

Stormwater Pollution Prevention Plan

Renovation of Bennett Building
Sacred Heart University
175 Jefferson Street
Fairfield, Connecticut
June 2, 2016

Prepared for:
Sacred Heart University
175 Jefferson Street
Fairfield, Connecticut 06825

MMI #2982-17



Prepared by:
MILONE & MACBROOM, INC.
99 Realty Drive
Cheshire, Connecticut 06410
(203)-271-1773
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1.0 INTRODUCTION

This Stormwater Pollution Prevention Plan (SWPPP) has been developed for Sacred Heart University in accordance with the requirements of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activity, effective October 1, 2013 (the General Permit). Milone & MacBroom, Inc. (MMI) has been retained by Sacred Heart University to prepare this registration. In implementing this plan, it is Sacred Heart University's goal to prevent pollution caused by soil erosion and sedimentation during and after construction and prevent stormwater pollution caused by use of the site after construction is completed.

Information contained in this SWPPP has been obtained from site inspections and available mapping. A copy of this plan shall be maintained at the site as required by Section 5(b)(5) of the General Permit. For a period of at least five years from the date construction is complete, the permittee shall retain a copy of this plan and any reports generated from its requirements.

2.0 SITE DESCRIPTION

The subject property is a 15.56-acre parcel located at 175 Jefferson Street in Fairfield, Connecticut. The site is currently occupied by the Jewish Home for the Elderly. The site includes seven buildings with a footprint of 104,000 square feet and associated parking and driveways that total 245,000 square feet, for a total of 349,000 square feet.

At this time, Sacred Heart University is proposing to demolish one existing building, known as Tandet, and renovate one building, known as Bennett. The other buildings will remain but be unoccupied for the time being. Approximately 216,750 square feet of impervious area will be removed, comprising 70,500 square feet of building and 146,250 square feet of parking, driveway, and sidewalk areas. The renovated Bennett building will become a new residence hall. Other site improvements include an amphitheater on the eastern portion of the parcel and new sidewalks. As part of this project, the roadway west of the parcel will be widened by 5 feet and the roadway south of the parcel will be widened by 9 feet to allow for parking. The remaining areas affected by the demolition are to become landscaped areas. The campus master plan calls for three new buildings, parking improvements, and driveway or sidewalk reconfigurations, which will add impervious area.

The existing storm drainage system on site consists of three main pipe networks. These networks discharge into two existing stormwater detention basins before connecting to the municipal storm sewer system in Jefferson Street. Both basins are along the northern edge of the property just south of Jefferson Street.

As part of the site design, a comparison between existing and proposed impervious coverage was performed. The analysis comprehensively accounted for development associated with this project as well as possible future campus improvements. The computations indicated that there will be a significant decrease in impervious coverage due to the removal of the building and large portion of the looped entrance drive. The proposed development at this time will reduce the parcel's impervious area from 8.0 acres to 4.6 acres, a net decrease of 3.4 acres, or 42.5%, in impervious coverage.

While not part of the current application, the parcel's impervious area under the master plan is still expected to decrease from 8.0 acres to 6.4 acres, a net decrease of 1.6 acres, or 20.0%, of impervious coverage and the site curve number(CN) will subsequently decrease from 85 to 71. A graphical representation of the change in impervious coverage is provided in Appendix B.

As the amount of impervious coverage directly attributes to the amount of runoff, the result will be an overall reduction in stormwater now, as well as in the future. Additional detention measures are not necessary for the site.

Watershed maps and drainage calculations to support the proposed stormwater design are provided in Appendix C.

3.0 CONSTRUCTION SEQUENCING AND CONTROL MEASURES

This project includes the demolition of one existing building and associated infrastructure as well as the renovation of one existing building and associated utility improvements for a total disturbed area of 8.21-acres. Sediment and erosion control concerns include cuts and fills associated with construction and the protection of the existing storm drainage system on site.

All sediment and erosion control measures shall conform to the “Guidelines for Soil Erosion and Sediment Control, Connecticut – 2002, Town of Fairfield requirements, and in all cases best management practices shall prevail. Control measures shall be implemented in accordance with Section 5(b)(2) of the General Permit. A stormwater pollution control plan and details are supplied in Appendix D.

Proposed construction sequencing as follows:

1. Install perimeter controls and construction entrance.
2. Throughout the course of construction, the stabilized construction areas shall not have exposed soils and shall not have soils susceptible to erosion. These areas shall be stabilized to prevent the visible movement of soil particles and development of rills.
3. Install inlet protection on existing drainage structures.
4. Demolish Tandet building and begin interior demolition of Bennett.
5. Install diversion berms and temporary sediment traps.
6. Topsoil should be stripped and sediment filter fence to be installed around the stockpile. The soil stockpile should then be stabilized with mulch and seed.
7. Demolish hardscapes associated with Tandet building.
8. Begin Bennett building renovation in conjunction with site improvements.
9. Install underground utilities. Drainage inlet protection controls should be installed as structures are put in place.
10. Construct amphitheater and proposed hardscapes including the western and southern drive pavement widenings.
11. Slopes should be stabilized as soon as possible with erosion control blanket or mulch and seed.
12. Clean out temporary sediment trap before final stabilization measures are in place.
13. Final stabilization and installation of landscaping.

4.0 INSPECTIONS AND MONITORING

The site shall be inspected initially for implementation of this plan and then weekly for routine inspections pursuant to Section 5(b)(4) of the general permit. Within 30 days following commencement of construction, the permittee must contact the design engineer to inspect the site. Qualifications of site inspector(s) as well as their findings, actions, and results of all inspections conducted on site shall be included in this plan.

During construction, inspections of the erosion controls shall occur weekly and/or within 24 hours of the end of a storm that generates a discharge. For storms that end on a weekend, holiday or other time after which normal working hours will not commence within 24 hours, an inspection is required within 24 hours only for storms that equal or exceed 0.5 inches. For storms less than 0.5 inches, an inspection shall occur immediately upon the start of the subsequent normal working hours.

Monitoring of stormwater turbidity shall follow the primary requirements set forth in Section 5(c) of the General Permit. The contractor shall monitor a log of all monthly inspections and plan modifications on site. The monitoring outfall location is identified in Appendix E. Samples shall be taken at Outfall 1 and reported following NetDMR requirements.

5.0 MAINTENANCE PROGRAM

Upon site development, there will be a need to periodically maintain stormwater systems on the property. The stormwater system consists of piping and catch basins. In order to ensure optimal performance of the system, the following stormwater maintenance program has been established. The property owner will be responsible for implementation of this program

A. Catch Basins/Yard Drains

Catch basins are designed with 2-foot minimum depth sumps for the purpose of collecting coarse sediment. All catch basins should be inspected two times per year, typically when the site is swept in the spring after winter sanding and in the fall after all the leaves have fallen. Site sweeping shall be provided between April 15 and May 15 each spring.

Sediment should be removed when it extends to within 6 inches of the outlet pipe invert or not less than once per year. Cleanout with a vacuum truck is generally the best and most convenient method. The sediment shall be disposed of in an approved off-site location in accordance with town and state requirements.

B. Pavement Sweeping

The parking area and roadway shall be swept annually. Sweeping should occur in the spring after winter sanding, between April 15 and May 15. Salt alternatives shall be used during the winter months for deicing.

C. Stormwater Basins

a. Mowing

The upper stage, side slopes, and embankment of stormwater ponds must be mowed at least once per year to discourage woody growth and control weeds.

b. Inspections

Basins should be inspected twice per year (spring and fall) to ensure that the structure operates in the manner originally intended. When possible, inspections should be conducted during wet weather to determine if the basin is meeting the targeted detention times per approved design. In particular, the outlet control device should be regularly inspected for evidence of clogging or, conversely, for too rapid a release, and the flow path should be checked for erosion problems. Other problems that should be checked for include subsidence, outlet water turbidity, bank/bed/outlet erosion, cracking, or tree growth on the embankment; the accumulation of sediment around the outlet; the adequacy of upstream/downstream channel erosion control measures; and modifications to the basin or its contributing watershed that may influence basin performance. Inspections should be carried out with design plans in hand.

c. Debris and Litter Removal

Debris and litter will accumulate near the outlet control device and should be removed during regular inspection and/or mowing operations. Particular attention should be paid to floatable debris that could eventually clog the control device or riser.

d. Sediment Removal

When properly designed, detention/water quality basins will accumulate sediment over time. However, most of the sediment will be trapped in the sediment chambers and catch basin sump units before reaching the basin. The remainder will accumulate in the stormwater pond. Accumulated sediment must be removed from the basin every 5 years after one half (12"±) of the sediment storage capacity in the forebay has been filled, after 4 inches of sediment has accumulated in the main portion of the basin, or when significant algal growth is observed. A permanent measuring device shall be installed in the middle of each forebay and in the main portion of the basin. The marker shall delineate inches up from the bottom of the basin so the depth of sediment can easily be measured. More frequent spot cleanouts may be needed around the outlet control device or the sediment forebay. Sediment removal operations are relatively simple. Front-end loaders, backhoes, or vacuum trucks can be used to remove the accumulated sediment followed by manual removal of sediment deposited around the outlet control device. The sediment shall be disposed of in an approved off-site location in accordance with town and state requirements. The disturbed area should be immediately seeded with appropriate grass seed and mulched with hay after removal operations are completed to prevent the outlet control device from clogging.

D. Lawn and Vegetated Areas

Vegetated cover shall be maintained on all earth surfaces to minimize soil erosion. Use of fertilizer should be minimized and applied using prudent application processes

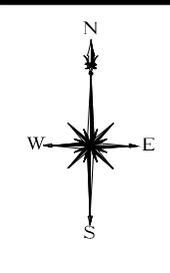
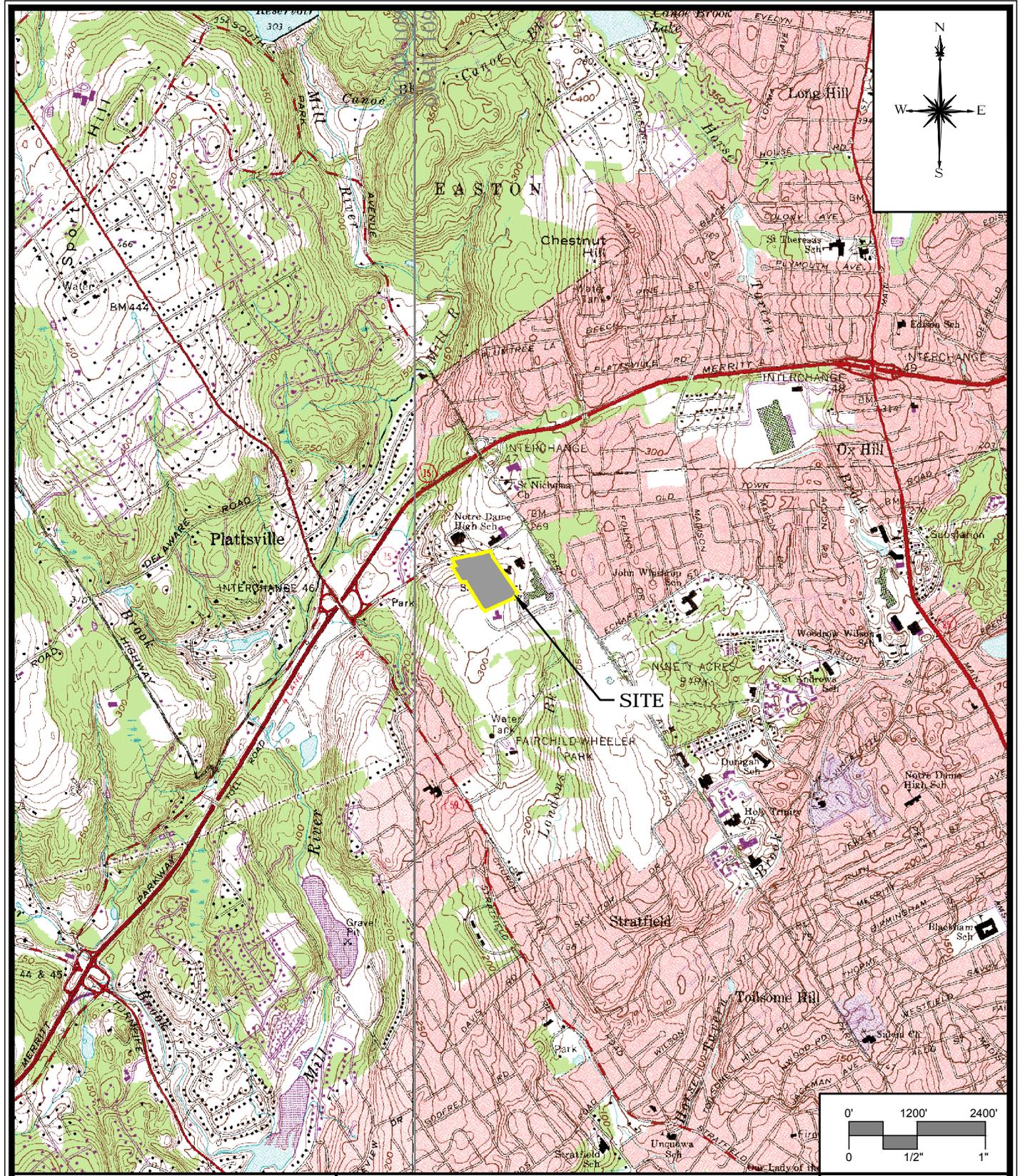


APPENDIX A

GENERAL LOCATION MAP

EXISTING CONDITIONS PLAN

PROPOSED UTILITY PLAN



Drawing: W:\DESIGN\2982-17-DE\CAD\NONPLANSET\SWPPP_AERIAL.DWG Layout: TOR:8.5X11V

Plotted by: KANTVNT On this date: Wed, 2016 May 25 - 3:23pm

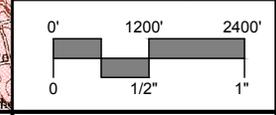
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USGS QUADRANGLE MAP

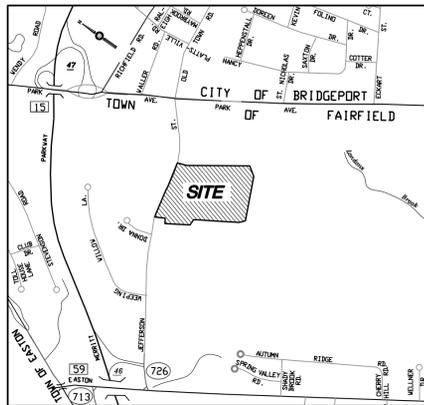
SACRED HEART UNIVERSITY

**175 JEFFERSON STREET
 FAIRFIELD, CONNECTICUT**

REGISTRANT: SACRED HEART UNIVERSITY AD NO. 10



DATE JUNE 3, 2016		
SCALE 1"=2400'		
PROJ. NO. 2982-17		
DESIGNED KMT	DRAWN AWG	CHECKED TD
DRAWING NAME □		
01 OF 01		



VICINITY MAP
SCALE: 1"=1,000'

