ZONING COMMITTEE STAFF REPORT

1. **FILE NAME:** Site Plan for Lexington Station Apartments **FILE #** 20-102-273

2. **APPLICANT:** Alatus Development LLC **HEARING DATE:** January 14, 2021

3. **TYPE OF APPLICATION:** Site Plan Review

4. **LOCATION:** 411 & 417 Lexington Pkwy N

5. **PINS & LEGAL DESCRIPTION:** 342923410069 Hall And Brown'S Addition,To H Subj To Esmts Vac Ave Accruing & Fol, Ex The N 111.6 Ft And Ex The W 294.01 Ft; Lot 36. 342923410067 LEXINGTON & UNIVERSITY LOT 4 BLK 1

6. **PLANNING DISTRICT:** 13 – Union Park **PRESENT ZONING:** T4

7. **ZONING CODE REFERENCE:** §61.402(c)

8. **STAFF REPORT DATE:** Jan. 7, 2021 **BY:** Ashley Skarda

9. **DATE RECEIVED:** Dec. 18, 2020 **DEADLINE FOR ACTION:** Feb. 16, 2021

A. **PURPOSE:** Site Plan Review for a 6-story mixed-use building on Lexington Pkwy N. at Fuller Ave.

As proposed, the Site Plan includes:
- 288 residential units
- 3,000 square feet of ground level commercial space
- 254 structured parking spaces

B. **PARCEL SIZE:** 89,298 SF

C. **EXISTING LAND USE:** Vacant

D. **SURROUNDING LAND USE:**
North: Commercial (T4)
West: Commercial and multifamily residential (T4)
South: Commercial and single family residential (T3)
East: Commercial and multifamily residential (T2, T3)

E. **ZONING CODE CITATION:**

- §61.402(c) - Findings for site plan review.

F. **HISTORY/DISCUSSION:**
During the 2019 planning phase, the project was awarded but then declined a Metropolitan Council Livable Communities Grant. The project is currently not receiving any public

funding.

The project team held a preliminary site plan review discussion December 1, 2020, with the Site Plan Review Committee and received preliminary feedback on December 7, 2020 (see attached Preliminary Staff Report). At the Planning Commission meeting on December 4, 2020 the Planning Commission voted to hold a public hearing for the site plan once an application was received. A complete Site Plan Application and plan set was received on December 22, 2020. Site Plan Review is a function delegated by the Saint Paul Planning Commission (PC) to City staff, however, a Site Plan may be referred to Planning Commission for public hearing and decision.

The land consists of two adjacent vacant lots in the south east corner of a 7-lot block. This large block has existing private drives that allow for circulation. One private drives runs along the north, and north west property lines.

The applicant is proposing a new 6-story, 331,300 sf mixed-use building with 288 residential units, 3,000 sf of commercial tenant space, and 254 structured parking spaces. Storm water management, landscaping, incorporation of existing private drives, and a bike path routed along the north of the property are also proposed. Based on the application, no variances or conditional use permits are required.

G. **DISTRICT COUNCIL RECOMMENDATION:**

At the time of the staff report, the Union Park District Council (DC 13) has not provided a recommendation to approve or deny the Site Plan. The District Council hosted multiple community meetings regarding the future development.

H. **FINDINGS:** § 61.402(c) of the Zoning Code says that in "order to approve the site plan, the planning commission shall consider and find that the site plan is consistent with" the findings listed below:

1. *The city's adopted comprehensive plan and development or project plans for sub-areas of the city.*

   The site plan meets this finding. The proposed mixed-use project is consistent with the 2040 Saint Paul Comprehensive Plan (2020), the Lexington Station Area Plan (2008), and Union Park Community Plan (2016). Generally, the comprehensive plan encourages transit supportive density and supports growth and development of new housing, particularly in areas identified as Mixed Use, Urban Neighborhoods and/or in areas with the highest existing or planned transit capacity, to meet market demand for living in walkable, transit-accessible, urban neighborhoods. The plan also supports increases in density on valuable urban land and calls for high-quality urban design that supports pedestrian friendliness and a healthy environment, and enhances the public realm.

   For a detailed analysis, please see the Analysis Included in the SPR Committee Preliminary Review. "*Lexington Station Site Plan Review – Comprehensive Plan Summary*"

2. *Applicable ordinances of the City of Saint Paul.*
   The site plan meets this finding. The site plan complies with the following key Zoning ordinances:
   - §66.315 - Intent, T4 traditional neighborhood district.
   - §66.331 - Traditional Neighborhood District Density and dimensional standards.
   - §66.342 - Parking requirements in T3—T4 traditional neighborhood districts.
   - §66.343 - Traditional neighborhood district design standards.
   - §63.110 – Building design standards.

3. *Preservation of unique geologic, geographic or historically significant characteristics of the city and environmentally sensitive areas.*

   The site plan meets this finding. The property is typical of the intent of a T4 neighborhood district, which provides for higher-density pedestrian- and transit-oriented mixed-use development. This vacant land is neither designated as having historical or environmental significance. It is also not located within a heritage preservation district.

4. *Protection of adjacent and neighboring properties through reasonable provision for such matters as surface water drainage, sound and sight buffers, preservation of views, light and air, and those aspects of design which may have substantial effects on neighboring land uses.*

   The site plan meets this finding, the effect of this specific proposed building on neighboring properties is reasonable.

   Specific to the findings:
   - The stormwater system meets City standards for run-off rate control. The system will consist of pipes buried below grade located on the west side of the building in the landscaped setback area.
   - The building's proposed setbacks meet or exceed the zoning code for the district. The building is set back 21'4" from the rear property line along the west. A shadow study was provided to demonstrate a reasonable impact to neighboring properties. A spatial buffer is provided by 17' alley right-of-way and 8.5' side setback from the single-family homes to the south.
   - The setback areas will be landscaped or paved for vehicular, bicycle, and pedestrian traffic. Existing boulevard trees will be protected where possible and new boulevard trees will be planted as required.
   - The off-street parking will be provided for residential tenants with two levels of structured parking. A separate structured parking area will serve the commercial use. Trash and recycling will occur within the parking structure, tenant move in will have a dedicated move in garage access off the alley. There will be no alley access to the parking structures.
   - The proposed site adheres to Traditional Neighborhood Design Standards as well as General Design Standards including minimum window and door openings, mechanical screening, building facade articulation, inclusion of

elements that relate to the human scale in the bottom 25' of the building, lighting etc.

5. *The arrangement of buildings, uses and facilities of the proposed development in order to assure abutting property and/or its occupants will not be unreasonably affected.*

   The site plan meets this finding for the reasons listed in finding 4 above. The effect of this specific proposed building on neighboring properties is reasonable:

   - A stormwater management system that can manage runoff.
   - The site meets or exceeds the minimum setbacks.
   - Outdoor residential tenant areas will be protected by two separate three sided courtyards on the second story roof deck, one open towards Lexington Parkway, another open towards the west of the building.
   - Structured parking access from the rear of the building off a private street to the rear of the site.
   - No alley access to building or parking is proposed beyond a move-in bay.
   - Deliveries will occur within the parking structure, the move-in garage, or in the port cochere to the north of the building along a private street reducing additional congestion in the public right-of-way.
   - Trash and recycling haulers from the parking structure.
   - The building will comply with all applicable design standards.

6. *Creation of energy-conserving design through landscaping and location, orientation and elevation of structures.*

   The site plan meets this finding. Higher density development is inherently more energy conserving because it has fewer exterior walls per dwelling unit than low density housing minimizing heat loss. The building exceeds the minimum amount of glazing on all sides, allowing the building to gain solar heat. The project shall meet current building and energy codes. Stormwater will be managed onsite and discharged at a rate that complies with city standards.

   The proposed development is in the Lexington Station Area and four blocks south of an enhanced bicycle route conducive to walking, biking, and using public transit rather than driving. Secure indoor bicycle parking and a maintenance area is conveniently located off Lexington Parkway for enhanced convenience.

7. *Safety and convenience of both vehicular and pedestrian traffic both within the site and in relation to access streets, including traffic circulation features, the locations and design of entrances and exits and parking areas within the site.*

   The site plan meets this finding. Access to both the commercial (13 spaces) and residential (241 spaces) parking structures are off a private drive to the rear of the property. Existing private drives have been incorporated in their current position for the least impact to circulation on the site. A move-in garage is accessed off an existing

public alley, further reduce blockages in the Public Right of Way.

The building's first floor layout allows for convenient pedestrian entry at the south east, north east, north, and north west sides of the building. Other considerations include a primary pedestrian building entrance on Lexington Parkway for the commercial space, twelve-foot wide sidewalks enhance pedestrian friendliness and walkability along Lexington Parkway and the 15-foot wide landscaped boulevard between the sidewalk and roadway enhance pedestrian safety, friendliness, walkability. Pedestrian ramps have been added in line with Fuller Avenue's future crosswalks in mind.

Bike racks were added on the exterior near the commercial space and a large interior bicycle storage and maintenance room is proposed. The applicant met with Saint Paul Public Works Parks and Ramsey County prior to the submission of these plans to discuss site circulation. A bike lane will be accommodated to the north of the building in anticipation of future connection with the neighborhood.

8. *The satisfactory availability and capacity of storm and sanitary sewers, including solutions to any drainage problems in the area of the development.*

The site plan meets this finding. The utility connections are shown on Sheet C4-1. Water, and Sanitary are available in Lexington Parkway and stormwater from the building site will be piped to an underground detention system located on the south west of the property. The stormwater detention system will then connect to existing private stormwater pipes installed when The Wilder Foundation building was constructed. These private pipes connect to the public main at Lexington Parkway. Drainage maps and HydroCAD modeling to meet the City's stormwater run-off rate control standards were reviewed and approved by Public Works.
The project disturbs more than one acre of land and requires an Erosion and Sediment Control permit from the Minnesota Pollution Control Agency as well as a permit from the Capitol Region Watershed District to meet water quality requirements.

9. *Sufficient landscaping, fences, walls and parking necessary to meet the above objectives.*

The site plan meets this finding. The setback areas around the building will be landscaped and the plan will be approved by the city forester. Existing boulevard trees will be protected where possible and new boulevard trees will be planted as required.

Parking is not required within ¼ mile of University Ave. The project is proposing 254 parking spaces, 13 for in the structured commercial lot and 241 for the residential lot.

10. *Site accessibility in accordance with the provisions of the Americans with Disabilities Act (ADA), including parking spaces, passenger loading zones and accessible routes.*

The site plan meets this requirement. Required ADA parking spaces will be provided. The floors of the commercial spaces and lobbies will match the sidewalk grades. The sidewalks have accessible crossings.

11. *Provision for erosion and sediment control as specified in the "Ramsey Erosion*

Sediment and Control Handbook."

The site plan meets this finding. The site plan includes an erosion and sediment control plan that meets this standard.

I. STAFF RECOMMENDATION:

Based on the findings above, the staff recommends approval of the site plan to allow a six-story mixed-use building at 411 and 417 Lexington Pkwy N. with the following conditions:

1. The final Landscape Plan shall be approved by the City Forester.
2. Sewer plans and technical details shall be approved by the Public Works Sewer Division.
3. The Traffic Impact Study shall be accepted, and the plans be approved by Public Works Traffic Engineering.
4. The final Utility Plan shall be approved by Saint Paul Regional Water Services
5. Lots shall be combined with Ramsey County Records and Mapping.

CITY OF ST PAUL

DEPARTMENT OF SAFETY AND INSPECTIONS
375 JACKSON STREET, SUITE 220
ST. PAUL, MINNESOTA 55101-1806
Phone: 651-266-8989 Fax: 651-266-9124
Visit our Web Site at www.stpaul.gov/dsi

Site Plan Review Application

Electronic PlanReview
CITY OF SAINT PAUL

Application Date 12/18/2020	**Application Method** Mail ☐ Email ☑ Walk-in ☐ Fax ☐	**Site Plan Review Meeting Date** ***(STAFF ENTRY ONLY)*** ZC hearing 1/14/21
Site Address(es) 411 & 417 Lexington Pkwy N, St. Paul, MN, 55104		**Property Identification Number (PIN)** 417: 342923410067 & 411: 342923410069
Project Name Lexington Station Apartments		

Project Type:

☒ New Construction	☐ Addition	☐ Parking Lot Only	☐ Other Site Work

Proposed Land Use:

☐ Commercial	☒ Mixed-Use	☐ Multi-Family Residential	☐ Industrial
☐ Institutional	☐ Recreational	☐ Single-Family	☐ Duplex

Project Description:

This project is a 288-unit, six story, mixed-use development located on Lexington Parkway at the end of Fuller Avenue in St. Paul. The routing of the bike path will be incorporated into the site design and located on the north end of the overall property. The development will include Type I-A Construction (concrete with steel stud) for the first floor and Type III-B Construction (wood framed, prefabricated module construction) for the upper floors (Levels 2-6).

