

MEMORANDUM

DATE: 12/01/2017
TO: City of La Crosse – Engineering Department
Attn: Yuri Nasonovs
FROM: Kris Roppe
SUBJECT: Garden Terrace Townhomes and Community Center - Stormwater Management

This stormwater management memo has been prepared to accompany the submitted plans and stormwater calculations for the proposed townhomes and community center located at 1190 St. James Street. The project will consist of the construction of 6 unit townhomes, a community center, construction of asphalt pavement, concrete driveway, concrete walk, retaining walls, utilities, erosion control, stormwater management, and landscaping. A project location map is provided on Sheet C0-10 in the submitted plan set.

A geotechnical Report was prepared by Braun Intertec, Inc. Soil evaluations indicate that the design infiltration rate is 0.5 inches/hour based on the requirements of Wisconsin DNR Conservation Practice Standard 1002.

Design Standards

Stormwater management plans and calculations have been prepared to meet the requirements of the City of La Crosse Municipal Code 115-517. The proposed site is over 20,000 SF therefore stormwater management will be required to provide treatment from parking areas and infiltration of the 2-year storm event. The disturbed area for the project is less than one acre therefore it will not require a Wisconsin DNR WPDES permit.

Stormwater Management Facilities

Bio-infiltration basins have been designed to meet the stormwater management requirements of the Multifamily Design Standards. The proposed site has been separated into 4 sub-watersheds. Watersheds DA-1 and DA-2 consist of the buildings and parking areas which will drain to the proposed bio-infiltration basins on site. The bio-infiltration basins will have a two foot section of engineered fill to treat runoff from the parking areas and capacity to infiltrate a 2-year storm event. DA-3 consists of the driveway to the townhomes and will drain to a proposed catch basin to prevent runoff across the City sidewalk. DA-4 consists of the landscaped area and the sidewalk and stairs to access the townhomes. The proposed watersheds, ground cover, and stormwater management facilities are provided on Sheet C1-20 in the enclosures.

Calculation summary

In conjunction with the plans for the townhome and community center project, calculations were performed for the proposed drainage conditions. Water quantity calculations were completed using hydraulic models developed by utilizing the design data and the HydroCAD Version 10.00-19 computer modeling system. This was used to provide sizing and analysis for the proposed bio-infiltration basins. Hydrographs for existing and proposed scenarios were generated and routed through these models using the Atlas-14 rainfall distribution. The 2-year and 100-year 24-hour design storm events were analyzed for this project. The HydroCAD calculations for the proposed conditions are included in the enclosures. The calculations show that the basins contain the 2-year runoff event and safely convey the 100-year 24 hour design storm event without overtopping meeting the City requirements.

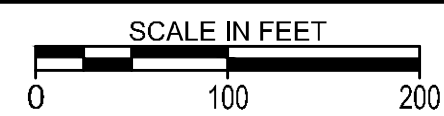
Enclosures:

Garden Terrace – Townhomes & Community Center Plans – December 01, 2017
Braun Intertec, Inc. Geotechnical Report
Proposed HydroCAD Report



CITY OF
LA CROSSE, WI

LOCATION MAP



**PROJECT
ADDRESS / LOCATION:
ST JAMES STREET
LA CROSSE, WI 54603**

**SECTION/TOWNSHIP/RANGE
SEC 29 / TWP 16 / R 7**

LA CROSSE, WISCONSIN

PROJECT GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE CONTRACT DOCUMENTS, WHICH INCLUDE, BUT ARE NOT LIMITED TO THE OWNER - CONTRACTOR AGREEMENT, THE PROJECT MANUAL (WHICH INCLUDES GENERAL SUPPLEMENTARY CONDITIONS AND SPECIFICATIONS), DRAWINGS OF ALL DISCIPLINES AND ALL ADDENDA, MODIFICATIONS AND CLARIFICATIONS ISSUED BY THE ARCHITECT/ENGINEER.
2. CONTRACT DOCUMENTS SHALL BE ISSUED TO ALL SUBCONTRACTORS BY THE GENERAL CONTRACTOR IN COMPLETE SETS IN ORDER TO ACHIEVE THE FULL EXTENT AND COMPLETE COORDINATION OF ALL WORK.
3. WRITTEN DIMENSIONS TAKE PRECEDENCE OVER SCALED DIMENSIONS. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES OR CONDITIONS REQUIRING INFORMATION OR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.
4. FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES OR CONDITIONS REQUIRING INFORMATION OR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.
5. DETAILS SHOWN ARE INTENDED TO BE INDICATIVE OF THE PROFILES AND TYPE OF DETAILING REQUIRED THROUGHOUT THE WORK. DETAILS NOT SHOWN ARE SIMILAR IN CHARACTER TO DETAILS SHOWN. WHERE SPECIFIC DIMENSIONS, DETAILS OR DESIGN INTENT CANNOT BE DETERMINED, NOTIFY ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.
6. ALL MANUFACTURED ARTICLES, MATERIALS AND EQUIPMENT SHALL BE APPLIED, INSTALLED, CONNECTED, ERECTED, CLEANED AND CONDITIONED ACCORDING TO MANUFACTURERS' INSTRUCTIONS. IN CASE OF DISCREPANCIES BETWEEN MANUFACTURERS' INSTRUCTIONS AND THE CONTRACT DOCUMENTS, NOTIFY ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.
7. ALL DISSIMILAR METALS SHALL BE EFFECTIVELY ISOLATED FROM EACH OTHER TO AVOID GALVANIC CORROSION.
8. THE LOCATION AND TYPE OF ALL IN PLACE UTILITIES SHOWN ON THE PLANS ARE FOR GENERAL INFORMATION ONLY AND ARE ACCURATE AND COMPLETE TO THE BEST OF THE KNOWLEDGE OF I & S GROUP, INC. (ISG). NO WARRANTY OR GUARANTEE IS IMPLIED. THE CONTRACTOR SHALL VERIFY THE SIZES, LOCATIONS AND ELEVATIONS OF ALL IN PLACE UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY NOTIFY ENGINEER OF ANY DISCREPANCIES OR VARIATIONS FROM PLAN.
9. THE CONTRACTOR IS TO CONTACT "DIGGER'S HOTLINE" FOR UTILITY LOCATIONS. MINIMUM 3 BUSINESS DAYS PRIOR TO ANY EXCAVATION / CONSTRUCTION (811 OR 1-800-242-8511).

DIGGERS' HOTLINE
Dial 811 or (800)242-8511
www.DiggersHotline.com

SPECIFICATIONS REFERENCE

ALL CONSTRUCTION SHALL COMPLY WITH THE CITY OF LA CROSSE STANDARD SPECIFICATIONS, CURRENT EDITION, WISDOT STANDARD SPECIFICATIONS, 2017 EDITION, WISDOT CONSTRUCTION AND MATERIALS MANUAL, CURRENT EDITION, WISCONSIN DEPARTMENT OF SAFETY AND PROFESSIONAL SERVICES STATE PLUMBING CODE, CURRENT EDITION, AND STANDARD SPECIFICATION FOR SEWER & WATER CONSTRUCTION IN WISCONSIN, 8th EDITION, UNLESS DIRECTED OTHERWISE.

PROJECT DATUM

HORIZONTAL COORDINATES HAVE BEEN REFERENCED TO THE NORTH AMERICAN DATUM, OF 1983 (NAD83), 2011 ADJUSTMENT ON THE LA CROSSE COUNTY COORDINATE SYSTEM, IN U.S. SURVEY FEET.

TOPOGRAPHIC SURVEY

THIS PROJECT'S TOPOGRAPHIC SURVEY CONSISTS OF DATA COLLECTED ON 9/16, 1/17, & 1/17 BY ISG.

B.M. ELEVATION=646.52

TOP NUT OF FIRE HYDRANT LOCATED ON THE NORTHEAST CORNER OF THE INTERSECTION OF ST JAMES ST AND GEORGE ST FRONTAGE RD

LEGEND

EXISTING	
---	CITY LIMITS
---	SECTION LINE
---	QUARTER SECTION LINE
---	RIGHT OF WAY LINE
---	PROPERTY / LOTLINE
---	EASEMENT LINE
---	ACCESS CONTROL
---	WATER EDGE
---	WETLAND BOUNDARY
---	WETLAND / MARSH
---	FENCE LINE
---	CULVERT
---	STORM SEWER
---	SANITARY SEWER
---	SANITARY SEWER FORCEMAIN
---	WATER
---	GAS
---	OVERHEAD ELECTRIC
---	UNDERGROUND ELECTRIC
---	UNDERGROUND TELEPHONE
---	UNDERGROUND TV
---	OVERHEAD UTILITY
---	UNDERGROUND UTILITY
---	UNDERGROUND FIBER OPTIC
---	CONTOUR (MAJOR)
---	CONTOUR (MINOR)
---	DECIDUOUS TREE
---	CONIFEROUS TREE
---	TREE LINE
---	MANHOLE/STRUCTURE
---	CATCH BASIN
---	HYDRANT
---	VALVE
---	CURB STOP
---	POWER POLE
---	UTILITY PEDESTAL / CABINET

PROPOSED	
---	PROPERTY BOUNDARY
---	RIGHT OF WAY
---	EASEMENT
---	CULVERT
---	STORM SEWER
---	STORM SEWER (PIPE WIDTH)
---	SANITARY SEWER
---	SANITARY SEWER (PIPE WIDTH)
---	WATER
---	GAS
---	OVERHEAD ELECTRIC
---	UNDERGROUND ELECTRIC
---	UNDERGROUND TV
---	CONTOUR
---	MANHOLE
---	CATCH BASIN
---	HYDRANT
---	VALVE

CIVIL SHEET INDEX

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**Garden Terrace -
Townhomes**

St James Street
La Crosse, WI 54603
Owner
Impact Seven
2961 Decker Drive
Rice Lake, WI 54888

PROJECT NUMBER 17-19647

ISSUED FOR:
CITY REVIEW SET 12/01/17

REVISION FOR:
NO. DESCRIPTION DATE

GARDEN TERRACE
TOWNHOMES - ST JAMES ST

DRAWN BY CLF
CHECKED BY KBR

SITE DATA

**Garden Terrace -
Townhomes**

St James Street
La Crosse, WI 54603
Owner
Impact Seven
2961 Decker Drive
Rice Lake, WI 54868

PROJECT NUMBER 17-19647

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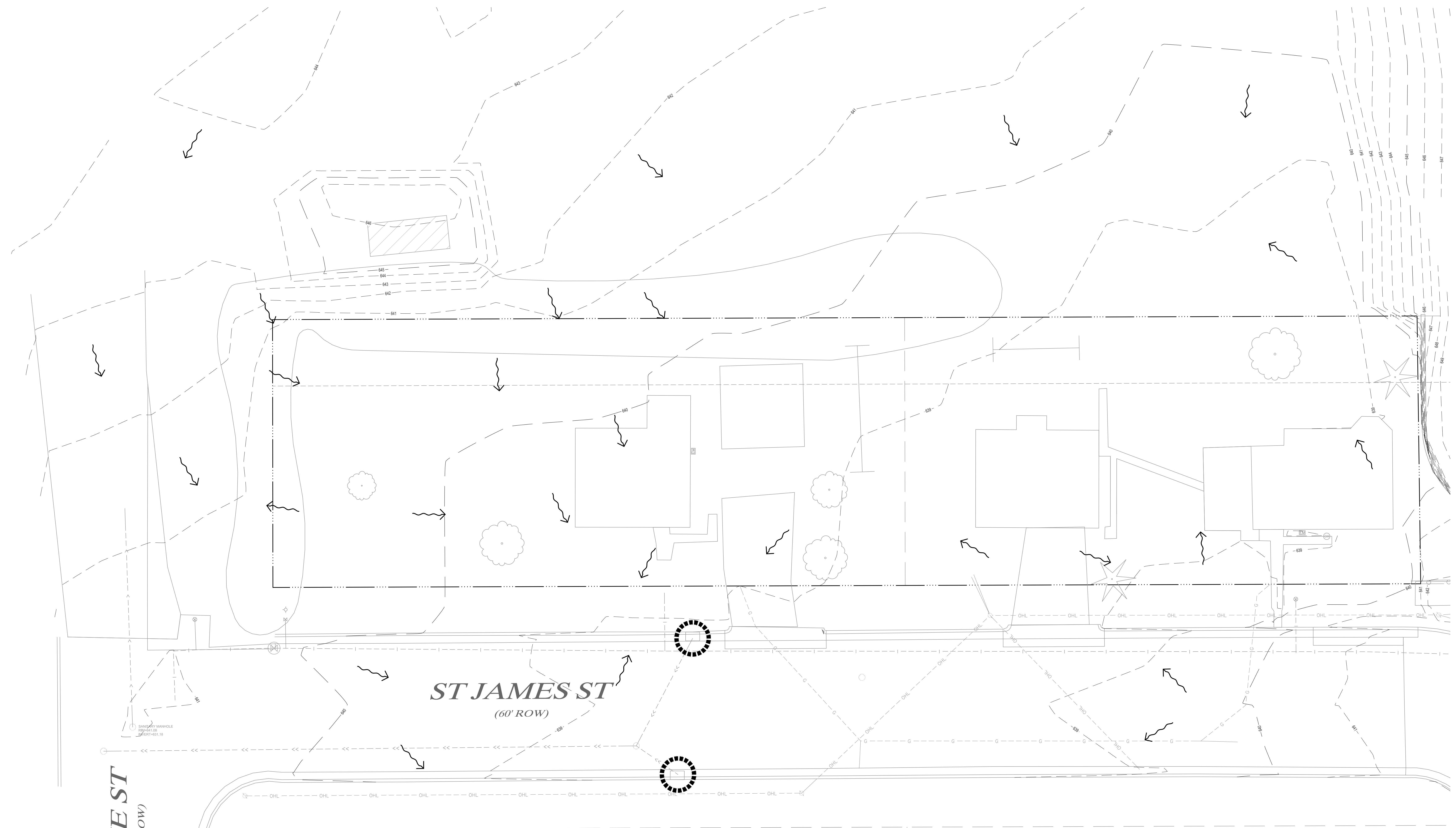
REVISION FOR:
NO. DESCRIPTION DATE

**GARDEN TERRACE
TOWNHOMES - ST JAMES ST**

DRAWN BY CLF
CHECKED BY KBR

**EROSION CONTROL PLAN
(EXISTING CONDITIONS)**

C1-10



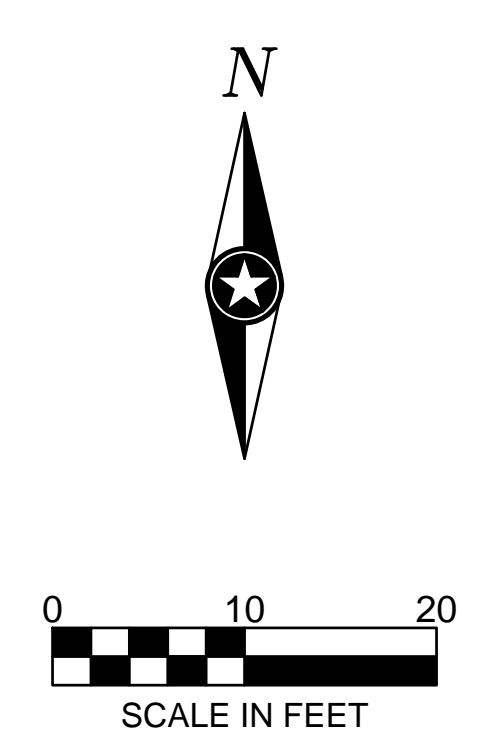
EROSION CONTROL LEGEND			
SYMBOL	DESCRIPTION	UNITS	QUANTITY
	EXISTING STORM DRAIN INLET PROTECTION	EACH	2
	EXISTING DRAINAGE ARROW		
	EXISTING CONTOUR (MINOR INTERVAL)		
	EXISTING CONTOUR (MAJOR INTERVAL)		
	PROPOSED CONTOUR (MINOR INTERVAL)		
	PROPOSED CONTOUR (MAJOR INTERVAL)		

QUANTITIES ARE FOR INFORMATIONAL PURPOSES TO MEET THE REQUIREMENTS OF THE CONSTRUCTION STORMWATER PERMIT. NO GUARANTEE IS MADE TO THE ACTUAL QUANTITIES REQUIRED.

THE QUANTITIES SHOWN ARE TOTAL FOR THE ENTIRE PROJECT NOT SPECIFIC TO THIS SHEET.

SEE SITE RESTORATION PLAN FOR FINAL TURF ESTABLISHMENT

NOTE: EROSION CONTROL PLAN COVERAGE INCLUDES ELECTRIC, GAS, TELEPHONE, AND CABLE INSTALLATION. EACH COMPANY OR THEIR SUBCONTRACTOR IS RESPONSIBLE TO FOLLOW THE REQUIREMENTS OF THIS EROSION CONTROL PLAN INCLUDING PROVIDING THEIR OWN RESTORATION IF INSTALLATION OCCURS AFTER PRIMARY INSTALLATION OF SEEDING/SODDING/MULCHING DURING CONSTRUCTION OF EACH UTILITY.