LEGEND

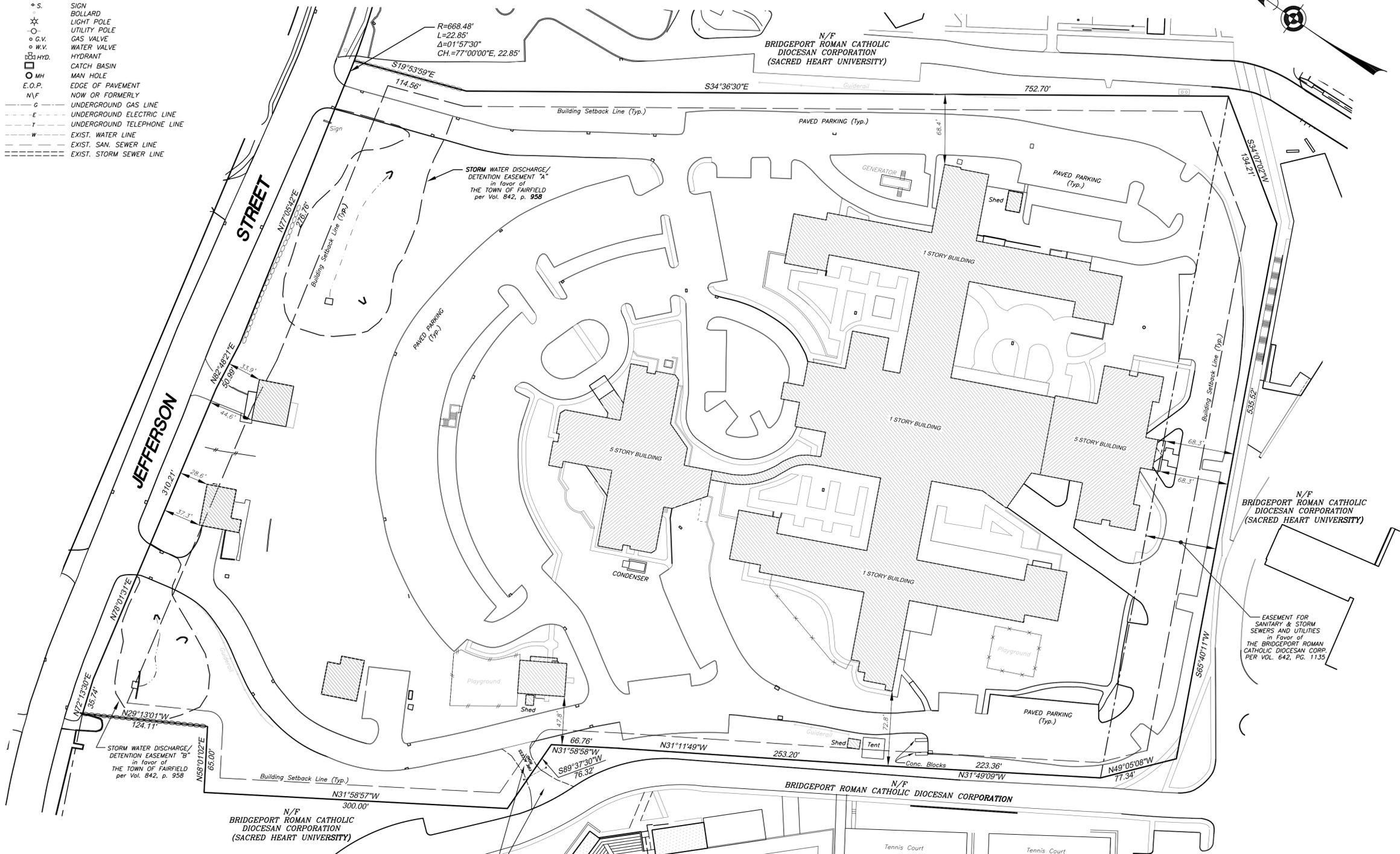
- S. SIGN
- BOLLARD
- LIGHT POLE
- UTILITY POLE
- G.V. GAS VALVE
- W.V. WATER VALVE
- HYD. HYDRANT
- CATCH BASIN
- M.H. MAN HOLE
- E.O.P. EDGE OF PAVEMENT
- N/F NOW OR FORMERLY
- G UNDERGROUND GAS LINE
- E UNDERGROUND ELECTRIC LINE
- T UNDERGROUND TELEPHONE LINE
- W EXIST. WATER LINE
- S EXIST. SAN. SEWER LINE
- SS EXIST. STORM SEWER LINE

MAP REFERENCES:

1. "MAP OF PROPERTY FOR JEWISH HOME FOR THE ELDERLY OF FAIRFIELD COUNTY, INC. FAIRFIELD, CONN." DATED JAN. 5, 1987, REVISED JULY 26, 1988, SCALE 1"=40', PREPARED BY THE HUNTINGTON COMPANY. TOWN CLERK MAP #5733.
2. "PROPERTY TO BE ACQUIRED BY FRED G. & ANITA H. VICEANT, GAYNOS DRIVE (PRIVATE STREE), FAIRFIELD, CONN." DATED MAY 31, 1975, MAP SCALE 1"=40', BY J. & D. KASPER & ASSOC. TOWN CLERK MAP #4447.
3. "BOUNDARY MAP OF PROPERTY LOCATED ON JEFFERSON STREET & PARK AVE., FAIRFIELD, CONN., PREPARED FOR SACRED HEART UNIVERSITY INCORPORATED." DATED JUNE 19, 1990, LAST REVISED MAR. 29, 1996, BY KASPER GROUP, INC. TOWN CLERK MAP #6328.
4. "JEFFERSON STREET LAYOUT IN FAIRFIELD, CONN." ON FILE IN THE FAIRFIELD ENGINEERING DEPT.

NOTES:

1. THIS SURVEY HAS BEEN PREPARED IN ACCORDANCE WITH THE REGULATIONS OF CONNECTICUT STATE AGENCIES, SECTIONS 20-300b-1 THROUGH 20-300b-20, "THE MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT", ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPT. 26, 1996. THE TYPE OF SURVEY IS A PROPERTY SURVEY. IT IS A RESURVEY CONFORMING TO CLASS A-2 HORIZONTAL ACCURACY STANDARDS.
2. ADDITIONAL PROPERTY CORNER MONUMENTATION NOT SET.
3. PROPERTY SUBJECT TO EASEMENTS IN FAVOR OF THE SOUTHERN CONN. GAS. COMPANY PER VOL. 1159, PG. 200 & VOL. 904, PG. 248.
4. PROPERTY SUBJECT TO AND TOGETHER WITH A SEWER MAINTENANCE AGREEMENT BETWEEN THE TOWN OF FAIRFIELD W.P.C.A. AND THE JEWISH HOME FOR THE ELDERLY OF FAIRFIELD COUNTY PER VOL. 851, PG. 212.
5. PROPERTY SUBJECT TO RIGHT OF WAY AGREEMENTS IN FAVOR OF THE BRIDGEPORT HYDRAULIC CO. PER VOL. 427, PGS. 379, 382, AND 384.
6. REFERENCE IS MADE TO QUIT CLAIM DEED FROM THE BRIDGEPORT HYDRAULIC COMPANY TO JEWISH HOME FOR THE ELDERLY, INC. PER VOL. 957, PG. 195.
7. PROPERTY IS SUBJECT TO THE FOLLOWING LAND RECORD NOTICE, VARIANCES, SPECIAL EXCEPTIONS, & SPECIAL PERMITS:
 VOL. 4571, PG. 286; VARIANCE
 VOL. 4434, PG. 340; VARIANCE
 VOL. 4284, PG. 146; VARIANCE
 VOL. 2147, PG. 223; VARIANCE
 VOL. 2039, PG. 136; VARIANCE
 VOL. 1721, PG. 297; NOTICE
 VOL. 1649, PG. 250; SPEC. EXCEPTION
 VOL. 1416, PG. 213; VARIANCE
 VOL. 1331, PG. 37; VARIANCE
 VOL. 1250, PG. 86; SPEC. EXCEPTION
 VOL. 941, PG. 58; VARIANCE
 VOL. 834, PG. 13; SPEC. EXCEPTION
 VOL. 834, PG. 10; SPEC. EXCEPTION
 VOL. 802, PG. 868; NOTICE
 VOL. 712, PG. 1049; SPEC. PERMIT
 VOL. 661, PG. 705; VARIANCE
 VOL. 652, PG. 507; VARIANCE
 VOL. 647, PG. 722; SPEC. EXCEPTION
8. REFERENCE IS MADE TO THE FOLLOWING LEASES AND MEMORANDUM OF LICENSE RECORDED IN VOL. 1410, PG. 342; VOL. 1662, PG. 73, VOL. 1693, PG. 142; & VOL. 5088, PG. 323.



RESIDENCE DISTRICT "R-3"

STANDARD	MIN./REQUIRED	EXISTING
MIN. LOT AREA	20,000 S.F.	677,767 S.F.
MIN. SQUARE ON LOT	100'	>100'
MIN. LOT FRONTAGE	20'	696.55'
DENSITY-MINIMUM LOT AREA PER DWELLING UNIT		
ONE FAMILY DWELLING UNIT	20,000 S.F.	-
TWO FAMILY DWELLING UNIT	-	-
THREE FAMILY DWELLING UNIT	-	-
FOUR FAMILY DWELLING UNIT	-	-
MINIMUM SET BACK		
SET BACK FROM STREET LINE	40'	28.6'
SET BACK FROM SIDE PROPERTY LINES - ONE STORY	-	-
SET BACK FROM SIDE PROPERTY LINES - MORE THAN 1 STORY	30'	47.8'
SET BACK FROM ONE SIDE PROPERTY LINE	15'	47.8'
SET BACK FROM REAR PROPERTY LINES	30'	68.3'
SET BACK FROM ONE STREET LINE ON A CORNER LOT - 1 STORY	-	-
SET BACK FROM ONE STREET LINE ON A CORNER LOT - MORE THAN 1 STORY	30'	-
MINIMUM FLOOR AREA		
FLOOR AREA - ONE STORY BUILDING	900 S.F.	-
FLOOR AREA - SPLIT LEVEL BUILDING	1,200 S.F.	-
FLOOR AREA - 2 OR MORE STORY BUILDING - TOTAL FLOOR AREA	1,200 S.F.	-
GROUND FLOOR	650 S.F.	-
FLOOR AREA PER APARTMENT		
MAX. HEIGHT FOR A BUILDING OR STRUCTURE	40'	> 40'*
MAX. NUMBER OF STORIES PER BUILDING	3	5**
MAX. BUILDING LOT COVERAGE AS A PERCENTAGE OF LOT AREA	15%	15.38%
MAX. BUILDING FLOOR AREA AS A PERCENTAGE OF LOT AREA	30%	31.48%
MIN. FIRST FLOOR ELEVATION	N/A	N/A

RECIPROCAL EASEMENT / RIGHT OF WAY FOR EMERGENCY ACCESS BETWEEN JEWISH HOME FOR THE ELDERLY OF FAIRFIELD COUNTY, INC. & SACRED HEART UNIVERSITY, INC. per Vol. 1195, p. 290

AREA = 677,767 S.F. = 15.5594 Acres

TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

PHILIP L. TISO, L.S. CONN. LIC. No. 12324
NO CERTIFICATION IS EXPRESSED OR IMPLIED UNLESS THIS MAP BEARS THE SIGNATURE AND THE EMBOSSED SEAL OF THE ABOVE NAMED LAND SURVEYOR.

REVISIONS		
NO.	DESCRIPTION	DATE

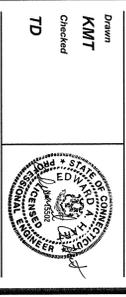
PROPERTY SURVEY

OF PROPERTY LOCATED AT
175 JEFFERSON STREET
FAIRFIELD, CONNECTICUT

PREPARED FOR
SACRED HEART UNIVERSITY, INC.

ROSE-TISO & CO. LLC.
ARCHITECTS • SURVEYORS • ENGINEERS
100 WASHINGTON AVENUE, FAIRFIELD, CT 06424
TEL: (203) 251-8222 FAX: (203) 251-0424

DATE: MAR. 20, 2014
SCALE: 1" = 50'
DRAWN BY: LJC/PLT
CHECKED BY: PLT
SHEET 1 OF 1
DWG: 1769-M1.dwg
PATH: S:\1769-SHU-Jewish-Home



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Sacred Heart
 UNIVERSITY
 RENOVATIONS TO
 BENNETT HALL

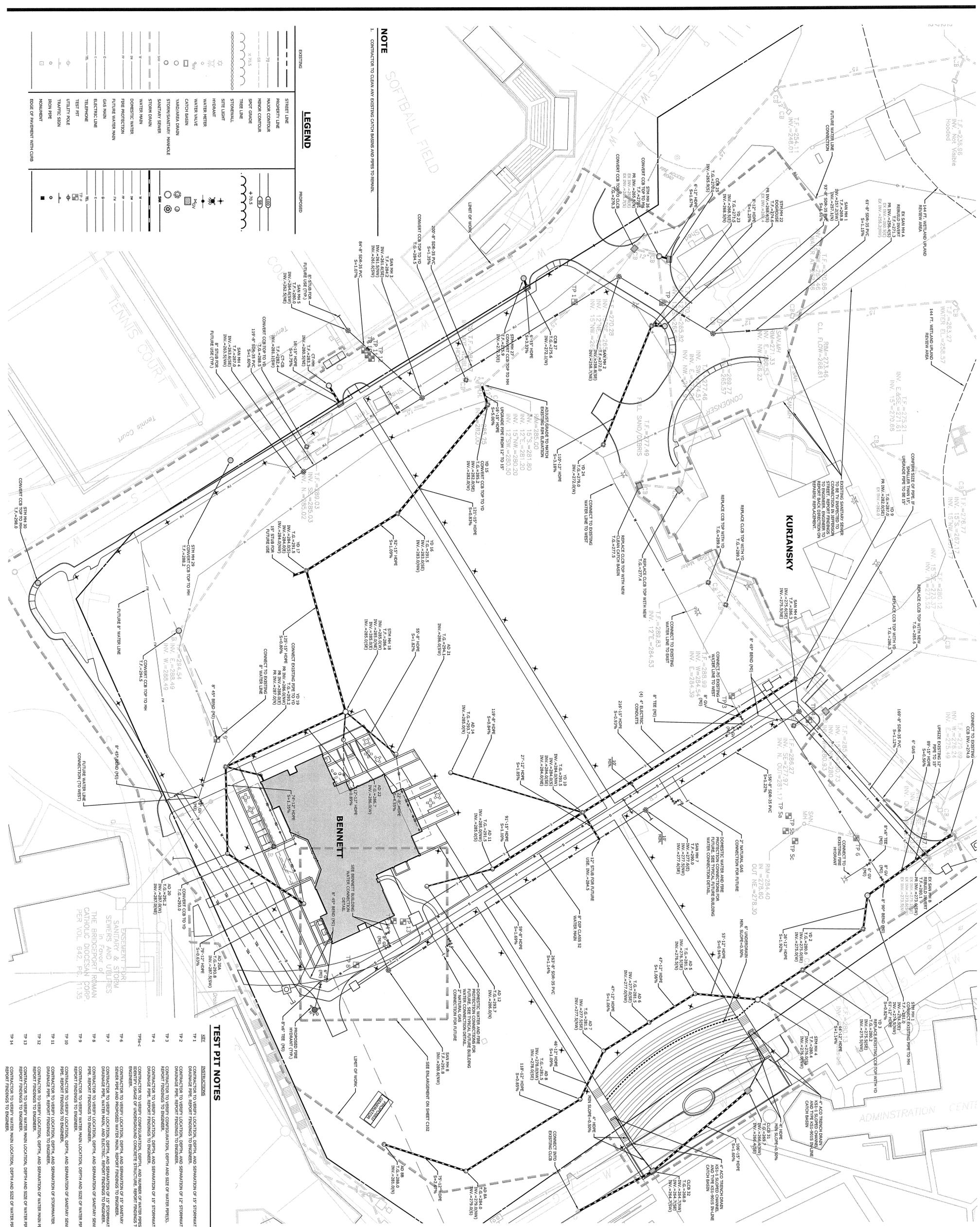
175 JEFFERSON STREET
 FAIRFIELD, CT 06825

