130	LIRIOPE SPICATA	LILYTURF	#2 POT	9" O.C.
BM	30	HEMEROCALLIS BARBARA MITCHELL	BARBARA MITCHELL DAYLILY	#2 POT	24" O.C.
LG	30	RUDBECKIA 'LITTLE GOLDSTAR'	LITTLE GOLDSTAR BLACK EYED SUSAN	#2 POT	24" O.C.
MS	6	MISCANTHUS SINENSIS 'ADAGIO'	DWARF MAIDEN GRASS	#2 POT	24" O.C.



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Client/Project

DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS

Wellesley, MA

Title

PLANTING PLAN

Project No. 210801597

Scale AS SHOWN

Sheet 10 of 16

Drawing No. L-4

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Dana Hall Road	Illuminance	Fc	2.50	5.7	0.5	5.00	11.40
Entry Drive	Illuminance	Fc	2.11	13.8	0.2	10.55	69.00
Exit Drive	Illuminance	Fc	1.99	15.2	0.2	9.95	76.00
Pathway	Illuminance	Fc	2.29	5.7	0.3	7.63	19.00

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Client/Project

DANA HALL SCHOOL

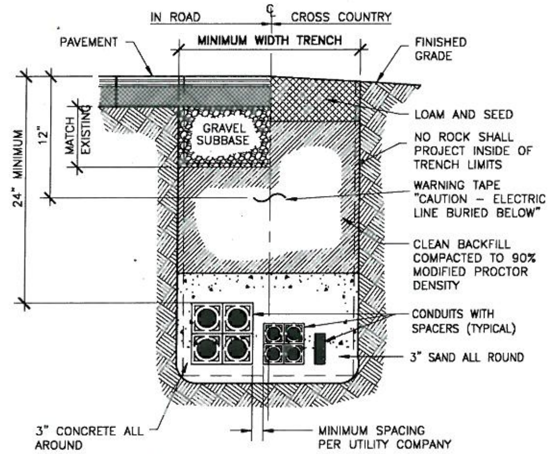
PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS

Wellesley, MA

Title

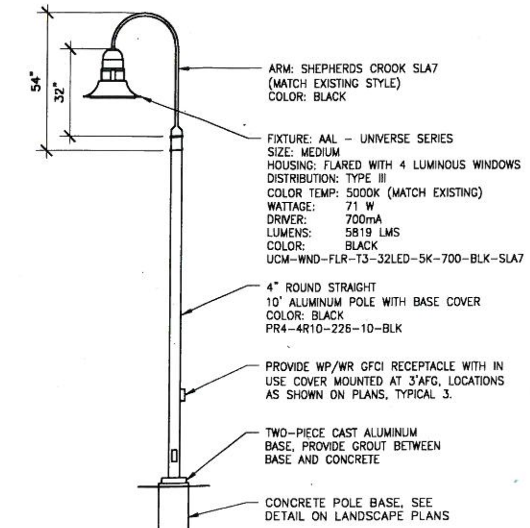
ELECTRICAL PHOTOMETRIC PLAN

Project No.	Scale	Drawing No.
210801597	AS SHOWN	
Sheet 11 of 16		EL-1



TYPICAL UTILITY CONDUITS TRENCH SECTION

NOT TO SCALE



SL / ES1.1 **TYPICAL SITE LIGHT**

NOT TO SCALE

GENERAL NOTES AND SPECIFICATIONS

1. THE SCOPE OF WORK IS TO PROVIDE ALL LABOR, MATERIALS, SERVICES, SUPPLIES, TOOLS, EQUIPMENT, TRANSPORTATION, AND FACILITIES NECESSARY TO FURNISH AND INSTALL COMPLETE ELECTRICAL WORK AS CALLED FOR ON THE DRAWINGS, SPECIFIED, OR AS MAY REASONABLY BE IMPLIED AS BEING INCIDENTAL TO THIS WORK.

2. SECURE AND PAY COSTS OF PERMITS, CERTIFICATES, LICENSES, INSPECTIONS, AND APPROVALS. ANY POWER OUTAGE SHALL BE SCHEDULED AND APPROVED BY THE OWNER.

3. DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF WORK. BASIC DESIGN CONCEPTS INDICATED ARE TO BE EITHER FOLLOWED OR BETTERED. WORK IS INTENDED TO INCLUDE ITEMS NECESSARY FOR PROPER OPERATION AND COMPLETION. FIELD VERIFY ALL LOCATIONS, ELEVATIONS, AND DIMENSIONS.

4. EXECUTE ALL WORK IN A NEAT AND WORKMANLIKE MANNER IN CONFORMANCE WITH BEST MODERN TRADE PRACTICE, BY COMPETENT, EXPERIENCED TRADESMEN, PRESENTING A NEAT APPEARANCE WHEN COMPLETED. REPLACE WORK NOT APPROVED BY OWNER WITHOUT ADDITIONAL CHARGE.