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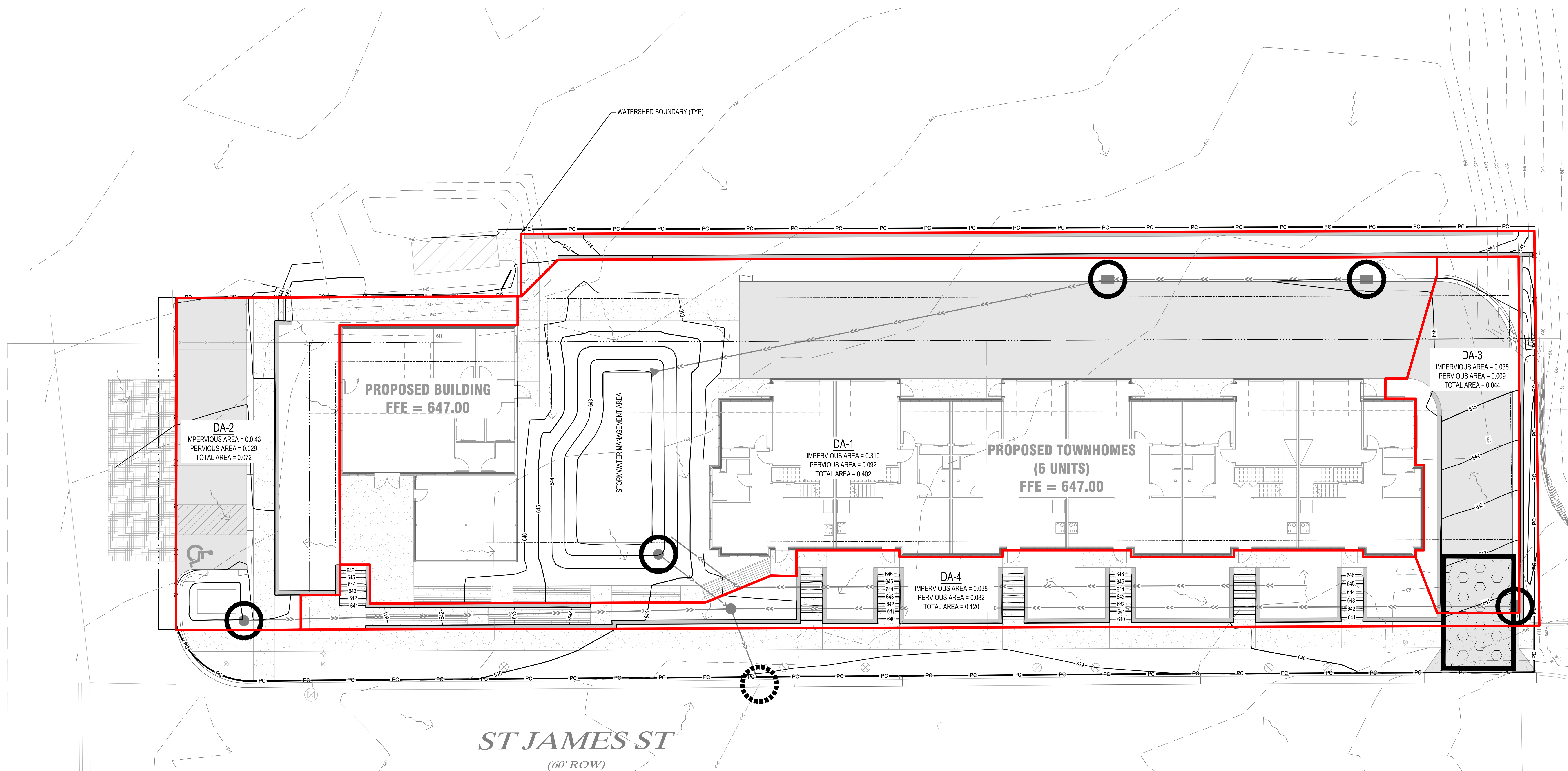
ISSUED FOR:
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TOWNHOMES - ST JAMES ST**

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**EROSION CONTROL PLAN
(PROPOSED CONDITIONS)**

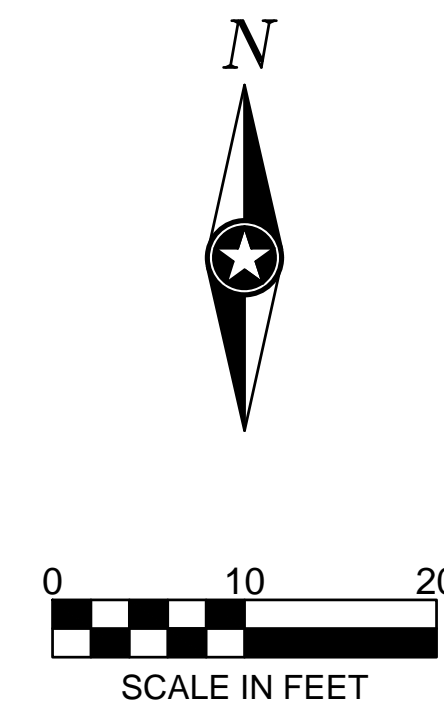


ST JAMES ST
(60' ROW)

KANE ST
(70' ROW)

EROSION CONTROL LEGEND			
SYMBOL	DESCRIPTION	UNITS	QUANTITY
— PC —	PERIMETER CONTROL	LF	830
⊙	EXISTING STORM DRAIN INLET PROTECTION	EACH	2
○	PROPOSED STORM DRAIN INLET PROTECTION	EACH	5
◻	STABILIZED CONSTRUCTION EXT	EACH	1
↗	EXISTING DRAINAGE ARROW		
↘	PROPOSED DRAINAGE ARROW		
--- 101 ---	EXISTING CONTOUR (MINOR INTERVAL)		
--- 100 ---	EXISTING CONTOUR (MAJOR INTERVAL)		
— 101 —	PROPOSED CONTOUR (MINOR INTERVAL)		
— 100 —	PROPOSED CONTOUR (MAJOR INTERVAL)		

PERIMETER CONTROL CAN BE SILT FENCE, BIO-ROLL OR WOOD MULCH.
 QUANTITIES ARE FOR INFORMATIONAL PURPOSES TO MEET THE REQUIREMENTS OF THE CONSTRUCTION STORMWATER PERMIT. NO GUARANTEE IS MADE TO THE ACTUAL QUANTITIES REQUIRED.
 THE QUANTITIES SHOWN ARE TOTAL FOR THE ENTIRE PROJECT NOT SPECIFIC TO THIS SHEET.
 SEE SITE RESTORATION PLAN FOR FINAL TURF ESTABLISHMENT
 NOTE: EROSION CONTROL PLAN COVERAGE INCLUDES ELECTRIC, GAS, TELEPHONE, AND CABLE INSTALLATION. EACH COMPANY OR THEIR SUBCONTRACTOR IS RESPONSIBLE TO FOLLOW THE REQUIREMENTS OF THIS EROSION CONTROL PLAN INCLUDING PROVIDING THEIR OWN RESTORATION IF INSTALLATION OCCURS AFTER PRIMARY INSTALLATION OF SEEDING/SODDING/MULCHING DURING CONSTRUCTION OF EACH UTILITY.



**Garden Terrace -
Townhomes**

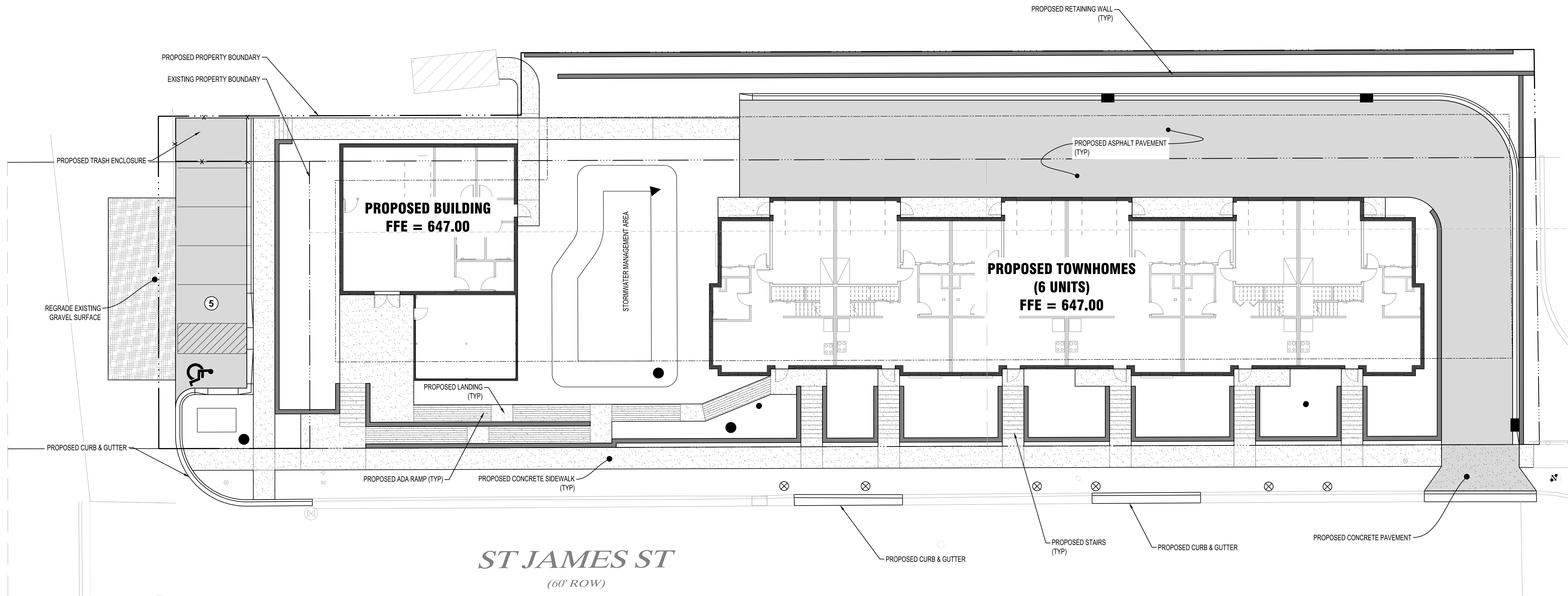
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PAVEMENT LEGEND	
SYMBOL	DESCRIPTION
	ASPHALT PAVEMENT
	CONCRETE PAVEMENT
	CONCRETE SIDEWALK



**GARDEN TERRACE
TOWNHOMES - ST JAMES ST**

DRAWN BY CLF
CHECKED BY KBR

PROPOSED SITE PLAN



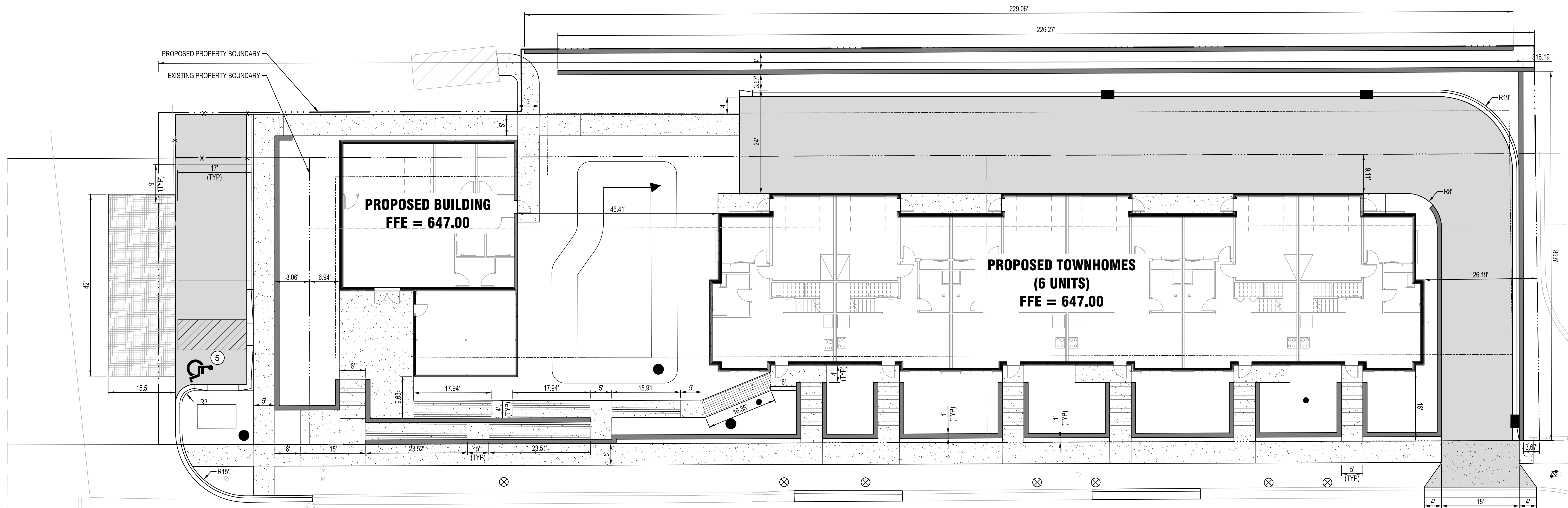
**Garden Terrace -
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ST JAMES ST
(60' ROW)

KANE ST
(70' ROW)

**GARDEN TERRACE
TOWNHOMES - ST JAMES ST**

DRAWN BY CLF
CHECKED BY KBR

PROPOSED SITE LAYOUT
PLAN



**Garden Terrace -
Townhomes**

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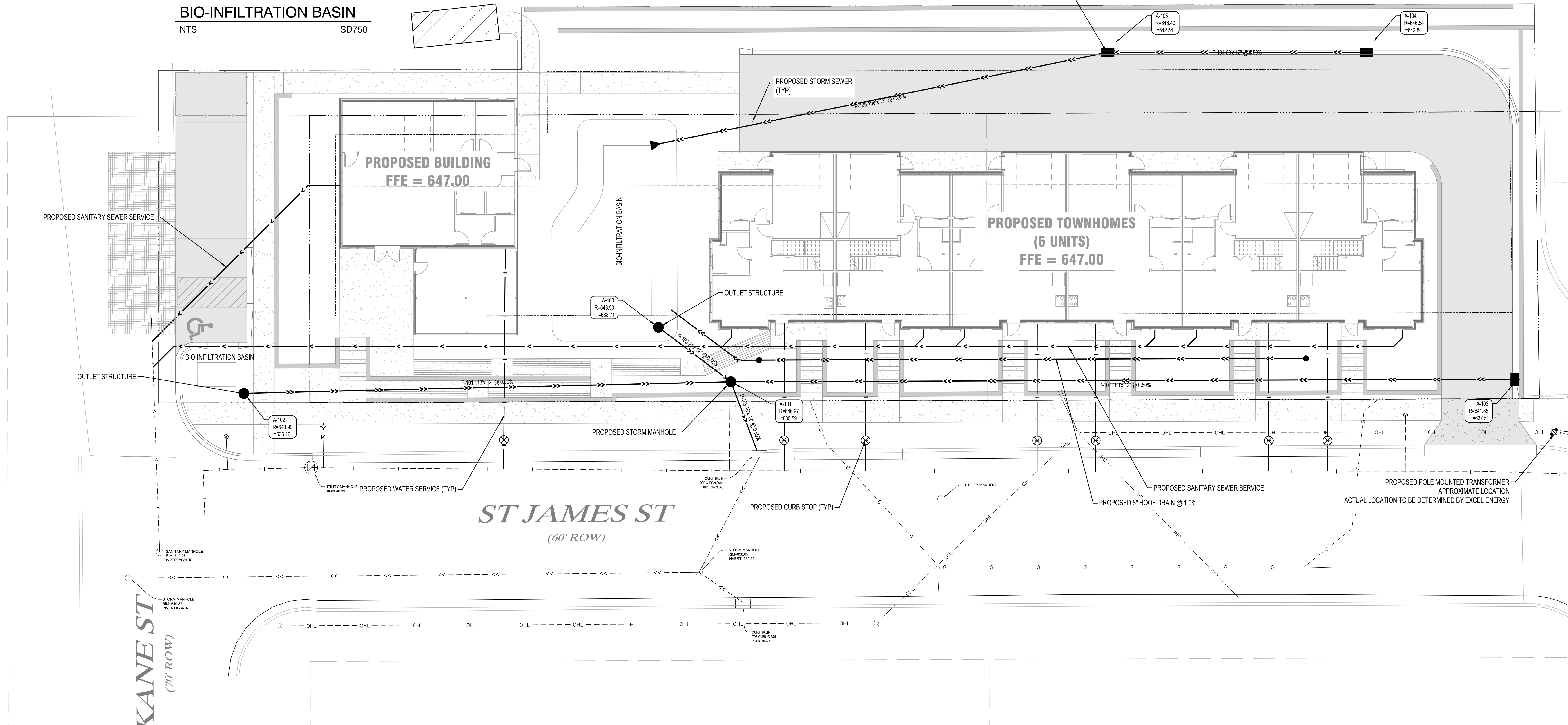
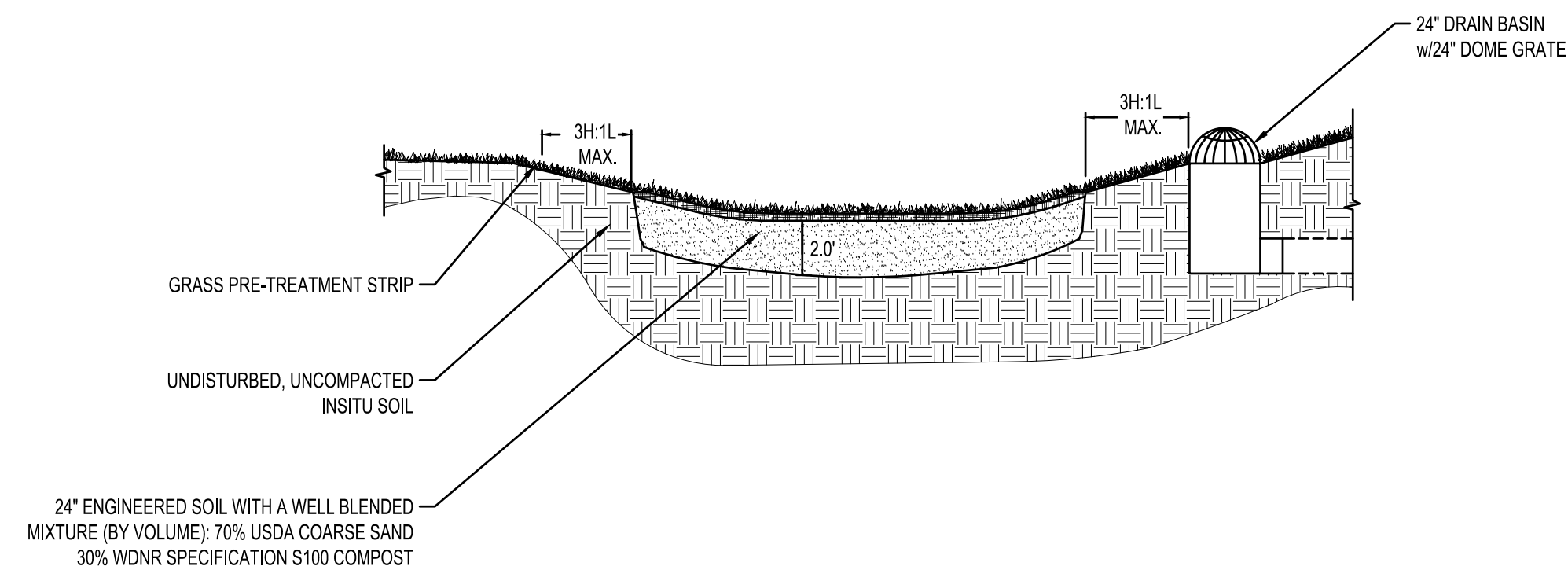
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TOWNHOMES - ST JAMES ST**