Number	Date	Revised For

NO	DATE	BY	REVISION

SITE UTILITIES PLAN

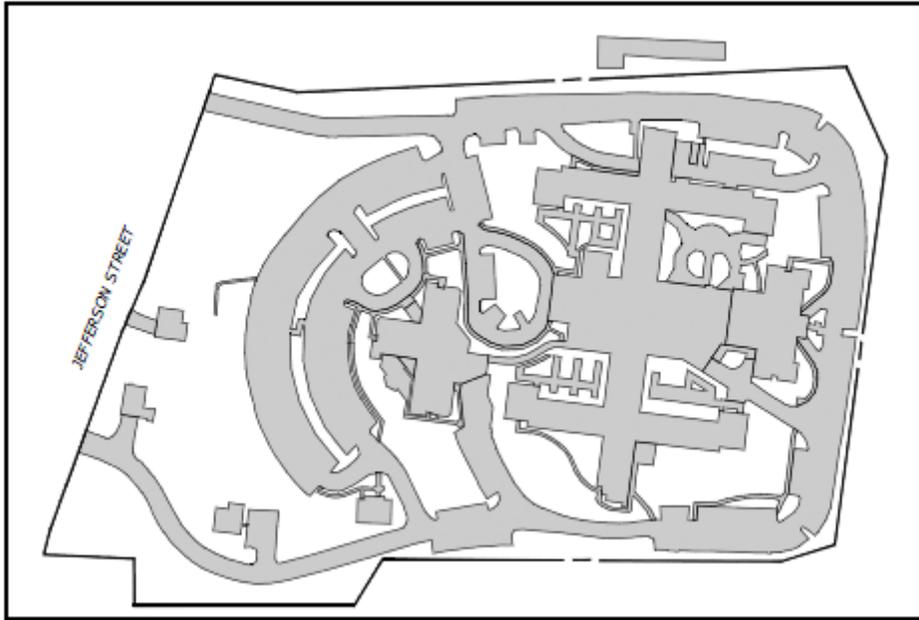
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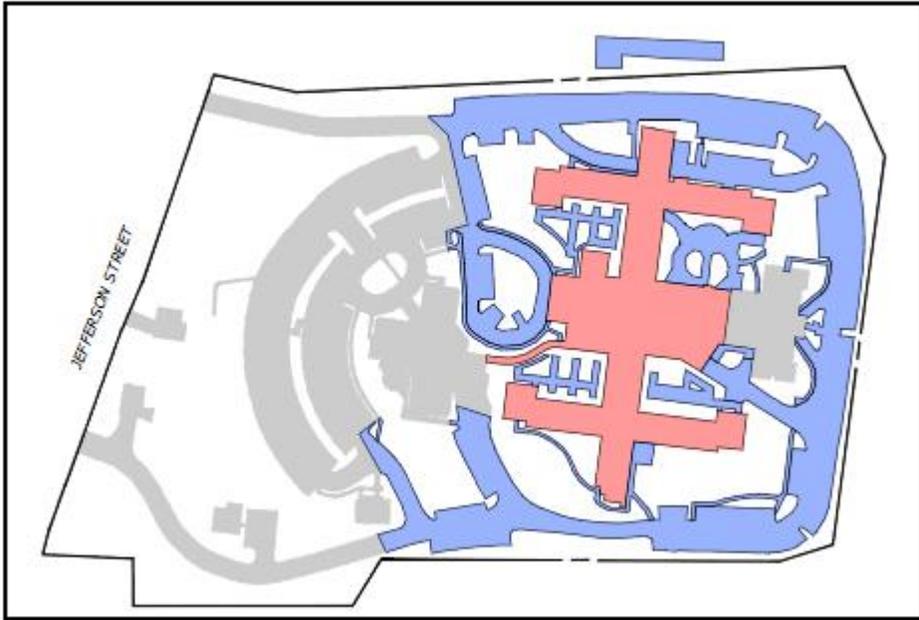


APPENDIX B

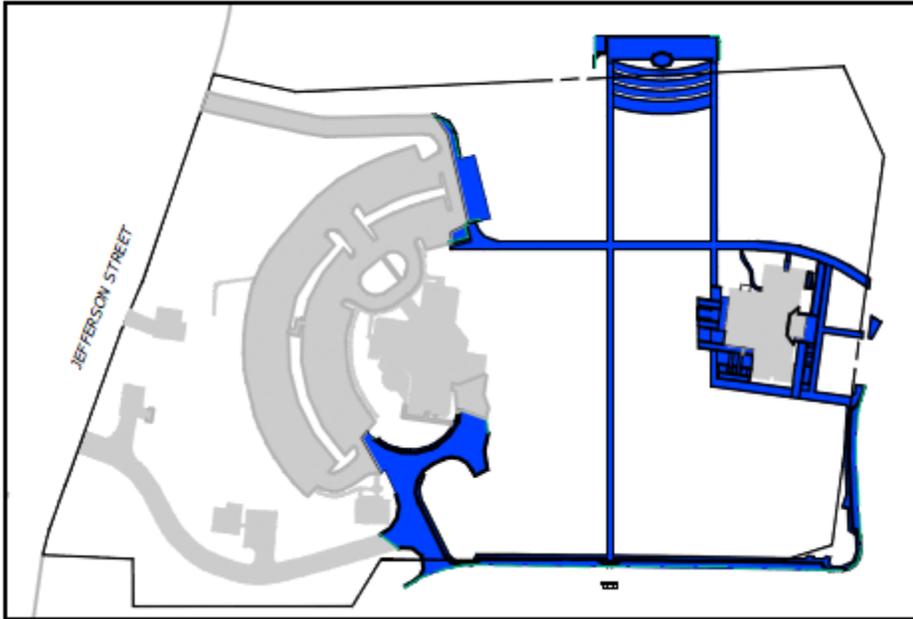
IMPERVIOUS COVERAGE GRAPHICS



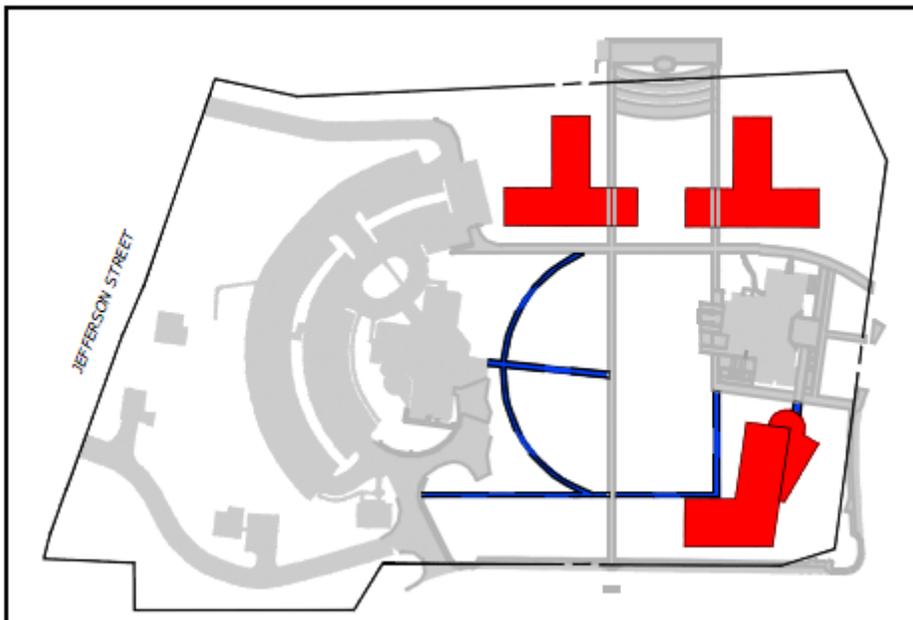
Existing Impervious Coverage



Impervious Coverage to Be Removed for Bennett Renovation and Campus Improvements



Proposed Impervious Areas for Bennett Renovation and Campus Improvements



Additional Proposed Impervious Areas from the Future Master Plan



APPENDIX C

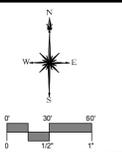
WATERSHED MAPS AND DRAINAGE CALCULATIONS

EXISTING CONDITIONS WATERSHED MAP
 SACRED HEART UNIVERSITY
 RENOVATIONS TO BENNETT HALL
 175 JEFFERSON STREET
 FAIRFIELD, CT



LEGEND

- WATERSHED BOUNDARY
- WS 10** WATERSHED LABEL
- 110** DETENTION BASIN LABEL
- HYDROLOGIC SOIL-TYPE BOUNDARY
- C** HYDROLOGIC SOIL-TYPE LABEL
- (A)** ANALYSIS POINT LABEL



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DESCRIPTION	DATE	BY

EXISTING CONDITIONS WATERSHED MAP
SACRED HEART UNIVERSITY
RENOVATIONS TO BENNETT HALL
 175 JEFFERSON STREET
 FAIRFIELD, CT

KMT	AWG	TD
DESIGNED	DRAWN	CHECKED
SCALE 1"=60'		
DATE JUNE 3, 2016		
PROJECT NO. 2982-17		

EXWS

Curve Number Calculations

Project: Renovations to Bennett Hall By: PKG Date: 6/2/16
 Location: Sacred Heart University Checked: TD Date: 6/3/16
 Circle one: Present Developed Watershed: EX WS 10

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN Value ^{1.}			Area Acres Sq. Ft. %	Product of CN x Area
		Table 2-2	Figure 2-3	Figure 2-4		
N/A	Impervious	98			2.41	236.18
B soil	Grass, good condition	61			1.92	117.12
C soil	Grass, good condition	74			0.08	5.92
D soil	Grass, good condition	80			0.42	33.60
Totals =					4.83	392.82

(0.00755 sq mi)

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = $\frac{392.82}{4.83}$ Use CN = 81

Curve Number Calculations

Project: Renovations to Bennett Hall By: PKG Date: 6/2/16
 Location: Sacred Heart University Checked: TD Date: 6/3/16
 Circle one: Present Developed Watershed: EX WS 20

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN Value ^{1.}			Area <u>Acres</u> Sq. Ft. %	Product of CN x Area
		Table 2-2	Figure 2-3	Figure 2-4		
N/A	Impervious	98			2.25	220.50
B soil	Grass, good condition	61			1.19	72.59
Totals =					3.44	293.09

(0.00538 sq mi)

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = $\frac{293.09}{3.44}$ Use CN = 85

Curve Number Calculations

Project: Renovations to Bennett Hall By: PKG Date: 6/2/16
 Location: Sacred Heart University Checked: TD Date: 6/3/16
 Circle one: **Present** Developed Watershed: EX WS 21

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN Value ^{1.}			Area <u>Acres</u> Sq. Ft. %	Product of CN x Area
		Table 2-2	Figure 2-3	Figure 2-4		
N/A	Impervious	98			2.61	255.78
B soil	Grass, good condition	61			0.90	54.90
C soil	Grass, good condition	74			0.10	7.40
Totals =					3.61	318.08

(0.00564 sq mi)

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = $\frac{318.08}{3.61}$ Use CN = 88

Curve Number Calculations

Project: Renovations to Bennett Hall By: AWG Date: 6/3/16
 Location: Sacred Heart University Checked: TD Date: 6/3/16
 Circle one: Present **Developed** Watershed: PR WS 10

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN Value ^{1.}			Area Acres Sq. Ft. %	Product of CN x Area
		Table 2-2	Figure 2-3	Figure 2-4		
N/A	Impervious	98			0.87	85.16
B soil	Grass, good condition	61			3.35	204.26
C soil	Grass, good condition	74			0.07	4.93
D soil	Grass, good condition	80			0.28	22.16
Totals =					4.56	316.51

(0.00713 sq mi)

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = $\frac{316.51}{4.56}$ Use CN = 69

Curve Number Calculations

Project: Renovations to Bennett Hall By: AWG Date: 6/3/16
 Location: Sacred Heart University Checked: TD Date: 6/3/16
 Circle one: Present **Developed** Watershed: PR WS 20

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN Value ^{1.}			Area <u>Acres</u> Sq. Ft. %	Product of CN x Area
		Table 2-2	Figure 2-3	Figure 2-4		
N/A	Impervious	98			1.84	180.62
B soil	Grass, good condition	61			2.64	161.04
Totals =					4.48	341.67

(0.00700 sq mi)

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = $\frac{341.67}{4.48}$ Use CN = 76

Curve Number Calculations

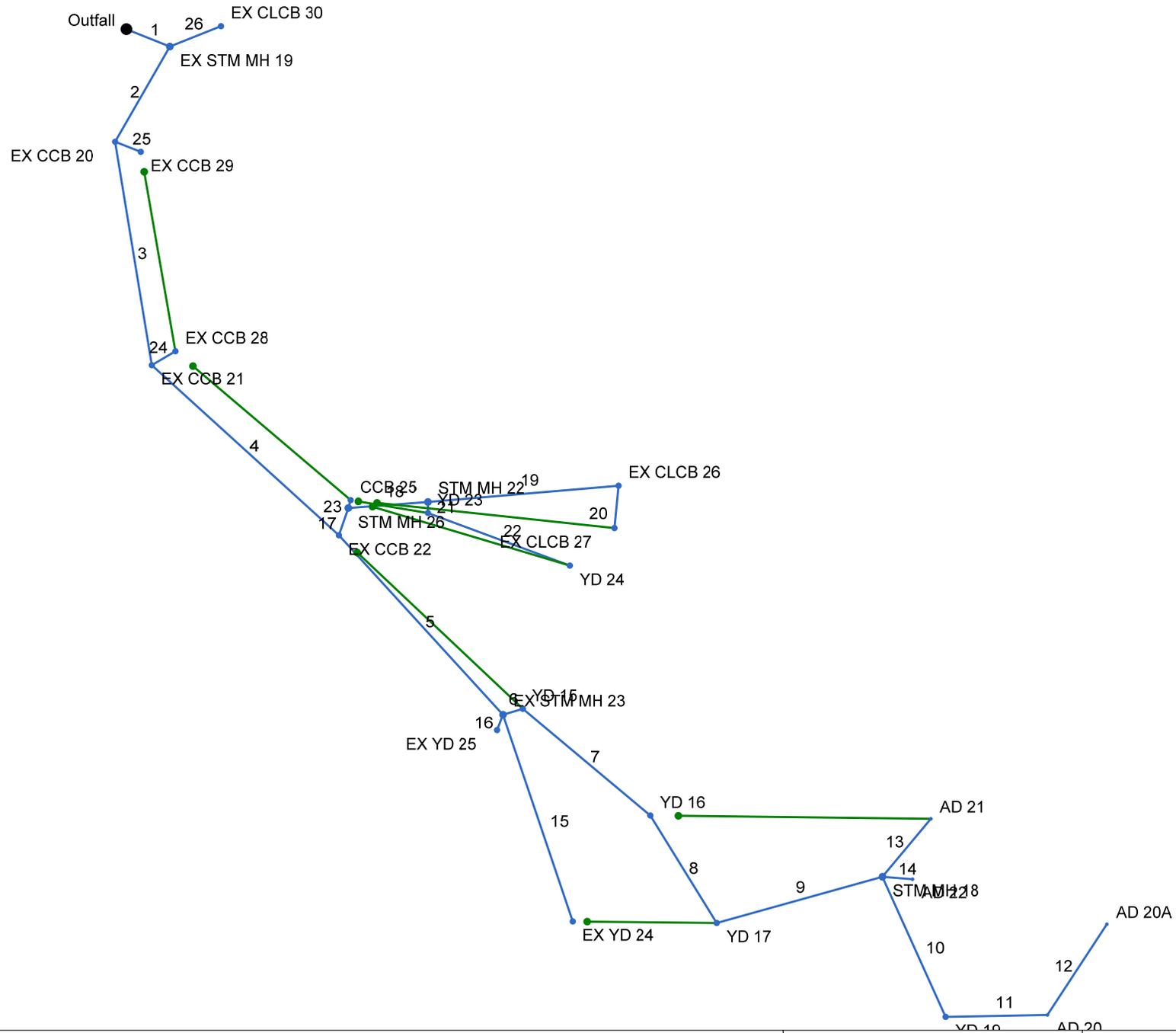
Project: Renovations to Bennett Hall By: AWG Date: 6/3/16
 Location: Sacred Heart University Checked: TD Date: 6/3/16
 Circle one: Present **Developed** Watershed: PR WS 21