5. ALL MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NED) & MEC, AND ALL CODES, REGULATIONS AND REQUIREMENTS OF ALL MUNICIPAL, STATE, FEDERAL AND OTHER PUBLIC OR PRIVATE AUTHORITIES WHICH HAVE JURISDICTION. IN EACH CASE, CODES ARE MINIMUM REQUIREMENTS.

6. SHOP DRAWINGS: SUBMIT COMPLETE CATALOG INFORMATION FOR ALL MATERIALS AND EQUIPMENT TO BE PURCHASED AND USED ON THIS PROJECT, AS SPECIFIED ON THE DRAWINGS. DO NOT INSTALL MATERIALS OR EQUIPMENT WITHOUT APPROVAL BY THE OWNER. UNAPPROVED MATERIAL ALREADY INSTALLED SHALL BE SUBJECT TO REMOVAL AND REPLACEMENT WITH APPROVED MATERIALS AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR IS RESPONSIBLE FOR INSURING THAT APPROVED SUBSTITUTE ITEMS WILL FIT INTO AVAILABLE SPACES AND FOR ANY EXTRA CHARGES BY OTHER TRADES.

7. AS THERE MAY BE VARIOUS CONDITIONS AT THE SITE WHICH DO NOT SHOW ON THE ACCOMPANYING DRAWINGS, OR WHICH ARE AT VARIANCE WITH THE CONDITIONS INDICATED ON THE DRAWINGS, IT IS IMPORTANT THAT EACH BIDDER VISIT THE SITE AND ACQUAINT HIMSELF WITH EXISTING CONDITIONS AND TAKE THESE CONDITIONS INTO CONSIDERATION WHEN PREPARING HIS BID. EACH BIDDER SHALL OBTAIN INFORMATION OR MAKE ANY MEASUREMENT DESIRED. LACK OF KNOWLEDGE RELATIVE TO EXISTING SITE CONDITIONS WILL NOT BE ALLOWED AS A BASIS FOR EXTRA COMPENSATION.

8. THE FINISHED INSTALLATION SHALL BE COMPLETE IN EVERY RESPECT AND DETAIL, TESTED AND LEFT READY IN PERFECT OPERATING CONDITION FOR THE OWNER'S USE.

9. MATERIALS AND EQUIPMENT SHALL BE LISTED BY UNDERWRITERS' LABORATORIES AND SHALL BE INSTALLED IN ACCORDANCE WITH SUCH LISTINGS.

10. THE CONTRACTOR SHALL GUARANTEE THAT MATERIALS, EQUIPMENT AND WORKMANSHIP PROVIDED BY HIM SHALL BE FREE FROM DEFECTS IN MATERIALS OR WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE OF THE WORK DONE UNDER THIS CONTRACT, AND SHALL REPLACE PARTS FOUND TO BE DEFECTIVE WITHIN THE PERIOD COVERED BY SUCH GUARANTEE, WITHOUT COST TO THE OWNER.

11. INSTALLATION SHALL BE MADE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

GENERAL SITE CONSTRUCTION NOTES:

1. ALIGN FIXTURES ALONG ALL CONTINUOUS STRAIGHT WALKWAY/ROADWAY SECTIONS. FIXTURES SHALL BE SET AT A NOMINAL DISTANCE OF 2 FT. FROM EDGE OF WALKWAYS OR 3FT FROM EDGE OF ROADWAYS TO CENTER OF FIXTURE BASE. SEE TYPICAL LIGHT POLE LAYOUT TO EDGE OF WALKWAY DETAIL.

2. CONTRACTOR SHALL CARRY ALL COSTS RELATING TO THE REMOVAL AND DISPOSAL OF CONCRETE BASES, WIRING, AND ASSOCIATED MATERIALS FOR THE RELOCATED FIXTURES.

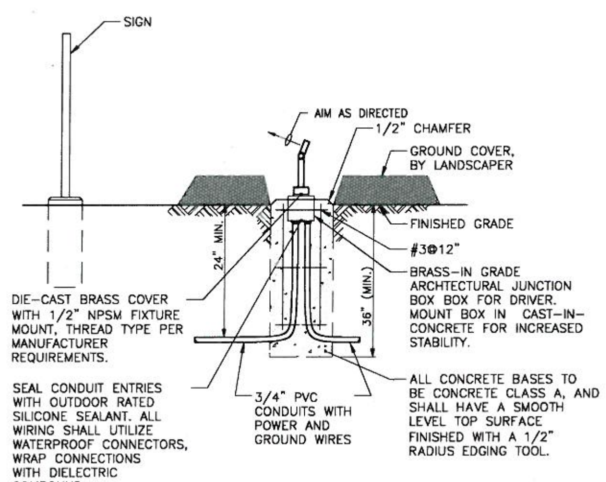
3. EXISTING LIGHTING TO REMAIN IN PLACE AND OPERATIONAL, EXISTING UNDERGROUND WIRE AND CONDUIT SHALL BE REMAIN.