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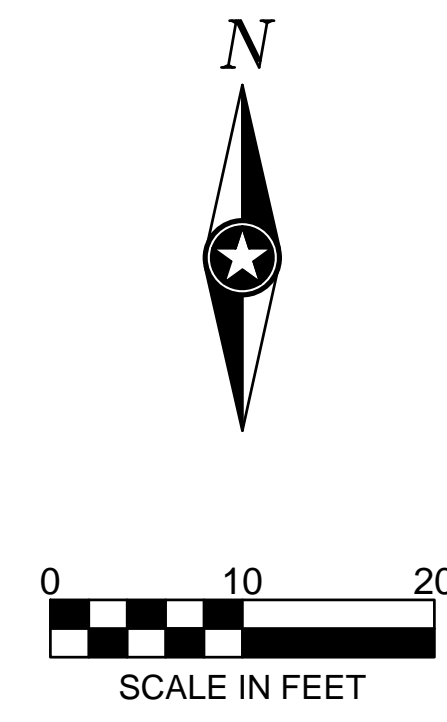
**PROPOSED CITY UTILITY
PLAN**

C3-30



UTILITY LEGEND		
EXISTING		PROPOSED
--->---	STORM DRAIN	--->>---
--->---	SANITARY SEWER	--->---
--- >---	SANITARY SEWER FORCEMAIN	--- >---
--- ---	WATER MAIN	--- ---
---G---	GAS	---G---
---OE---	OVERHEAD ELECTRIC	---OE---
---UE---	UNDERGROUND ELECTRIC	---UE---
---UT---	UNDERGROUND TELEPHONE	---UT---
---UTV---	UNDERGROUND TV	---UTV---
---OHL---	OVERHEAD UTILITY	---OHL---
---UTL---	UNDERGROUND UTILITY	---UTL---
---FBO---	FIBER OPTIC	---FBO---

NOTE:
CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES.



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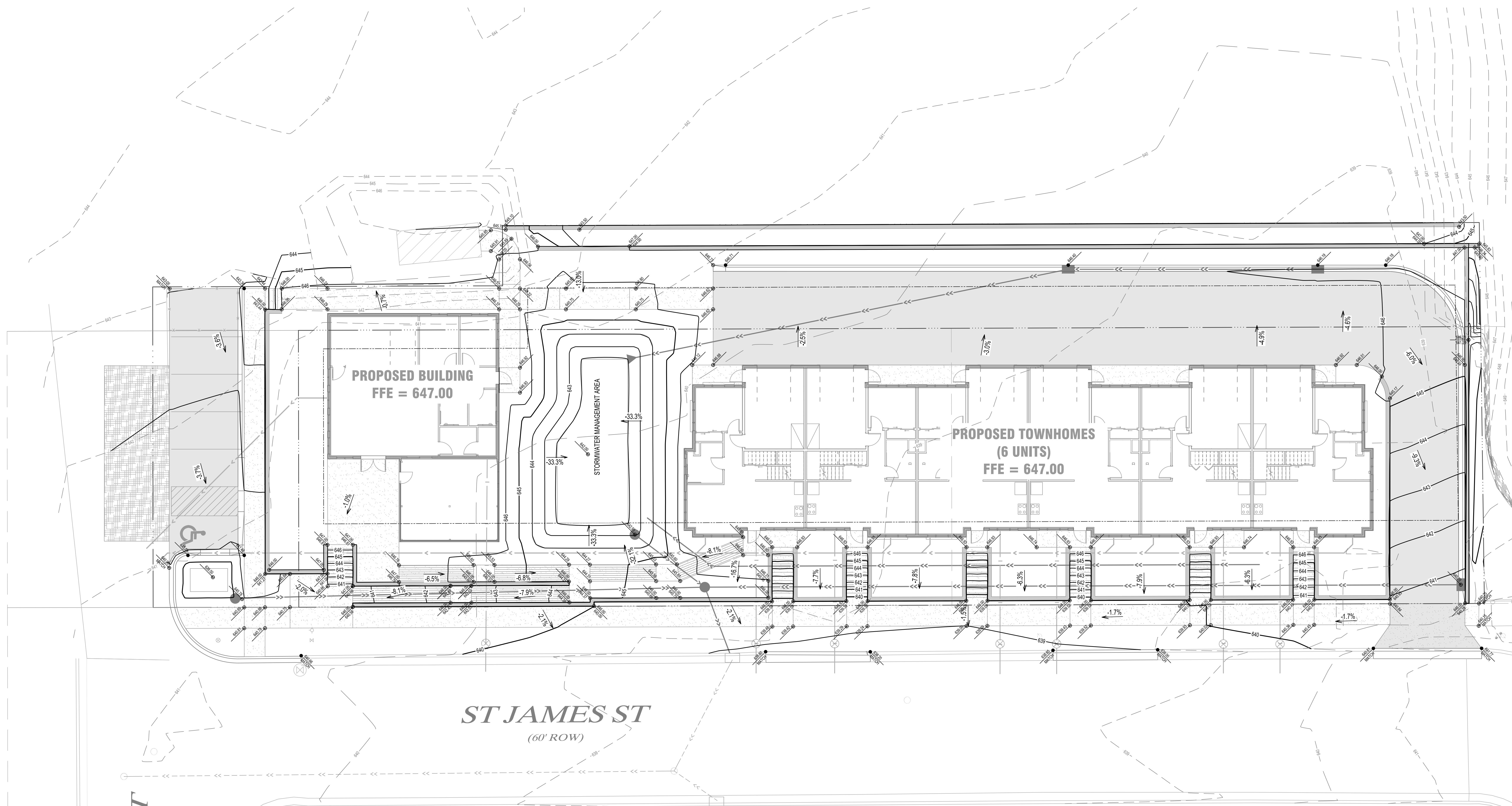
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**GARDEN TERRACE
TOWNHOMES - ST JAMES ST**

DRAWN BY CLF
CHECKED BY KBR

OVERALL GRADING PLAN



GRADING LEGEND	
--- 101 ---	EXISTING CONTOUR (MINOR INTERVAL)
--- 100 ---	EXISTING CONTOUR (MAJOR INTERVAL)
— 101 —	PROPOSED CONTOUR (MINOR INTERVAL)
— 100 —	PROPOSED CONTOUR (MAJOR INTERVAL)
● 650.0	PROPOSED SPOT ELEVATION
● 650.0	PROPOSED TOP BACK OF CURB SPOT ELEVATION
● 650.0	PROPOSED TOP & BOTTOM ELEVATION
-X.X%	SURFACE GRADE / DIRECTION

GENERAL GRADING NOTES
EXCAVATED MATERIAL SHALL BE COMPACTED TO 100% PROCTOR DENSITY FOR THE UPPER 3" AND 95% PROCTOR DENSITY BELOW 3" IN ALL BUILDING PADS. REFER TO THE QUALITY COMPACTION METHOD IN ALL OTHER AREAS.
PROPOSED CONTOURS SHOW FINISHED GRADE ELEVATIONS. BUILDING PAD AND PAVEMENT HOLD DOWNS ARE NOT INCLUDED.

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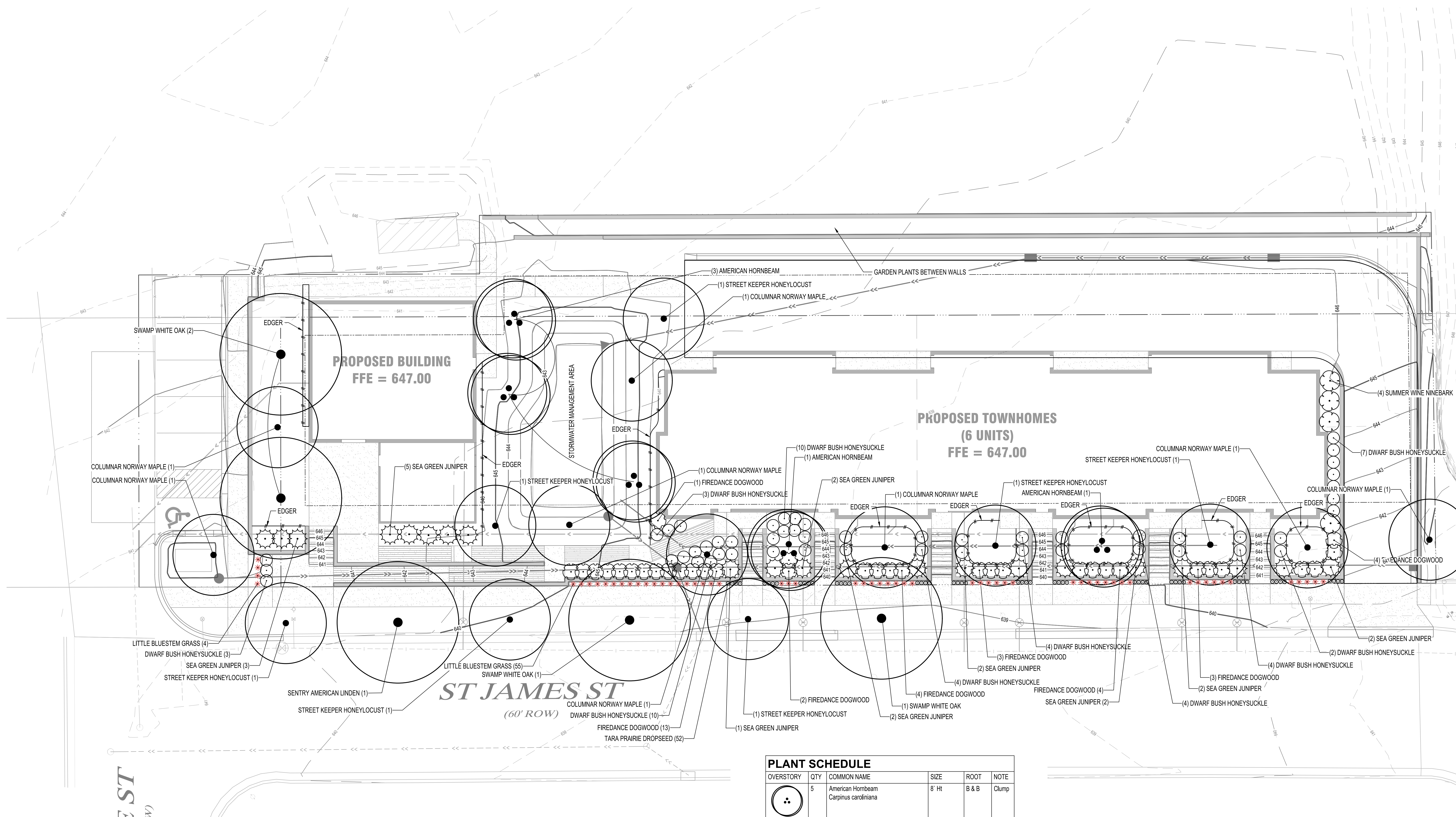
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TOWNHOMES - ST JAMES ST**

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PLANTING PLAN



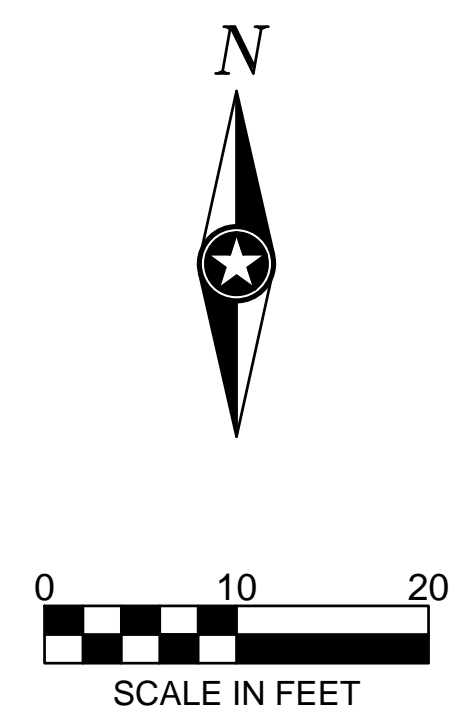
CITY LANDSCAPE REQUIREMENTS

AS REQUIRED IN THE CITY OF LA CROSSE, WISCONSIN ZONING CODE.
6466 SF = LANDSCAPED AREA (NOT INCLUDING NORTH WALLS AREA)
290 LF = LOT FRONTAGE
7 TREES REQUIRED
CODE: 1 TREE PER 40 LF OF LOT FRONTAGE
(290 LF / 40 = 7.25 OR 7 TREES)
PLUS
7 TREES REQUIRED
CODE: 1 TREE PLACED IN BOULEVARD PER 40 LF OF LOT FRONTAGE
(290 LF / 40 = 7.25 OR 7 BOULEVARD TREES)
PLUS
11 TREES REQUIRED
CODE: 1 TREE PER 600 SF OF LANDSCAPED AREA
(6466 SF / 600 = 10.8 OR 11 TREES)
PLUS
104 SHRUBS REQUIRED
CODE: 10 SHRUBS PER 600 SF OF LANDSCAPED AREA
(6466 SF / 600 x 10 = 108 SHRUBS)
TOTAL PLANT REQUIREMENTS
25 TREES
108 SHRUBS
TOTAL PLANTS SHOWN ON PLAN
25 TREES
110 SHRUBS
111 GRASSES
MANY GARDEN PLANTS BETWEEN NORTH WALLS

PLANT SCHEDULE

OVERSTORY	QTY	COMMON NAME	SIZE	ROOT	NOTE
	5	American Hornbeam <i>Carpinus caroliniana</i>	8' Ht	B & B	Clump
	8	Columnar Norway Maple <i>Acer platanoides 'Columnare'</i>	3" cal. DBH	B & B	
	1	Sentry American Linden <i>Tilia americana 'Sentry'</i>	3" cal. DBH	B & B	
	7	Street Keeper Honeylocust <i>Gleditsia triacanthos 'Draves'</i>	2" Cal. DBH	B & B	
	4	Swamp White Oak <i>Quercus bicolor</i>	3" cal. DBH	B & B	
CON.SHRUBS	QTY	COMMON NAME	SIZE	ROOT	NOTE
	21	Sea Green Juniper <i>Juniperus chinensis 'Sea Green'</i>	24" HL	Cont.	
DEC.SHRUBS	QTY	COMMON NAME	SIZE	ROOT	NOTE
	51	Dwarf Bush Honeysuckle <i>Dierilla lonicera</i>	24" HL	Cont.	
	34	Firedance Dogwood <i>Cornus sericea 'Balladeline'</i>	24" HL	Cont.	
	4	Summer Wine Ninebark <i>Physocarpus opulifolius 'Summer Wine'</i>	24" HL	Cont.	
GRASSES	QTY	COMMON NAME	SIZE	ROOT	NOTE
	59	Little Bluestem Grass <i>Schizachyrium scoparium</i>	12" Ht	#1 Cont.	
	52	Tara Prairie Dropseed <i>Sporobolus heterolepis 'Tara'</i>	6" HT.	#1 Cont.	

UTILITY LOCATIONS SHOWN ARE APPROXIMATE.
CONTRACTOR IS RESPONSIBLE FOR LOCATING UTILITIES
ON-SITE PRIOR TO CONSTRUCTION.