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN Value ^{1.}			Area <u>Acres</u> Sq. Ft. %	Product of CN x Area
		Table 2-2	Figure 2-3	Figure 2-4		
N/A	Impervious	98			0.10	9.93
B soil	Grass, good condition	61			1.61	98.29
C soil	Grass, good condition	74			0.26	19.28
Totals =					1.97	127.51

(0.00308 sq mi)

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = $\frac{127.51}{1.97}$ Use CN = 65

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: Storm 1.stm

Number of lines: 26

Date: 6/2/2016

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	34.000	21.807	MH	0.00	0.00	0.00	0.0	217.30	8.53	220.20	24	Cir	0.012	1.00	228.20	OUT - EX STM MH 19
2	1	80.000	98.006	Comb	0.00	0.20	0.45	5.0	223.10	11.50	232.30	18	Cir	0.012	1.50	236.50	EX STM MH 19 - EX
3	2	165.000	-39.095	Comb	0.00	0.26	0.47	5.0	232.70	8.85	247.30	15	Cir	0.012	1.50	254.00	EX CCB 20 - EX CCB
4	3	184.000	-38.365	Comb	0.00	0.17	0.45	5.0	247.40	9.73	265.30	15	Cir	0.012	1.50	270.30	EX CCB 21 - EX CCB
5	4	177.000	5.289	MH	0.00	0.00	0.00	0.0	265.50	8.31	280.20	15	Cir	0.012	0.92	285.30	EX CCB 22 - EX STM
6	5	15.000	-64.379	DrGrt	0.00	0.14	0.37	5.0	281.20	5.33	282.00	15	Cir	0.012	1.30	285.25	EX STM MH 23 - YD
7	6	121.000	56.738	DrGrt	0.00	0.35	0.32	5.0	282.00	0.83	283.00	15	Cir	0.012	0.55	291.50	YD 15 - YD 16
8	7	92.000	18.377	DrGrt	0.08	0.19	0.38	5.0	283.00	1.09	284.00	15	Cir	0.012	1.45	291.50	YD 16 - YD 17
9	8	125.000	-74.006	MH	0.00	0.00	0.00	0.0	284.00	0.80	285.00	15	Cir	0.012	0.99	286.36	YD 17 - STM MH 18
10	9	112.000	81.410	DrGrt	0.00	0.16	0.49	5.0	285.00	0.89	286.00	12	Cir	0.012	1.40	293.25	STM MH 18 - YD 19
11	10	74.000	-66.889	DrGrt	0.00	0.18	0.50	5.0	286.00	1.35	287.00	12	Cir	0.012	1.28	291.25	YD 19 - AD 20
12	11	79.000	-55.771	DrGrt	0.02	0.02	0.38	5.0	287.00	0.63	287.50	12	Cir	0.012	1.00	293.75	AD 20 - AD 20A
13	9	55.000	-34.548	DrGrt	0.02	0.06	0.70	5.0	285.00	1.82	286.00	8	Cir	0.012	1.00	294.10	STM MH 18 - AD 21
14	9	22.000	20.206	DrGrt	0.02	0.05	0.74	5.0	285.00	4.55	286.00	8	Cir	0.012	1.00	286.71	STM MH 18 - AD 22
15	5	159.000	23.759	DrGrt	0.00	0.10	0.33	5.0	281.80	2.01	285.00	15	Cir	0.012	1.00	288.50	EX STM MH 23 - EX
16	5	12.000	63.539	DrGrt	0.00	0.37	0.39	5.0	280.50	1.67	280.70	12	Cir	0.012	1.00	284.50	EX STM MH 23 - EX
17	4	21.000	-113.230	MH	0.00	0.00	0.00	0.0	265.30	2.38	265.80	12	Cir	0.012	0.93	270.12	EX CCB 22 - STM MH
18	17	58.000	66.522	MH	0.00	0.00	0.00	0.0	265.80	4.66	268.50	12	Cir	0.012	1.00	274.60	STM MH 26 - STM MH
19	18	139.000	-0.546	Grate	0.08	0.02	0.84	5.0	268.50	4.17	274.30	12	Cir	0.012	1.50	277.40	STM MH 22 - EX CLC
20	19	31.000	100.363	Grate	0.00	0.03	0.59	5.0	274.50	0.97	274.80	12	Cir	0.012	1.00	277.50	EX CLCB 26 - EX CL
21	18	8.000	94.289	DrGrt	0.00	0.24	0.36	5.0	268.40	1.25	268.50	12	Cir	0.012	1.42	271.50	STM MH 22 - YD 23
22	21	110.000	-69.519	DrGrt	0.00	0.24	0.37	5.0	268.50	3.18	272.00	12	Cir	0.012	1.00	279.00	YD 23 - YD 24
23	17	6.000	-3.283	Comb	0.00	0.23	0.77	5.0	265.80	1.67	265.90	12	Cir	0.012	1.00	270.10	STM MH 26 - CCB 25

Project File: Storm 1.stm

Number of lines: 26

Date: 6/2/2016

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	3	20.000	-111.259	Comb	0.00	0.18	0.55	5.0	247.80	1.00	248.00	12	Cir	0.012	1.00	254.10	EX CCB 21 - EX CCB
25	2	20.000	-98.309	Comb	0.00	0.29	0.52	5.0	232.70	1.00	232.90	12	Cir	0.012	1.00	237.00	EX CCB 20 - EX CCB
26	1	40.000	-43.526	Grate	0.00	0.38	0.30	5.0	222.60	3.25	223.90	12	Cir	0.012	1.00	227.90	EX STM MH 19 - EX
Project File: Storm 1.stm												Number of lines: 26				Date: 6/2/2016	

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	34.000	0.00	3.86	0.00	0.00	1.71	0.0	10.4	6.3	10.92	71.56	11.05	24	8.53	217.30	220.20	217.83	221.38	219.30	228.20	OUT - EX STM M
2	1	80.000	0.20	3.48	0.45	0.09	1.59	5.0	10.3	6.3	10.26	38.58	12.53	18	11.50	223.10	232.30	223.63	233.53	228.20	236.50	EX STM MH 19 -
3	2	165.000	0.26	2.99	0.47	0.12	1.35	5.0	10.0	6.4	8.87	20.81	8.87	15	8.85	232.70	247.30	233.53	248.45	236.50	254.00	EX CCB 20 - EX
4	3	184.000	0.17	2.55	0.45	0.08	1.13	5.0	9.5	6.5	7.63	21.82	6.81	15	9.73	247.40	265.30	248.45	266.40	254.00	270.30	EX CCB 21 - EX
5	4	177.000	0.00	1.62	0.00	0.00	0.67	0.0	8.9	6.8	4.66	20.16	5.02	15	8.31	265.50	280.20	266.40	281.07	270.30	285.30	EX CCB 22 - EX
6	5	15.000	0.14	1.15	0.37	0.05	0.49	5.0	8.9	6.8	3.47	16.16	7.49	15	5.33	281.20	282.00	281.59	282.75	285.30	285.25	EX STM MH 23 -
7	6	121.000	0.35	1.01	0.32	0.11	0.44	5.0	8.4	7.0	3.20	6.36	4.26	15	0.83	282.00	283.00	282.75	283.72	285.25	291.50	YD 15 - YD 16
8	7	92.000	0.19	0.66	0.38	0.07	0.33	5.0	8.0	7.1	2.47	7.29	3.69	15	1.09	283.00	284.00	283.72	284.63	291.50	291.50	YD 16 - YD 17
9	8	125.000	0.00	0.47	0.00	0.00	0.26	0.0	7.4	7.4	1.95	6.26	3.42	15	0.80	284.00	285.00	284.63	285.56	291.50	286.36	YD 17 - STM MH
10	9	112.000	0.16	0.36	0.49	0.08	0.18	5.0	6.8	7.7	1.37	3.65	3.30	12	0.89	285.00	286.00	285.56	286.49	286.36	293.25	STM MH 18 - YD
11	10	74.000	0.18	0.20	0.50	0.09	0.10	5.0	6.3	7.9	0.79	4.48	2.52	12	1.35	286.00	287.00	286.49	287.37	293.25	291.25	YD 19 - AD 20
12	11	79.000	0.02	0.02	0.38	0.01	0.01	5.0	5.0	8.8	0.09	3.07	0.98	12	0.63	287.00	287.50	287.37	287.62	291.25	293.75	AD 20 - AD 20A
13	9	55.000	0.06	0.06	0.70	0.04	0.04	5.0	5.0	8.8	0.39	1.76	1.96	8	1.82	285.00	286.00	285.56	286.29	286.36	294.10	STM MH 18 - AD
14	9	22.000	0.05	0.05	0.74	0.04	0.04	5.0	5.0	8.8	0.34	2.79	1.84	8	4.55	285.00	286.00	285.56	286.27	286.36	286.71	STM MH 18 - AD
15	5	159.000	0.10	0.10	0.33	0.03	0.03	5.0	5.0	8.8	0.29	9.92	2.87	15	2.01	281.80	285.00	281.95	285.21	285.30	288.50	EX STM MH 23 -
16	5	12.000	0.37	0.37	0.39	0.14	0.14	5.0	5.0	8.8	1.27	4.98	3.08	12	1.67	280.50	280.70	281.07	281.17	285.30	284.50	EX STM MH 23 -
17	4	21.000	0.00	0.76	0.00	0.00	0.39	0.0	7.0	7.6	3.02	5.95	4.34	12	2.38	265.30	265.80	266.40	266.54	270.30	270.12	EX CCB 22 - STM
18	17	58.000	0.00	0.53	0.00	0.00	0.21	0.0	6.7	7.8	1.71	8.32	3.27	12	4.66	265.80	268.50	266.54	269.06	270.12	274.60	STM MH 26 - ST
19	18	139.000	0.02	0.05	0.84	0.02	0.03	5.0	5.2	8.6	0.38	7.88	1.63	12	4.17	268.50	274.30	269.06	274.55	274.60	277.40	STM MH 22 - EX
20	19	31.000	0.03	0.03	0.59	0.02	0.02	5.0	5.0	8.8	0.16	3.80	2.13	12	0.97	274.50	274.80	274.64	274.96	277.40	277.50	EX CLCB 26 - EX
21	18	8.000	0.24	0.48	0.36	0.09	0.18	5.0	5.7	8.3	1.45	4.31	3.13	12	1.25	268.40	268.50	269.06	269.01	274.60	271.50	STM MH 22 - YD
22	21	110.000	0.24	0.24	0.37	0.09	0.09	5.0	5.0	8.8	0.78	6.88	2.45	12	3.18	268.50	272.00	269.01	272.37	271.50	279.00	YD 23 - YD 24

Project File: Storm 1.stm

Number of lines: 26

Run Date: 6/2/2016

NOTES: Intensity = 39.08 / (Inlet time + 3.60) ^ 0.69; Return period = Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	17	6.000	0.23	0.23	0.77	0.18	0.18	5.0	5.0	8.8	1.55	4.98	3.08	12	1.67	265.80	265.90	266.54	266.43	270.12	270.10	STM MH 26 - CC
24	3	20.000	0.18	0.18	0.55	0.10	0.10	5.0	5.0	8.8	0.87	3.86	2.34	12	1.00	247.80	248.00	248.45	248.39	254.00	254.10	EX CCB 21 - EX
25	2	20.000	0.29	0.29	0.52	0.15	0.15	5.0	5.0	8.8	1.32	3.86	2.70	12	1.00	232.70	232.90	233.53	233.39	236.50	237.00	EX CCB 20 - EX
26	1	40.000	0.38	0.38	0.30	0.11	0.11	5.0	5.0	8.8	1.00	6.96	4.74	12	3.25	222.60	223.90	222.86	224.32	228.20	227.90	EX STM MH 19 -

Project File: Storm 1.stm

Number of lines: 26

Run Date: 6/2/2016

NOTES: Intensity = $39.08 / (\text{Inlet time} + 3.60)^{0.69}$; Return period = Yrs. 25 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			By Line No		
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)	
1	EX STM MH 19	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.0	Off
2	EX CCB 20	0.79	0.29	0.87	0.21	Comb	4.0	2.73	0.00	1.35	2.31	0.030	2.53	0.020	0.020	0.013	0.11	5.61	0.11	5.46	0.0	Off	
3	EX CCB 21	1.07	0.19	0.97	0.29	Comb	4.0	2.73	0.00	1.35	2.31	0.030	2.53	0.020	0.020	0.013	0.12	5.96	0.12	5.76	0.0	2	
4	EX CCB 22	0.67	0.32	0.81	0.19	Comb	4.0	2.73	0.00	1.35	2.31	0.030	2.53	0.020	0.020	0.013	0.11	5.46	0.11	5.26	0.0	3	
5	EX STM MH 23	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off	
6	YD 15	0.45	0.00	0.13	0.32	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.05	7.10	0.05	7.10	0.0	4	
7	YD 16	0.98	0.27	0.27	0.98	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.08	10.10	0.08	10.10	0.0	Off	
8	YD 17	0.71*	0.00	0.18	0.54	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.07	9.10	0.07	9.10	0.0	15	
9	STM MH 18	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off	
10	YD 19	0.69	0.00	0.69	0.00	DrGrt	0.0	0.00	1.51	1.23	1.23	Sag	2.00	0.020	0.020	0.000	0.13	14.94	0.13	14.94	0.0	Off	
11	AD 20	0.79	0.00	0.79	0.00	DrGrt	0.0	0.00	1.51	1.23	1.23	Sag	2.00	0.020	0.020	0.000	0.14	16.19	0.14	16.19	0.0	Off	
12	AD 20A	0.09*	0.00	0.09	0.00	DrGrt	0.0	0.00	1.51	1.23	1.23	Sag	2.00	0.020	0.020	0.000	0.03	5.25	0.03	5.25	0.0	Off	
13	AD 21	0.39*	0.00	0.12	0.27	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.05	7.10	0.05	7.10	0.0	7	
14	AD 22	0.34*	0.00	0.34	0.00	DrGrt	0.0	0.00	1.51	1.23	1.23	Sag	2.00	0.020	0.020	0.000	0.08	10.16	0.08	10.16	0.0	Off	
15	EX YD 24	0.29	0.54	0.20	0.62	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.07	9.10	0.07	9.10	0.0	Off	
16	EX YD 25	1.27	0.00	0.28	0.99	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.08	10.10	0.08	10.10	0.0	Off	
17	STM MH 26	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off	
18	STM MH 22	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	Off	
19	EX CLCB 26	0.23*	0.00	0.22	0.00	Grate	0.0	0.00	0.00	1.35	2.31	0.030	2.53	0.020	0.020	0.013	0.06	3.15	0.02	0.76	0.0	Off	
20	EX CLCB 27	0.16	0.00	0.16	0.00	Grate	0.0	0.00	0.00	1.35	2.31	0.030	2.53	0.020	0.020	0.013	0.06	2.75	0.00	0.01	0.0	23	
21	YD 23	0.76	0.00	0.19	0.57	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.07	9.10	0.07	9.10	0.0	23	
22	YD 24	0.78	0.00	0.19	0.59	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.07	9.10	0.07	9.10	0.0	23	
23	CCB 25	1.55	1.16	1.74	0.97	Comb	4.0	2.73	0.00	1.35	2.31	0.030	2.53	0.020	0.020	0.013	0.16	7.96	0.16	7.76	0.0	24	