4. WHERE CONDUIT IS TO BE INSTALLED UNDER EXISTING PAVED WALKWAY. PAVEMENT SHALL BE CUT AND PATCHED.

5. LOCATION OF PROPOSED ELECTRICAL SERVICES ARE INTENDED NOT TO DISTURB ROOT SYSTEMS OF EXISTING TREES OR SHRUBS. CONTRACTOR SHALL EXERCISE DUE CARE TO PREVENT DAMAGE THERETO. ALL GRASS AREAS DISTURBED SHALL BE RESTORED TO ROUGH GRADE. TOPSOIL AND GRASS SEEDING SHALL BE DONE BY OTHERS. CONTRACTOR IS RESPONSIBLE FOR REMOVAL, CARE & REPLANTING OF ALL PLANTINGS AND SHRUBS DISTURBED DURING CONSTRUCTION.

6. EXISTING UTILITIES ARE SHOWN USING THE BEST AVAILABLE RECORD PLAN INFORMATION. EXPLORATORY EXCAVATION BY CONTRACTOR SHALL BE PERFORMED AT ALL POTENTIAL UTILITY CONFLICTS TO LOCATE EXISTING UTILITIES, PRIOR TO INSTALLATION OF UNDERGROUND CONDUITS, DUCTBANKS, AND BASES. CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF ALL UTILITIES WHETHER OR NOT THEY ARE SHOWN ON THE PLANS. ALL REPAIRS TO DAMAGED UTILITIES SHALL BE MADE BY THE CONTRACTOR USING MATERIALS APPROVED BY THE ENGINEER AT NO ADDITIONAL EXPENSE TO THE OWNER.

7. CONTRACTOR TO CONTACT DIG SAFE 1-888-DIG-SAFE, PRIOR TO COMMENCING WORK. CONTRACTOR SHALL VERIFY LOCATION OF ALL OVERHEAD AND UNDERGROUND ELECTRIC AND TELEPHONE LINES AND TAKE NECESSARY PRECAUTIONS IN STRICT ACCORDANCE WITH OSHA STANDARDS DURING CONSTRUCTION. CONTRACTOR SHALL CONTACT LOCAL ELECTRICAL, CABLE AND TELEPHONE UTILITIES REGARDING ANY NECESSARY SUPPORT OF ANY UTILITY LINES DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR THE SUPPORT OR TEMPORARY RELOCATION OF ALL UTILITY POLES AFFECTED BY THE CONSTRUCTION.



SECTION

FIXTURE DESCRIPTION

LUMINAIRE:
COOPER LIGHTING – LUMIERE:
EON SERIES: 303-A1-LEDB1-4000-UNV-T2-DIM10-BK-6" STEM
OPTICS: 8.8W LED'S – 4000K

LENS: CLEAR, TEMPERED GLASS LENS, FACTORY SEALED WITH ADHESIVE TO PREVENT WATER INTRUSION

DRIVER: PROVIDE WITH UNIVERSAL VOLTAGE FOR 120, 240, OR 277V. CONNECTIONS.

FINISH: TEXTURED BLACK

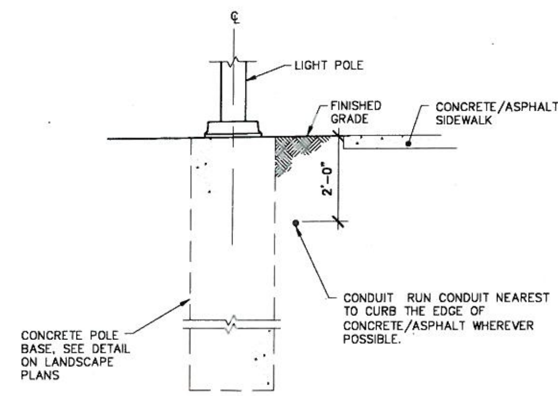
HARDWARE: STAINLESS STEEL.

INSTALLATION SHALL BE MADE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

NOTE: SEE LANDSCAPING PLANS FOR EXACT LOCATION OF SIGN, LOCATE FIXTURE MINIMUM OF 5' FROM SIGN

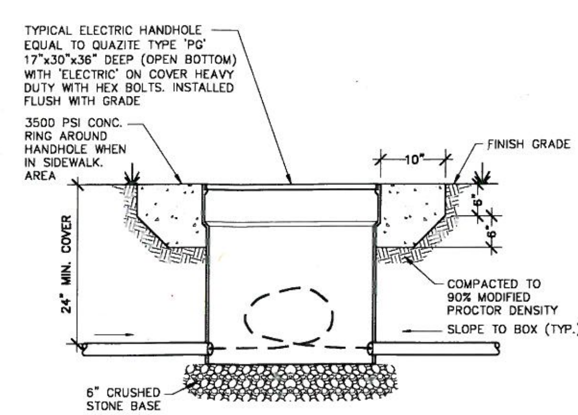
A **SIGN LIGHT FIXTURE – TYPE A**

NOT TO SCALE



TYPICAL LIGHT POLE LAYOUT TO EDGE OF WALKWAY/ROADWAY

NOT TO SCALE



TYPICAL SECTION @ HANDHOLE

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Client/Project

DANA HALL SCHOOL

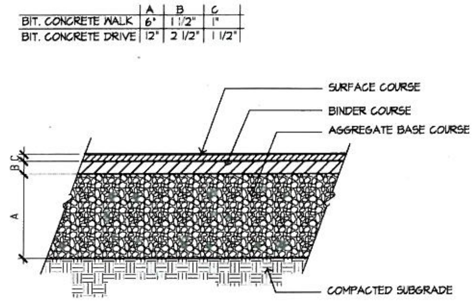
PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS
Wellesley, MA