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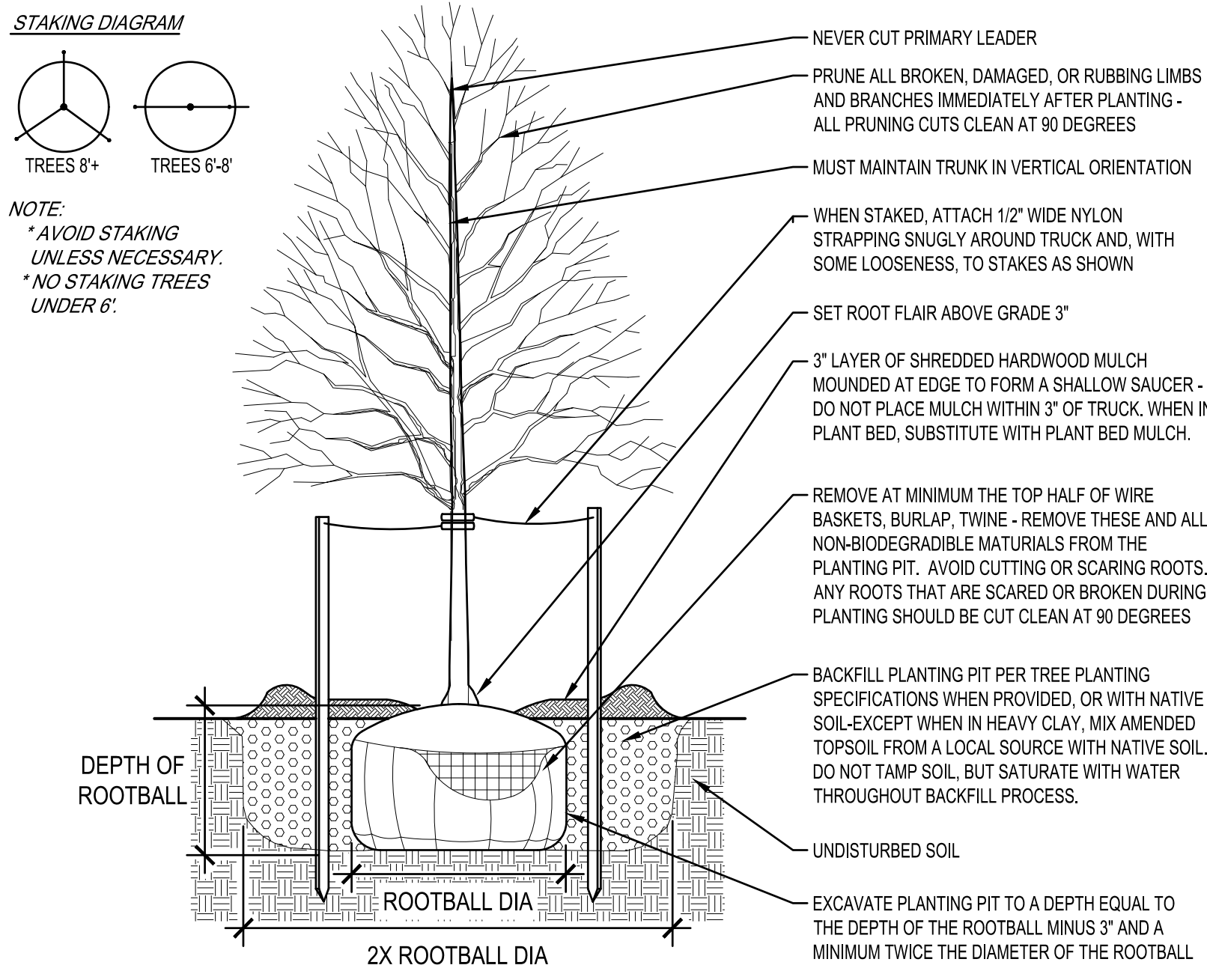
**GARDEN TERRACE
TOWNHOMES - ST JAMES ST**

DRAWN BY CWT
CHECKED BY KBR

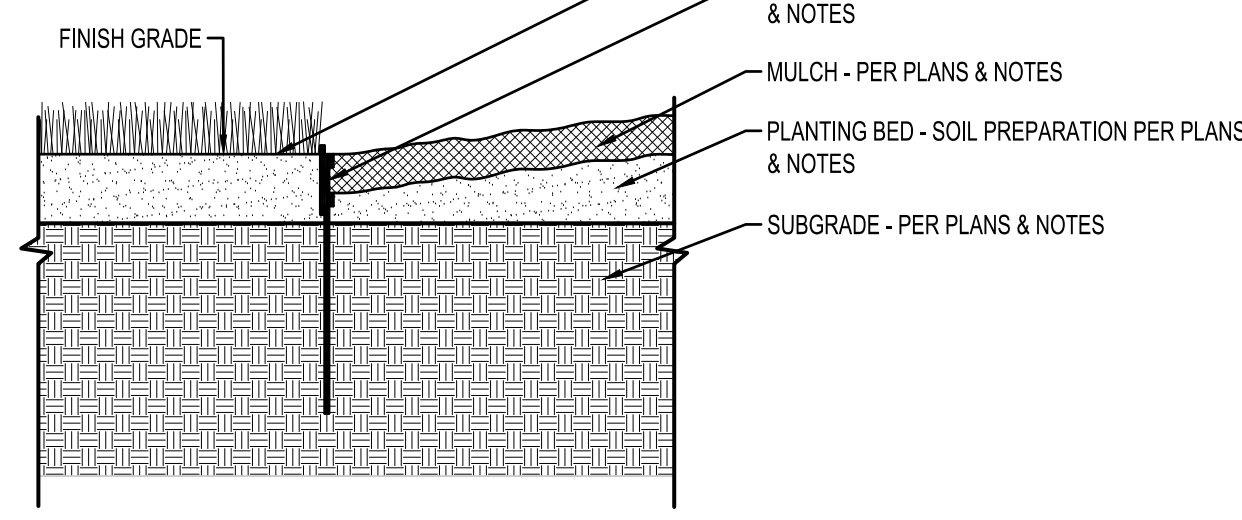
**PLANTING NOTES &
DETAILS**

GENERAL PLANTING NOTES

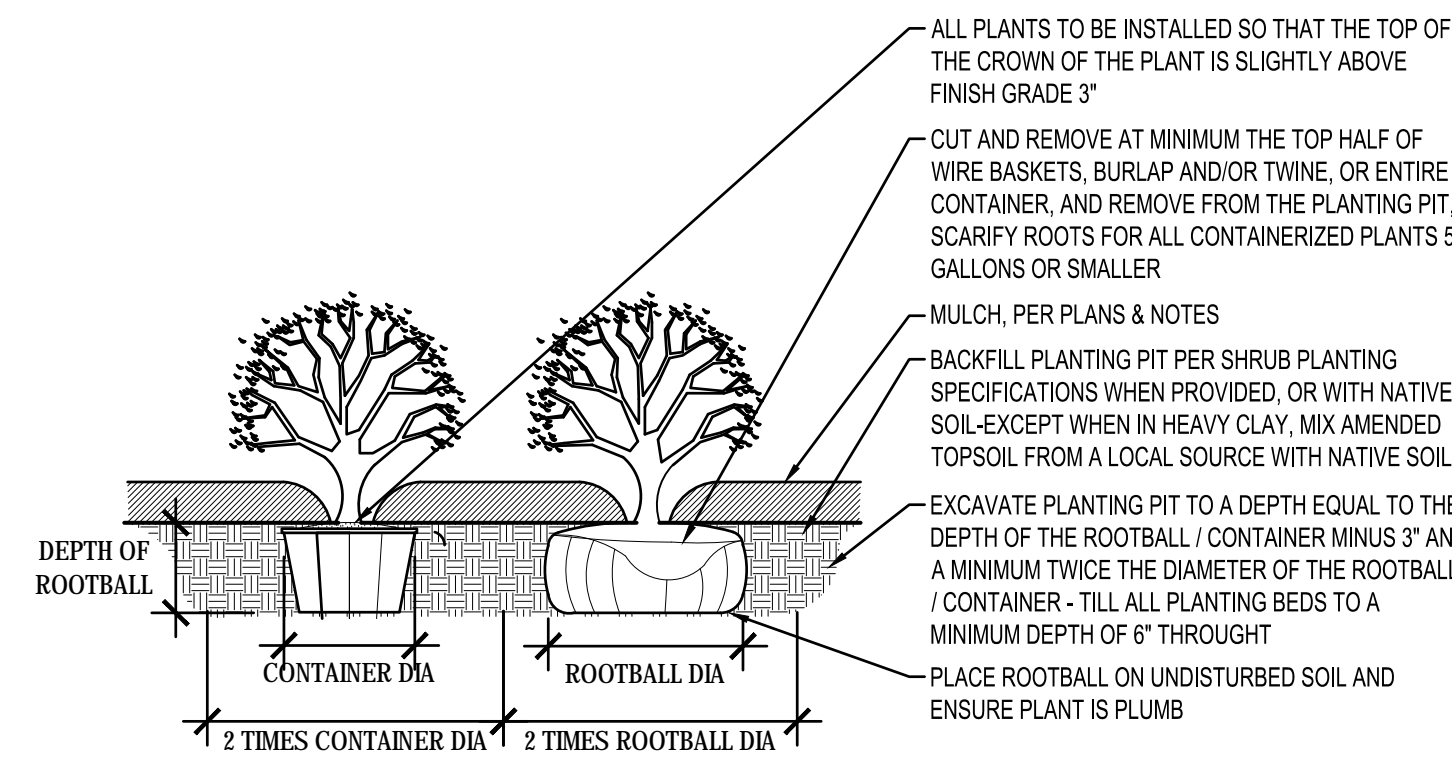
- COORDINATE LOCATION OF ALL UTILITIES (LINES, DUCTS, CONDUITS, SLEEVES, FOOTINGS, ETC.) WITH LOCATIONS OF PROPOSED LANDSCAPE ELEMENTS (FENCE, FOOTINGS, TREE ROOTBALLS, ETC.). CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO OWNER'S REPRESENTATIVE PRIOR TO CONTINUING WORK.
- SAVE AND PROTECT ALL EXISTING TREES NOT NOTED TO BE REMOVED.
- REMOVE ALL CONSTRUCTION DEBRIS AND MATERIALS INJURIOUS TO PLANT GROWTH FROM PLANTING PITS AND BEDS PRIOR TO BACKFILLING WITH PLANTING MIX.
- LAWN AREAS SHALL HAVE 6" MINIMUM DEPTH OF TOPSOIL. TOPSOIL SHALL BE COMPACTED TO 85% MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT.
- REFER TO PLANTING DETAILS PLAN FOR AMENDED SOIL DEPTH IN PLANTING BEDS AND SURROUNDING TREES. REFER TO SPECIFICATIONS FOR MIX TYPE.
- FIELD STAKE PLANTINGS ACCORDING TO PLAN. OWNER'S REPRESENTATIVE SHALL APPROVE ALL PLANT LOCATIONS PRIOR TO INSTALLATION. OWNER RESERVES THE RIGHT TO REVISE PLANTING LAYOUT AT TIME OF INSTALLATION.
- ALL PLANT MATERIALS SHALL BE TRUE TO THEIR SCIENTIFIC NAME AND SIZE AS INDICATED IN THE PLANT SCHEDULE.
- IF DISCREPANCIES EXIST BETWEEN THE NUMBER OF PLANTS DRAWN ON THE PLANTING PLAN AND THE NUMBER OF PLANTS IN THE SCHEDULE, THE PLANTING PLAN SHALL GOVERN.
- OWNER RESERVES THE RIGHT TO REVISE QUANTITIES TO SUIT BUDGET LIMITATIONS. CONTRACTOR'S UNIT BID PRICES SHALL PREVAIL FOR ANY CHANGES IN QUANTITIES.
- ANY PROPOSED SUBSTITUTIONS OF PLANT SPECIES SHALL BE MADE WITH PLANTS OF EQUIVALENT OVERALL FORM, HEIGHT, BRANCHING HABIT, FLOWER, LEAF, COLOR, FRUIT AND CULTURE, AND ONLY AFTER WRITTEN APPROVAL OF THE OWNER'S REPRESENTATIVE AND OWNER.
- ALL PLANT MATERIALS MUST CONFORM TO AMERICAN STANDARDS FOR NURSERY STOCK (A.N.S.I.), LATEST EDITION PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSEYMEN, WASHINGTON, D.C. LARGER SIZED PLANT MATERIALS OF THE SPECIES LISTED MAY BE USED IF THE STOCK CONFORMS TO A.N.S.I.
- ALL PLANT MATERIAL SHALL BE GUARANTEED TO BE IN A LIVE AND HEALTHY GROWING CONDITION FOR ONE FULL GROWING SEASON (ONE YEAR) AFTER FINAL PROJECT ACCEPTANCE OR SHALL BE REPLACED FREE OF CHARGE WITH THE SAME GRADE AND SPECIES. ALL TREES SHALL HAVE A STRONG CENTRAL LEADER.
- CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE DUE TO OPERATIONS. ANY AREAS THAT ARE DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
- PLANTING BED EDGING - USE 1/8" x 4" METAL EDGING IN ALL AREAS WHERE PLANTING BED MEETS LAWN AREAS OR WHERE INDICATED. USE 12" METAL SPIRES AS INSTRUCTED BY MANUFACTURER.
- PROVIDE SHREDDDED HARDWOOD MULCH, NATURAL COLOR, SURROUNDING ALL PROPOSED TREES TO A 3-INCH MINIMUM DEPTH AS SHOWN IN TREE PLANTING DETAIL. DO NOT USE AN UNDERLAYMENT SUCH AS PLASTIC SHEET OR LANDSCAPE FABRIC. IF LOCATED WITHIN A PLANT BED, SUBSTITUTE THIS MULCH WITH THE MULCH CALLED FOR WITHIN THAT PLANT BED. APPLY PRE-EMERGENT TO ALL PLANTING BEDS PRIOR TO MULCHING.
- PROVIDE SHREDDDED HARDWOOD MULCH, NATURAL COLOR, IN ALL PLANTING BEDS 3-INCH MINIMUM DEPTH. DO NOT USE AN UNDERLAYMENT SUCH AS PLASTIC SHEET OR LANDSCAPE FABRIC. APPLY PRE-EMERGENT TO ALL PLANTING BEDS PRIOR TO MULCHING.
- ALL TURF AREAS DISTURBED BY CONSTRUCTION SHALL BE SOODED. SOD SECTIONS SHALL BE NO SMALLER THAN 24" X 36" STAKED IN PLACE WITH BIODEGRADABLE SOD STAKES WHEN SLOPE IS STEEPER THAN 5:1 OR WHEN CONDITIONS REQUIRE.
- FOR PLANT, SHRUB, AND TREE LOCATIONS, CONTRACTOR IS PERMITTED TO USE DISCRETION AS NECESSARY TO AVOID DRIVEWAYS, UTILITIES, OR OTHER CONFLICTS. THE TOTAL NUMBER OF PLANTS, INCLUDING SHRUBS AND TREES SHALL MEET CITY CODE.
- INDICATED QUANTITIES ARE ESTIMATES AND SHOULD BE CONFIRMED BY THE CONTRACTOR/BIDDER.



TREE PLANTING DETAIL
NO SCALE



LANDSCAPE EDGING DETAIL
NO SCALE



SHRUB PLANTING DETAIL
NO SCALE

November 2, 2017

Project B1710414

Ms. Kristine Giornalista
Impact Seven
642 West North Avenue
Milwaukee, Wisconsin 53212
Email: kristine.giornalista@impactseven.org

Re: Proposed Stormwater Evaluation
Kane Street – Saint James Street Multifamily Development
733 Kane Street and 1109 Saint James Street
La Crosse, Wisconsin

Dear Ms. Giornalista:

This letter is a summary of our Stormwater Evaluation for the proposed Kane Street – Saint James Street Multifamily Development stormwater infiltration systems to be located at 733 Kane Street and 1109 Saint James Street in La Crosse, Wisconsin.

Soil Profile

We drilled three borings to a depth of 20 feet and collected continuous samples using a GeoProbe. One boring was performed at the Saint James Street property, and was labeled GP-1, and two GeoProbe borings were performed at the Kane Street property, and were labeled GP-2 and GP-3. These exploration locations are shown on the attached boring location sketches. The GeoProbe borings at the Saint James Street property are composed of topsoil over alluvial sand soils. At the Kane Street property, the site is composed of topsoil fill over undocumented fill and alluvial sand soils. The topsoil and topsoil fill consisted of sandy clay loam that was dark brown in color. The undocumented fill consisted of sandy clay loam and fine-grained loamy sand that was dark brown to brown in color. The alluvial sand soils consisted of fine-grained loamy sand and fine- to medium-grained sand that was brown to light brown in color and contained mottling at depths of 5 to 5 ½ feet that was orange and red in color.

Groundwater was observed at depths of 8 to 16 feet as the GeoProbe borings were advanced. These depths correspond to elevation 628 ½ to 630 ½. Seasonal and annual fluctuations of groundwater should be anticipated.

Stormwater Infiltration

Infiltration rates for the soils we encountered in our GeoProbe borings were determined by referencing Table 2 in the Wisconsin Department of Natural Resources (DNR) Stormwater Infiltration Technical Standard 1002, dated February 2004. These infiltration rates represent the long-term infiltration capacity of a practice and not the capacity of the soils in their natural state. Field testing, such as with a double-ring infiltrometer (ASTM D3385), may indicate that a higher infiltration rate can be used. However, we suggest adjusting field test rates by the appropriate correction factor, as provided in the Wisconsin DNR

Stormwater Infiltration Technical Standard 1002 or as allowed by the local watershed. We suggest consulting the Wisconsin DNR Stormwater Infiltration Technical Standard 1002 for stormwater design.

Fine-grained soils (silts and clays), topsoil, organic matter, or debris that mixes into or washes onto the soil will lower the permeability. Organic matter, debris, and silt washed into the system after construction can fill the soil pores and reduce permeability over time. Proper maintenance is important for long-term performance of infiltration systems. This stormwater evaluation does not constitute a review of site suitability for stormwater infiltration or evaluate the potential impacts, if any, from infiltration of large amounts of stormwater.

Morphological Evaluation

In general, the alluvial soils are well suited for infiltration of stormwater. The soil mottling and groundwater, however, should be considered limiting layers.

Infiltration rates in natural soils are variable based on soil type, moisture content, void space between soil particles and discontinuities in the soil structure. Discontinuities generally are not present in disturbed or compacted soils, such as existing fills, because void space between soil particles may have been reduced from compaction efforts.

Double-Ring Infiltrometer Testing

Braun Intertec provides design infiltration rates using a Double-Ring Infiltrometer test as required by the Wisconsin Department of Natural Resources for Technical Standard 1002. Please contact us for additional information and pricing for these services.


Remarks

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made. If you have any questions about this letter, please contact Brandon Wright or Ben Sullivan at 608.781.7277 or by email at bwright@braunintertec.com or bsullivan@braunintertec.com.