Project File: Storm 1.stm

Number of lines: 26

Run Date: 6/2/2016

NOTES: Inlet N-Values = 0.016; Intensity = 39.08 / (Inlet time + 3.60) ^ 0.69; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
24	EX CCB 28	0.87	0.97	1.30	0.54	Comb	4.0	2.73	0.00	1.35	2.31	0.030	2.53	0.020	0.020	0.013	0.14	6.86	0.13	6.66	0.0	25
25	EX CCB 29	1.32	0.54	1.31	0.55	Comb	4.0	2.73	0.00	1.35	2.31	0.030	2.53	0.020	0.020	0.013	0.14	6.91	0.13	6.71	0.0	Off
26	EX CLCB 30	1.00	0.00	0.77	0.23	Grate	0.0	0.00	0.00	1.35	2.31	0.030	2.53	0.020	0.020	0.013	0.11	5.46	0.06	3.15	0.0	Off

Project File: Storm 1.stm

Number of lines: 26

Run Date: 6/2/2016

NOTES: Inlet N-Values = 0.016; Intensity = 39.08 / (Inlet time + 3.60) ^ 0.69; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
1	24	10.92	217.30	217.83	0.53	0.66	16.45	0.49	218.32	0.000	34.000	220.20	221.38	1.18**	1.94	5.64	0.49	221.88	0.000	0.000	n/a	1.00	0.49
2	18	10.26	223.10	223.63	0.53*	0.56	18.46	0.68	224.31	0.000	80.000	232.30	233.53	1.23**	1.55	6.60	0.68	234.21	0.000	0.000	n/a	1.50	n/a
3	15	8.87	232.70	233.53	0.83	0.87	10.23	0.88	234.41	0.000	165.000	247.30	248.45	1.15**	1.18	7.51	0.88	249.33	0.000	0.000	n/a	1.50	1.32
4	15	7.63	247.40	248.45	1.05	1.10	6.93	0.70	249.15	0.000	184.000	265.30	266.40	1.10**	1.14	6.69	0.70	267.09	0.000	0.000	n/a	1.50	1.04
5	15	4.66	265.50	266.40	0.90	0.92	4.95	0.40	266.80	0.000	177.000	280.20	281.07 j	0.87**	0.92	5.08	0.40	281.48	0.000	0.000	n/a	0.92	n/a
6	15	3.47	281.20	281.59	0.39*	0.33	10.48	0.32	281.91	0.000	15.000	282.00	282.75	0.75**	0.77	4.50	0.32	283.07	0.000	0.000	n/a	1.30	n/a
7	15	3.20	282.00	282.75	0.75	0.73	4.15	0.30	283.05	0.000	121.000	283.00	283.72 j	0.72**	0.73	4.37	0.30	284.02	0.000	0.000	n/a	0.55	n/a
8	15	2.47	283.00	283.72	0.72	0.62	3.38	0.25	283.97	0.000	92.000	284.00	284.63 j	0.63**	0.62	4.00	0.25	284.88	0.000	0.000	n/a	1.45	0.36
9	15	1.95	284.00	284.63	0.63	0.53	3.15	0.21	284.84	0.000	125.000	285.00	285.56 j	0.55**	0.53	3.70	0.21	285.77	0.000	0.000	n/a	0.99	0.21
10	12	1.37	285.00	285.56	0.55	0.39	3.06	0.19	285.75	0.000	112.000	286.00	286.49 j	0.49**	0.39	3.54	0.19	286.69	0.000	0.000	n/a	1.40	0.27
11	12	0.79	286.00	286.49	0.49	0.27	2.05	0.14	286.63	0.000	74.000	287.00	287.37 j	0.37**	0.27	2.98	0.14	287.51	0.000	0.000	n/a	1.28	0.18
12	12	0.09	287.00	287.37	0.37	0.05	0.33	0.04	287.41	0.000	79.000	287.50	287.62	0.12**	0.05	1.63	0.04	287.66	0.000	0.000	n/a	1.00	n/a
13	8	0.39	285.00	285.56	0.55	0.15	1.25	0.11	285.67	0.000	55.000	286.00	286.29 j	0.29**	0.15	2.67	0.11	286.40	0.000	0.000	n/a	1.00	n/a
14	8	0.34	285.00	285.56	0.55	0.13	1.11	0.10	285.66	0.000	22.000	286.00	286.27 j	0.27**	0.13	2.57	0.10	286.38	0.000	0.000	n/a	1.00	n/a
15	15	0.29	281.80	281.95	0.15*	0.08	3.59	0.07	282.02	0.000	159.000	285.00	285.21	0.21**	0.13	2.16	0.07	285.28	0.000	0.000	n/a	1.00	0.07
16	12	1.27	280.50	281.07	0.57	0.37	2.71	0.18	281.26	0.000	12.000	280.70	281.17 j	0.47**	0.37	3.45	0.18	281.36	0.000	0.000	n/a	1.00	0.18
17	12	3.02	265.30	266.40	1.00	0.63	3.85	0.23	266.63	0.615	21.000	265.80	266.54 j	0.74**	0.63	4.82	0.36	266.91	0.751	0.683	n/a	0.93	0.34
18	12	1.71	265.80	266.54	0.74	0.45	2.72	0.23	266.77	0.000	58.000	268.50	269.06 j	0.56**	0.45	3.81	0.23	269.28	0.000	0.000	n/a	1.00	0.23
19	12	0.38	268.50	269.06	0.56	0.16	0.84	0.09	269.15	0.000	139.000	274.30	274.55 j	0.25**	0.16	2.41	0.09	274.64	0.000	0.000	n/a	1.50	n/a
20	12	0.16	274.50	274.64	0.14*	0.07	2.37	0.06	274.69	0.000	31.000	274.80	274.96	0.16**	0.08	1.90	0.06	275.02	0.000	0.000	n/a	1.00	0.06
21	12	1.45	268.40	269.06	0.66	0.40	2.66	0.20	269.26	0.000	8.000	268.50	269.01 j	0.51**	0.40	3.61	0.20	269.21	0.000	0.000	n/a	1.42	n/a
22	12	0.78	268.50	269.01	0.51	0.26	1.94	0.14	269.15	0.000	110.000	272.00	272.37 j	0.37**	0.26	2.97	0.14	272.51	0.000	0.000	n/a	1.00	n/a

Project File: Storm 1.stm

Number of lines: 26

Run Date: 6/2/2016

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
23	12	1.55	265.80	266.54	0.74	0.42	2.48	0.21	266.76	0.000	6.000	265.90	266.43	0.53**	0.42	3.69	0.21	266.64	0.000	0.000	n/a	1.00	n/a
24	12	0.87	247.80	248.45	0.65	0.28	1.61	0.15	248.60	0.000	20.000	248.00	248.39	0.39**	0.28	3.06	0.15	248.54	0.000	0.000	n/a	1.00	n/a
25	12	1.32	232.70	233.53	0.83	0.38	1.90	0.19	233.72	0.000	20.000	232.90	233.39	0.49**	0.38	3.50	0.19	233.58	0.000	0.000	n/a	1.00	n/a
26	12	1.00	222.60	222.86	0.26*	0.16	6.29	0.16	223.02	0.000	40.000	223.90	224.32	0.42**	0.31	3.20	0.16	224.48	0.000	0.000	n/a	1.00	n/a

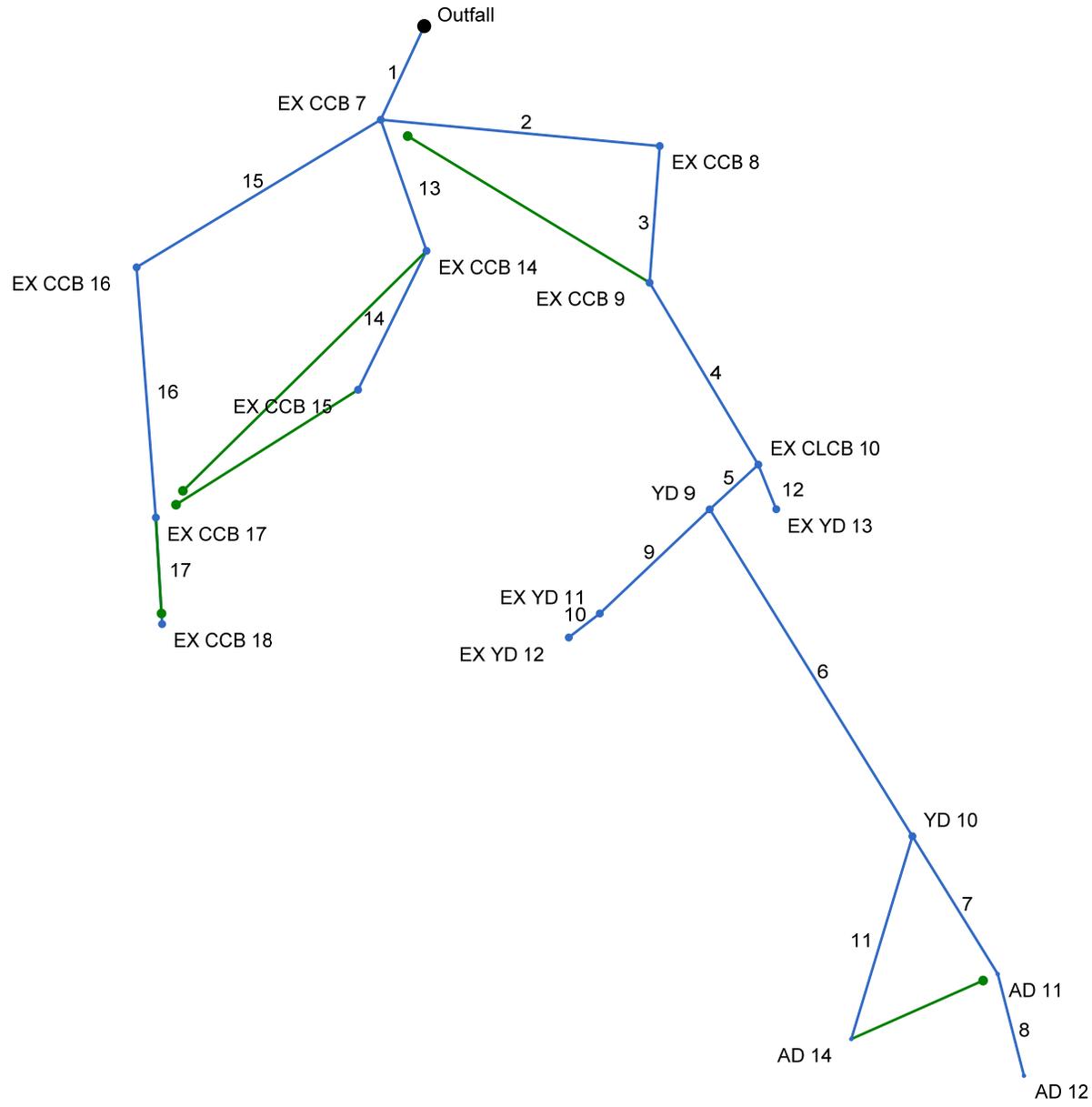
Project File: Storm 1.stm

Number of lines: 26

Run Date: 6/2/2016

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: Storm 2.stm

Number of lines: 17

Date: 6/2/2016

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	58.000	114.818	Comb	0.00	0.30	0.79	5.0	256.00	1.90	257.10	18	Cir	0.012	2.07	269.10	OUT - EX CCB 7
2	1	157.000	-109.420	Comb	0.00	0.30	0.73	5.0	262.10	5.22	270.30	18	Cir	0.012	1.50	274.80	EX CCB 7 - EX CCB
3	2	77.000	88.831	Comb	0.00	0.28	0.70	5.0	270.30	4.03	273.40	15	Cir	0.012	0.94	280.10	EX CCB 8 - EX CCB
4	3	119.000	-35.004	Grate	0.00	0.04	0.69	5.0	273.40	5.63	280.10	15	Cir	0.012	2.14	285.60	EX CCB 9 - EX CLCB
5	4	37.000	78.044	DrGrt	0.00	0.38	0.33	16.0	280.90	2.97	282.00	15	Cir	0.012	1.48	287.00	EX CLCB 10 - YD 9
6	5	216.000	-78.993	DrGrt	0.00	0.26	0.34	14.0	282.00	0.93	284.00	15	Cir	0.012	1.18	291.50	YD 9 - YD 10
7	6	91.000	0.038	DrGrt	0.12	0.20	0.48	7.0	284.00	1.10	285.00	15	Cir	0.012	0.52	291.50	YD 10 - AD 11
8	7	59.000	17.271	DrGrt	0.00	0.19	0.44	8.0	285.00	1.69	286.00	8	Cir	0.012	1.00	293.70	AD 11 - AD 12
9	5	85.000	-0.813	DrGrt	0.00	0.05	0.33	5.0	282.00	2.82	284.40	15	Cir	0.012	0.50	289.50	YD 9 - EX YD 11
10	9	22.000	5.768	DrGrt	0.00	0.04	0.39	5.0	284.40	0.45	284.50	12	Cir	0.012	1.00	289.80	EX YD 11 - EX YD 1
11	6	119.000	48.457	DrGrt	0.00	0.09	0.42	5.0	284.00	0.84	285.00	8	Cir	0.012	1.00	293.70	YD 10 - YD 14
12	4	27.000	8.894	DrGrt	0.00	0.41	0.42	13.0	280.70	1.85	281.20	15	Cir	0.012	1.00	286.30	EX CLCB 10 - EX YD
13	1	78.000	-44.018	Comb	0.00	0.17	0.69	5.0	260.60	8.46	267.20	15	Cir	0.012	1.13	276.80	EX CCB 7 - EX CCB
14	13	87.000	45.374	Comb	0.00	0.07	0.55	5.0	267.20	4.02	270.70	15	Cir	0.012	1.00	275.20	EX CCB 14 - EX CCB
15	1	160.000	33.966	Comb	0.00	0.55	0.77	5.0	257.10	0.94	258.60	18	Cir	0.012	1.37	263.30	EX CCB 7 - EX CCB
16	15	141.000	-63.170	Comb	0.00	0.36	0.74	5.0	258.60	2.62	262.30	15	Cir	0.012	0.50	270.90	EX CCB 16 - EX CCB
17	16	60.000	1.023	Comb	0.00	0.22	0.65	5.0	264.50	1.83	265.60	15	Cir	0.012	1.00	269.80	EX CCB 17 - EX CCB