Project Contacts: Site Plans and documents shall be uploaded to the Electronic Plan Review system planreview.stpaul.gov/ProjectDox

Applicant Alatus Development LLC Contact - Chris Osmundson	Address 80 S 8th Street Suite 4155 City Minneapolis State MN Zip 55402	Email cbosmundson@alatusllc.com Phone 612.455.0712
Responsible Party (Developer/Property Owner) Alatus Development LLC	Address 80 S 8th Street Suite 4155 City Minneapolis State MN Zip 55402	Email See Applicant Phone See Applicant
Architect DJR Architecture, Inc. Contact - Michael Kuntz	Address 333 N Washington Ave, Suite 210 City Minneapolis State MN Zip 55401	Email mkuntz@djr-inc.com Phone 612.207.1241
Civil Engineer Loucks Contact - PJ Disch	Address 7200 Hemlock Lane, Suite 300 City Maple Grove State MN Zip 55396	Email PDisch@loucksinc.com Phone 763.300.3596

REQUIRED: Email to receive Electronic Plan Review document upload link: mkuntz@djr-inc.com

Project and Land Use Details:

Est. Project Start/End Dates: May, 2021 - July, 2022	Estimated Project Cost: $ 60,496,000 TDC
Existing Use: Vacant Commercial Land	Proposed Use: Mixed Use (Market Rate Apartments & Commercial)
Parcel Area (square feet): 89,298 SF	Disturbed Land Area (square feet): 88,000 SF
Building Gross Floor Area: 331,300 SF	Floor Area Ratio: 2.72
No. of Existing Off-Street Parking Spaces: 0	No. of Proposed Off-Street Parking Spaces: 243
No. of Existing Residential Units: 0	No. of Proposed Residential Units: 288
No. of Affordable Residential Units: 0	% AMI for Affordable Residential Units: N/A

☐ Flood Plain Property	☐ Historic District/Property	☐ Steep Slopes (>12%)	☒ Travel Demand Mgmt. Plan

☐ If you are a religious institution you may have certain rights under RLUIPA. Check this box if you identify as a religious institution.

☒ Applicant certifies that all information provided herein is true and accurate.

APPLICANT NAME (PRINT) Christian Osmundson	**SPR File #** ***(STAFF ENTRY ONLY)*** 20-100-785
APPLICANT SIGNATURE	**SPR Fee $** ***(STAFF ENTRY ONLY)*** ☐ Check ☐ Credit Card ☐ Online Payment

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DEPARTMENT OF SAFETY AND INSPECTIONS
375 JACKSON STREET, SUITE 220
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Site Plan Review Application

Electronic PlanReview
CITY OF SAINT PAUL

STAFF USE ONLY

City Agent Ashley Skarda	Date Application Received 12/18/20
Zoning District T4	Overlay Zoning District Lightrail Station Area
District Council Union Park, Frogtown, Summit U, Hamline Midway	City Council Ward 4, 1
Watershed District CRWD	MnDOT or County ROW County ROW - Lexington
☐ Entitlements Required: Variance, CUP, Rezoning, Plat	☐ Current Building Permit(s) #
☒ Parkland Dedication Fee Required, AMOUNT: $_____	☐ Previous SPR(s)

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Site Plan Review Application Submittal Requirements

Electronic PlanReview
CITY OF SAINT PAUL

Site Plan Review applications and application fees may be submitted to the City of Saint Paul Department of Safety and Inspections at 375 Jackson Street, Suite 220, St. Paul MN 55101, by email at SitePlanReview@ci.stpaul.mn.us or by fax at 651-266-9124. Site Plan Review can be reached at 651-266-9008 from 7:30 am - 4:30 pm, Monday through Friday.

Site Plan Review is required for multi-family residential, commercial, industrial, institutional, or recreational new construction, additions, or parking lots, as well as land disturbances greater than 10,000 feet square, construction on slopes 12% or greater, or one and two-family residential properties over one acre or located in a tree preservation district.

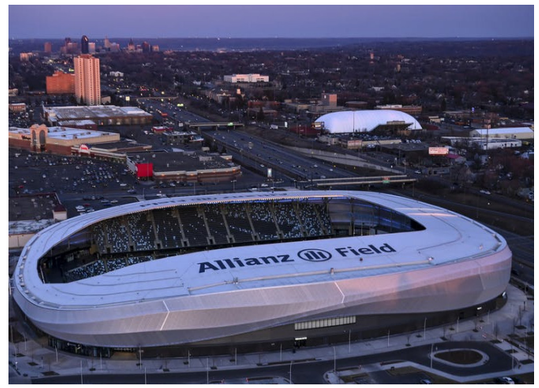
Identify the items below that are included with the submittal of your Site Plan Review application package. Provide an explanation for any item indicated as Not Included or Not Applicable. Failure to provide required documentation may result in your Site Plan Review application being rejected.

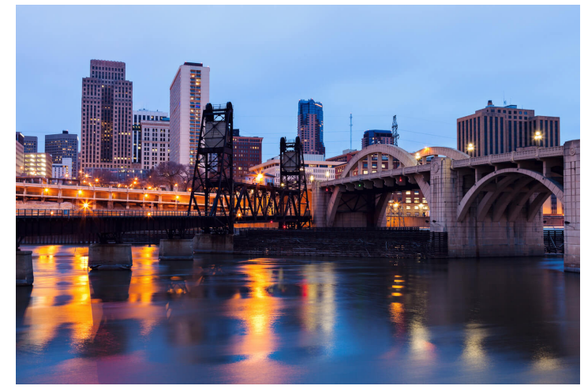
Upload this completed document and the following required Site Plan materials to your Electronic Plan Review project.

Item	Yes	No	N/A	Comments:
Site Plan Review Application	☑	☐	☐	
Application Fee (check or credit card)— $525 for first 10,000 sf of disturbance, plus $210 for each additional 10,000 sf increment of disturbance for expansions or parcel area for new construction. Additional fees may apply, e.g. TDMP, Flood Plain, Steep Slopes	☑	☐	☐	
Project Description/Overview— Narrative description of the project, project contacts and design professionals	☑	☐	☐	
Location Map— Map of the proposed development within the City	☑	☐	☐	
Certified Survey— Including existing conditions such as property lines, easements, buildings, utilities, parking, sidewalks, driveways, landscaping, wetland, park land	☑	☐	☐	
Demolition Plan— Including private property and public realm removals, utility cuts, tree protection measures	☑	☐	☐	
Erosion Control Plan— Including measures such as silt fences, inlet protection, rock construction entrance and street cleaning, stormwater pollution prevention plan	☑	☐	☐	
Site Layout and Paving Plan— Including proposed buildings, dimensions, and other appropriate labels. Consider Zoning design and dimensional standards.	☑	☐	☐	

Grading Plan— Including existing and proposed conditions, 1' contours and elevation points, ponding areas for storm water detention	☑	☐	☐	
Utility Plan— Including water lines, hydrants, fire department connections for sprinklers, catch basins with rim and invert elevations, sanitary and storm lines	☑	☐	☐	
Landscaping and Site Improvements— Existing and proposed conditions including planting schedule and details, streetscape features (e.g. lighting, fences, sidewalks, poles)	☑	☐	☐	
Architectural Plans— Building elevations, basic floor and parking level plans, roof plans including drainage and mechanical screening	☑	☐	☐	
Exhibits— As needed, e.g., vehicle turning movements, site triangles	☑	☐	☐	
HydroCAD and Drainage Maps— As needed to meet stormwater rate control requirements	☑	☐	☐	
Travel Demand Management Plan (TDMP)— For development of 100+ off-street parking spaces, or 100+ spaces existing and increase of 25% or 50 parking spaces	☑	☐	☐	
Traffic Memo or Traffic Impact Study— As requested by Public Works Transportation Planning and Safety	☑	☐	☐	
Floodplain Application— Flood Response Plan required for development within the River Corridor Critical Area or flood plain	☑	☐	☒	n/a not in flood plain

DJR ARCHITECTURE





Prepared for:

Site Plan Review

12.22.2020

Project:

417& 411 Lexington Pkwy N, St. Paul

20-053.00

DJR ARCHITECTURE

ALATUS LLC

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411 & 417 Lexington Parkway N
St. Paul, Minnesota, 55104
Project #: 20-053.00
12.22.2020

Project Narrative

Alatus, LLC submits this narrative in support of the site plan application for Lexington Project (the "Project"), a 6-story, mixed-use residential building featuring 285 apartment homes, street-level retail, active ground-floor amenity spaces, and structured parking. Located just one-half block south of Metro Transit's Green Line Lexington Parkway Station (a 3-minute walk), the Project will promote public transit use and multi-modal forms of transportation, support the City's density goals and provide a development that aligns with the City's long-term vision for this area.
The Project supports the City's goals as stated in the Transit-Corridor plans as well as the applicable neighborhood Small Area Plans. Specifically, it will enhance the existing community's density and mixed-use character through new right-sized, transit-oriented development. The Project is designed to support this vibrant, mixed-use corridor though the construction of a landmark building that draws upon Lexington Parkway's processional potential yet respects the history and context of the area. The Project will strengthen the streetscape edge, give definition to the block that will improve safety, and, perhaps most importantly, provide connections to the single-family neighborhood (East of Lexington Pkwy) which will improve the porosity and legibility of the area (in alignment with the City's long-term vision for this area). Lastly, considering that this site has long been vacant and tremendously unattractive for neighbors in all directions, The Project will transform an under-utilized location into its highest and best use for the local community and larger region.

The Lexington Project also implements the community's stated goals through design choices and thoughtful use of quality building materials. For example, multiple "front doors" are visible from/oriented toward the intersection of Lexington Parkway and University Avenue, and from Lexington and Fuller Avenue. The building's prominent architectural features and public frontages line Lexington Avenue in an undulating manner with varying setbacks and cut-outs to break up massing. A multi-modal grand entrance provides clear wayfinding and site circulation.

The Project creatively supports the desire of area stakeholders to see a wider range in rents within new privately-financed developments, including more units at deeper levels of affordability. Specifically, the Project seeks to reduce construction costs and use new, efficient unit configurations (including affordable co-living suites) in an effort to achieve overall rent levels that will be appealing and attainable to both existing and new community members. In addition, the Project reduces overall housing cost burdens for its residents due to proximity to multiple public transit options, as well as carefully selected operational strategies including transit subsidies, bulking internet and cable, the building's use of efficient heating and cooling systems to reduce resident utility burdens, and pooling of insurance deposits to reduce up-front resident costs.

In summary, over the past 18+ months, the Lexington Project team has invested significant time and energy in engagement with area stakeholders in order to fully understand and explore the specific and varied needs, wants, and opportunities that are presented at this significant and nuanced location. In response to these discussions, the Project has evolved over time. The Project's program and design reflect community values and leverage the tools and resources available. As a result, the Project will (1) introduce a needed diversity of quality attainable housing options into the area, (2) create a connected, walkable, active streetscape, (3) provide economic opportunity through retail oriented to transit, and (4) help balance the various land uses, cultural backgrounds, and income levels in the community.

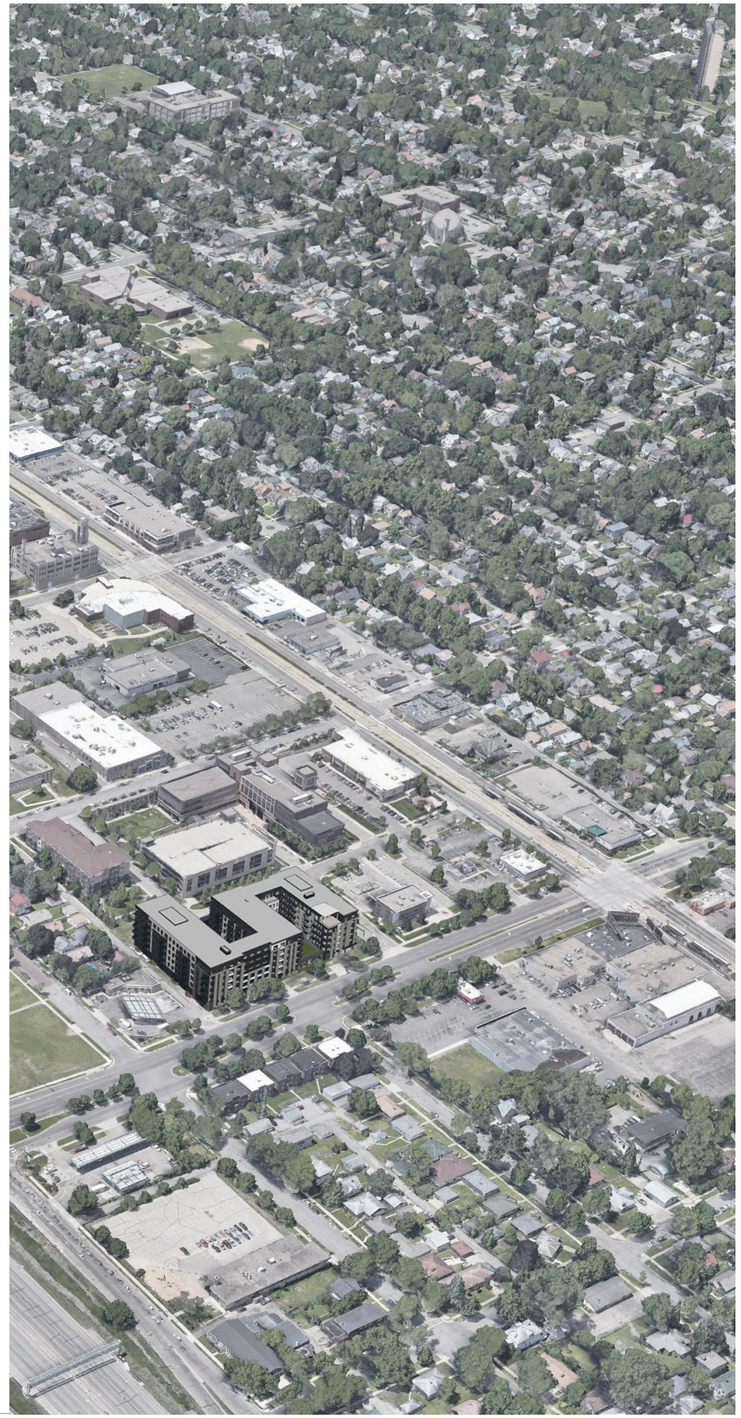
Importantly, the Project meets all of the Code requirements that are necessary for site plan approval and, based on this, and for all of the reasons stated above, we ask that Staff support the Project and approve the site plan.