Sincerely,
BRAUN INTERTEC CORPORATION



Benjamin R. Sullivan, EIT
Certified Soil Tester
License Number: 1324025
November 2, 2017



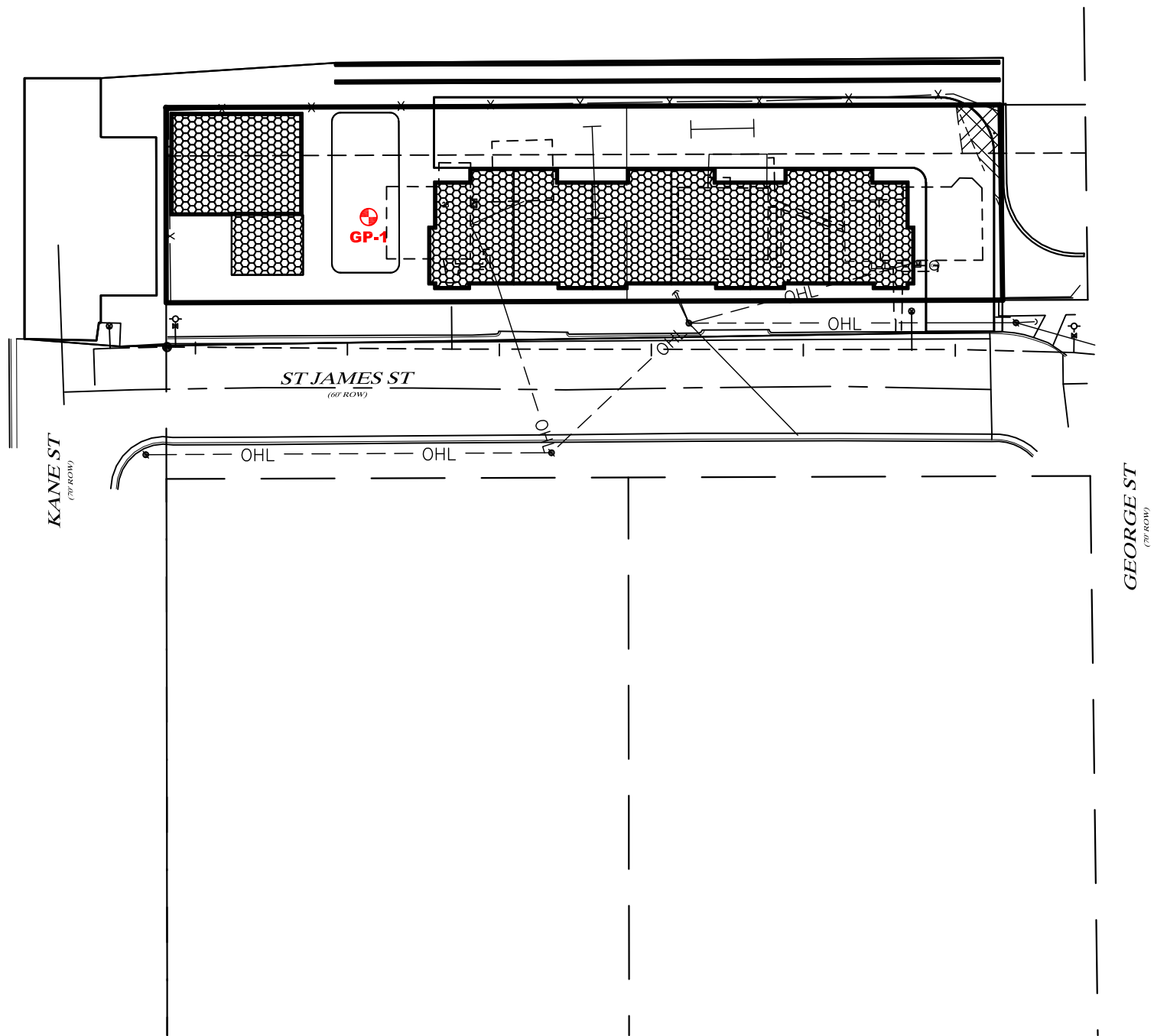
Brandon K. Wright, PE
Senior Engineer

Cc: Kristopher Roppe with I & S Group, Inc.; kris.roppe@is-grp.com

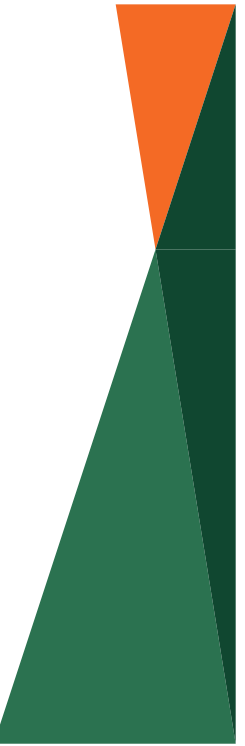
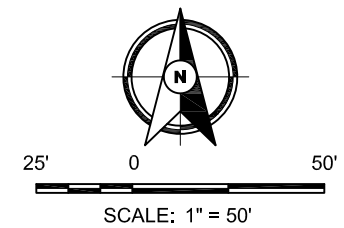
Attachments:

GeoProbe Boring Location Sketches
Wisconsin DNR – Soil Evaluation Forms

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 **DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING**



Drawing Information

Project No:
B1710414

Drawing No:
B1710414

Drawn By: LAO
Date Drawn: 11/1/17
Checked By: BS
Last Modified: 11/1/17

Project Information

Stormwater Evaluation

Kane Street - St. James
Multifamily Development

1109 St. James Street

La Crosse, Wisconsin

**GeoProbe Boring
Location Sketch**

Figure 1



Drawing Information

Project No:
B1710414

Drawing No:
B1710414

Drawn By: LAO
Date Drawn: 11/1/17
Checked By: BS
Last Modified: 11/1/17

Project Information

Stormwater Evaluation

Kane Street - St. James
Multifamily Development

733 Kane Street

La Crosse, Wisconsin

GeoProbe Boring
Location Sketch

Figure 2

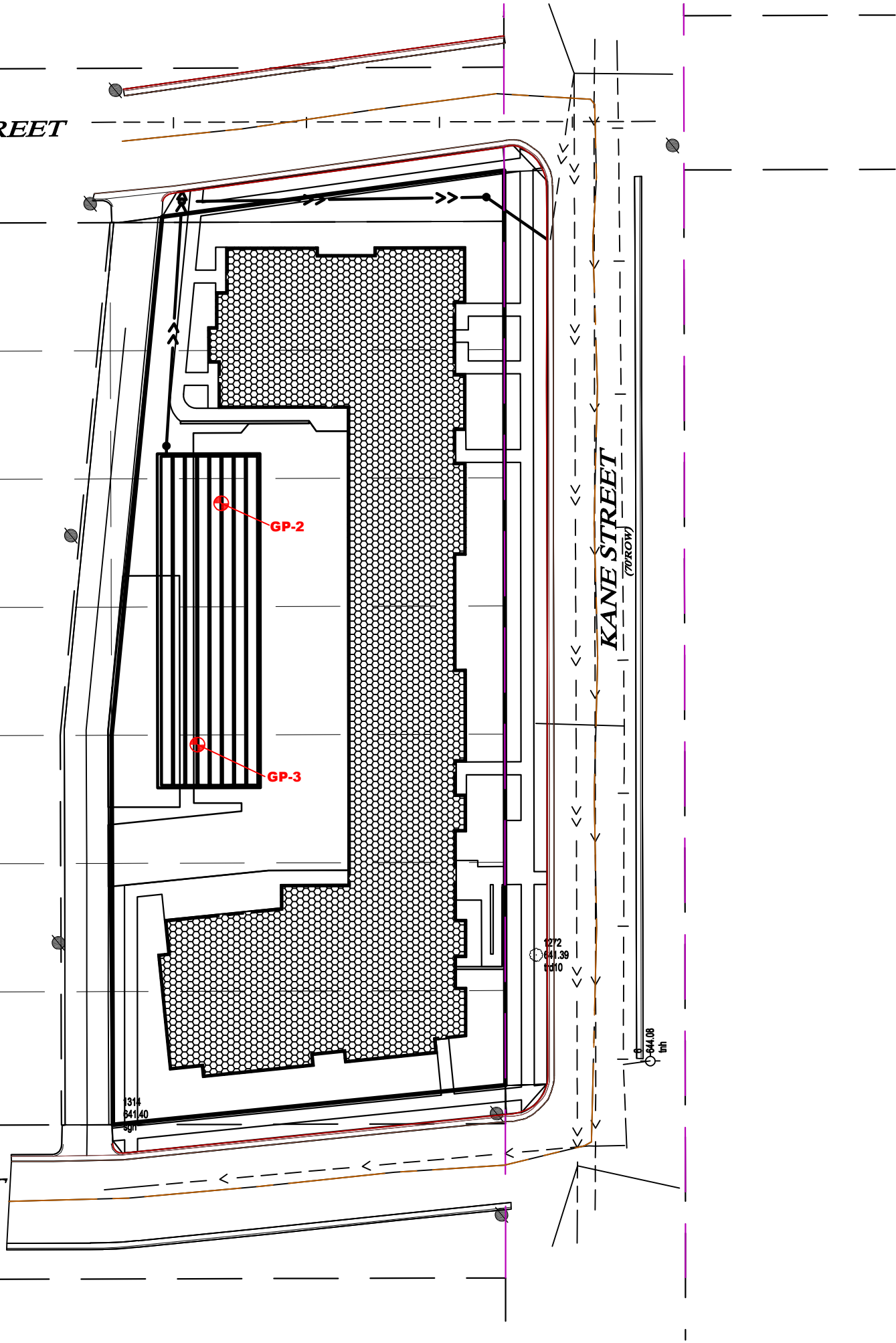
F:\2017\B1710414.dwg, KANE, 11/1/2017 2:15:07 PM

CHARLES STREET
(60' ROW)

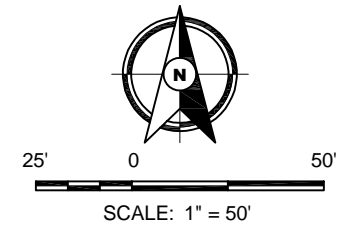
ST. CLOUD STREET
(60' ROW)

HAGAR STREET
(60' ROW)

KANE STREET
(70' ROW)



 DENOTES APPROXIMATE LOCATION OF
STANDARD PENETRATION TEST BORING



Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direct and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

Please print all information

Personal information you provide may be used for secondary purposes (Privacy Law, s.15.04 (1)(m)).

County La Crosse	
Parcel I.D. 17-10069-60	
Reviewed by	Date

Property Owner Impact Seven				Property Location Gov. Lot SE1/4 NW1/4 S 29 T 16N R 07			
Property Owner's Mailing Address 2961 Decker Drive				Lot #	Block #	Subd. Name or CSM#	
City Rice Lake	State WI	Zip Code 54868	Phone Number (800) 685-9353	<input checked="" type="checkbox"/> City La Crosse	<input type="checkbox"/> Village	<input type="checkbox"/> Town	Nearest Road Saint James Street

Drainage Area _____ <input type="checkbox"/> sq. ft. <input type="checkbox"/> acres Optional: Test Site Suitable for (Check all that apply) <input type="checkbox"/> Irrigation <input type="checkbox"/> Bio-retention trench <input type="checkbox"/> Trench(es) <input type="checkbox"/> Rain Garden <input type="checkbox"/> Grassed swale <input type="checkbox"/> Reuse <input type="checkbox"/> Infiltration Trench <input type="checkbox"/> SDS (>15' wide) <input checked="" type="checkbox"/> Other	Hydraulic Application Test Method: <input checked="" type="checkbox"/> Morphological Evaluation <input type="checkbox"/> Double-Ring Infiltrometer <input type="checkbox"/> Other (specify)
---	--

GP-1 Boring Test Pit
Obs. # _____ Ground Surface Elev. 638.5 Ft. Depth to limiting factor 67 in.

Horizon	Depth (in.)	Dominate Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr.
O	0 - 3	10YR 2.5/1	NONE	scl	2.f.gr.	mfr	c	0	0.11
E	3 - 67	10YR 3/3	NONE	f.sl	1.f.gr.	mvfr	g	5	0.50
B	67 - 79	10YR 4/3	c.m.d. 5YR 3/3	f.ls	0.f.gr.	ml	c	5	0.50
C	79 - 144	10YR 5/4	NONE	f.s	0.f.gr.	ml	g	0	0.50
C	144 - 240	10YR 5/3	NONE	m.s	0.m.gr.	ml	c	0	3.60

CST/PSS Name (Please Print) Benjamin R. Sullivan	Signature <i>Ben Sullivan</i>	CST/PSS Number 1324025
Address 2309 Palace Street, La Crosse, Wisconsin 54601	Date Evaluation Conducted October 25, 2017	Telephone Number 608.781.7277

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direct and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

County La Crosse	
Parcel I.D. 17-10068-100	
Reviewed by	Date

Please print all information

Personal information you provide may be used for secondary purposes (Privacy Law, s.15.04 (1)(m)).

Property Owner Impact Seven				Property Location Gov. Lot SE1/4 NW1/4 S 29 T 16N R 07			
Property Owner's Mailing Address 2961 Decker Drive				Lot #	Block #	Subd. Name or CSM#	
City Rice Lake	State WI	Zip Code 54868	Phone Number (800) 685-9353	<input checked="" type="checkbox"/> City La Crosse	<input type="checkbox"/> Village	<input type="checkbox"/> Town	Nearest Road Kane Street

Drainage Area _____ <input type="checkbox"/> sq. ft. <input type="checkbox"/> acres Optional: Test Site Suitable for (Check all that apply) <input type="checkbox"/> Irrigation <input type="checkbox"/> Bio-retention trench <input type="checkbox"/> Trench(es) <input type="checkbox"/> Rain Garden <input type="checkbox"/> Grassed swale <input type="checkbox"/> Reuse <input type="checkbox"/> Infiltration Trench <input type="checkbox"/> SDS (>15' wide) <input checked="" type="checkbox"/> Other	Hydraulic Application Test Method: <input checked="" type="checkbox"/> Morphological Evaluation <input type="checkbox"/> Double-Ring Infiltrometer <input type="checkbox"/> Other (specify)
---	--

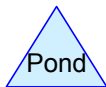
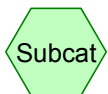
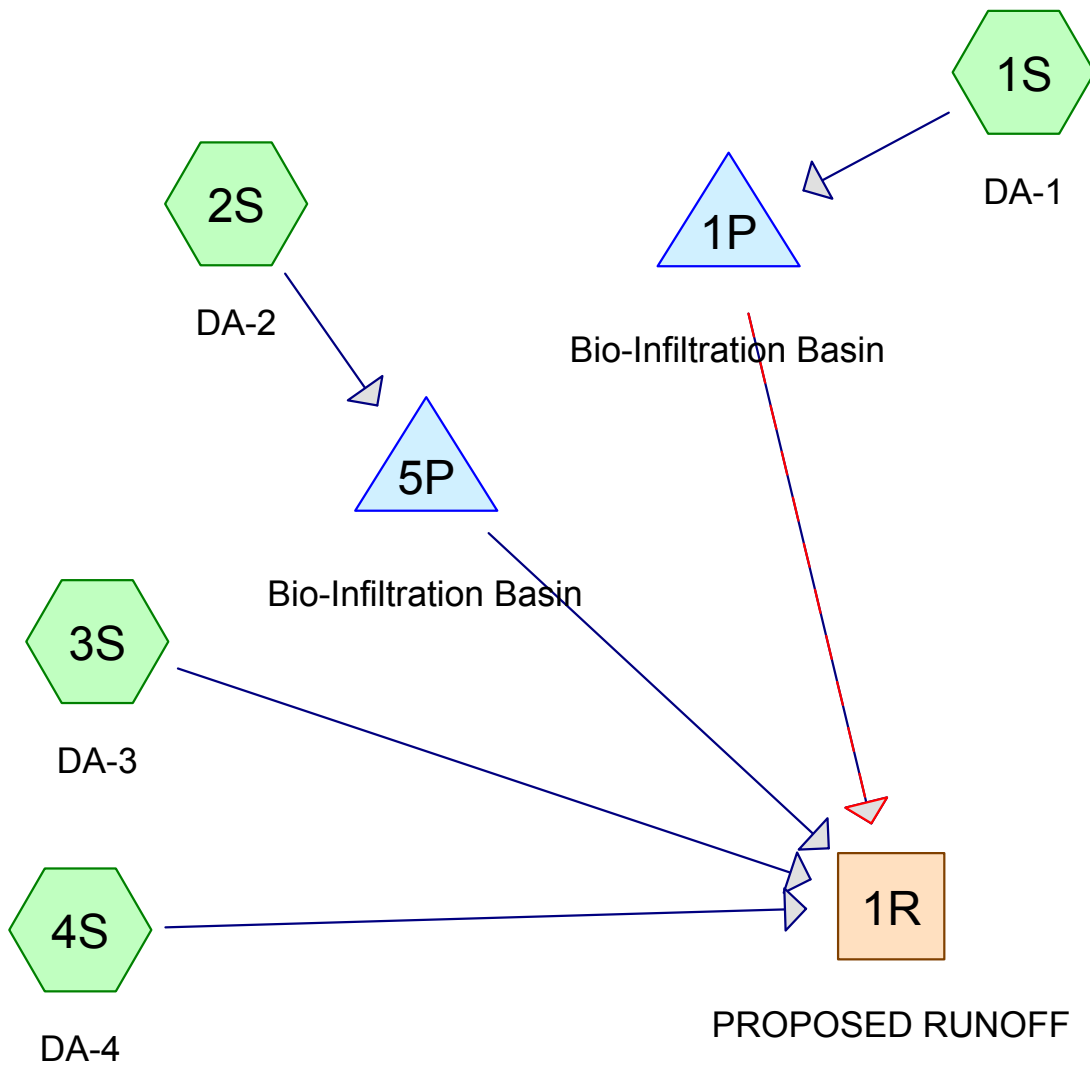
GP-2 Boring Test Pit
Obs. # _____ Ground Surface Elev. 645.4 Ft. Depth to limiting factor 192 in.

Horizon	Depth (in.)	Dominate Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr.
FILL	0 - 4	10YR 3/2	NONE	scl	2.f.gr.	mfr	g	0	0.11
FILL	4 - 114	10YR 3/3	NONE	f.sl	1.f.gr.	mvfr	g	10	0.50
E	114 - 122	10YR 3/2	NONE	f.ls	0.f.gr.	ml	c	0	0.50
B	122 - 132	7.5YR 3/2	NONE	f.s	0.f.gr.	ml	g	0	0.50
C	132 - 204	10YR 4/3	NONE	m.s	0.m.gr.	ml	g	20	3.60
C	204 - 240	10YR 5/3	NONE	f.s	0.f.gr.	ml	g	5	0.50

GP-3 Boring Test Pit
Obs. # _____ Ground Surface Elev. 640.6 Ft. Depth to limiting factor 60 in.