Project File: Storm 2.stm

Number of lines: 17

Date: 6/2/2016

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	58.000	0.30	3.91	0.79	0.24	2.30	5.0	17.2	4.8	11.09	15.67	8.27	18	1.90	256.00	257.10	256.93	258.37	257.50	269.10	OUT - EX CCB 7
2	1	157.000	0.30	2.24	0.73	0.22	1.08	5.0	16.9	4.8	5.31	26.00	8.21	18	5.22	262.10	270.30	262.56	271.19	269.10	274.80	EX CCB 7 - EX C
3	2	77.000	0.28	1.94	0.70	0.20	0.86	5.0	16.6	4.9	4.29	14.04	4.76	15	4.03	270.30	273.40	271.19	274.24	274.80	280.10	EX CCB 8 - EX C
4	3	119.000	0.04	1.66	0.69	0.03	0.66	5.0	16.1	4.9	3.39	16.60	4.17	15	5.63	273.40	280.10	274.24	280.84	280.10	285.60	EX CCB 9 - EX C
5	4	37.000	0.38	1.21	0.33	0.13	0.46	16.0	16.0	5.0	2.42	12.06	5.82	15	2.97	280.90	282.00	281.28	282.62	285.60	287.00	EX CLCB 10 - YD
6	5	216.000	0.26	0.74	0.34	0.09	0.31	14.0	14.0	5.3	1.75	6.73	3.23	15	0.93	282.00	284.00	282.62	284.53	287.00	291.50	YD 9 - YD 10
7	6	91.000	0.20	0.39	0.48	0.10	0.18	7.0	8.4	7.0	1.37	7.33	3.06	15	1.10	284.00	285.00	284.53	285.46	291.50	291.50	YD 10 - AD 11
8	7	59.000	0.19	0.19	0.44	0.08	0.08	8.0	8.0	7.1	0.60	1.70	2.69	8	1.69	285.00	286.00	285.46	286.36	291.50	293.70	AD 11 - AD 12
9	5	85.000	0.05	0.09	0.33	0.02	0.03	5.0	5.2	8.6	0.28	11.75	1.29	15	2.82	282.00	284.40	282.62	284.60	287.00	289.50	YD 9 - EX YD 11
10	9	22.000	0.04	0.04	0.39	0.02	0.02	5.0	5.0	8.8	0.14	2.60	1.50	12	0.45	284.40	284.50	284.60	284.65	289.50	289.80	EX YD 11 - EX Y
11	6	119.000	0.09	0.09	0.42	0.04	0.04	5.0	5.0	8.8	0.33	1.20	1.83	8	0.84	284.00	285.00	284.53	285.27	291.50	293.70	YD 10 - YD 14
12	4	27.000	0.41	0.41	0.42	0.17	0.17	13.0	13.0	5.6	0.96	9.52	3.98	15	1.85	280.70	281.20	280.97	281.58	285.60	286.30	EX CLCB 10 - EX
13	1	78.000	0.17	0.24	0.69	0.12	0.16	5.0	5.9	8.2	1.27	20.35	6.24	15	8.46	260.60	267.20	260.81	267.65	269.10	276.80	EX CCB 7 - EX C
14	13	87.000	0.07	0.07	0.55	0.04	0.04	5.0	5.0	8.8	0.34	14.03	1.56	15	4.02	267.20	270.70	267.65	270.93	276.80	275.20	EX CCB 14 - EX
15	1	160.000	0.55	1.13	0.77	0.42	0.83	5.0	5.8	8.2	6.86	11.02	4.85	18	0.94	257.10	258.60	258.37	259.61	269.10	263.30	EX CCB 7 - EX C
16	15	141.000	0.36	0.58	0.74	0.27	0.41	5.0	5.2	8.6	3.53	11.33	3.92	15	2.62	258.60	262.30	259.61	263.06	263.30	270.90	EX CCB 16 - EX
17	16	60.000	0.22	0.22	0.65	0.14	0.14	5.0	5.0	8.8	1.26	9.47	4.29	15	1.83	264.50	265.60	264.81	266.04	270.90	269.80	EX CCB 17 - EX

Project File: Storm 2.stm

Number of lines: 17

Run Date: 6/2/2016

NOTES: Intensity = 39.08 / (Inlet time + 3.60) ^ 0.69; Return period = Yrs. 25 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			By Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
1	EX CCB 7	2.08	2.45	1.66	2.87	Comb	4.0	2.73	0.00	2.31	1.35	0.030	2.53	0.020	0.020	0.013	0.19	9.61	0.19	9.56	0.0	Off
2	EX CCB 8	1.92	0.00	0.90	1.02	Comb	4.0	2.73	0.00	2.31	1.35	0.030	2.53	0.020	0.020	0.013	0.14	6.96	0.14	6.91	0.0	1
3	EX CCB 9	1.72	0.81	1.10	1.43	Comb	4.0	2.73	0.00	2.31	1.35	0.030	2.53	0.020	0.020	0.013	0.15	7.71	0.15	7.66	0.0	1
4	EX CLCB 10	0.24	1.32	0.76	0.81	Grate	0.0	0.00	0.00	2.31	1.35	0.030	2.53	0.020	0.020	0.013	0.13	6.46	0.10	5.06	0.0	3
5	YD 9	0.62	0.15	0.19	0.58	DrGrt	0.0	0.00	0.00	1.23	1.23	0.020	2.00	0.020	0.020	0.013	0.07	9.10	0.07	9.10	0.0	4
6	YD 10	0.47	0.00	0.13	0.34	DrGrt	0.0	0.00	0.00	1.23	1.23	0.020	2.00	0.020	0.020	0.013	0.06	8.10	0.06	8.10	0.0	Off
7	AD 11	0.85*	0.23	0.23	0.84	DrGrt	0.0	0.00	0.00	1.23	1.23	0.020	2.00	0.020	0.020	0.013	0.09	11.10	0.09	11.10	0.0	Off
8	AD 12	0.60	0.00	0.15	0.44	DrGrt	0.0	0.00	0.00	1.23	1.23	0.020	2.00	0.020	0.020	0.013	0.07	9.10	0.07	9.10	0.0	Off
9	EX YD 11	0.14	0.08	0.08	0.15	DrGrt	0.0	0.00	0.00	1.23	1.23	0.020	2.00	0.020	0.020	0.013	0.04	6.10	0.04	6.10	0.0	5
10	EX YD 12	0.14	0.00	0.05	0.08	DrGrt	0.0	0.00	0.00	1.23	1.23	0.020	2.00	0.020	0.020	0.013	0.04	6.10	0.04	6.10	0.0	9
11	AD 14	0.33	0.00	0.10	0.23	DrGrt	0.0	0.00	0.00	1.23	1.23	0.020	2.00	0.020	0.020	0.013	0.05	7.10	0.05	7.10	0.0	7
12	EX YD 13	0.96	0.00	0.22	0.74	DrGrt	0.0	0.00	0.00	1.23	1.23	0.020	2.00	0.020	0.020	0.013	0.08	10.10	0.08	10.10	0.0	4
13	EX CCB 14	1.03	0.00	0.57	0.46	Comb	4.0	2.73	0.00	2.31	1.35	0.030	2.53	0.020	0.020	0.013	0.11	5.51	0.11	5.46	0.0	16
14	EX CCB 15	0.34	0.00	0.25	0.09	Comb	4.0	2.73	0.00	2.31	1.35	0.030	2.53	0.020	0.020	0.013	0.07	3.65	0.07	3.60	0.0	16
15	EX CCB 16	3.72	0.00	3.72	0.00	Comb	4.0	2.73	3.12	2.31	1.35	Sag	2.53	0.020	0.020	0.000	0.39	19.37	0.39	19.37	0.0	Off
16	EX CCB 17	2.34	0.55	1.21	1.68	Comb	4.0	2.73	0.00	2.31	1.35	0.030	2.53	0.020	0.020	0.013	0.16	8.11	0.16	8.06	0.0	17
17	EX CCB 18	1.26	1.68	1.22	1.71	Comb	4.0	2.73	0.00	2.31	1.35	0.030	2.53	0.020	0.020	0.013	0.16	8.16	0.16	8.11	0.0	Off

Project File: Storm 2.stm

Number of lines: 17

Run Date: 6/2/2016

NOTES: Inlet N-Values = 0.016; Intensity = 39.08 / (Inlet time + 3.60) ^ 0.69; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
1	18	11.09	256.00	256.93	0.93	1.15	9.61	0.75	257.68	0.000	58.000	257.10	258.37	1.27**	1.60	6.93	0.75	259.12	0.000	0.000	n/a	2.07	n/a
2	18	5.31	262.10	262.56	0.46*	0.46	11.54	0.37	262.93	0.000	157.000	270.30	271.19	0.89**	1.09	4.88	0.37	271.56	0.000	0.000	n/a	1.50	n/a
3	15	4.29	270.30	271.19	0.89	0.88	4.61	0.37	271.56	0.000	77.000	273.40	274.24 j	0.84**	0.88	4.90	0.37	274.61	0.000	0.000	n/a	0.94	0.35
4	15	3.39	273.40	274.24	0.84	0.76	3.88	0.31	274.55	0.000	119.000	280.10	280.84 j	0.74**	0.76	4.47	0.31	281.15	0.000	0.000	n/a	2.14	n/a
5	15	2.42	280.90	281.28	0.38*	0.32	7.67	0.24	281.52	0.000	37.000	282.00	282.62	0.62**	0.61	3.97	0.24	282.87	0.000	0.000	n/a	1.48	0.36
6	15	1.75	282.00	282.62	0.62	0.49	2.88	0.20	282.82	0.000	216.000	284.00	284.53 j	0.53**	0.49	3.58	0.20	284.72	0.000	0.000	n/a	1.18	n/a
7	15	1.37	284.00	284.53	0.53	0.41	2.80	0.17	284.70	0.000	91.000	285.00	285.46 j	0.46**	0.41	3.32	0.17	285.63	0.000	0.000	n/a	0.52	n/a
8	8	0.60	285.00	285.46	0.46	0.19	2.31	0.15	285.61	0.000	59.000	286.00	286.36 j	0.36**	0.19	3.07	0.15	286.51	0.000	0.000	n/a	1.00	0.15
9	15	0.28	282.00	282.62	0.62	0.13	0.45	0.07	282.69	0.000	85.000	284.40	284.60 j	0.20**	0.13	2.13	0.07	284.67	0.000	0.000	n/a	0.50	0.04
10	12	0.14	284.40	284.60	0.20	0.07	1.20	0.02	284.63	0.154	22.000	284.50	284.65	0.15**	0.08	1.80	0.05	284.70	0.493	0.324	0.071	1.00	0.05
11	8	0.33	284.00	284.53	0.53	0.13	1.12	0.10	284.63	0.000	119.000	285.00	285.27 j	0.27**	0.13	2.54	0.10	285.37	0.000	0.000	n/a	1.00	n/a
12	15	0.96	280.70	280.97	0.27*	0.19	4.97	0.14	281.11	0.000	27.000	281.20	281.58	0.38**	0.32	2.99	0.14	281.72	0.000	0.000	n/a	1.00	n/a
13	15	1.27	260.60	260.81	0.21*	0.14	9.24	0.16	260.98	0.000	78.000	267.20	267.65	0.45**	0.39	3.25	0.16	267.81	0.000	0.000	n/a	1.13	n/a
14	15	0.34	267.20	267.65	0.45	0.15	0.86	0.08	267.72	0.000	87.000	270.70	270.93 j	0.23**	0.15	2.25	0.08	271.00	0.000	0.000	n/a	1.00	n/a
15	18	6.86	257.10	258.37	1.27	1.27	4.29	0.45	258.83	0.000	160.000	258.60	259.61 j	1.01**	1.27	5.40	0.45	260.07	0.000	0.000	n/a	1.37	n/a
16	15	3.53	258.60	259.61	1.01	0.78	3.31	0.32	259.93	0.000	141.000	262.30	263.06 j	0.76**	0.78	4.54	0.32	263.38	0.000	0.000	n/a	0.50	0.16
17	15	1.26	264.50	264.81	0.31*	0.23	5.35	0.16	264.97	0.000	60.000	265.60	266.04	0.44**	0.39	3.24	0.16	266.20	0.000	0.000	n/a	1.00	0.16