Parking Narrative

Applicant will be providing 234 structured and enclosed parking stalls between grade level and one level of underground parking for an approximately 0.81 parking stalls to units ratio. Additional necessary parking for building residents will be accommodated by surrounding on-street parking locations in all directions. Applicant is also looking to establish temporary parking locations in adjacent under-utilized surface parking lots which surround the redevelopment parcels.

Trash Narrative

Trash and waste management will occur within the confines of the property's boundary. Waste bins will be held internally on the first floor within the enclosed parking structure. It is estimated that trash removal will occur on Mondays and Thursdays in the morning hours. Containers will be moved from their interior location outside to a concrete pad on the western side of the building via the resident-entry garage door. The 3-cubic-yard containers would be moved to this location, picked up, and emptied by a private trash collection service. Once they have been emptied, on-site management staff will move the dumpster bins back to the interior of the building.



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411 & 417 Lexington Parkway N
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Project #: 20-053.00
12.22.2020

INTRODUCTION - CONTENTS & DESCRIPTION

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PROJECT TEAM

Real Estate Developer
Alatus
800 Nicollet Mall, Ste 2850, Minneapolis, MN, 55402

Architect
DJR Architecture, Inc.
333 N Washington Ave #210, Minneapolis, MN, 55401

Civil Engineer & Landscape Architect
Loucks
7200 Hemlock Lane, Ste 300, Maple Grove, MN 55396

General Contractor
Rise Modular
222 S 9th St, Ste 3700, Minneapolis, MN 55402

Traffic
Swing Traffic Solution, LLC
4290 Norwood Ln, N. Plymouth, MN 55442

Aerial from Google Earth - 2020

Address
417 & 411 Lexington Pkwy N, St. Paul, MN 55104

Area
2.05 acres (89,298 sq. ft.) existing

Legal Description
Parcel Number for 417: 342923410067 & Parcel Number for 411: 342923410069

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ALATUS LLC

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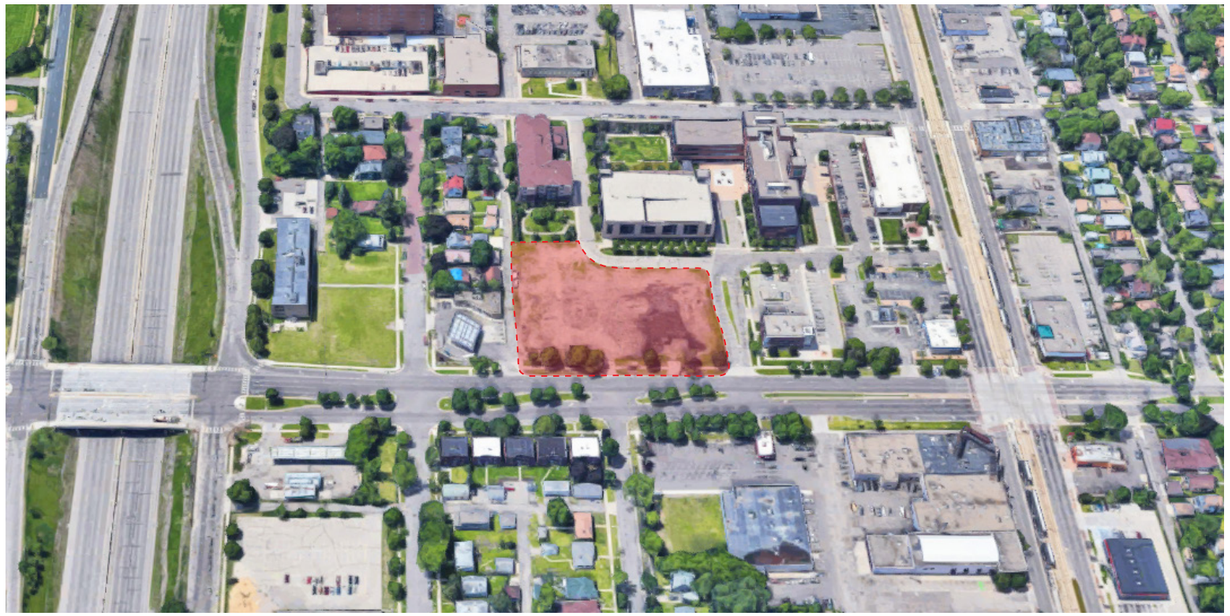
SITE ANALYSIS - AERIALS



Aerial Photo Looking West

Aerial Photo Looking North

Aerial Photo Looking East

Aerial Photo Looking South

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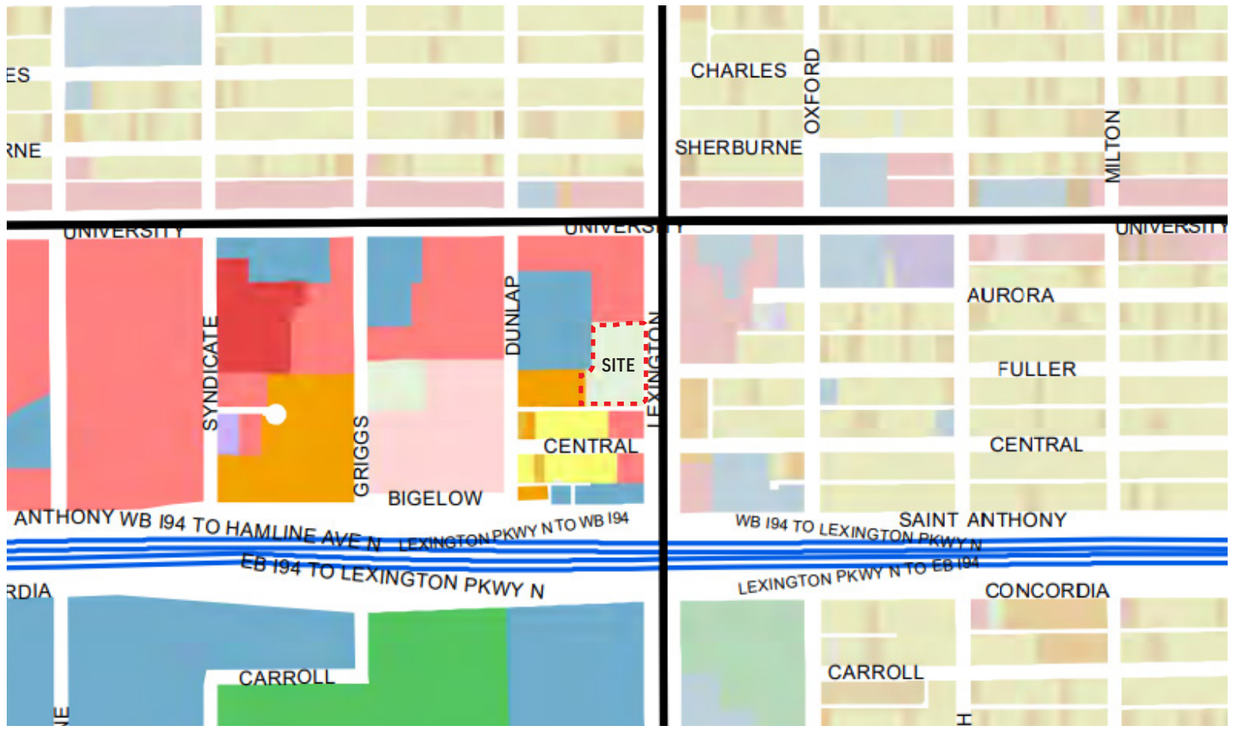
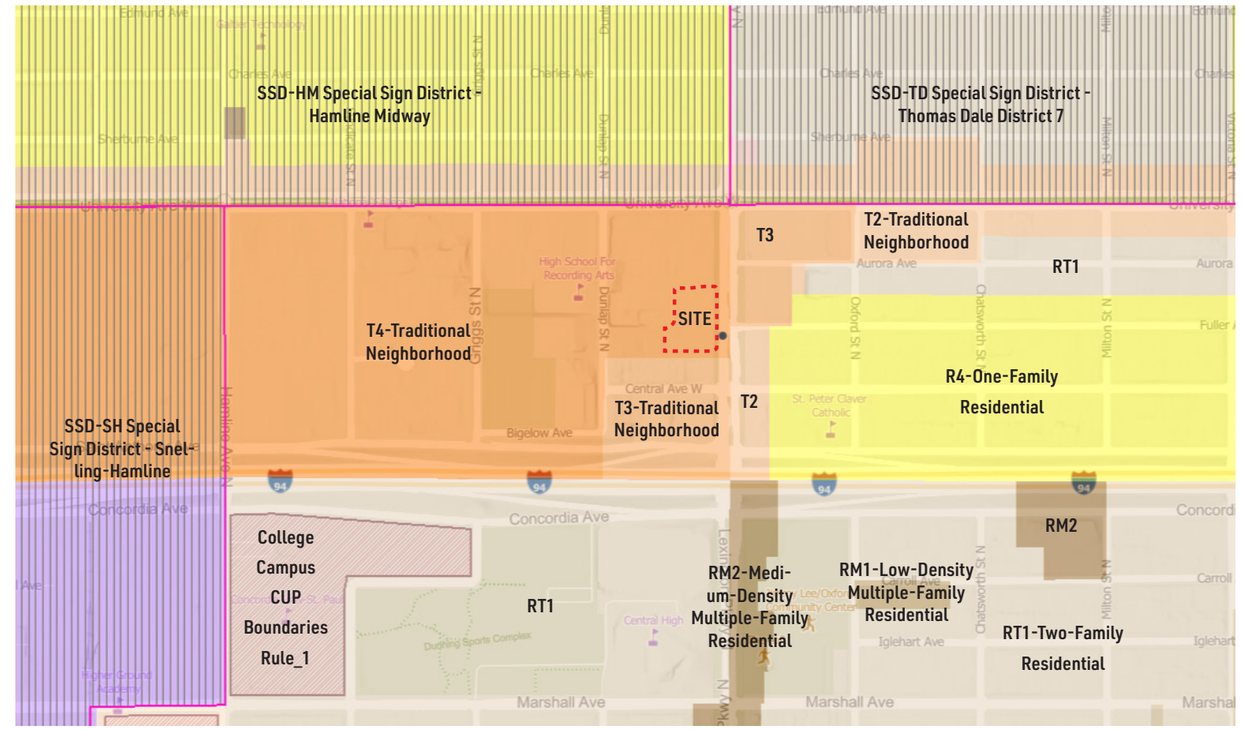
SITE ANALYSIS - ZONING AND ADJACENT USES



Land Use Map



Primary Zoning Map

Key:

- Undeveloped
- Water
- Institutional
- Park, Recreational or Preserve
- Single Family Attached
- Multifamily
- Retail and Other Commercial
- Office
- Mixed Use Commercial and Other
- Industrial and Utility

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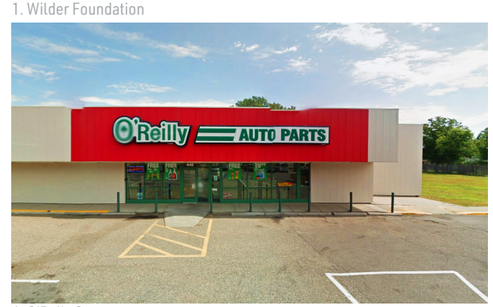
SITE ANALYSIS - SURROUNDING BUILDINGS

1. Wilder Foundation

2. Wilder Foundation Parking Garage

3. Multi Family Housing



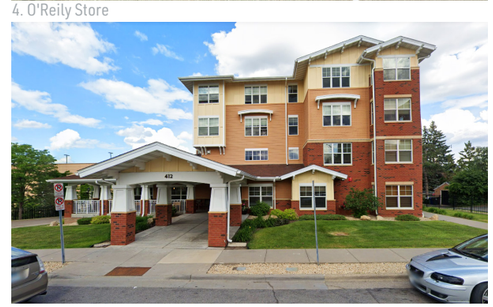
4. O'Reily Store

5. TCF Bank

6. Store Fronts (Scale Model Supplies)

7. Aldi Store

8. Super America Gas Station



9. Carty Heights Apartment Building

10. Whistler Creek Printed Music Publisher

11. Single Family Housing

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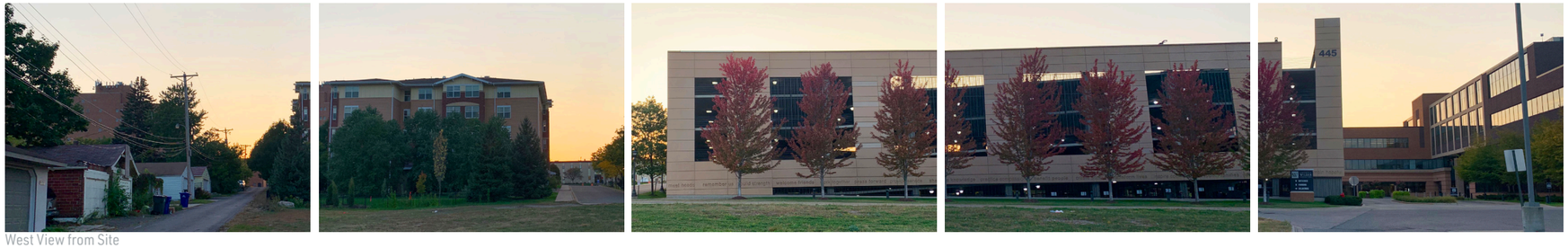
STREET PANORAMA