Horizon	Depth (in.)	Dominate Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr.
FILL	0 - 6	10YR 3/2	NONE	scl	2.f.gr.	mfr	g	0	0.11
FILL	6 - 48	10YR 4/2	NONE	scl	2.f.gr.	mfr	g	5	0.11
O	48 - 60	10YR 3/2	NONE	f.sl	1.f.gr.	mvfr	c	0	0.50
B	60 - 114	10YR 4/3	c.m.d. 5YR 3/3	f.ls	0.f.gr.	ml	g	20	0.50
C	114 - 192	10YR 5/4	NONE	f.s	0.f.gr.	ml	g	0	0.50
C	192 - 240	10YR 5/3	NONE	m.s	0.m.gr.	ml	g	10	3.60

CST/PSS Name (Please Print) Benjamin R. Sullivan	Signature <i>Ben Sullivan</i>	CST/PSS Number 1324025
Address 2309 Palace Street, La Crosse, Wisconsin 54601	Date Evaluation Conducted October 25, 2017	Telephone Number 608.781.7277



19647 Proposed Conditions St. James

Prepared by ISG

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.211	39	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 4S)
0.237	98	Paved parking, HSG A (1S, 2S, 3S, 4S)
0.189	98	Roofs, HSG A (1S)
0.636	78	TOTAL AREA

19647 Proposed Conditions St. James

Prepared by ISG

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Printed 11/30/2017

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.636	HSG A	1S, 2S, 3S, 4S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.636		TOTAL AREA

19647 Proposed Conditions St. James

Prepared by ISG

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.211	0.000	0.000	0.000	0.000	0.211	>75% Grass cover, Good	1S, 2S, 3S, 4S
0.237	0.000	0.000	0.000	0.000	0.237	Paved parking	1S, 2S, 3S, 4S
0.189	0.000	0.000	0.000	0.000	0.189	Roofs	1S
0.636	0.000	0.000	0.000	0.000	0.636	TOTAL AREA	

19647 Proposed Conditions St. James

fe_text_mean 24-hr SO 2-yr Rainfall=3.01"

Prepared by ISG

Printed 11/30/2017

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Page 5

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=17,471 sf 77.13% Impervious Runoff Depth>1.60"
Tc=5.0 min CN=85 Runoff=1.15 cfs 0.053 af

Subcatchment2S: DA-2 Runoff Area=3,126 sf 60.08% Impervious Runoff Depth>0.91"
Tc=5.0 min CN=74 Runoff=0.11 cfs 0.005 af

Subcatchment3S: DA-3 Runoff Area=1,882 sf 79.86% Impervious Runoff Depth>1.67"
Tc=5.0 min CN=86 Runoff=0.13 cfs 0.006 af

Subcatchment4S: DA-4 Runoff Area=5,220 sf 31.84% Impervious Runoff Depth>0.28"
Tc=5.0 min CN=58 Runoff=0.02 cfs 0.003 af

Reach 1R: PROPOSED RUNOFF Inflow=0.14 cfs 0.009 af
Outflow=0.14 cfs 0.009 af

Pond 1P: Bio-Infiltration Basin Peak Elev=643.87' Storage=1,756 cf Inflow=1.15 cfs 0.053 af
Discarded=0.02 cfs 0.016 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.016 af

Pond 5P: Bio-Infiltration Basin Peak Elev=640.87' Storage=165 cf Inflow=0.11 cfs 0.005 af
Discarded=0.00 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.002 af

Total Runoff Area = 0.636 ac Runoff Volume = 0.068 af Average Runoff Depth = 1.27"
33.14% Pervious = 0.211 ac 66.86% Impervious = 0.425 ac

Summary for Subcatchment 1S: DA-1

Runoff = 1.15 cfs @ 12.03 hrs, Volume= 0.053 af, Depth> 1.60"

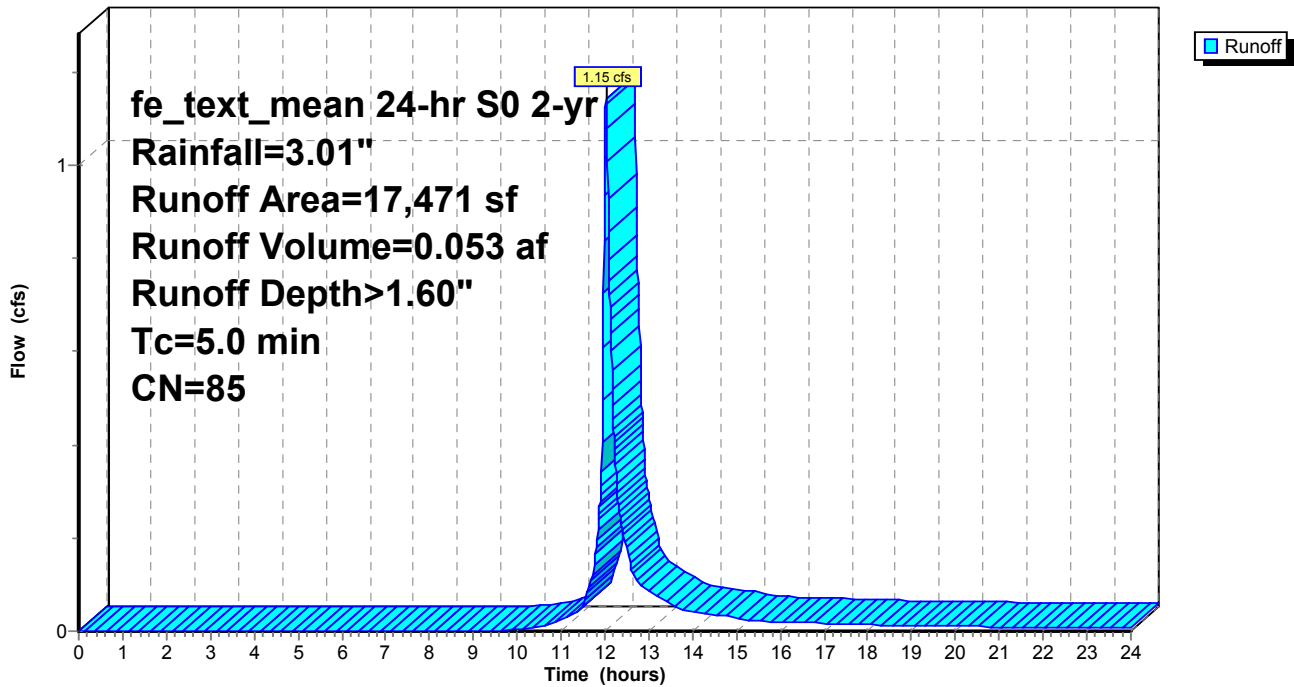
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 fe_text_mean 24-hr S0 2-yr Rainfall=3.01"

Area (sf)	CN	Description
3,995	39	>75% Grass cover, Good, HSG A
8,212	98	Roofs, HSG A
5,264	98	Paved parking, HSG A
17,471	85	Weighted Average
3,995		22.87% Pervious Area
13,476		77.13% Impervious Area

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

Subcatchment 1S: DA-1

Hydrograph



Summary for Subcatchment 2S: DA-2

Runoff = 0.11 cfs @ 12.04 hrs, Volume= 0.005 af, Depth> 0.91"

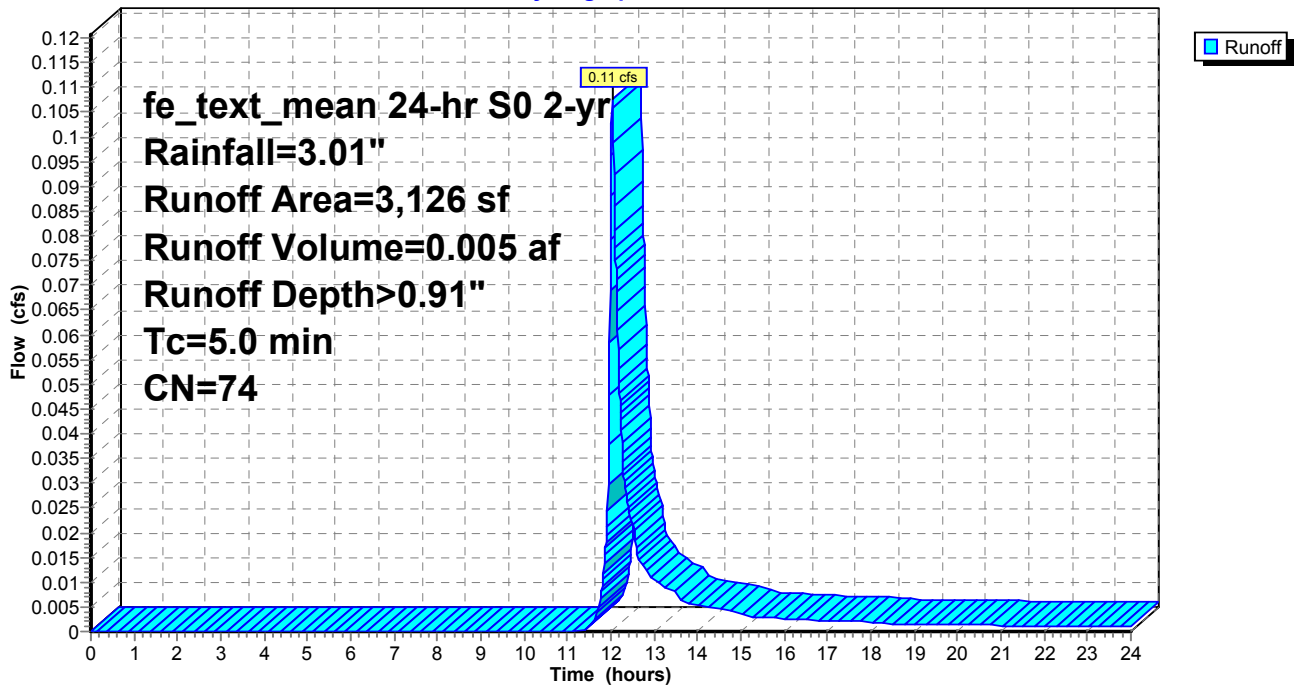
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 fe_text_mean 24-hr S0 2-yr Rainfall=3.01"

Area (sf)	CN	Description
1,248	39	>75% Grass cover, Good, HSG A
1,878	98	Paved parking, HSG A
3,126	74	Weighted Average
1,248		39.92% Pervious Area
1,878		60.08% Impervious Area

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

Subcatchment 2S: DA-2

Hydrograph



Summary for Subcatchment 3S: DA-3

Runoff = 0.13 cfs @ 12.03 hrs, Volume= 0.006 af, Depth> 1.67"

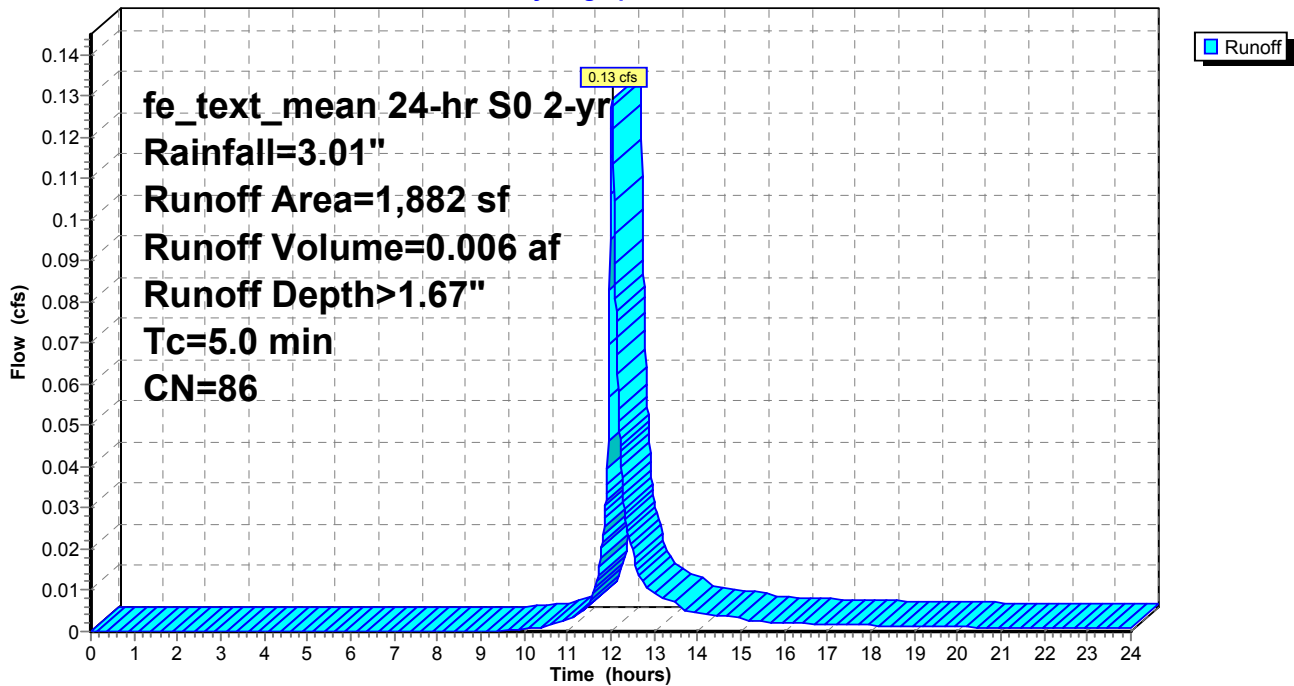
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 fe_text_mean 24-hr S0 2-yr Rainfall=3.01"

Area (sf)	CN	Description
379	39	>75% Grass cover, Good, HSG A
1,503	98	Paved parking, HSG A
1,882	86	Weighted Average
379		20.14% Pervious Area
1,503		79.86% Impervious Area

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

Subcatchment 3S: DA-3

Hydrograph



Summary for Subcatchment 4S: DA-4

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.003 af, Depth> 0.28"

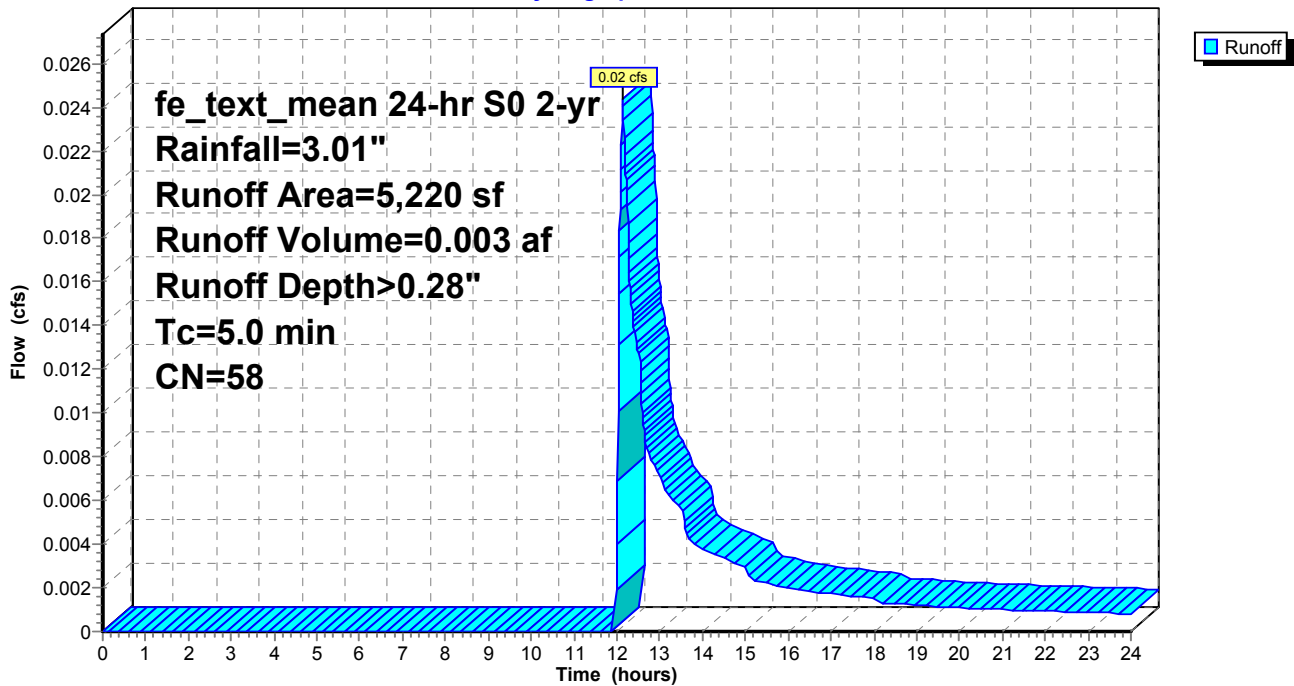
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 fe_text_mean 24-hr S0 2-yr Rainfall=3.01"

Area (sf)	CN	Description
3,558	39	>75% Grass cover, Good, HSG A
1,662	98	Paved parking, HSG A
5,220	58	Weighted Average
3,558		68.16% Pervious Area
1,662		31.84% Impervious Area