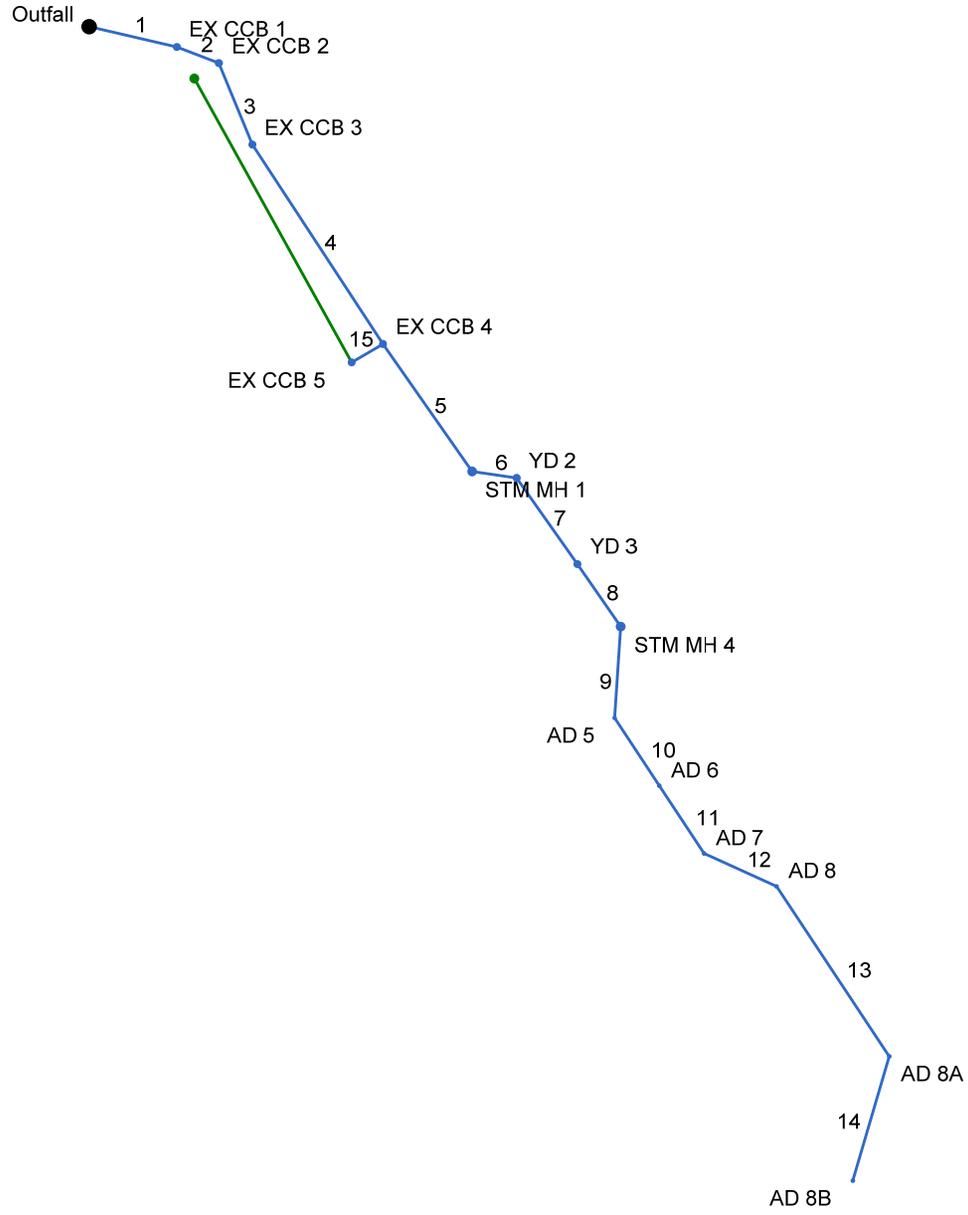
Project File: Storm 2.stm

Number of lines: 17

Run Date: 6/2/2016

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: Storm 3.stm

Number of lines: 15

Date: 6/2/2016

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	52.000	13.059	Comb	0.00	0.20	0.51	5.0	256.30	0.58	256.60	15	Cir	0.012	0.50	259.80	OUT - EX CCB 1
2	1	26.000	7.977	Comb	0.00	0.02	0.90	5.0	256.60	4.23	257.70	15	Cir	0.012	1.15	262.00	EX CCB 1 - EX CCB
3	2	51.000	46.698	Comb	0.00	0.04	0.90	5.0	257.70	6.67	261.10	15	Cir	0.012	0.50	267.40	EX CCB 2 - EX CCB
4	3	138.000	-10.878	Comb	0.00	0.11	0.40	5.0	261.20	8.84	273.40	15	Cir	0.012	1.50	279.10	EX CCB 4 - EX CCB
5	4	90.000	-1.731	MH	0.00	0.00	0.00	5.0	273.90	0.67	274.50	15	Cir	0.012	0.77	281.00	EX CCB 5 - STM MH
6	5	26.000	-46.844	DrGrt	0.00	0.21	0.30	11.0	274.50	1.92	275.00	12	Cir	0.012	1.15	280.00	STM MH 1- YD 2
7	6	61.000	46.632	DrGrt	0.00	0.13	0.30	11.0	275.00	0.82	275.50	12	Cir	0.012	0.50	280.20	YD 2 - YD 3
8	7	44.000	0.453	MH	0.00	0.00	0.00	0.0	275.50	1.14	276.00	12	Cir	0.012	0.67	280.40	YD 3 - STM MH 4
9	8	53.000	38.437	DrGrt	0.00	0.10	0.30	9.0	276.00	0.94	276.50	12	Cir	0.012	0.98	281.50	STM MH 4 - AD 5
10	9	47.000	-37.060	DrGrt	0.00	0.32	0.34	15.0	276.50	1.06	277.00	12	Cir	0.012	0.50	281.50	AD 5 - AD 6
11	10	47.000	-0.117	DrGrt	0.00	0.11	0.30	9.0	277.00	1.06	277.50	12	Cir	0.012	0.88	281.50	AD 6 - AD 7
12	11	46.000	-32.124	DrGrt	0.00	0.20	0.30	13.0	277.50	1.09	278.00	12	Cir	0.012	0.88	281.50	AD 7 - AD 8
13	12	118.000	32.034	DrGrt	0.00	0.11	0.30	8.0	278.00	0.85	279.00	12	Cir	0.012	1.20	284.00	AD 8 - AD 8A
14	13	75.000	49.752	DrGrt	0.00	0.39	0.42	13.0	279.00	2.67	281.00	12	Cir	0.012	1.00	288.00	AD 8A - AD 8B
15	4	21.000	92.725	Comb	0.00	0.09	0.90	5.0	273.90	7.62	275.50	15	Cir	0.012	1.00	279.70	EX CCB 4 - EX CCB

Project File: Storm 3.stm

Number of lines: 15

Date: 6/2/2016

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	52.000	0.20	2.03	0.51	0.10	0.81	5.0	17.0	4.8	3.88	5.31	4.72	15	0.58	256.30	256.60	257.09	257.40	257.50	259.80	OUT - EX CCB 1
2	1	26.000	0.02	1.83	0.90	0.02	0.71	5.0	16.9	4.8	3.40	14.39	4.30	15	4.23	256.60	257.70	257.40	258.44	259.80	262.00	EX CCB 1 - EX C
3	2	51.000	0.04	1.81	0.90	0.04	0.69	5.0	16.8	4.8	3.34	18.06	4.42	15	6.67	257.70	261.10	258.44	261.84	262.00	267.40	EX CCB 2 - EX C
4	3	138.000	0.11	1.77	0.40	0.04	0.66	5.0	16.3	4.9	3.22	20.80	4.76	15	8.84	261.20	273.40	261.84	274.12	267.40	279.10	EX CCB 4 - EX C
5	4	90.000	0.00	1.57	0.00	0.00	0.53	5.0	15.9	5.0	2.64	5.71	4.32	15	0.67	273.90	274.50	274.50	275.15	279.10	281.00	EX CCB 5 - STM
6	5	26.000	0.21	1.57	0.30	0.06	0.53	11.0	15.8	5.0	2.65	5.35	4.71	12	1.92	274.50	275.00	275.15	275.70	281.00	280.00	STM MH 1- YD 2
7	6	61.000	0.13	1.36	0.30	0.04	0.47	11.0	15.6	5.0	2.35	3.49	4.17	12	0.82	275.00	275.50	275.70	276.16	280.00	280.20	YD 2 - YD 3
8	7	44.000	0.00	1.23	0.00	0.00	0.43	0.0	15.4	5.1	2.17	4.11	4.07	12	1.14	275.50	276.00	276.16	276.63	280.20	280.40	YD 3 - STM MH 4
9	8	53.000	0.10	1.23	0.30	0.03	0.43	9.0	15.2	5.1	2.19	3.75	4.19	12	0.94	276.00	276.50	276.63	277.13	280.40	281.50	STM MH 4 - AD 5
10	9	47.000	0.32	1.13	0.34	0.11	0.40	15.0	15.0	5.1	2.05	3.98	4.00	12	1.06	276.50	277.00	277.13	277.61	281.50	281.50	AD 5 - AD 6
11	10	47.000	0.11	0.81	0.30	0.03	0.29	9.0	14.3	5.3	1.53	3.98	3.36	12	1.06	277.00	277.50	277.61	278.02	281.50	281.50	AD 6 - AD 7
12	11	46.000	0.20	0.70	0.30	0.06	0.26	13.0	14.1	5.3	1.37	4.02	3.41	12	1.09	277.50	278.00	278.02	278.49	281.50	281.50	AD 7 - AD 8
13	12	118.000	0.11	0.50	0.30	0.03	0.20	8.0	13.4	5.5	1.08	3.55	3.03	12	0.85	278.00	279.00	278.49	279.44	281.50	284.00	AD 8 - AD 8A
14	13	75.000	0.39	0.39	0.42	0.16	0.16	13.0	13.0	5.6	0.91	6.30	2.94	12	2.67	279.00	281.00	279.44	281.40	284.00	288.00	AD 8A - AD 8B
15	4	21.000	0.09	0.09	0.90	0.08	0.08	5.0	5.0	8.8	0.71	19.31	3.79	15	7.62	273.90	275.50	274.12	275.83	279.10	279.70	EX CCB 4 - EX C

Project File: Storm 3.stm

Number of lines: 15

Run Date: 6/2/2016

NOTES: Intensity = 39.08 / (Inlet time + 3.60) ^ 0.69; Return period = Yrs. 25 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depr (in)
1	EX CCB 1	0.90	0.09	0.82	0.16	Comb	4.0	0.85	0.00	1.35	2.73	0.030	2.53	0.020	0.020	0.013	0.11	5.46	0.06	2.80	0.0	Off
2	EX CCB 2	0.16	0.01	0.16	0.00	Comb	4.0	0.85	0.00	1.35	2.73	0.030	2.53	0.020	0.020	0.013	0.06	2.80	0.00	0.01	0.0	Off
3	EX CCB 3	0.32	0.01	0.32	0.01	Comb	4.0	0.85	0.00	1.35	2.73	0.030	2.53	0.020	0.020	0.013	0.07	3.60	0.02	0.86	0.0	2
4	EX CCB 4	0.39	0.00	0.38	0.01	Comb	4.0	0.85	0.00	1.35	2.73	0.030	2.53	0.020	0.020	0.013	0.08	3.85	0.02	1.01	0.0	3
5	STM MH 1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
6	YD 2	0.38	0.00	0.12	0.27	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.05	7.10	0.05	7.10	0.0	Off
7	YD 3	0.24	0.00	0.08	0.16	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.04	6.10	0.04	6.10	0.0	Off
8	STM MH 4	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
9	AD 5	0.20	0.00	0.07	0.13	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.04	6.10	0.04	6.10	0.0	Off
10	AD 6	0.56	0.00	0.15	0.41	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.06	8.10	0.06	8.10	0.0	Off
11	AD 7	0.22	0.00	0.08	0.15	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.04	6.10	0.04	6.10	0.0	Off
12	AD 8	0.33	0.00	0.10	0.23	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.05	7.10	0.05	7.10	0.0	Off
13	AD 8A	0.24	0.00	0.08	0.16	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.04	6.10	0.04	6.10	0.0	Off
14	AD 8B	0.91	0.00	0.22	0.69	DrGrt	0.0	0.00	0.00	1.23	1.23	0.030	2.00	0.020	0.020	0.013	0.07	9.10	0.07	9.10	0.0	Off
15	EX CCB 5	0.71	0.00	0.62	0.09	Comb	4.0	0.85	0.00	1.35	2.73	0.030	2.53	0.020	0.020	0.013	0.10	4.81	0.04	2.20	0.0	1

Project File: Storm 3.stm

Number of lines: 15

Run Date: 6/2/2016

NOTES: Inlet N-Values = 0.016; Intensity = 39.08 / (Inlet time + 3.60) ^ 0.69; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
1	15	3.88	256.30	257.09	0.79	0.82	4.73	0.34	257.44	0.000	52.000	256.60	257.40	0.80**	0.82	4.71	0.34	257.74	0.000	0.000	n/a	0.50	0.17
2	15	3.40	256.60	257.40	0.80	0.76	4.13	0.31	257.71	0.000	26.000	257.70	258.44 j	0.74**	0.76	4.47	0.31	258.75	0.000	0.000	n/a	1.15	n/a
3	15	3.34	257.70	258.44	0.74	0.75	4.39	0.31	258.75	0.000	51.000	261.10	261.84 j	0.74**	0.75	4.44	0.31	262.14	0.000	0.000	n/a	0.50	0.15
4	15	3.22	261.20	261.84	0.64	0.63	5.13	0.30	262.13	0.000	138.000	273.40	274.12	0.72**	0.73	4.38	0.30	274.42	0.000	0.000	n/a	1.50	n/a
5	15	2.64	273.90	274.50	0.60*	0.58	4.56	0.26	274.76	0.000	90.000	274.50	275.15	0.65**	0.65	4.09	0.26	275.41	0.000	0.000	n/a	0.77	0.20
6	12	2.65	274.50	275.15	0.65	0.54	4.89	0.32	275.47	0.000	26.000	275.00	275.70	0.70**	0.58	4.53	0.32	276.02	0.000	0.000	n/a	1.15	0.37
7	12	2.35	275.00	275.70	0.70	0.55	4.03	0.29	275.99	0.000	61.000	275.50	276.16 j	0.66**	0.55	4.31	0.29	276.44	0.000	0.000	n/a	0.50	0.14
8	12	2.17	275.50	276.16	0.66	0.52	3.97	0.27	276.43	0.000	44.000	276.00	276.63 j	0.63**	0.52	4.17	0.27	276.90	0.000	0.000	n/a	0.67	n/a
9	12	2.19	276.00	276.63	0.63	0.52	4.20	0.27	276.90	0.000	53.000	276.50	277.13	0.63**	0.52	4.18	0.27	277.40	0.000	0.000	n/a	0.98	n/a
10	12	2.05	276.50	277.13	0.63	0.50	3.92	0.26	277.39	0.000	47.000	277.00	277.61 j	0.61**	0.50	4.08	0.26	277.87	0.000	0.000	n/a	0.50	n/a
11	12	1.53	277.00	277.61	0.61	0.42	3.04	0.21	277.82	0.000	47.000	277.50	278.02 j	0.52**	0.42	3.67	0.21	278.23	0.000	0.000	n/a	0.88	n/a
12	12	1.37	277.50	278.02	0.52	0.39	3.28	0.19	278.22	0.000	46.000	278.00	278.49 j	0.49**	0.39	3.54	0.19	278.69	0.000	0.000	n/a	0.88	n/a
13	12	1.08	278.00	278.49	0.49	0.33	2.78	0.17	278.66	0.000	118.000	279.00	279.44 j	0.44**	0.33	3.27	0.17	279.60	0.000	0.000	n/a	1.20	0.20
14	12	0.91	279.00	279.44	0.44	0.29	2.77	0.15	279.59	0.000	75.000	281.00	281.40 j	0.40**	0.29	3.11	0.15	281.55	0.000	0.000	n/a	1.00	n/a
15	15	0.71	273.90	274.12	0.22	0.15	4.82	0.12	274.24	0.000	21.000	275.50	275.83	0.33**	0.26	2.75	0.12	275.95	0.000	0.000	n/a	1.00	n/a

Project File: Storm 3.stm

Number of lines: 15

Run Date: 6/2/2016

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box



APPENDIX D

STORMWATER POLLUTION CONTROL PLAN

STORMWATER POLLUTION CONTROL DETAILS

STORM WATER MAINTENANCE PROGRAM

THE FOLLOWING PROGRAM IS INTENDED TO PERIODICALLY MAINTAIN STORMWATER SYSTEMS ON THE PROPERTY. THE STORMWATER SYSTEM CONSISTS OF PIPING AND CATCH BASINS. IN ORDER TO ENSURE OPTIMAL PERFORMANCE OF THE SYSTEM, THE FOLLOWING STORMWATER MAINTENANCE PROGRAM HAS BEEN ESTABLISHED. THE PROPERTY OWNER WILL BE RESPONSIBLE FOR IMPLEMENTATION OF THIS PROGRAM.

- A. CATCH BASINS/YARD DRAINS
 - CATCH BASINS CONTAIN SWIMS THAT WILL REQUIRE PERIODIC MAINTENANCE. EACH CATCH BASIN ON THE PROPERTY SHALL BE INSPECTED TWICE A YEAR FOR THE FIRST TWO YEARS, AND THE FREQUENCY OF SUCH MONITORING IN SUBSEQUENT YEARS SHALL BE ADJUSTED BASED ON OBSERVATION IN THE FIRST TWO YEARS. SEDIMENT AND DEBRIS SHALL BE REMOVED ONCE THE SEDIMENT REACHES WITHIN SIX INCHES OF THE INVERT OF THE PIPE.
- B. PAVEMENT SWEEPING
 - ROADWAYS SHALL BE SWEEPED CLEAN OF SAND AND LITTER AT LEAST ONCE PER YEAR DURING THE MONTH OF APRIL (AFTER SNOW MELT) AND AT OTHER TIMES AS MAY BE NECESSARY.

SOIL EROSION AND SEDIMENT CONTROLS SEQUENCE

1. INSTALL PERIMETER CONTROLS AND CONSTRUCTION ENTRANCE TRAP AT CONSTRUCTION SITE.
2. THROUGHOUT THE COURSE OF CONSTRUCTION, THE STABILIZED CONSTRUCTION AREAS SHALL NOT BE EXPOSED TO WIND AND SHALL BE COVERED WITH MULCH AND SEED TO PREVENT THE VISIBLE MOVEMENT OF SOIL PARTICLES AND DEVELOPMENT OF RILLS.
3. INSTALL DIVERSION BERMS AND TEMPORARY SEDIMENT TRAPS.
4. TOPSOIL SHOULD BE STOPPED AND SEDIMENT FILTER FENCE TO BE INSTALLED AROUND THE STOCKPILE. THE SOIL STOCKPILE SHOULD THEN BE STABILIZED WITH MULCH AND SEED.
5. SLOPES SHOULD BE STABILIZED AS SOON AS POSSIBLE WITH EROSION CONTROL BLANKET OR MULCH AND SEED.
6. DRAINAGE INLET PROTECTION CONTROLS SHOULD BE INSTALLED AS STRUCTURES ARE PUT IN PLACE.
7. CLEAN OUT TEMPORARY SEDIMENT TRAP BEFORE FINAL STABILIZATION MEASURES ARE IN PLACE.