West View from Site

North View from Site

West View from Site

South View from Site

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SITE PLAN

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PROJECT INFORMATION

ZONING

CURRENT PRIMARY ZONING	T4 - TRADITIONAL NEIGHBORHOOD
CURRENT OVERLAY ZONING	N/A
SP 2030 COMPREHENSIVE PLAN	MIXED USE CORRIDOR

SITE*

TOTAL AREA	89,168SF*

*Site area estimated from Ramsey County Property Map

FAR

FLOOR AREA RATIO = 2.72

Area Schedule - Gross (Summary)

Level	Area
LEVEL P1	46,597 SF
LEVEL 1	60,718 SF
LEVEL 2	44,750 SF
LEVEL 3	44,676 SF
LEVEL 4	44,321 SF
LEVEL 5	44,326 SF
LEVEL 6	44,312 SF
Grand total	329,700 SF

Area Schedule

Level	Name	Area
LEVEL P1	BOH	1,071 SF
LEVEL P1	CIRCULATION	1,079 SF
LEVEL P1	PARKING	44,446 SF
		46,597 SF
LEVEL 1	AMENITY	7,419 SF
LEVEL 1	BOH	3,049 SF
LEVEL 1	CIRCULATION	4,980 SF
LEVEL 1	COMMERCIAL	3,004 SF
LEVEL 1	PARKING	42,285 SF
		60,737 SF
LEVEL 2	AMENITY	1,368 SF
LEVEL 2	BOH	110 SF
LEVEL 2	CIRCULATION	5,104 SF
LEVEL 2	RESIDENTIAL	37,391 SF
LEVEL 2	WORK SUITE RENTABLE	814 SF
		44,787 SF
LEVEL 3	BOH	110 SF
LEVEL 3	CIRCULATION	4,780 SF
LEVEL 3	RESIDENTIAL	39,006 SF
LEVEL 3	WORK SUITE RENTABLE	925 SF
		44,821 SF
LEVEL 4	BOH	110 SF
LEVEL 4	CIRCULATION	4,780 SF
LEVEL 4	RESIDENTIAL	39,006 SF
LEVEL 4	WORK SUITE RENTABLE	925 SF
		44,821 SF
LEVEL 5	BOH	110 SF
LEVEL 5	CIRCULATION	4,780 SF
LEVEL 5	RESIDENTIAL	39,006 SF
LEVEL 5	WORK SUITE RENTABLE	925 SF
		44,821 SF
LEVEL 6	BOH	110 SF
LEVEL 6	CIRCULATION	4,717 SF
LEVEL 6	COMMON / AMENITY	1,636 SF
LEVEL 6	RESIDENTIAL	36,953 SF
		43,416 SF

Parking Schedule

Stall Type	Size	Count
ADA 2	8' x 18' (ADA)	6
Compact 2	9' x 16' (Compact 2)	71
Compact 3	8' x 18' (Compact 3)	19
Standard 1	9' x 18' (Standard 1)	140
Tandem	9' x 16' (Tandem)	18
		254

Bike Racks

Bike Rack Type	Counts
Exterior Freestanding Bike Rack	8
Interior Dero Bike Rack "Bike File" (floor mounted)	144
Interior Dero Bike Rack "Bike File" (wall mounted)	72
Interior Dero Bike Rack "Wall Rack"	64
	288

Unit Rentable Area (SF)

Name	Level	Count	Area
1BR	LEVEL 2	**14**	9,520 SF
1BR DEN	LEVEL 2	**1**	795 SF
2BR	LEVEL 2	**7**	6,674 SF
4BR	LEVEL 2	**3**	5,475 SF
ALCOVE	LEVEL 2	**10**	5,456 SF
STUDIO	LEVEL 2	**21**	9,474 SF
56			**37,395 SF**
1BR	LEVEL 3	**15**	10,269 SF
1BR DEN	LEVEL 3	**1**	795 SF
2BR	LEVEL 3	**8**	7,459 SF
4BR	LEVEL 3	**3**	5,475 SF
ALCOVE	LEVEL 3	**10**	5,453 SF
STUDIO	LEVEL 3	**21**	9,479 SF
58			**38,930 SF**
1BR	LEVEL 4	**15**	10,262 SF
1BR DEN	LEVEL 4	**1**	796 SF
2BR	LEVEL 4	**8**	7,459 SF
4BR	LEVEL 4	**3**	5,475 SF
ALCOVE	LEVEL 4	**6**	3,300 SF
STUDIO	LEVEL 4	**25**	11,279 SF
58			**38,570 SF**
1BR	LEVEL 5	**15**	10,271 SF
1BR DEN	LEVEL 5	**1**	796 SF
2BR	LEVEL 5	**8**	7,459 SF
4BR	LEVEL 5	**3**	5,475 SF
ALCOVE	LEVEL 5	**6**	3,300 SF
STUDIO	LEVEL 5	**25**	11,279 SF
58			**38,580 SF**
1BR	LEVEL 6	**15**	10,271 SF
1BR DEN	LEVEL 6	**1**	796 SF
2BR	LEVEL 6	**8**	7,511 SF
4BR	LEVEL 6	**3**	5,475 SF
ALCOVE	LEVEL 6	**6**	3,295 SF
STUDIO	LEVEL 6	**25**	11,279 SF
58			**38,626 SF**
Grand total: 288			**192,101 SF**

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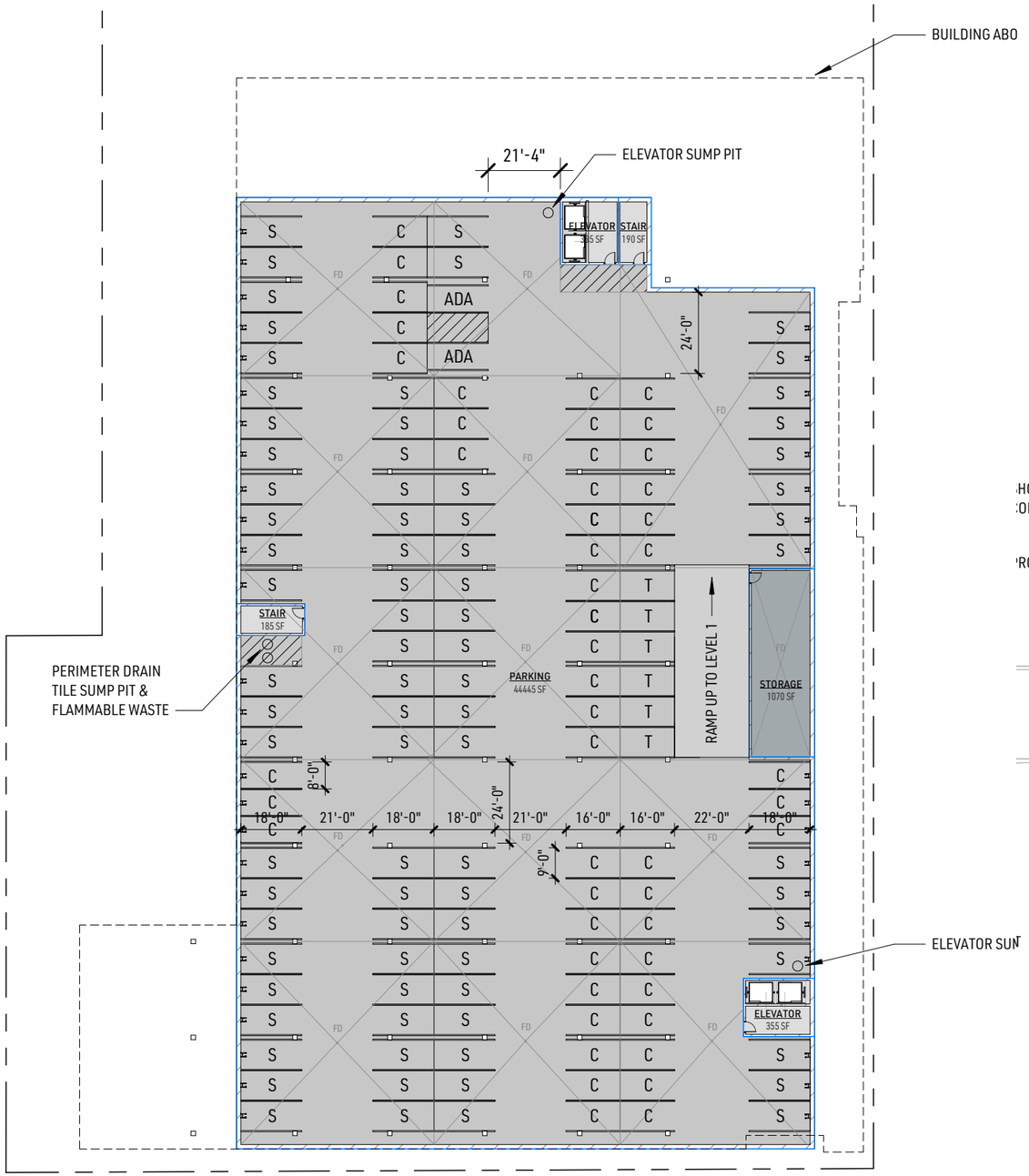
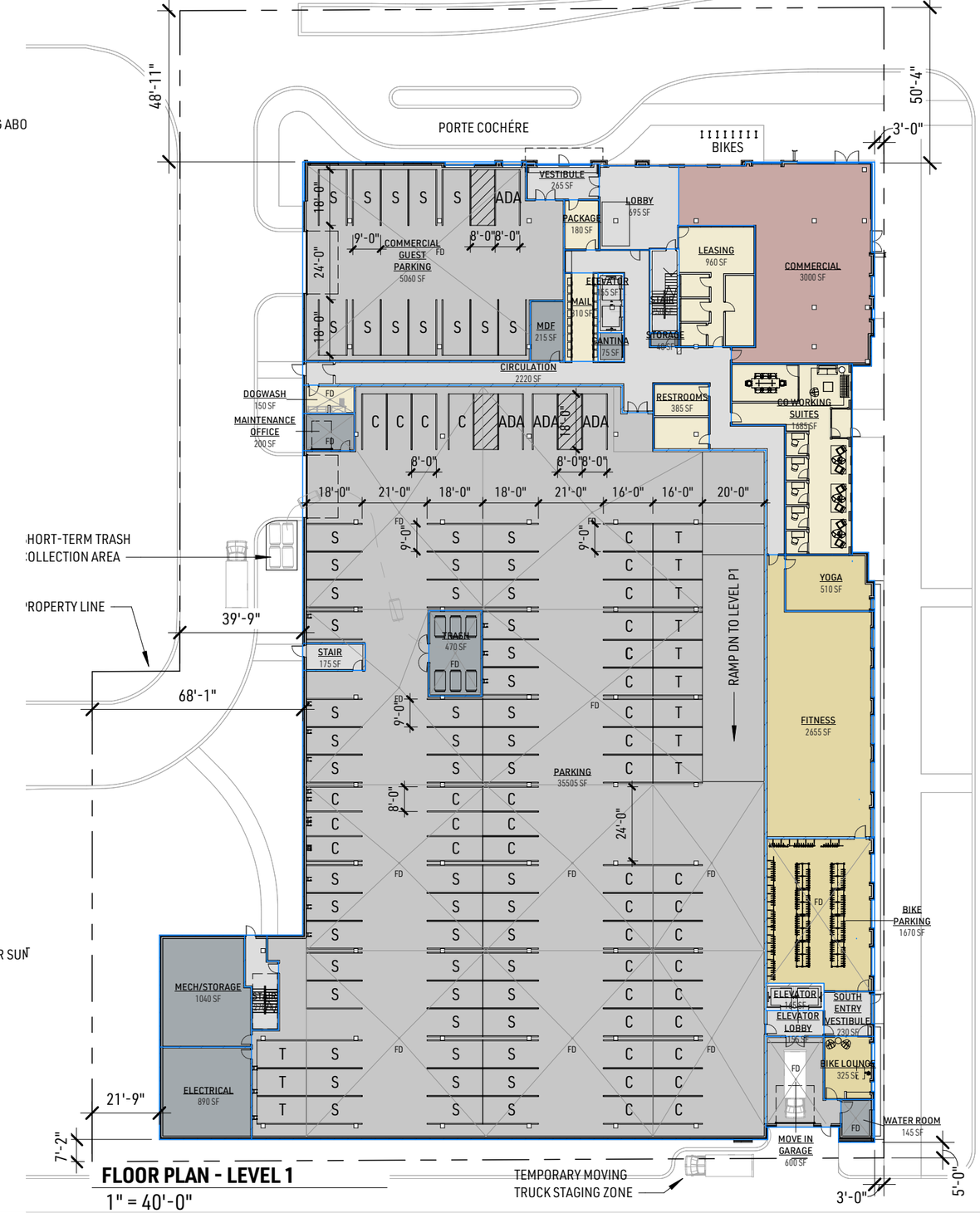
FLOOR PLANS