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

Subcatchment 4S: DA-4

Hydrograph



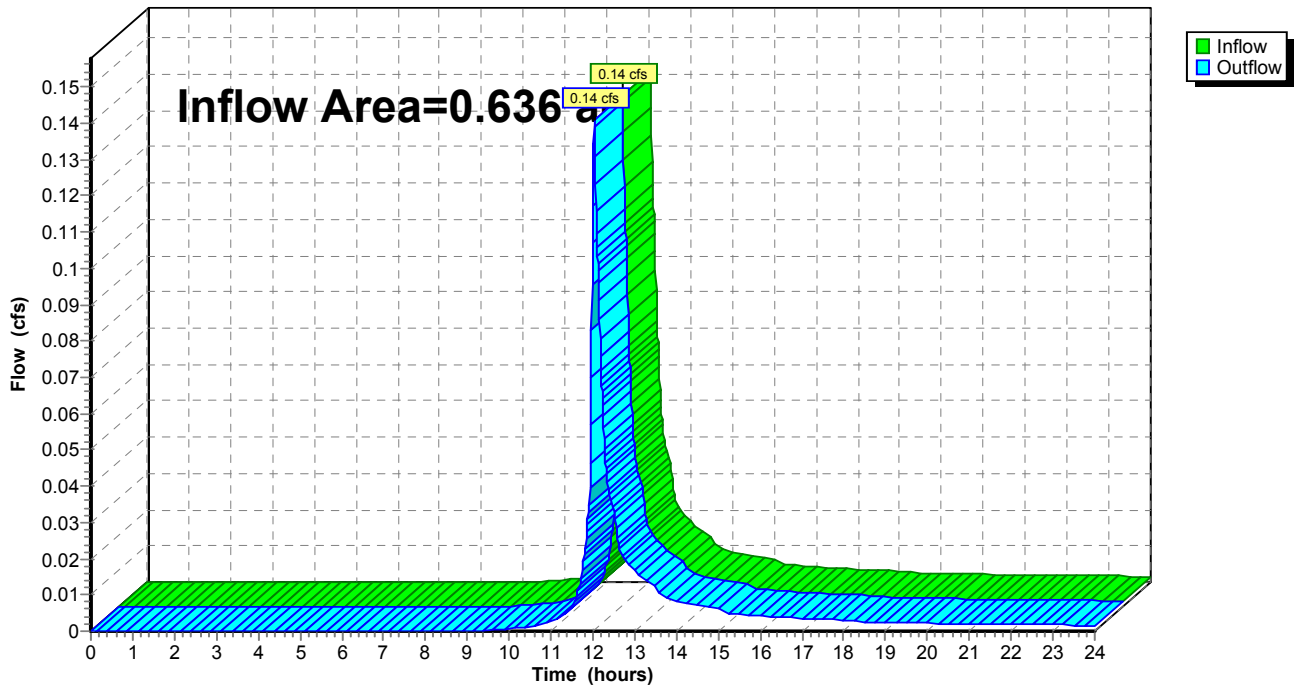
Summary for Reach 1R: PROPOSED RUNOFF

Inflow Area = 0.636 ac, 66.86% Impervious, Inflow Depth > 0.17" for 2-yr event
Inflow = 0.14 cfs @ 12.04 hrs, Volume= 0.009 af
Outflow = 0.14 cfs @ 12.04 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: PROPOSED RUNOFF

Hydrograph



Summary for Pond 1P: Bio-Infiltration Basin

Inflow Area = 0.401 ac, 77.13% Impervious, Inflow Depth > 1.60" for 2-yr event
 Inflow = 1.15 cfs @ 12.03 hrs, Volume= 0.053 af
 Outflow = 0.02 cfs @ 17.57 hrs, Volume= 0.016 af, Atten= 99%, Lag= 332.4 min
 Discarded = 0.02 cfs @ 17.57 hrs, Volume= 0.016 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 643.87' @ 17.57 hrs Surf.Area= 1,308 sf Storage= 1,756 cf

Plug-Flow detention time= 348.1 min calculated for 0.016 af (30% of inflow)
 Center-of-Mass det. time= 246.5 min (1,053.9 - 807.4)

Volume	Invert	Avail.Storage	Storage Description
#1	642.00'	3,592 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
642.00	574	0	0
644.00	1,360	1,934	1,934
645.00	1,955	1,658	3,592

Device	Routing	Invert	Outlet Devices
#1	Discarded	642.00'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	643.90'	24.0" Horiz. Orifice/Grate C= 0.600 in 24.0" Grate (100% open area) Limited to weir flow at low heads
#3	Secondary	644.30'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.02 cfs @ 17.57 hrs HW=643.87' (Free Discharge)

↑1=**Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=642.00' TW=0.00' (Dynamic Tailwater)

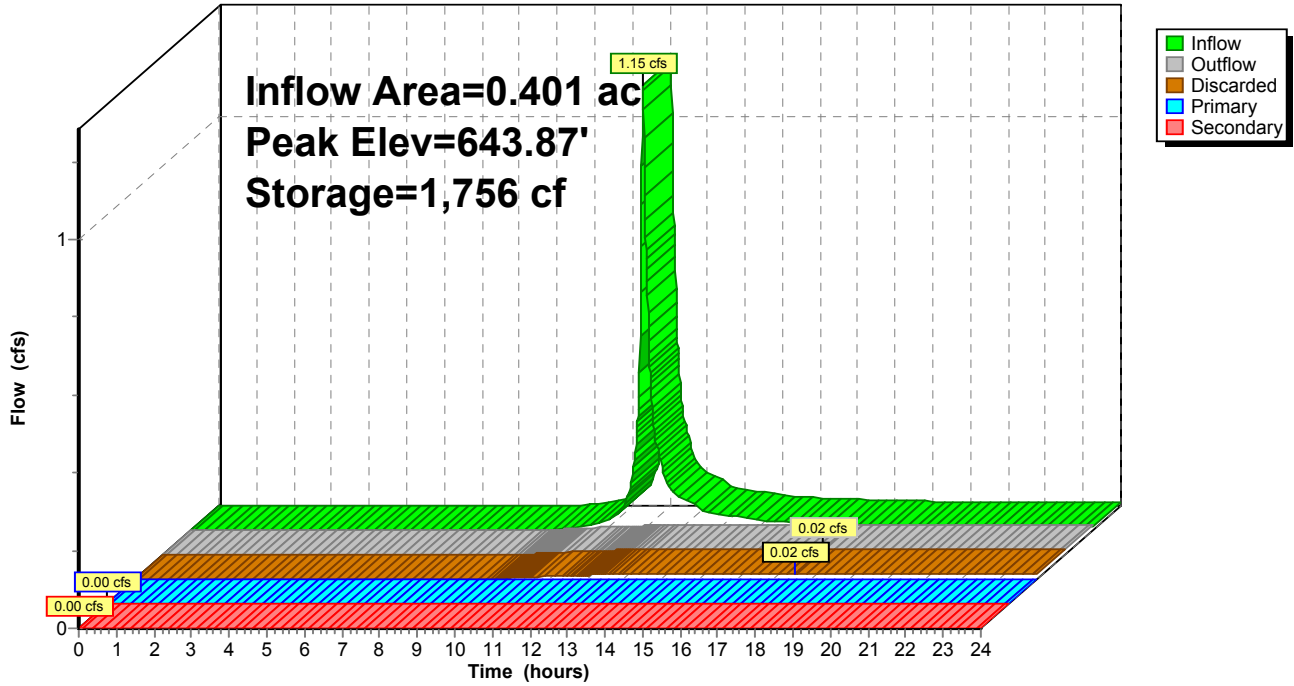
↑2=**Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=642.00' TW=0.00' (Dynamic Tailwater)

↑3=**Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 1P: Bio-Infiltration Basin

Hydrograph



Summary for Pond 5P: Bio-Infiltration Basin

Inflow Area = 0.072 ac, 60.08% Impervious, Inflow Depth > 0.91" for 2-yr event
 Inflow = 0.11 cfs @ 12.04 hrs, Volume= 0.005 af
 Outflow = 0.00 cfs @ 16.88 hrs, Volume= 0.002 af, Atten= 98%, Lag= 290.7 min
 Discarded = 0.00 cfs @ 16.88 hrs, Volume= 0.002 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 640.87' @ 16.88 hrs Surf.Area= 191 sf Storage= 165 cf

Plug-Flow detention time= 356.3 min calculated for 0.002 af (39% of inflow)
 Center-of-Mass det. time= 243.1 min (1,079.6 - 836.5)

Volume	Invert	Avail.Storage	Storage Description
#1	639.50'	318 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
639.50	50	0	0
641.00	205	191	191
641.50	300	126	318

Device	Routing	Invert	Outlet Devices
#1	Discarded	639.50'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	640.90'	24.0" Horiz. Orifice/Grate C= 0.600 in 24.0" Grate (100% open area) Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 16.88 hrs HW=640.87' (Free Discharge)

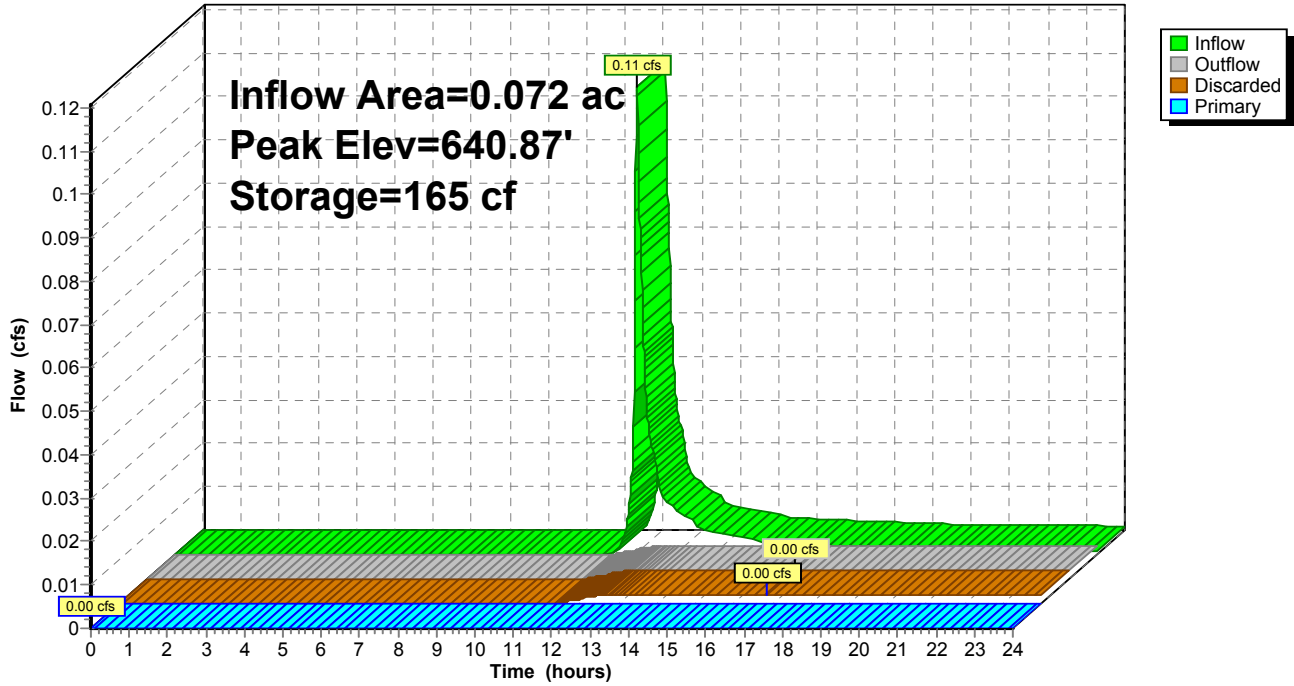
↑1=**Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=639.50' TW=0.00' (Dynamic Tailwater)

↑2=**Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: Bio-Infiltration Basin

Hydrograph



19647 Proposed Conditions St. James

fe_text_mean 24-hr SO 100-yr Rainfall=7.55"

Prepared by ISG

Printed 11/30/2017

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: DA-1 Runoff Area=17,471 sf 77.13% Impervious Runoff Depth>5.78"
Tc=5.0 min CN=85 Runoff=3.53 cfs 0.193 af

Subcatchment2S: DA-2 Runoff Area=3,126 sf 60.08% Impervious Runoff Depth>4.52"
Tc=5.0 min CN=74 Runoff=0.51 cfs 0.027 af

Subcatchment3S: DA-3 Runoff Area=1,882 sf 79.86% Impervious Runoff Depth>5.89"
Tc=5.0 min CN=86 Runoff=0.39 cfs 0.021 af

Subcatchment4S: DA-4 Runoff Area=5,220 sf 31.84% Impervious Runoff Depth>2.79"
Tc=5.0 min CN=58 Runoff=0.50 cfs 0.028 af

Reach 1R: PROPOSED RUNOFF Inflow=4.63 cfs 0.202 af
Outflow=4.63 cfs 0.202 af

Pond 1P: Bio-Infiltration Basin Peak Elev=644.19' Storage=2,210 cf Inflow=3.53 cfs 0.193 af
Discarded=0.02 cfs 0.019 af Primary=3.28 cfs 0.132 af Secondary=0.00 cfs 0.000 af Outflow=3.30 cfs 0.152 af

Pond 5P: Bio-Infiltration Basin Peak Elev=640.98' Storage=188 cf Inflow=0.51 cfs 0.027 af
Discarded=0.00 cfs 0.003 af Primary=0.50 cfs 0.021 af Outflow=0.50 cfs 0.023 af

Total Runoff Area = 0.636 ac Runoff Volume = 0.269 af Average Runoff Depth = 5.08"
33.14% Pervious = 0.211 ac 66.86% Impervious = 0.425 ac

Summary for Subcatchment 1S: DA-1

Runoff = 3.53 cfs @ 12.03 hrs, Volume= 0.193 af, Depth> 5.78"

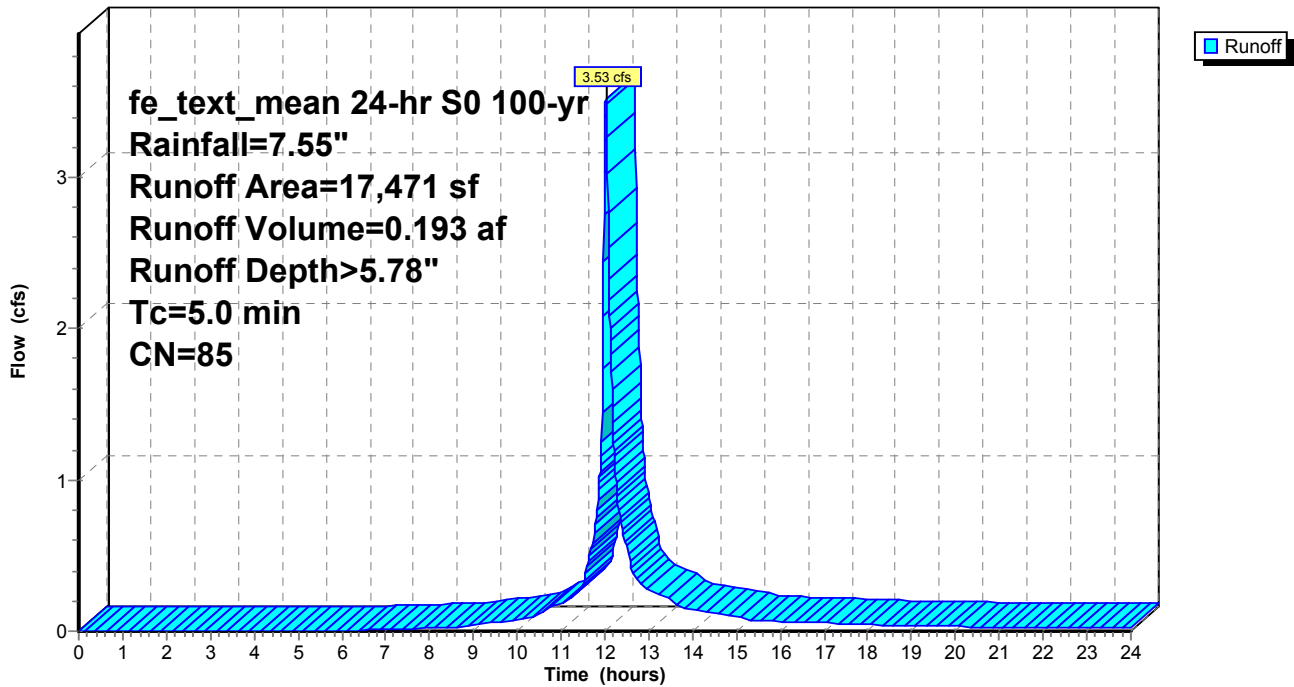
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 fe_text_mean 24-hr S0 100-yr Rainfall=7.55"

Area (sf)	CN	Description
3,995	39	>75% Grass cover, Good, HSG A
8,212	98	Roofs, HSG A
5,264	98	Paved parking, HSG A
17,471	85	Weighted Average
3,995		22.87% Pervious Area
13,476		77.13% Impervious Area

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

Subcatchment 1S: DA-1

Hydrograph



Summary for Subcatchment 2S: DA-2

Runoff = 0.51 cfs @ 12.03 hrs, Volume= 0.027 af, Depth> 4.52"