Title

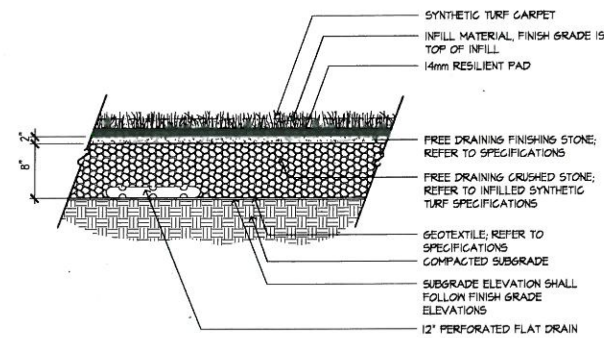
ELECTRICAL DETAILS

Project No. 210801597 — Scale AS SHOWN

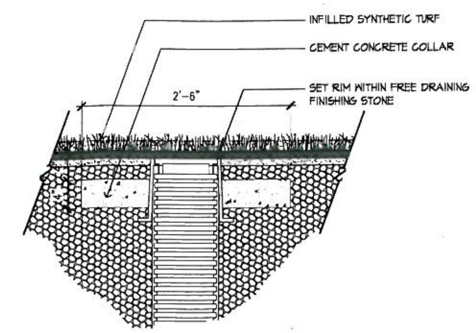
Sheet 12 of 16 — Drawing No. EL-2



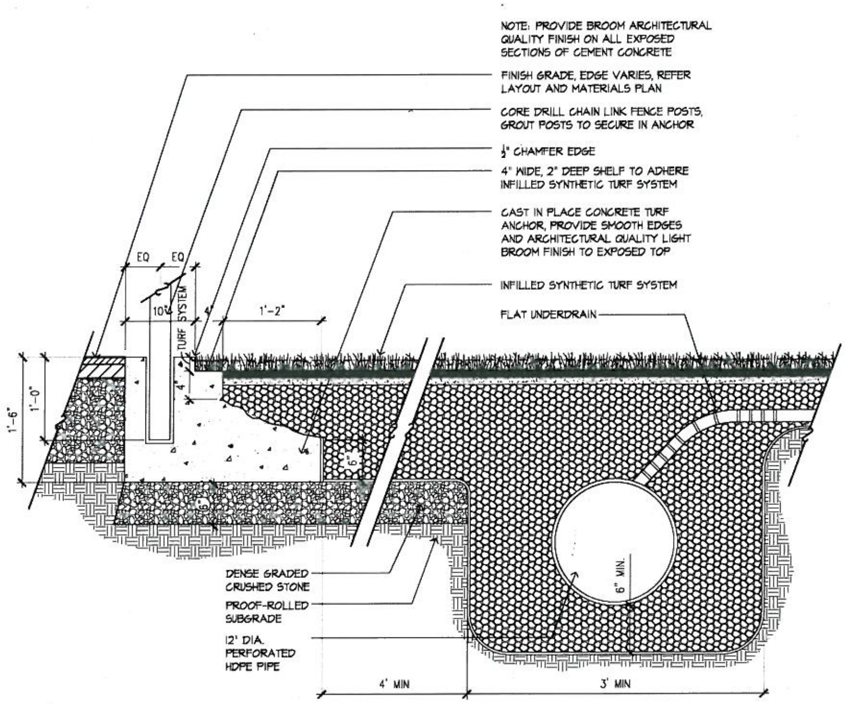
1 BITUMINOUS CONCRETE PAVEMENT
NOT TO SCALE



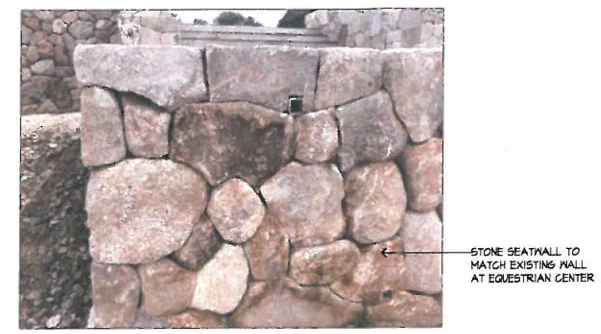
2 INFILLED SYNTHETIC TURF SYSTEM
NOT TO SCALE