SOIL EROSION AND SEDIMENT CONTROL NARRATIVE

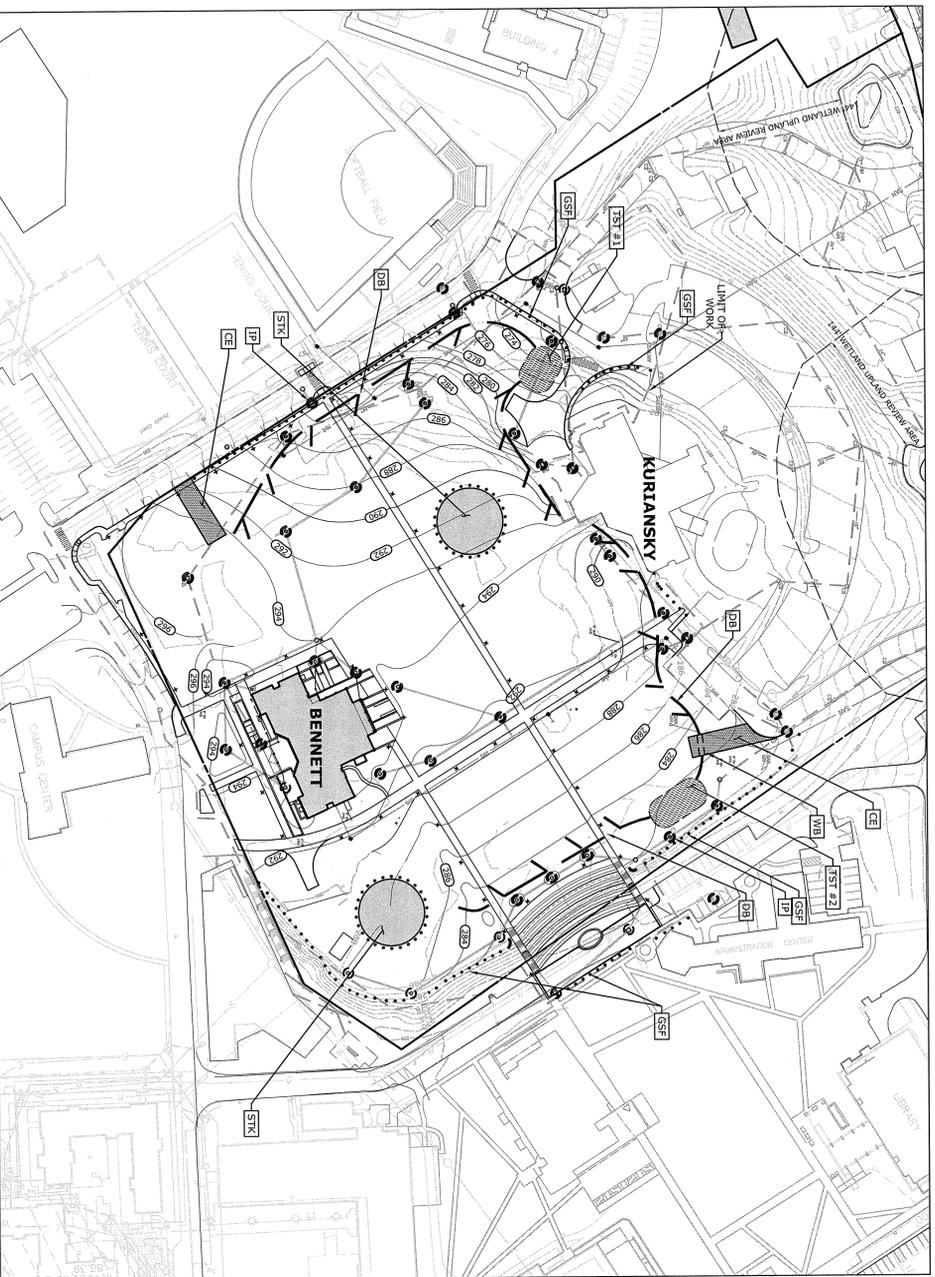
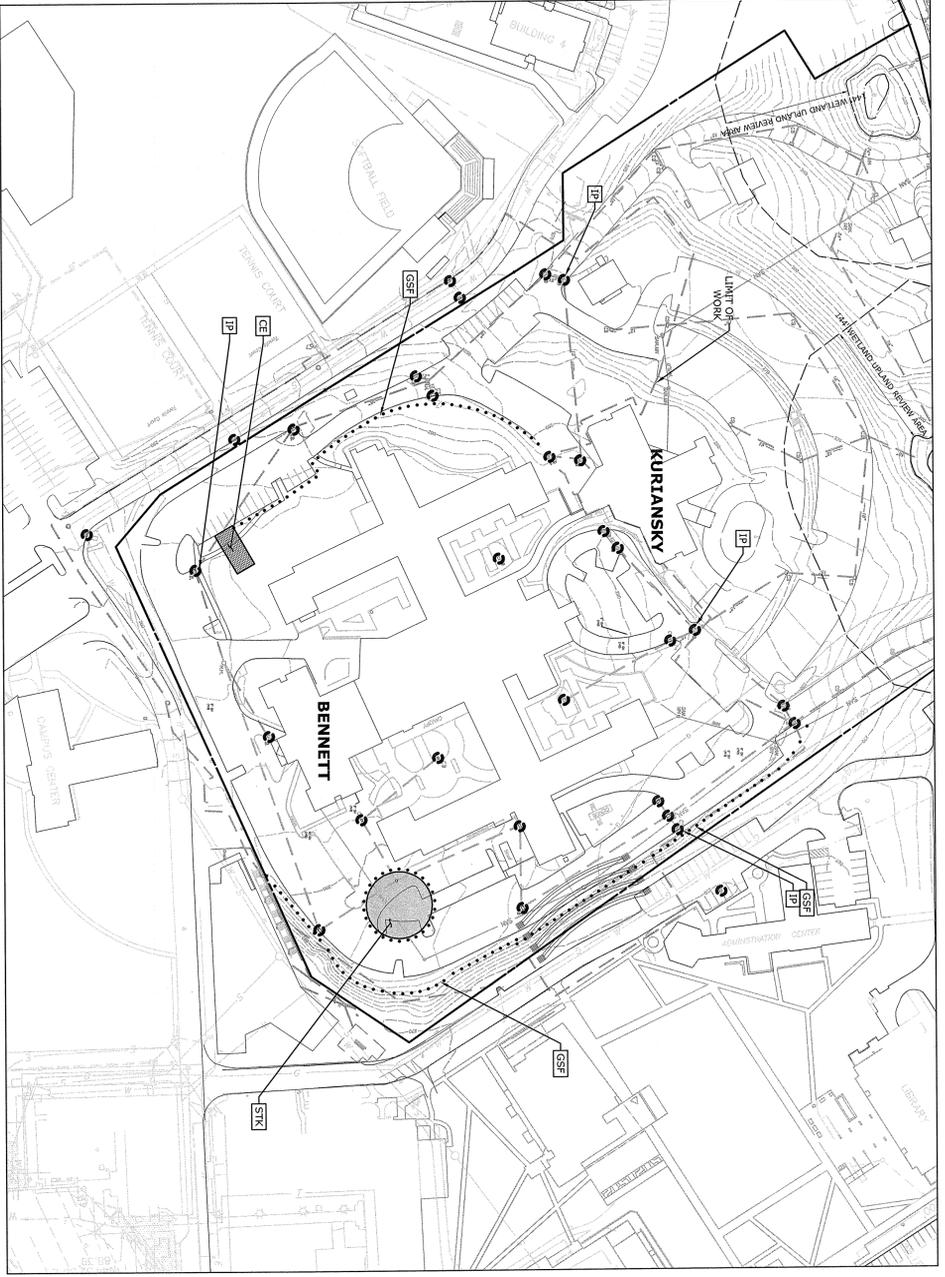
SEDIMENT AND EROSION CONTROL MEASURES AS DEPICTED ON THESE PLANS AND DESCRIBED WITHIN THE SEDIMENT AND EROSION CONTROL NARRATIVE SHALL BE IMPLEMENTED AND MAINTAINED UNTIL PERMANENT COVER AND STABILIZATION IS ESTABLISHED. THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND THROUGHOUT THE CONNECTICUT - 2002 TOWN OF FAIRFIELD STANDARDS, AND IN ALL CASES BEST MANAGEMENT PRACTICES SHALL PREVAIL.

1. PURPOSE AND DESCRIPTION OF PROJECT
 - A.) DEMOLITION OF ONE EXISTING BUILDING AND ASSOCIATED INFRASTRUCTURE. RENOVATION OF ONE EXISTING BUILDING AND ASSOCIATED UTILITY IMPROVEMENTS.
 - B.) DISTURBED AREA: 48.9 AC.
 2. IDENTIFICATION OF EROSION AND SEDIMENT CONTROL CONCERNS
 - A.) CUTS AND FILLS ASSOCIATED WITH CONSTRUCTION.
 - B.) PROTECTION OF EXISTING STORM DRAINAGE SYSTEM.
 3. IDENTIFICATION OF OTHER POSSIBLE PERMITS
- THE PERMITS REQUIRED FOR THE PROJECT ARE DEMOLITION, CT DEEP SWOP, IWMA, PZC, WHCA.

TRAP NO.	ACRES	TEMPORARY SEDIMENT TRAP SIZING SUMMARY
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#2	2.1	TEMPORARY SEDIMENT TRAP SIZING SUMMARY
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#100	2.1	TEMPORARY SEDIMENT TRAP SIZING SUMMARY

EROSION CONTROL LEGEND

- CE CONSTRUCTION ENTRANCE (7.5 L.F. MIN.)
- GSF SEDIMENT FILTER FENCE
- STK TEMPORARY STOCKPILE SURROUND WITH SEDIMENT FILTER FENCE
- IP INLET PROTECTION
- TST TEMPORARY SEDIMENT TRAP
- DB DIVERSION BERM
- WB WATER BAR



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Drawn: **KMT**
 Checked: **TD**

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 www.miloneandmacbroom.com



Sacred Heart
 UNIVERSITY

RENOVATIONS TO
 BENNETT HALL
 175 JEFFERSON STREET
 FAIRFIELD, CT 06825



Number	Date	Issued For

06/03/2016
 1"=80'
 15228.00

C103

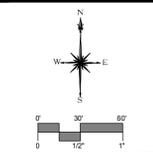
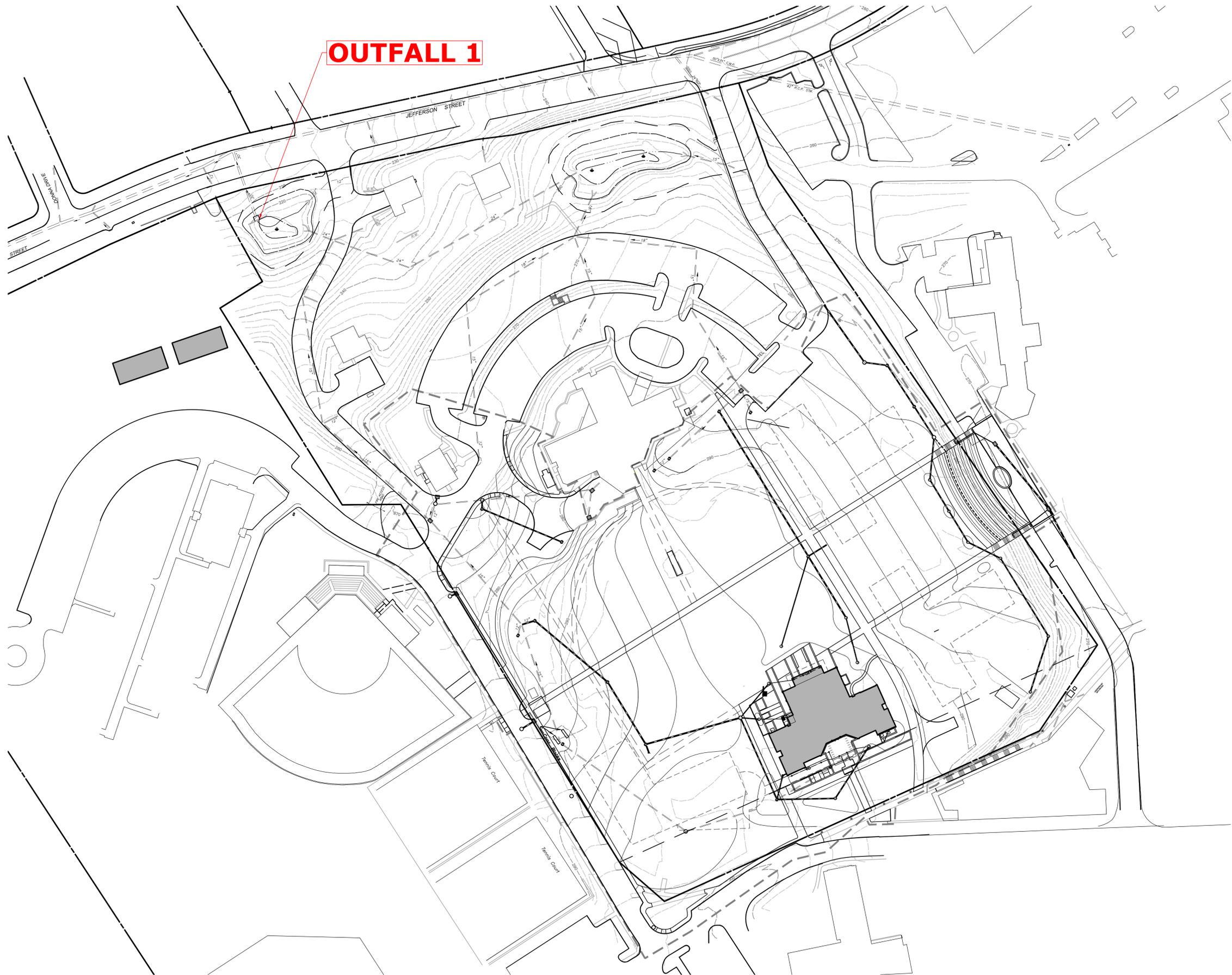
STORM WATER
 POLLUTION CONTROL
 PLAN



APPENDIX E

MOINTORING OUTFALL LOCATION

DATE PLOTTED: 06/03/2016 10:58:10 AM



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 Cheshire, Connecticut 06410
 (203) 271-1773 Fax (203) 272-9733
 www.miloneandmacbroom.com

DESCRIPTION	DATE	BY

MONITORING LOCATION
 SACRED HEART UNIVERSITY
 RENOVATIONS TO BENNETT HALL
 175 JEFFERSON STREET
 FAIRFIELD, CT

KMT	AWG	TD
DESIGNED	DRAWN	CHECKED

SCALE: 1"=60'
 DATE: JUNE 3, 2016
 PROJECT NO.: 2982-17

FIG. 1