FLOOR PLAN - LEVEL P1

1" = 40'-0"



FLOOR PLAN - LEVEL 1

1" = 40'-0"

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FLOOR PLANS - LEVEL 2

FLOOR PLAN - LEVEL 2

1" = 40'-0"

FLOOR PLAN - LEVEL 3-5

1" = 40'-0"

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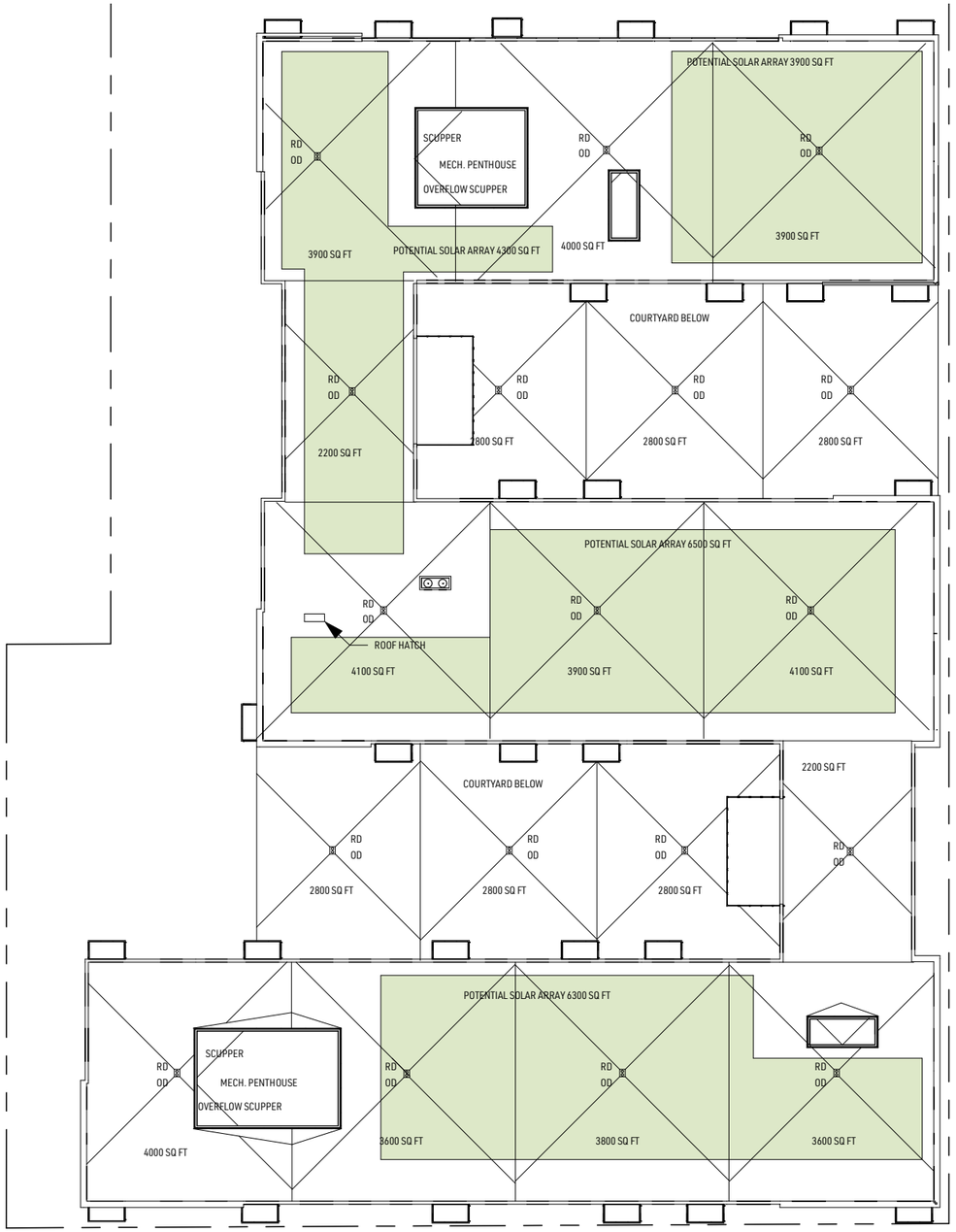
FLOOR PLANS - LEVEL 6



ROOF PLAN
1" = 40'-0"

FLOOR PLAN - LEVEL 6
1" = 40'-0"

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ELEVATIONS - NORTH & SOUTH

SOUTH EXTERIOR ELEVATION
1" = 30'-0"

SOUTH ELEVATION - OPENING %		
Material	Area	%
OPAQUE	11,886 SF	70%
WINDOW	5,027 SF	30%
	16,913 SF	100%

NORTH EXTERIOR ELEVATION
1" = 30'-0"

NORTH ELEVATION - OPENING %		
Material	Area	%
OPAQUE	8,247 SF	61%
WINDOW	5,199 SF	39%
	13,446 SF	100%

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ELEVATIONS - EAST & WEST

LINEAR GLAZING %
@ GROUND LEVEL

OPAQUE 123'
GLAZING 174'
%58.5

EAST ELEVATION -OPENING %)		
Material Type	Area	%
OPAQUE	15,158 SF	65%
WINDOW	8,038 SF	35%
	23,196 SF	100%

EAST EXTERIOR ELEVATION
1" = 30'-0"

WEST ELEVATION - OPENING %		
Material	Area	%
OPAQUE	16,167 SF	73%
WINDOW	6,124 SF	27%
	22,290 SF	100%

WEST EXTERIOR ELEVATION
1" = 30'-0"

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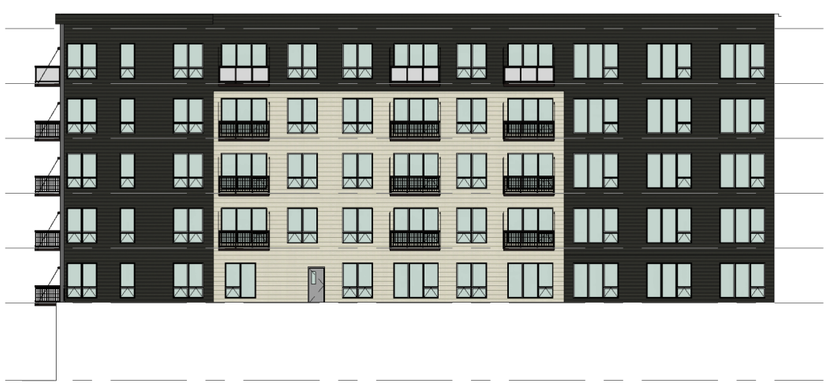
ELEVATIONS - COURTYARD

NORTH COURTYARD (LOOKING NORTH)
1" = 30'-0"

NORTH COURTYARD (LOOKING WEST)
1" = 30'-0"

NORTH COURTYARD (LOOKING SOUTH)
1" = 30'-0"



SOUTH COURTYARD (LOOKING NORTH)
1" = 30'-0"

SOUTH COURTYARD (LOOKING EAST)
1" = 30'-0"

SOUTH COURTYARD (LOOKING SOUTH)
1" = 30'-0"

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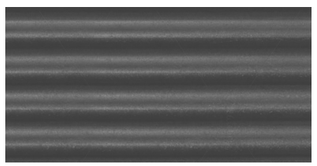
EXTERIOR MATERIALS

GL1 - LOW-E GLASS
Vendor/Supplier: Vitro or similar
Model: SN 68, Insulated, Low-E coating
Color: Starphire
Use: All glass

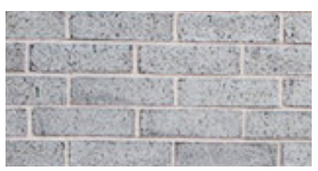
CP1 - Composite Panel
Vendor/Supplier: James Hardie
Model: Hardie Plank Lap Siding Colonial Smooth
Color: White
Use: Field Material



CMP1 - CORRUGATED PANEL
Vendor/Supplier: Metal Sales or Similar
Model: 1/25" corrugated or Similar
Color: Charcoal
Use: Field Material

EXPOSED FASTENERS - PUT IN LIST

BR1 - BRICK
Vendor/Supplier: Glen-Gery or similar
Model: Facebrick
Color: Ebonite Velour - Black (with dark mortar)
Use: Podium Material



BR2 - BRICK
Vendor/Supplier: Glen-Gery or similar
Model: Facebrick
Color: Light Gray (with light mortar)
Use: Podium Material

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PERSPECTIVE - FROM NE

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PERSPECTIVE - FROM SE

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PERSPECTIVES - ROOF DECK

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PERSPECTIVES - NE AERIAL

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PERSPECTIVES - STREET LEVEL

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PERSPECTIVE - NORTH RESIDENTIAL ENTRY

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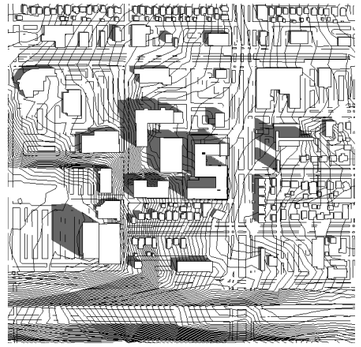
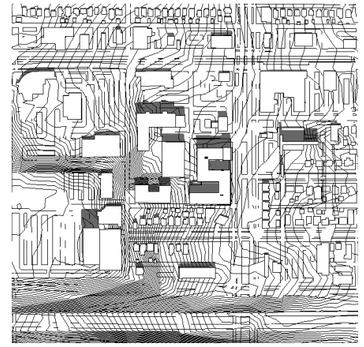
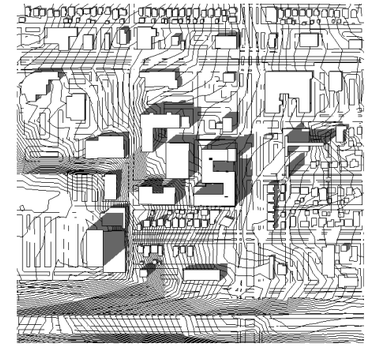
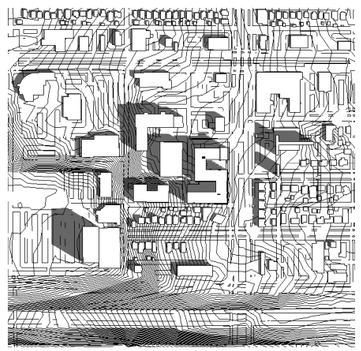
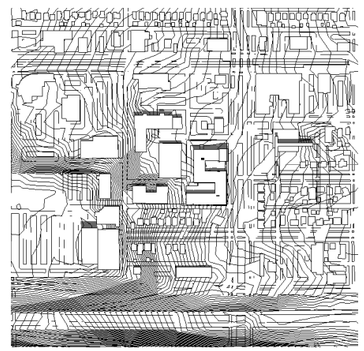
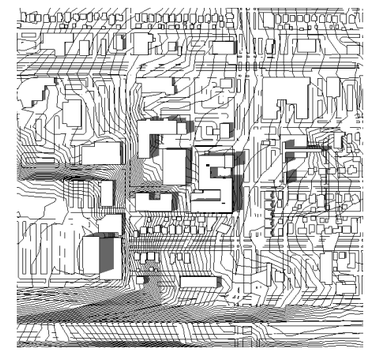
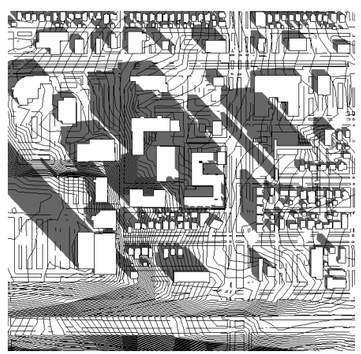
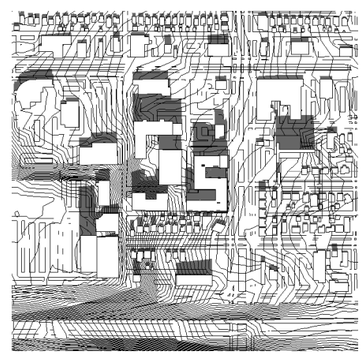
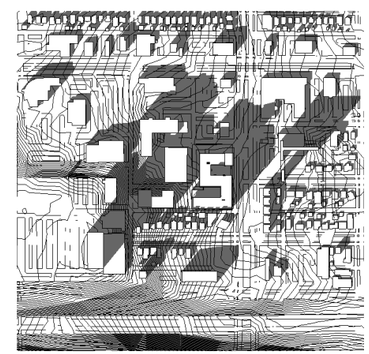
SHADOW STUDY

	9:00 AM	12:00 PM	3:00 PM
SPRING/FALL EQUINOX MARCH 21	 *MARCH 21 AT 9:00 AM*	 *MARCH 21 AT 12:00 PM*	 *MARCH 21 AT 3:00 PM*
SUMMER SOLSTICE JUNE 21	 *JUNE 21 AT 9:00 AM*	 *JUNE 21 AT 12:00 PM*	 *JUNE 21 AT 3:00 PM*
WINTER SOLSTICE DECEMBER 22	 *DECEMBER 22 AT 9:00 AM*	 *DECEMBER 22 AT 12:00 PM*	 *DECEMBER 22 AT 3:00 PM*