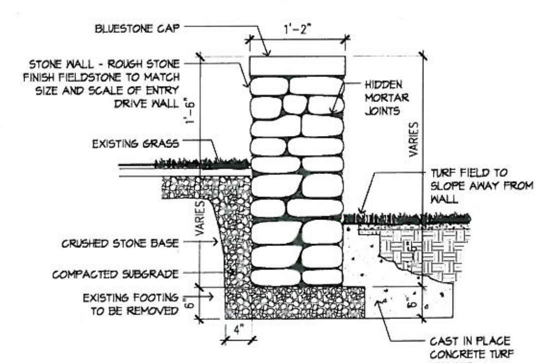


3 CLEAN OUT IN INFILLED SYNTHETIC TURF
NOT TO SCALE

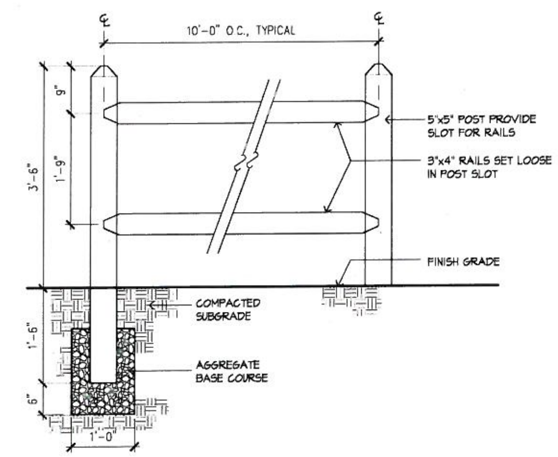


4 CAST-IN-PLACE CONCRETE TURF ANCHOR AND COLLECTOR PIPE
NOT TO SCALE

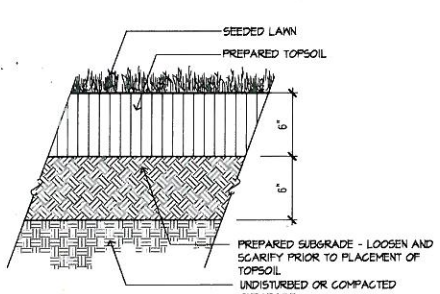




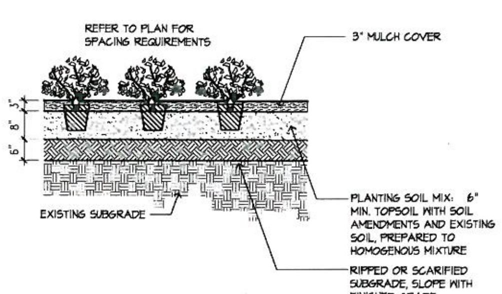
5 STONE SEAT WALL
NOT TO SCALE



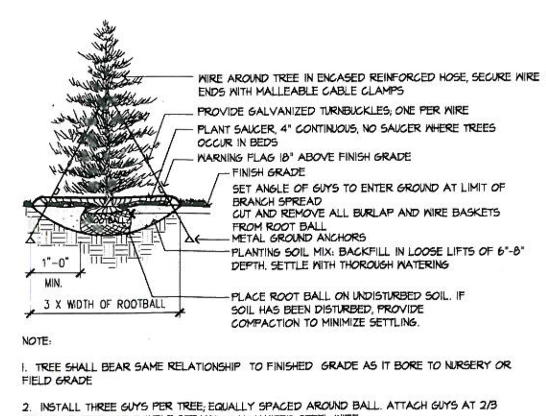
6 POST AND RAIL FENCE
NOT TO SCALE



7 LOAM AND SEED
NOT TO SCALE



8 SHRUB PLANTING
NOT TO SCALE

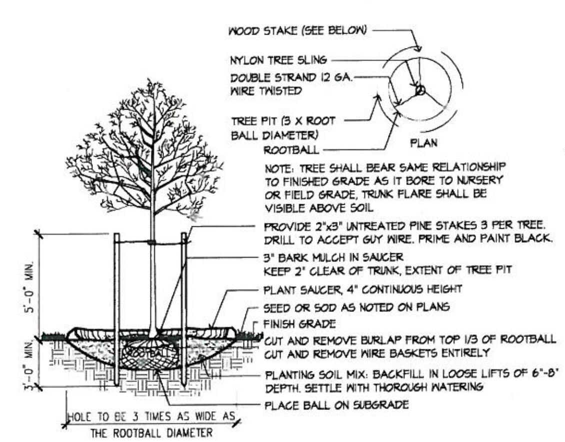


NOTE:

1. TREE SHALL BEAR SAME RELATIONSHIP TO FINISHED GRADE AS IT BORE TO NURSERY OR FIELD GRADE

2. INSTALL THREE GUYS PER TREE; EQUALLY SPACED AROUND BALL. ATTACH GUYS AT 2/3 HEIGHT OF TREE; USE DOUBLE STRAND GALVANIZED STEEL WIRE