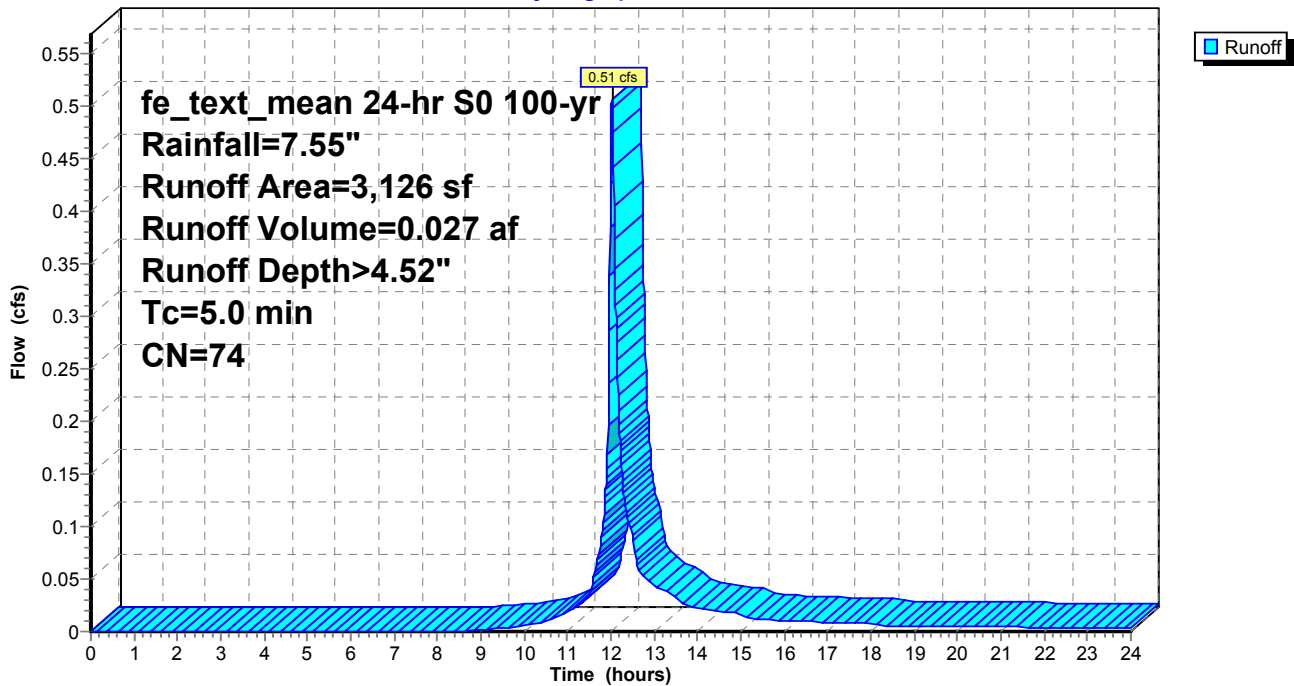
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 fe_text_mean 24-hr S0 100-yr Rainfall=7.55"

Area (sf)	CN	Description
1,248	39	>75% Grass cover, Good, HSG A
1,878	98	Paved parking, HSG A
3,126	74	Weighted Average
1,248		39.92% Pervious Area
1,878		60.08% Impervious Area

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

Subcatchment 2S: DA-2

Hydrograph



Summary for Subcatchment 3S: DA-3

Runoff = 0.39 cfs @ 12.03 hrs, Volume= 0.021 af, Depth> 5.89"

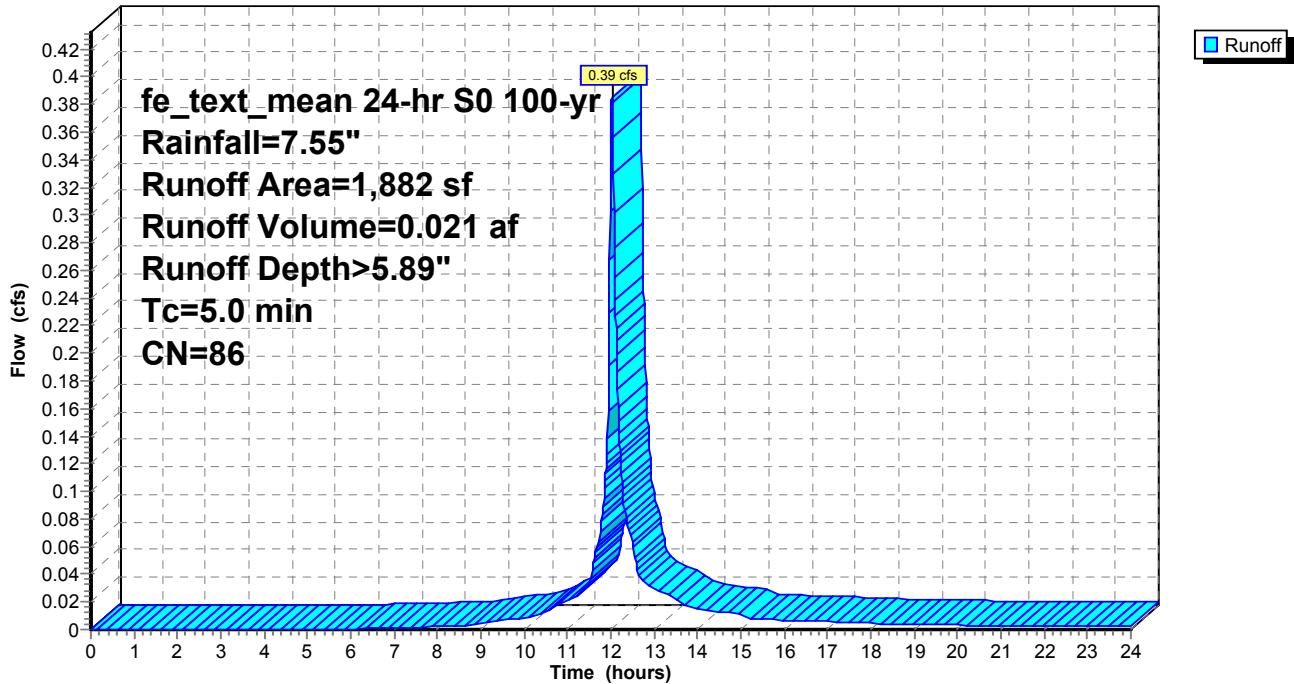
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 fe_text_mean 24-hr S0 100-yr Rainfall=7.55"

Area (sf)	CN	Description
379	39	>75% Grass cover, Good, HSG A
1,503	98	Paved parking, HSG A
1,882	86	Weighted Average
379		20.14% Pervious Area
1,503		79.86% Impervious Area

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

Subcatchment 3S: DA-3

Hydrograph



Summary for Subcatchment 4S: DA-4

Runoff = 0.50 cfs @ 12.03 hrs, Volume= 0.028 af, Depth> 2.79"

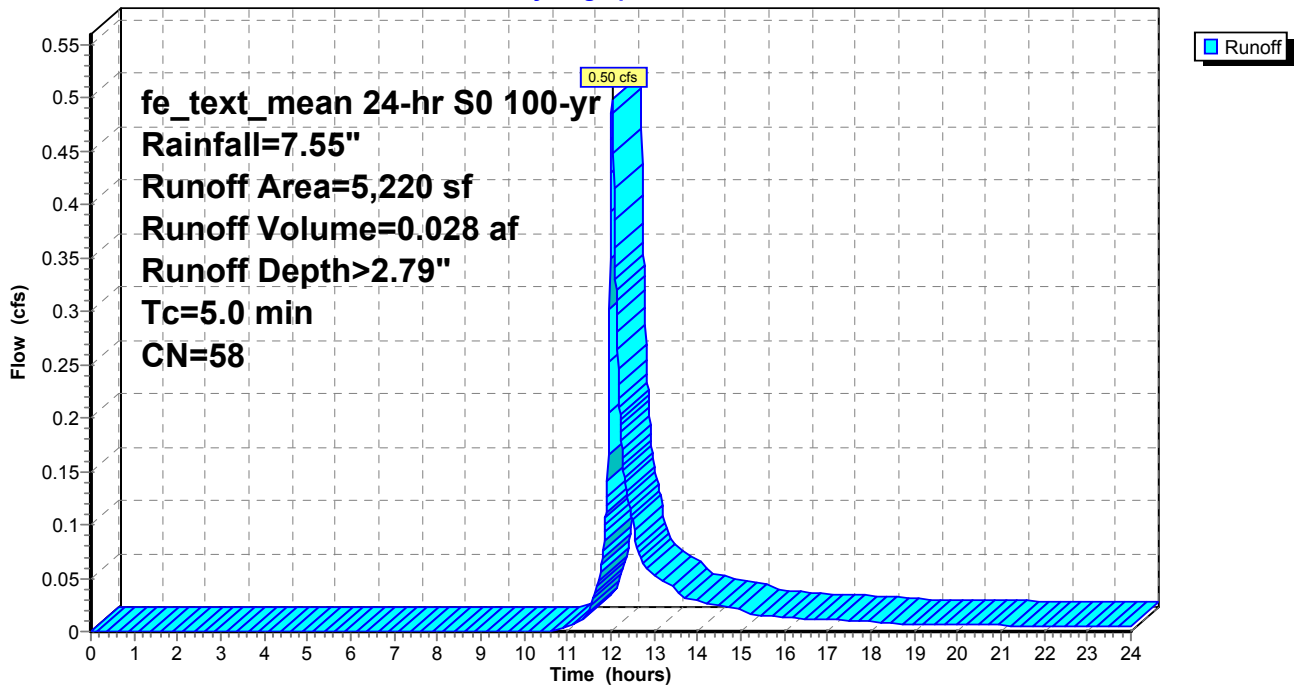
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 fe_text_mean 24-hr S0 100-yr Rainfall=7.55"

Area (sf)	CN	Description
3,558	39	>75% Grass cover, Good, HSG A
1,662	98	Paved parking, HSG A
5,220	58	Weighted Average
3,558		68.16% Pervious Area
1,662		31.84% Impervious Area

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

Subcatchment 4S: DA-4

Hydrograph



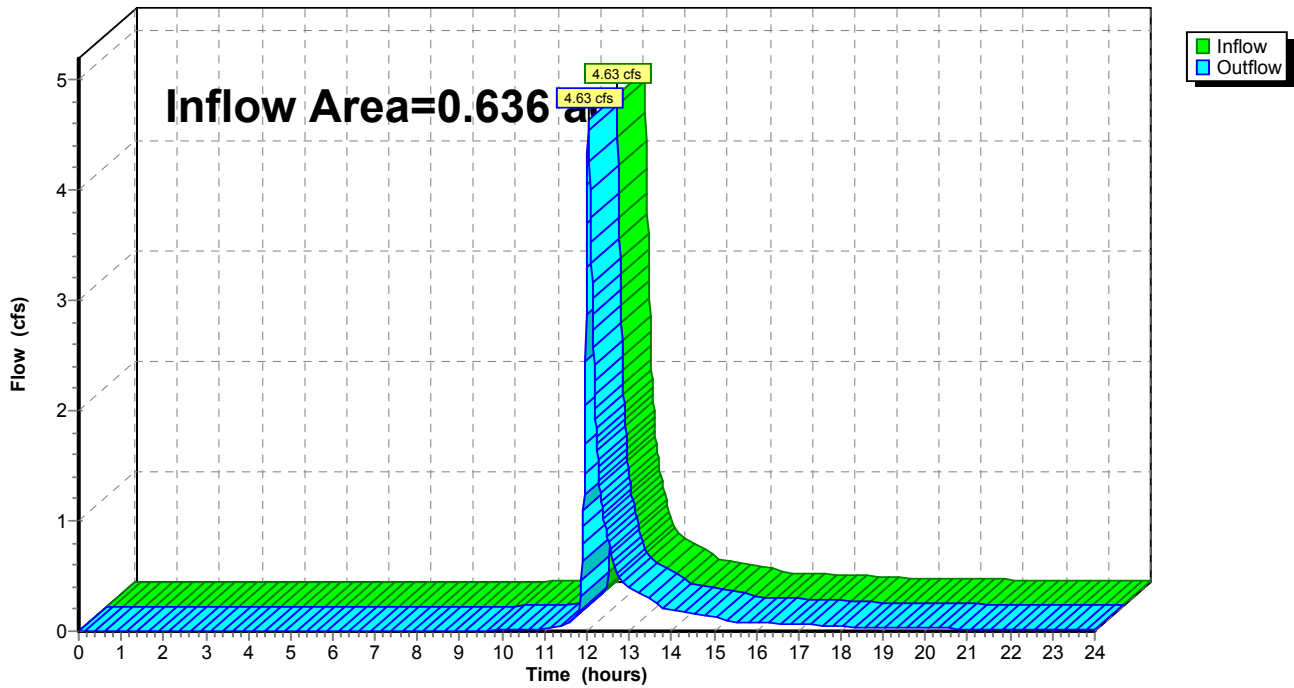
Summary for Reach 1R: PROPOSED RUNOFF

Inflow Area = 0.636 ac, 66.86% Impervious, Inflow Depth > 3.81" for 100-yr event
Inflow = 4.63 cfs @ 12.04 hrs, Volume= 0.202 af
Outflow = 4.63 cfs @ 12.04 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: PROPOSED RUNOFF

Hydrograph



Summary for Pond 1P: Bio-Infiltration Basin

Inflow Area = 0.401 ac, 77.13% Impervious, Inflow Depth > 5.78" for 100-yr event
 Inflow = 3.53 cfs @ 12.03 hrs, Volume= 0.193 af
 Outflow = 3.30 cfs @ 12.05 hrs, Volume= 0.152 af, Atten= 6%, Lag= 1.3 min
 Discarded = 0.02 cfs @ 12.05 hrs, Volume= 0.019 af
 Primary = 3.28 cfs @ 12.05 hrs, Volume= 0.132 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 644.19' @ 12.05 hrs Surf.Area= 1,476 sf Storage= 2,210 cf

Plug-Flow detention time= 104.5 min calculated for 0.152 af (79% of inflow)
 Center-of-Mass det. time= 36.9 min (818.5 - 781.6)

Volume	Invert	Avail.Storage	Storage Description
#1	642.00'	3,592 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
642.00	574	0	0
644.00	1,360	1,934	1,934
645.00	1,955	1,658	3,592

Device	Routing	Invert	Outlet Devices
#1	Discarded	642.00'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	643.90'	24.0" Horiz. Orifice/Grate C= 0.600 in 24.0" Grate (100% open area) Limited to weir flow at low heads
#3	Secondary	644.30'	5.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.02 cfs @ 12.05 hrs HW=644.19' (Free Discharge)

↑1=**Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=3.28 cfs @ 12.05 hrs HW=644.19' TW=0.00' (Dynamic Tailwater)

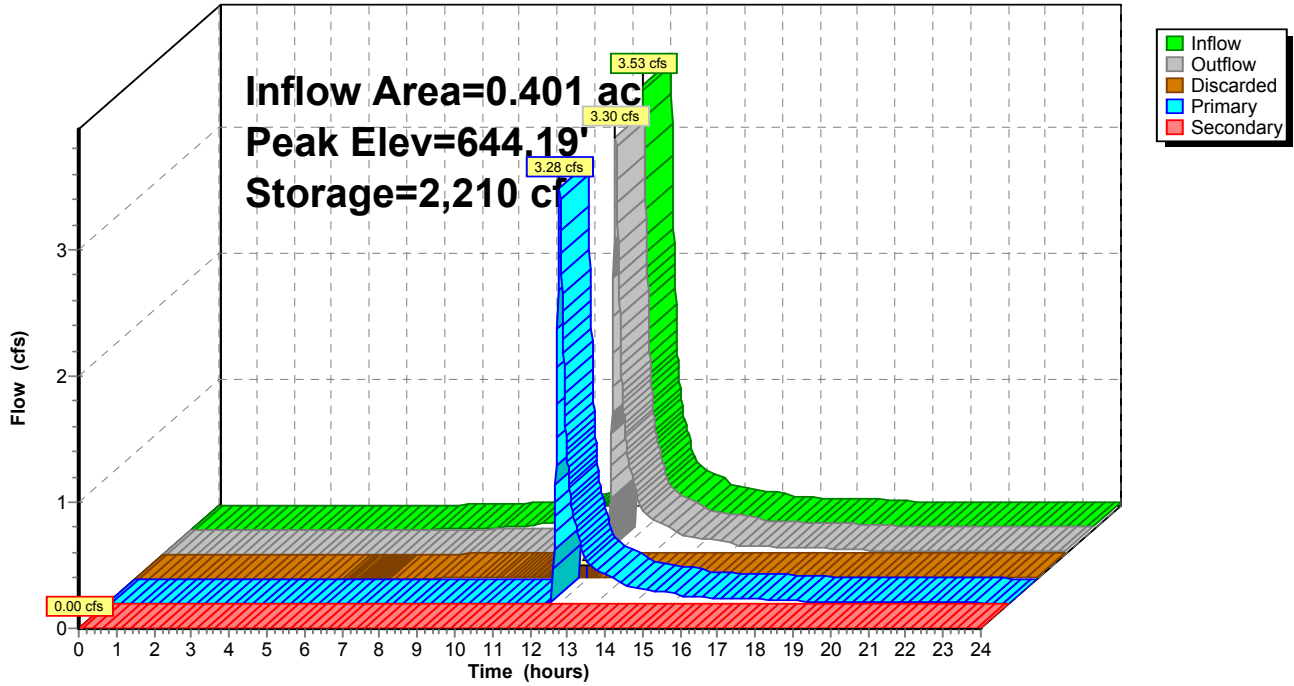
↑2=**Orifice/Grate** (Weir Controls 3.28 cfs @ 1.77 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=642.00' TW=0.00' (Dynamic Tailwater)

↑3=**Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 1P: Bio-Infiltration Basin

Hydrograph



Summary for Pond 5P: Bio-Infiltration Basin

Inflow Area = 0.072 ac, 60.08% Impervious, Inflow Depth > 4.52" for 100-yr event
 Inflow = 0.51 cfs @ 12.03 hrs, Volume= 0.027 af
 Outflow = 0.50 cfs @ 12.04 hrs, Volume= 0.023 af, Atten= 1%, Lag= 0.4 min
 Discarded = 0.00 cfs @ 12.04 hrs, Volume= 0.003 af
 Primary = 0.50 cfs @ 12.04 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 640.98' @ 12.04 hrs Surf.Area= 203 sf Storage= 188 cf

Plug-Flow detention time= 80.3 min calculated for 0.023 af (85% of inflow)
 Center-of-Mass det. time= 22.8 min (825.8 - 803.1)

Volume	Invert	Avail.Storage	Storage Description
#1	639.50'	318 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
639.50	50	0	0
641.00	205	191	191
641.50	300	126	318

Device	Routing	Invert	Outlet Devices
#1	Discarded	639.50'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	640.90'	24.0" Horiz. Orifice/Grate C= 0.600 in 24.0" Grate (100% open area) Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.04 hrs HW=640.98' (Free Discharge)

↑1=**Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.50 cfs @ 12.04 hrs HW=640.98' TW=0.00' (Dynamic Tailwater)

↑2=**Orifice/Grate** (Weir Controls 0.50 cfs @ 0.95 fps)

Pond 5P: Bio-Infiltration Basin

Hydrograph