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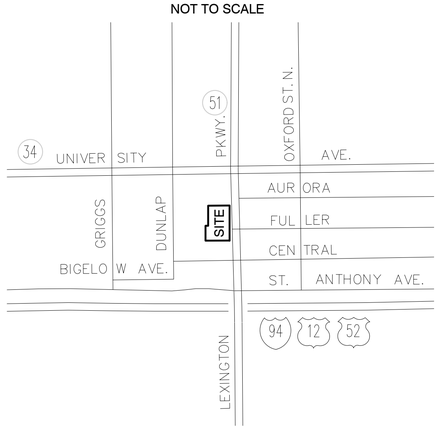
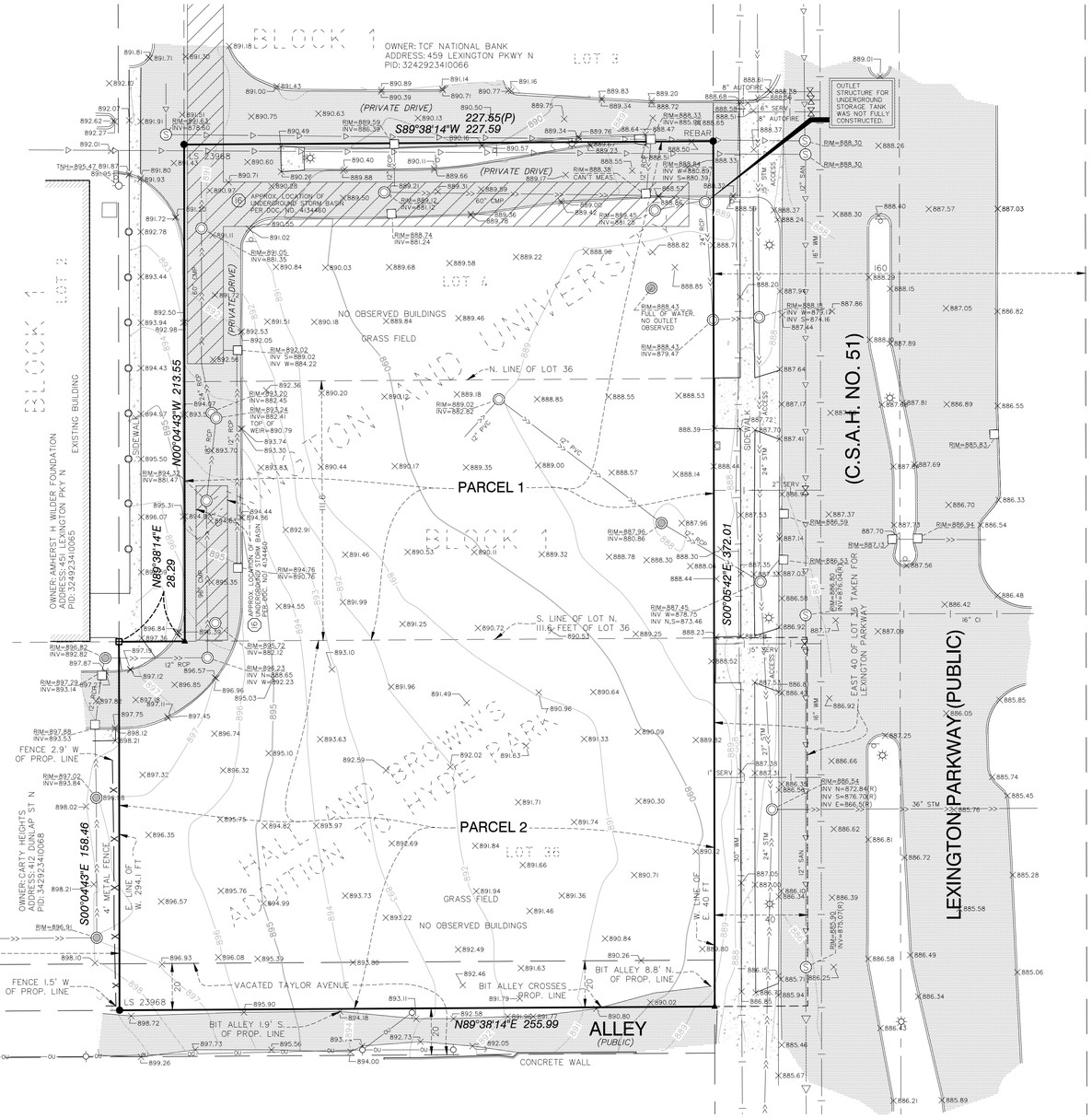
LEGEND

- FOUND IRON MONUMENT
- FOUND SCRIBED 'X'
- FOUND NAIL
- SET IRON MONUMENT 18425
- HYDRANT
- WATER VALVE
- WATER MANHOLE
- SANITARY MANHOLE
- CATCH BASIN
- ELECTRIC BOX
- LIGHT
- STORM MANHOLE
- POWER POLE
- BOLLARD
- SPOT ELEVATION
- SIGN
- GUY WIRE
- CABLE BOX
- UNKNOWN MANHOLE
- (P) PLATTED DISTANCE
- (R) PER RECORD/AS-BUILT PLAN
- GAS
- SANITARY SEWER
- STORM SEWER
- WATERMAIN
- OVERHEAD UTILITY
- FENCE
- CONCRETE
- BITUMINOUS
- WALL
- APPROX. LOCATION OF UNDERGROUND STORM BASIN

VICINITY MAP

NOT TO SCALE





PROPERTY DESCRIPTION

Parcel 1:

Lot 4, Block 1, Lexington and University, according to the plat thereof, Ramsey County, Minnesota.

Abstract Property

Parcel 2:

Lot 36, except the North 111.6 feet thereof, also except the West 294.01 feet thereof, also except the East 40 feet thereof taken for Lexington Parkway, Hall and Brown's Addition to Hyde Park, according to the recorded plat thereof, and situate in Ramsey County, Minnesota, together with that part of the North Half of vacated Taylor Avenue lying between the Southerly extensions of the East line of the West 294.1 feet and the West line of the East 40 feet of said Lot 36.

Ramsey County, Minnesota
Abstract Property

CERTIFICATION

To Alatus Development LLC, A Minnesota limited liability company, Commercial Partners Title, LLC, and Old Republic National Title Insurance Company:

This is to Certify that this map or plat and the survey on which it is based were made in accordance with the 2016 Minimum Standard Detail Requirements for ALTA Land Title Surveys, jointly established and adopted by ALTA and includes Items 1-5, 6(a), 7(a), 7(b)(1), 7(c), 8, 9, 10, 11,13, 14, 16, 17, 19 and 20 of Table A thereof. The fieldwork was completed on June 14, 2019.

Date of Plat or Map: July 3, 2019

REVIEW COPY

Dennis B. Olmstead, Professional Land Surveyor
Minnesota License No. 18425

NOTES

1. This survey and the property description shown here on are based upon information found in the commitment for title insurance prepared by Commercial Partners Title, LLC as agent for Old Republic National Title Insurance Company, file no. 55478, First Supplemental, dated March 26, 2019.

2. The locations of underground utilities are depicted based on Gopher State One Call, available city maps, records and field locations and may not be exact. Verify critical utilities prior to construction or design.

3. The basis of bearings is assumed.

4. All distances are in feet.

5. The area of the above described property is 89,168 square feet or 2.047 acres.

6. There are 0 regular striped parking stalls and 0 handicapped parking stalls.

7. The property lies within Zone X (unshaded - areas determined to be outside the 0.2% annual chance floodplain) of Federal Emergency Management Agency (FEMA) Flood Insurance Community Panel No. 27123C0085G, effective June 4, 2010.

8. At time of field work, site was being used as a snow storage area approximately 15 feet in height. We were not able to survey the ground surface in this area.

9. Names of adjoining owners are depicted based on Ramsey County GIS tax information.

10. No party walls identified during survey.

11. Per City of Saint Paul Capital Improvements plan, no proposed evidence of proposed street right of way lines are evident.

12. Survey related exceptions set forth in Schedule B, Section Two of the Title Commitment:

Item no. 14 - Terms, conditions, easements, restrictions and obligations created in Reciprocal Easement Agreement dated December 28, 2004, filed December 30, 2004, as Document No. 3820140. Access and stormwater easements are blanket affecting Parcel 1. Subject property also has access and drainage rights to the ALDI property to the north. Location of parking and utility easements could not be determined.

Item no. 15 - Terms, conditions, easements, covenants and obligations created in Lexington Park Reciprocal Easement Agreement dated April 18, 2006, filed April 18, 2006, as Document No. 3953818. Access easements are depicted graphically in the document over the existing drives as shown on the survey along the north and west lines of the property. Appears to provide access rights to subject property to Dunlap St. to the west and University Ave to the north.

Item no. 16 - Terms, conditions, easements and obligations of Access and Parking Easement Agreement dated December 17, 2008, filed January 6, 2009, as Document No. 4134460. Access easements are depicted graphically in the document over the existing drive as shown on the survey along the north line of the property.

Certificate of Completion dated June 9, 2009, filed September 4, 2009, as Document No. 4180438.
(Regarding Section 6 of the above mentioned agreement)

7-03-19: Revised per site visit and zoning letter
4-30-2019: Revised per First Supplemental Commitment
2-26-2019: Review copy issued

ZONING

The following zoning information is based on a zoning letter from the City of St. Paul to Commercial Partners Title, LLC, dated June 27, 2019.

Classification: T4 - traditional neighborhood district

Setbacks:
Front: information not provided
Side: information not provided
Rear: information not provided

Max. Height: information not provided

Floor Space Area: information not provided

Parking: no minimum parking requirements

POSSIBLE ENCROACHMENTS

1. Bituminous pavement extends onto the property from the adjoining alley to the south, as shown on the survey.

BENCHMARKS

Benchmark 1: Saint Paul benchmark 0004036 is a TNH on the NE corner of Saint Anthony Ave and Lexington Parkway N and has an elevation of 892.67 feet (NGVD29),

Benchmark 2: Local benchmark is a TNH located 33 feet SW of the NW corner of Lot 4 Block 1 of Lexington and University and 12 ft E of the NE corner of the parking garage located of Lot 2 Block 1 of Lexington and University and has an elevation of 895.47 feet (NGVD29).

N

0 15 30 60
SCALE IN FEET

ALLIANT ENGINEERING
733 Marquette Ave, Ste 700
Minneapolis, MN 55402
612.758.3080 MAIN
612.758.3099 FAX
www.alliant-inc.com