9 EVERGREEN TREE PLANTING
NOT TO SCALE



10 DECIDUOUS TREE PLANTING
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Client/Project

DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS

Wellesley, MA

Title

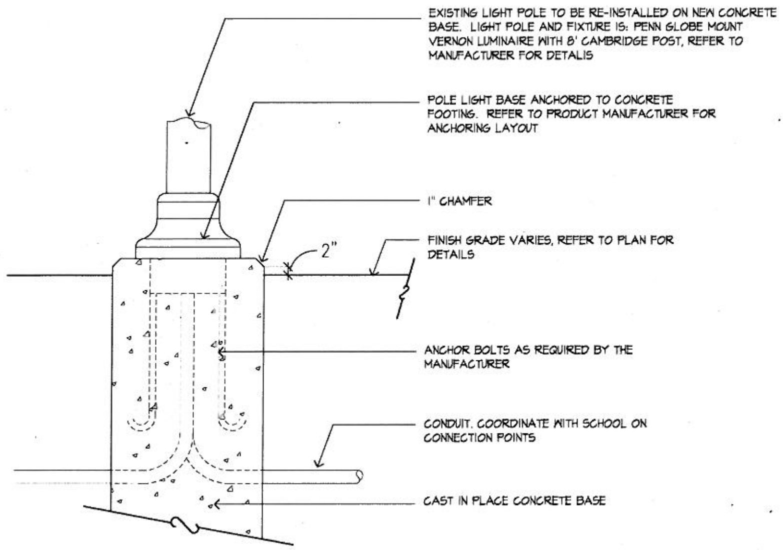
SITE DETAILS I

Project No. 210801597

Scale AS SHOWN

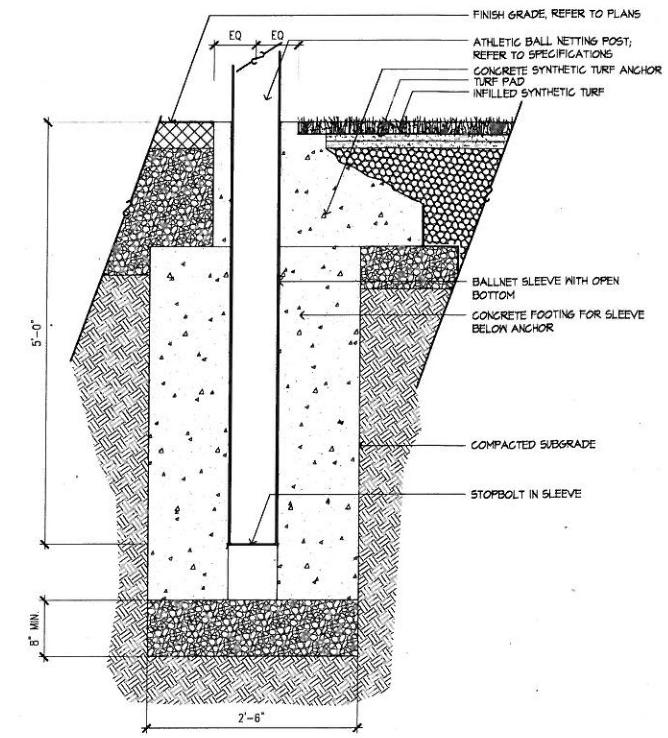
Sheet 13 of 16

Drawing No. D-1



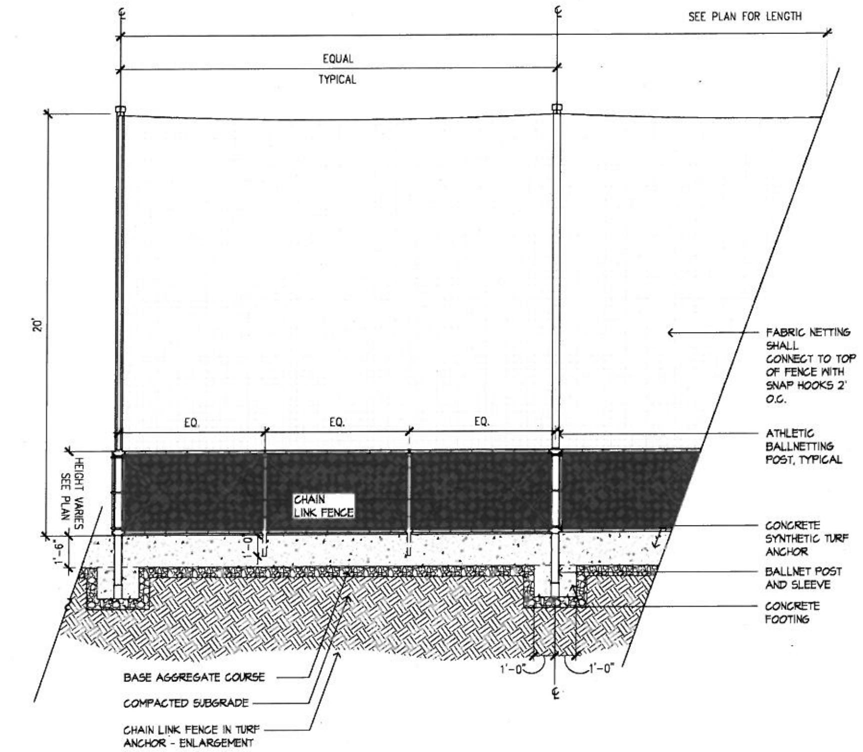
1 LIGHT POLE BASE

NOT TO SCALE



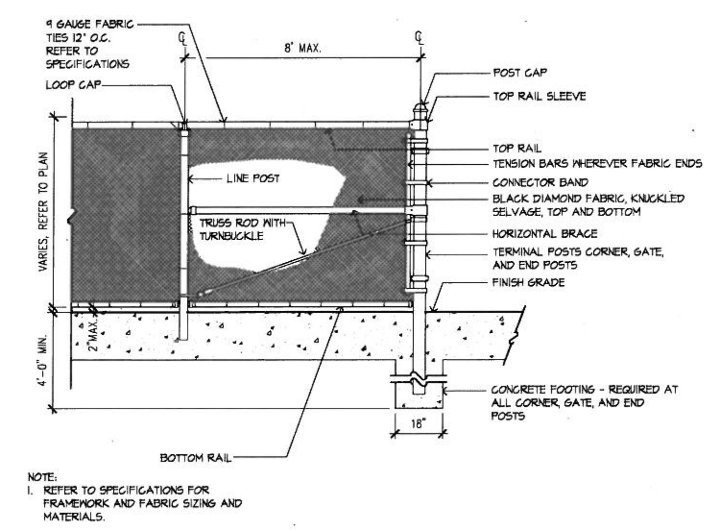
2 ATHLETIC BALL NETTING POST

NOT TO SCALE



3 ATHLETIC BALL NETTING AND INTEGRATED FENCE IN TURF ANCHOR

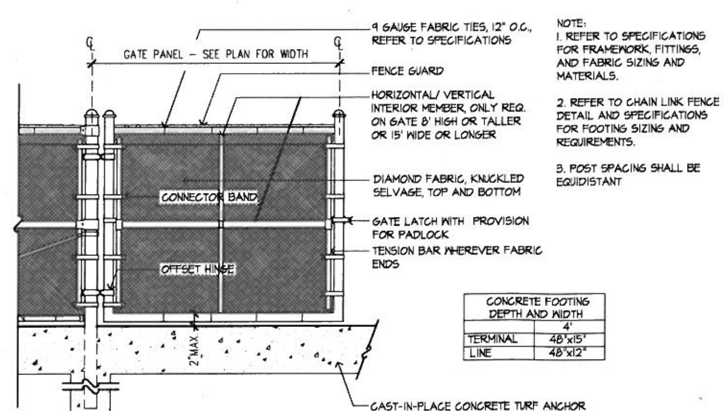
NOT TO SCALE



NOTE:
1. REFER TO SPECIFICATIONS FOR FRAMEWORK AND FABRIC SIZING AND MATERIALS.
2. POST SPACING SHALL BE EQUIDISTANT

4 CHAIN LINK FENCE

NOT TO SCALE

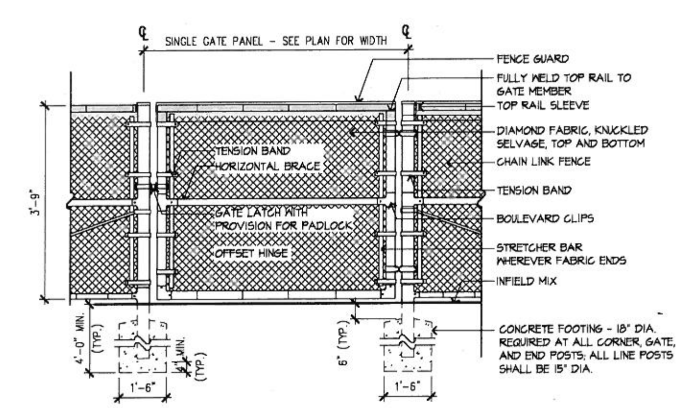


NOTE:
1. REFER TO SPECIFICATIONS FOR FRAMEWORK, FITTINGS, AND FABRIC SIZING AND MATERIALS.
2. REFER TO CHAIN LINK FENCE DETAIL AND SPECIFICATIONS FOR FOOTING SIZING AND REQUIREMENTS.
3. POST SPACING SHALL BE EQUIDISTANT

CONCRETE FOOTING DEPTH AND WIDTH	
	4'
TERMINAL	48"x15"
LINE	48"x12"

5 CHAIN LINK SINGLE GATE

NOT TO SCALE



6 CHAIN LINK DOUBLE GATE

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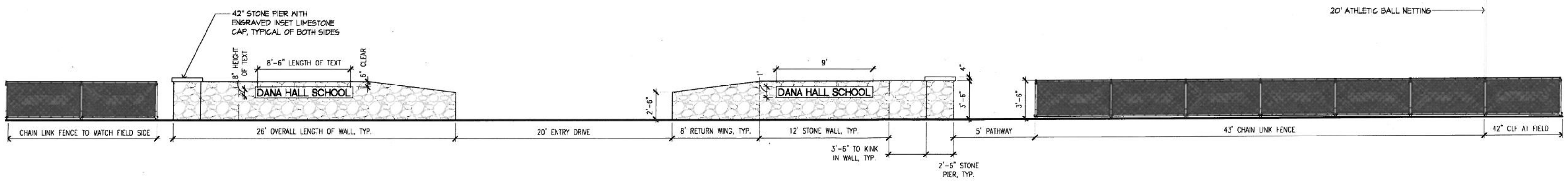
PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS
Wellesley, MA