ALTA/NSPS LAND TITLE SURVEY

ALATUS/LEXINGTON
411-417 Lexington Parkway North
ST PAUL, MINNESOTA

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CITY OF ST. PAUL NOTES

1. SIGNING: SIGNS REGULATING PARKING AND/OR TRAFFIC ON PRIVATE PROPERTY (OUTSIDE OF THE PUBLIC RIGHT-OF-WAY "ROW') SHALL BE FURNISHED AND INSTALLED BY THE PROPERTY OWNER OR CONTRACTOR AT NO COST TO THE CITY OF ST. PAUL DEPARTMENT OF PUBLIC WORKS.
   REMOVAL OF EXISTING SIGNS WITHIN THE PUBLIC ROW THAT REGULATE TRAFFIC AND OR PARKING SHALL BE COMPLETED BY THE CITY AT THE EXPENSE OF THE DEVELOPMENT. NEW SIGNS OR THE REINSTALLATION OF EXISTING SIGNS, AS APPROVED BY PUBLIC WORKS TRAFFIC ENGINEERING, REGULATING PARKING AND/OR TRAFFIC IN THE PUBLIC ROW SHALL BE FURNISHED AND INSTALLED BY THE CITY AT THE EXPENSE OF THE DEVELOPMENT. ALL EQUIPMENT, MATERIALS, AND LABOR COSTS ASSOCIATED WITH THE CITY AFFECTING A COMPLETE SIGN INSTALLATION SHALL BE THE RESPONSIBILITY OF THE DEVELOPMENT. CONTACT CHRIS GULDEN OF PUBLIC WORKS 651-266-9778 TWO WEEKS IN ADVANCE OF NEEDED SIGN WORK.
2. THE CONTRACTOR SHALL CONTACT MIKE LUSIAN, SUPERVISOR, LIGHTING - SIGNAL MAINTENANCE (651-266-9780) FOR THE ADDITION OF STREET LIGHTING OR IN THE EVENT OF DAMAGE TO THE LIGHTING OR SIGNAL UTILITIES. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY (AND RELATED COSTS) FOR ANY DAMAGE OR RELOCATIONS.
3. CARE MUST BE TAKEN DURING CONSTRUCTION AND EXCAVATION TO PROTECT ANY SURVEY MONUMENTS AND/OR PROPERTY IRONS. CALL SAM GIBSON OF PUBLIC WORKS SURVEYING (651-266-6075) IF YOU HAVE ANY QUESTIONS
4. PIPE WORK INSIDE PROPERTY TO BE PERFORMED BY A PLUMBER LICENSED BY THE STATE OF MINNESOTA AND CERTIFIED BY THE CITY OF SAINT PAUL. PIPE WORK WITHIN THE PUBLIC RIGHT OF WAY TO BE PERFORMED BY SPRWS.
5. ABANDONING EXISTING SEWER SERVICE OR MAKING NEW CONNECTIONS TO CITY SEWER MUST BE DONE TO CITY STANDARDS BY A LICENSED HOUSE DRAIN CONTRACTOR UNDER A PERMIT FROM PUBLIC WORKS SEWER SECTION (651-266-6234).
6. INSPECTION CONTACT: THE DEVELOPER SHALL CONTACT THE RIGHT OF WAY INSPECTOR, JENNIFER ZIEMER AT 651-485-4263(ONE WEEK PRIOR TO BEGINNING WORK) TO DISCUSS TRAFFIC CONTROL, PEDESTRIAN SAFETY AND COORDINATION OF ALL WORK IN THE PUBLIC RIGHT OF WAY. NOTE: IF ONE WEEK NOTICE IS NOT PROVIDED TO THE CITY, ANY RESULTING DELAYS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. AS PART OF THE ROW PERMITTING PROCESS, TWO WEEKS BEFORE ANY WORK BEGINS THAT IMPACTS THE ROW IN ANY WAY THE DEVELOPER SHALL PROVIDE TO THE ROW INSPECTOR THE NAME AND CONTACT INFORMATION OF THE CONSTRUCTION PROJECT MANAGER OR CONSTRUCTION PROJECT SUPERINTENDENT. IF THIS INFORMATION IS NOT PROVIDED THERE MAY BE A DELAY IN OBTAINING PERMITS FOR THE WORK IN THE ROW. SAID DELAYS WILL BE THE SOLE RESPONSIBILITY OF THE DEVELOPER.
7. SAFE WORK SITE REQUIREMENTS: THE CONTRACTOR SHALL PROVIDE A CONTINUOUS, ACCESSIBLE AND SAFE PEDESTRIAN WALKWAY THAT MEETS ADA AND MN MUTCD STANDARDS IF WORKING IN A SIDEWALK AREA, AND TRAFFIC CONTROL PER MN MUTCD REQUIREMENTS FOR WORK IN THE PUBLIC RIGHT OF WAY.
8. NO PRIVATE FACILITIES IN THE RIGHT OF WAY: THE DEVELOPER IS STRICTLY PROHIBITED FROM INSTALLING PRIVATE ELECTRICAL WIRING, CONDUIT, RECEPTACLES AND/OR LIGHTING IN THE CITY'S RIGHT OF WAY. THIS INCLUDES STUBBING CONDUIT OR CABLE INTO THE PUBLIC RIGHT OF WAY TO ACCOMMODATE UTILITY FEEDS TO THE SITE. COORDINATE WITH EACH UTILITY PRIOR TO CONSTRUCTION TO DETERMINE FEED POINTS INTO THE PROPERTY. UTILITIES ARE RESPONSIBLE FOR SECURING EXCAVATION PERMITS TO RUN THEIR SERVICE INTO A SITE, AND (WHERE REQUIRED) SUBMITTING PLANS FOR REVIEW BY THE PUBLIC WORKS UTILITY REVIEW COMMITTEE. THE CONTRACTOR SHALL CONTACT MIKE LUSIAN, GENERAL FOREMAN, LIGHTING - SIGNAL MAINTENANCE, (651-266-9780), IF REMOVAL OR RELOCATION OF EXISTING FACILITIES IS REQUIRED OR IN THE EVENT OF DAMAGE TO THE LIGHTING OR SIGNAL UTILITIES. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY (AND RELATED COSTS) FOR ANY DAMAGE OR RELOCATIONS.
9. ACCESS TO SIGNAL CONTROLLER AND LIGHTING CABINETS MUST BE MAINTAINED AT ALL TIMES. IF FENCING IS REQUIRED FOR A JOB SITE, A KEY OR OTHER MEANS OF ACCESS MUST BE PROVIDED TO THE CITY OF ST. PAUL'S TRAFFIC OPERATIONS DEPARTMENT. CONTACT MIKE LUSIAN, SUPERVISOR SIGNALS AND LIGHTING AT 651.266.9780 FOR MORE INFORMATION.
10. AN OBSTRUCTION PERMIT MUST BE OBTAINED FROM PUBLIC WORKS (651-266-6151) IF THERE WILL BE ANY EXCAVATION IN CITY R.O.W. OR IF TRUCKS/EQUIPMENT WILL BE DRIVING OVER CURBS OR IF CONSTRUCTION WILL BLOCK CITY STREETS, OR SIDEWALKS.
11. CONSTRUCTION MATERIALS AND EQUIPMENT SHALL NOT BE STORED ON THE PUBLIC BOULEVARD. CONSTRUCTION EQUIPMENT AND VEHICLES SHALL NOT BE OPERATED OR PARKED ON TURF BOULEVARDS.
12. STRIPING: ROADWAY STRIPING IMPACTED BY THE WORK ZONE SHALL BE REPLACED IN-KIND AT NO COST TO THE CITY. IF THERE ARE QUESTIONS AS TO THE TYPE OF MATERIAL TO BE USED, CONTACT CHRIS GULDEN (651.266.9778) IN THE CITY'S' TRAFFIC OPERATIONS SECTION. STRIPING RESTORATION SHALL BE COMPLETED IMMEDIATELY FOLLOWING FINAL PAVEMENT RESTORATION. IF THERE IS A DESIRE FOR THE CITY OF ST. PAUL PUBLIC WORKS DEPARTMENT TO COMPLETE PAVEMENT MARKING RESTORATION WORK, CONTACT CHRIS GULDEN OF PUBLIC WORKS TRAFFIC OPERATIONS FOR AN ESTIMATE. AT A MINIMUM, TWO WEEK'S ADVANCE NOTICE SHALL BE PROVIDED TO CHRIS GULDEN FOR ANY STRIPING WORK. IF ADVANCE NOTICE IS NOT PROVIDED, ANY ASSOCIATED PROJECT DELAYS, AND COSTS INCURRED RESULTING FROM SAID DELAYS, SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
13. THE REMOVAL, PRUNING AND/OR PLANTING OF TREES ON THE PUBLIC BOULEVARD REQUIRES A PERMIT FROM THE CITY FORESTER (651-632-5129).
14. ENCROACHMENTS: PER CHAPTER 134 OF THE LEGISLATIVE CODE, NO PERSON SHALL CONSTRUCT AND MAINTAIN ANY PROJECTION OR ENCROACHMENT WITHIN THE PUBLIC RIGHT-OF-WAY.CONSTRUCTION OF THE DEVELOPMENT THAT NECESSITATES TEMPORARY USE OF THE RIGHT-OF-WAY (ROW) FOR CONSTRUCTION PURPOSES SHALL BE LIMITED TO EQUIPMENT, PERSONNEL, DEVICES AND APPURTENANCES THAT ARE REMOVABLE FOLLOWING CONSTRUCTION. ENCROACHMENT PERMITS WILL NOT BE GRANTED FOR DEVICES SUCH AS TIE BACKS, ROCK BOLTS, H-PILES, LAGGING, TIMBERS, SHEET PILING, ETC. THAT THE OWNER IS SEEKING TO ABANDON IN THE ROW.SECTION 3201.3 OF THE MINNESOTA BUILDING CODE DEFERS FINAL AUTHORITY OF ENCROACHMENTS INTO PUBLIC RIGHTS-OF-WAY/PUBLIC PROPERTY TO THE LOCAL AUTHORITY. CITY LEGISLATIVE CODE GOVERNS MANAGEMENT OF THE PUBLIC RIGHTS-OF-WAY. PROVIDED SUCH INSTALLATIONS ARE APPROVED BY PUBLIC WORKS, FOOTINGS MAY BE ALLOWED TO ENCROACH INTO CITY ROW NO MORE THAN TWELVE (12) INCHES AT DEPTHS BELOW EIGHT (8) FEET AS PROVIDED FOR IN MINNESOTA BUILDING CODE SECTION 3202.1. SAID ENCROACHMENTS WOULD REQUIRE AN ENCROACHMENT PERMIT FROM THE CITY PER CHAPTER 134 OF THE LEGISLATIVE CODE. ENCROACHMENTS INSTALLED IN THE ROW WITHOUT AUTHORIZATION WILL BE REMOVED AT NO EXPENSE TO THE CITY/COUNTY/STATE.
15. CONSTRUCTION IN RIGHT OF WAY: ALL WORK ON CURBS, DRIVEWAYS, AND SIDEWALKS WITHIN THE PUBLIC RIGHT OF WAY MUST BE DONE TO CITY STANDARDS AND SPECIFICATIONS BY A LICENSED AND BONDED CONTRACTOR UNDER A PERMIT FROM PUBLIC WORKS SIDEWALK SECTION (651-266-6120). SIDEWALK GRADES MUST BE CARRIED ACROSS DRIVEWAYS.

DEMOLITION NOTES

1. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID PROPERTY DAMAGE TO ADJACENT PROPERTIES DURING THE CONSTRUCTION PHASE OF THIS PROJECT. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY DAMAGES TO ADJACENT PROPERTIES OCCURRING DURING THE CONSTRUCTION PHASE OF THIS PROJECT.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING TRAFFIC CONTROL DEVICES SUCH AS BARRICADES, WARNING SIGNS, DIRECTIONAL SIGNS, FLAGMEN AND LIGHTS TO CONTROL THE MOVEMENT OF TRAFFIC WHERE NECESSARY. PLACEMENT OF THESE DEVICES SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT. TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE APPROPRIATE MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARDS.
3. IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS ON THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING THE PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
4. THE DUTY OF THE ENGINEER OR THE DEVELOPER TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTORS PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTORS SAFETY MEASURES IN, OR NEAR THE CONSTRUCTION SITE.
5. CONTRACTOR IS RESPONSIBLE FOR DAMAGE TO THE MAININE SIDEWALK, CURB, DRIVE ACCESS AND BOULEVARD LANDSCAPING CAUSED DURING THE CONSTRUCTION. CONTRACTOR ADVISED TO DOCUMENT PRE-EXISTING CONDITION OF THE RIGHT OF WAY PRIOR TO COMMENCEMENT OF THE CONSTRUCTION.L
6. THE CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR VARIATIONS FROM THE PLANS.
7. MINNESOTA STATE STATUTE REQUIRES NOTIFICATION PER "GOPHER STATE ONE CALL" PRIOR TO COMMENCING ANY GRADING, EXCAVATION OR UNDERGROUND WORK.

CITY OF ST. PAUL NOTES

16. RIGHT OF WAY RESTORATION: RESTORATION OF ASPHALT AND CONCRETE PAVEMENTS ARE PERFORMED BY THE PUBLIC WORKS STREET MAINTENANCE DIVISION. THE CONTRACTOR IS RESPONSIBLE FOR PAYMENT TO THE CITY FOR THE COST OF THESE RESTORATIONS. THE CONTRACTOR SHALL CONTACT PUBLIC WORKS STREET MAINTENANCE TO SET UP A WORK ORDER PRIOR TO BEGINNING ANY REMOVALS IN THE STREET AT 651-266-9700. PROCEDURES AND UNIT COSTS ARE FOUND IN STREET MAINTENANCE'S "GENERAL REQUIREMENTS - ALL RESTORATIONS" AND ARE AVAILABLE AT THE PERMIT OFFICE.
17. ROADWAY RESTORATION: AS PER THE CITY'S "STANDARD SPECIFICATION FOR STREET OPENINGS" POLICY, RESTORATION ON ROADWAY SURFACES LESS THAN 5 YEARS OLD WILL REQUIRE FULL WIDTH MILL AND OVERLAY OR ADDITIONAL DEGRADATION FEES. DEGRADATION FEES ARE DETERMINED BY CONTACTING THE RIGHT OF WAY SERVICE DESK AT (651) 266-6151. PAVEMENT RESTORATION SHALL BE COMPLETED BY THE ST. PAUL PUBLIC WORKS STREET MAINTENANCE DIVISION. ALL RELATED COSTS ARE THE RESPONSIBILITY OF THE DEVELOPER/CONTRACTOR. CONTACT STREET MAINTENANCE AT (651) 266-9700 FOR ESTIMATE OF COSTS FOR PAVEMENT RESTORATION.
18. STREET SWEEPING: STREET SWEEPING IS AN IMPORTANT TEMPORARY EROSION CONTROL BEST MANAGEMENT PRACTICE AND SHALL BE PERFORMED WITH THE USE OF WATER. DRY SWEEPING IS PROHIBITED. ADDITIONALLY, TRUCKS HAULING IN AND OUT OF THE SITE, FOR ANY ACTIVITY INCLUDING BUT NOT NECESSARILY LIMITED TO PAVING, EXCAVATION, ETC., NEEDS TO ENSURE CLEAN OFF ALL MUD FLAPS TO AVOID ANY BUILDUP ON THE STREET PAVEMENT.
19. MISCELLANEOUS: ANY INFRASTRUCTURE DAMAGE RESULTING FROM THE CONTRACTORS ACTIVITIES, INCIDENTAL OR OTHERWISE, SHALL BE REPAIRED/REPLACED TO THE SATISFACTION OF THE CITY AT NO COST TO THE CITY.