Title
SITE DETAILS II

Project No. 210801597 — Scale AS SHOWN

Sheet 14 of 16 — Drawing No. D-2



(1) ENTRY DRIVE WALL ELEVATION

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PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS

Wellesley, MA

Title

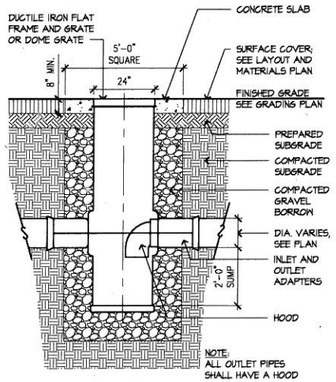
SITE DETAILS III

Project No. 210801597

Scale AS SHOWN

Sheet 15 of 16

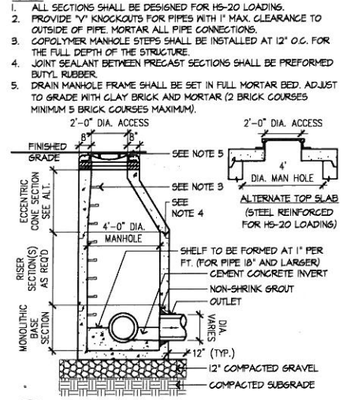
Drawing No. D-3



1 AREA DRAIN - 24 INCH

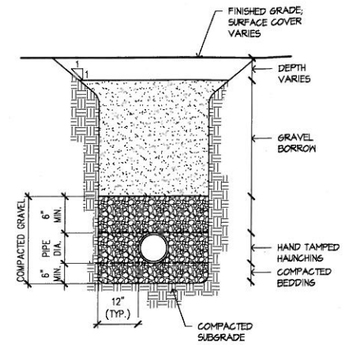
SCALE: NTS REV

NOTES:
1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
2. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 1" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
3. COPOLYMER MANHOLE STEPS SHALL BE INSTALLED AT 12" O.C. FOR THE FULL DEPTH OF THE STRUCTURE.
4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
5. DRAIN MANHOLE FRAME SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES MINIMUM 5 BRICK COURSES MAXIMUM).



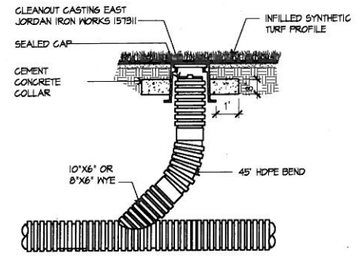
2 DRAIN MANHOLE

SCALE: NTS REV



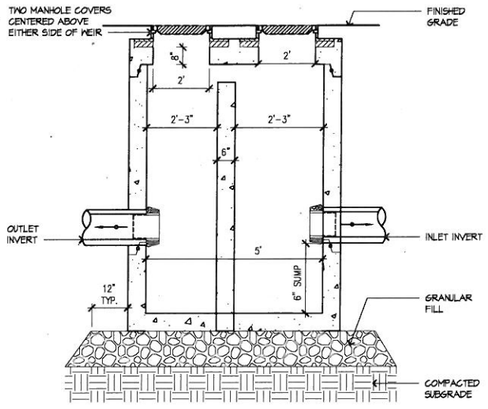
3 UTILITY TRENCH

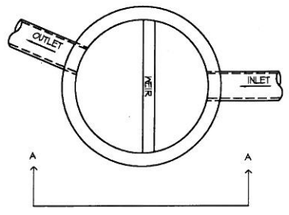
SCALE: NTS REV



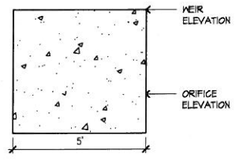
4 DRAINAGE SERVICE CLEANOUT

SCALE: NTS REV





NOTES:
1. ALL SECTIONS SHALL BE DESIGNED FOR HS-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. FRAME SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR. (2 BRICK COURSES MIN 5 BRICK COURSES MAX.).
5. ALL PIPE SHALL BE HDPE UNLESS OTHERWISE SPECIFIED.
6. REFER TO SUBSURFACE DETENTION SYSTEM DESIGN BY MANUFACTURE FOR INVERT ELEVATIONS INTO THE OUTLET CONTROL STRUCTURE.



5 OUTLET CONTROL STRUCTURE

SCALE: NTS REV

Stantec

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Consultants

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Notes

PERMIT SET	JW	JA	12.21.18
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Permit-Seal

COMMONWEALTH OF MASSACHUSETTS
FRANK HOLMES
CIVIL
No. 49583
REGISTERED PROFESSIONAL ENGINEER

Client/Project

DANA HALL SCHOOL

PERMIT SET: ENTRY DRIVE AND ATHLETIC FIELD IMPROVEMENTS
Wellesley, MA

Title

CIVIL DETAILS 1

Project No.	Scale	
210801597	AS SHOWN	
Sheet		Drawing No.
16 of 16		D-4