SITE NOTES

1. ALL PAVING, CONCRETE CURB, GUTTER AND SIDEWALK SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN PER THE DETAIL SHEET(S) AND STATE/LOCAL JURISDICTION REQUIREMENTS.
2. ACCESSIBLE PARKING AND ACCESSIBLE ROUTES SHALL BE PROVIDED PER CURRENT ADA STANDARDS AND LOCAL/STATE REQUIREMENTS.
3. ALL CURB DIMENSIONS SHOWN ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
4. ALL BUILDING DIMENSIONS ARE TO THE OUTSIDE FACE OF WALL UNLESS OTHERWISE NOTED.
5. ALL CURB RADII SHALL BE 3.0' UNLESS OTHERWISE NOTED.
6. BITUMINOUS IMPREGNATED FIBER BOARD TO BE PLACED AT FULL DEPTH OF CONCRETE ADJACENT TO EXISTING STRUCTURES AND BEHIND CURB ADJACENT TO DRIVEWAYS AND SIDEWALKS.
7. SEE SITE ELECTRICAL PLAN FOR SITE LIGHTING.
8. PLEASE COORDINATE ANY NEEDED SHORT TERM LANE CLOSURES WITH METRO TRANSIT STREET OPERATIONS, GREG TUVESON (612-349-5407 / GREG.TUVESON@METROTRANSIT.ORG)
9. MINNESOTA STATE STATUTE REQUIRES NOTIFICATION PER "GOPHER STATE ONE CALL" PRIOR TO COMMENCING ANY GRADING, EXCAVATION OR UNDERGROUND WORK.
10. THE CONTRACTOR SHALL BE REQUIRED TO OBTAIN ALL PERMITS FROM THE CITY AS REQUIRED FOR ALL WORK WITH THE STREET AND PUBLIC RIGHT OF WAY.
11. A SIGNIFICANT PORTION OF SITE IMPROVEMENTS NOT SHOWN ON THIS SHEET ARE DESCRIBED AND PROVIDED IN FURTHER DETAIL ON THE ARCHITECTURAL AND LANDSCAPE PLANS. THIS INCLUDES LANDSCAPING, LIGHTING AND OTHER FIXTURES.
12. CONSTRUCTION NOTES:
    A. PEDESTRIAN RAMPS SHALL BE PROVIDED AT THE LOCATIONS SHOWN AND AS SHOWN PER THE LANDSCAPE SITE PLANS.
    B. THE CONTRACTOR SHALL SAW-CUT BITUMINOUS AND CONCRETE PAVEMENTS AS REQUIRED PER THE SPECIFICATIONS. REMOVE EXISTING CURB AND GUTTER AND INSTALL B618 CONCRETE CURB AND GUTTER.
13. THE INTENT OF THE PROPOSED CONSTRUCTION IS TO PRESERVE AS MUCH OF THE EXISTING STREET PAVEMENT AS POSSIBLE, AND TO MILL AND OVERLAY. REMOVED PAVEMENT AREAS AND PATCHING SHALL BE INSTALLED PER PAVEMENT SECTION PROVIDED PER DETAIL SHEET.
14. CONTRACTOR TO MAINTAIN ACCESS TO THE FIRE DEPARTMENT CONNECTION FOR FIRE DEPARTMENT PERSONNEL AT ALL TIMES DURING THE CONSTRUCTION PERIOD.

GRADING, DRAINAGE & EROSION CONTROL NOTES

1. SPOT ELEVATIONS REPRESENT FINISHED SURFACE GRADES, GUTTER/FLOW LINE, FACE OF BUILDING, OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
2. CATCH BASINS AND MANHOLES IN PAVED AREAS SHALL BE SUMPED 0.04 FEET. ALL CATCH BASINS IN GUTTERS SHALL BE SUMPED 0.16 FEET. RIM ELEVATIONS SHOWN ON PLANS DO NOT REFLECT SUMPED ELEVATIONS.
3. ALL DISTURBED UNPAVED AREAS ARE TO RECEIVE MINIMUM OF 4 INCHES OF TOP SOIL AND SEED/MULCH OR SOD. THESE AREAS SHALL BE WATERED/MAINTAINED BY THE CONTRACTOR UNTIL VEGETATION IS ESTABLISHED.
4. FOR SITE RETAINING WALLS "TW" EQUALS SURFACE GRADE AT TOP FACE OF WALL (NOT TOP OF WALL), "GW" EQUALS SURFACE GRADE AT BOTTOM FACE OF WALL (NOT BOTTOM OF BURIED WALL COURSES).
5. STREETS MUST BE CLEANED AND SWEPT WHENEVER TRACKING OF SEDIMENTS OCCURS AND BEFORE SITES ARE LEFT IDLE FOR WEEKENDS AND HOLIDAYS. A REGULAR SWEEPING SCHEDULE MUST BE ESTABLISHED.
6. DUST MUST BE ADEQUATELY CONTROLLED.
7. SEE SWPPP FOR ADDITIONAL EROSION CONTROL NOTES AND REQUIREMENTS.
8. SEE UTILITY PLANS FOR WATER, STORM AND SANITARY SEWER INFORMATION.
9. SEE SITE PLAN FOR CURB AND BITUMINOUS TAPER LOCATIONS.
10. SEE LANDSCAPE PLAN FOR FINAL SITE STABILIZATION.

CITY OF ST. PAUL PERMIT REQUIREMENTS

1. ORDERING OBSTRUCTION AND EXCAVATION PERMITS: CONTACT PUBLIC WORKS RIGHT OF WAY SERVICE DESK AT (651) 266-6151. IT IS STRONGLY RECOMMENDED THAT CONTRACTORS CALL FOR COST ESTIMATES PRIOR TO BIDDING TO OBTAIN ACCURATE COST ESTIMATES.
2. OBSTRUCTION PERMITS: THE CONTRACTOR MUST OBTAIN AN OBSTRUCTION PERMIT IF CONSTRUCTION (INCLUDING SILT FENCES) WILL BLOCK CITY STREETS, SIDEWALKS OR ALLEYS, OR IF DRIVING OVER CURBS.
3. EXCAVATION PERMITS: ALL DIGGING IN THE PUBLIC RIGHT OF WAY REQUIRES AN EXCAVATION PERMIT. IF THE PROPOSED BUILDING IS CLOSE TO THE RIGHT OF WAY, AND EXCAVATING INTO THE RIGHT OF WAY IS NEEDED TO FACILITATE CONSTRUCTION, CONTACT THE UTILITY INSPECTOR.
4. FAILURE TO SECURE PERMITS: FAILURE TO SECURE OBSTRUCTION PERMITS OR EXCAVATION PERMITS WILL RESULT IN A DOUBLE-PERMIT FEE AND OTHER FEES REQUIRED UNDER CITY OF ST. PAUL LEGISLATIVE CODES.
5. REQUIREMENTS TO WORK IN THE PUBLIC RIGHT OF WAY: ALL UTILITIES AND CONTRACTORS WORKING IN THE PUBLIC RIGHT OF WAY MUST TO BE REGISTERED, INSURED AND BONDED, AS RECOGNIZED BY THE PUBLIC WORKS SERVICE DESK. (651-266-6151)
6. SEWER REPAIR PERMIT: PLUMBING CONTRACTOR TO OBTAIN "REPAIR PERMITS" FROM PUBLIC WORKS FOR PROPOSED MODIFICATION TO THE EXISTING STORM SEWER CONNECTIONS. CALL ST PAUL PW PERMIT DESK (651-266-6234) FOR INFORMATION ON OBTAINING THIS PERMIT.
7. SEWER REMOVAL/ABANDONMENT PERMIT: PLUMBING CONTRACTOR TO OBTAIN "REMOVAL PERMITS" FROM PUBLIC WORKS TO CUT OFF EXISTING SEWER CONNECTIONS SERVICES TO THE PROPERTY. CALL ST PAUL PW PERMIT DESK (651-266-6234) FOR INFORMATION ON OBTAINING THIS PERMIT.
8. SEWER CONNECTION PERMIT: LICENSE HOUSE DRAIN CONTRACTOR TO OBTAIN (SEWER CONNECTION PERMIT) TO CONSTRUCT NEW SANITARY AND STORM CONNECTION IN STREET FROM MAIN TO THE PROPERTY. CALL ST PAUL PW PERMIT DESK (651-266-6234) FOR INFORMATION ON OBTAINING THIS PERMIT.

CITY OF ST. PAUL FORESTRY NOTES

1. THE REMOVAL, PRUNING, AND/OR PLANTING OF TREES ON THE PUBLIC BOULEVARD REQUIRES AN APPROVED PERMIT FROM THE CITY FORESTER (651-632-2437). ANY WORK MUST BE COMPLETED BY A LICENSED TREE CONTRACTOR.
2. CONSTRUCTION SUPPLIES, MATERIALS, SPOILS, EQUIPMENT, AND VEHICLES SHALL NOT BE STORED OR OPERATED WITHIN THE DRIP LINE OF ANY PUBLIC STREET TREE OR ON TURF BOULEVARDS WITHOUT PRIOR WRITTEN APPROVAL FROM THE CITY FORESTER. IF THE BOULEVARD MUST BE USED FOR CONSTRUCTION ACTIVITIES, SITE ACCESS ROUTES, MATERIAL STORAGE OR OTHER RELATED ACTIVITIES, PROTECTIVE MEASURES APPROVED BY THE CITY FORESTER SHALL BE TAKEN TO REDUCE SOIL COMPACTION AND PROTECT TREE(S) FROM DAMAGE.
3. STREET TREES SHALL BE PROTECTED BY ESTABLISHING A TREE PROTECTION ZONE USING 4' TALL FENCING INSTALLED AT THE DRIP LINE OF THE TREE. TREE PROTECTION FENCING SHALL BE INSTALLED PRIOR TO THE START OF ANY SITE WORK AND MAINTAINED FOR THE DURATION OF THE PROJECT. PROPOSED WORK WITHIN, OR CHANGES TO THE LOCATION OF TREE PROTECTION FENCING SHALL BE REVIEWED BY THE CITY FORESTER PRIOR TO ALTERATION.
4. THE LOCATION OF TREE PROTECTION FENCES SHALL BE SHOWN ON THE PLAN.
5. A TREE PROTECTION FENCE DETAIL SHALL BE INCLUDED IN THE PLAN SET (SEE ATTACHED).
6. CONTRACTOR SHALL CONTACT THE CITY FORESTER (651-632-2437), PRIOR TO DEMOLITION OR OTHER LAND DISTURBANCE ASSOCIATED WITH SITE CONSTRUCTION, TO VERIFY TREE PROTECTION MEASURES.
7. TREE PLANTING DETAILS SHALL INCLUDE THE FOLLOWING:
8. EXPOSE ROOT FLARE AND SET AT GRADE.
9. REMOVE BURLAP AND ROPES FROM TOP 1/3RD OF ROOT BALL, CUT WIRE BASKET DOWN TO SECOND HORIZONTAL WIRE FROM THE BOTTOM, AND DISPOSE OF OFF-SITE.
10. CONTRACTOR IS RESPONSIBLE TO MAINTAIN TREES IN A PLUMB POSITION THROUGHOUT THE MAINTENANCE PERIOD.
11. AN AS-BUILT SHEET SHOWING THE LOCATION AND FINAL CONSTRUCTION DETAIL OF THE TREE TRENCHES WILL NEED TO BE PROVIDED TO CITY FORESTER.
12. WHERE DRIVEWAYS, SIDEWALKS OR OTHER SURFACE PAVING ARE REMOVED, ALL CONCRETE, ASPHALT, AND BASE MATERIALS SHALL BE REMOVED.
13. BOULEVARD SOILS ARE TO BE PROTECTED DURING CONSTRUCTION. SOIL COMPACTION DUT TO CONSTRUCTION ACTIVITIES SHALL BE MITIGATED AND SUBSOILS LOOSENED PRIOR TO FINAL GRADING.
14. BOULEVARDS SHALL BE RESTORED WITH A MINIMUM OF 6" OF TOPSOIL.

UTILITY PLAN NOTES

1. ALL SANITARY SEWER, STORM SEWER AND WATERMAIN UTILITIES SHALL BE FURNISHED AND INSTALLED PER THE REQUIREMENTS OF THE SPECIFICATIONS, THE CITY AND THE STANDARD UTILITIES SPECIFICATION OF THE CITY ENGINEERS ASSOCIATION OF MINNESOTA (CEAM), 1999 EDITION.
2. SEE DETAIL SHEET AND THE CONTRACT SPECIFICATIONS FOR SPECIFIC UTILITY DETAILS.
3. ALL CONNECTIONS TO EXISTING UTILITIES SHALL BE PERFORMED PER THE REQUIREMENTS OF THE CITY. THE CITY DEPARTMENT OF ENGINEERING AND BUILDING INSPECTIONS DEPARTMENT AND THE CONSTRUCTION ENGINEER MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO ANY WORK WITHIN THE PUBLIC RIGHT OF WAY, OR WORK IMPACTING PUBLIC UTILITIES.
4. THE CONTRACTOR SHALL NOTIFY GOPHER STATE ONE CALL AT 651-454-0002 AT LEAST 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION OR UNDERGROUND WORK.
5. THE CONTRACTOR SHALL FIELD ADJUST WATERMAIN TO AVOID CONFLICTS WITH SANITARY SEWER, STORM SEWER, AND SERVICES AS REQUIRED.
6. ALL STREET REPAIRS AND PATCHING SHALL BE PERFORMED PER THE REQUIREMENTS OF THE CITY. ALL TRAFFIC CONTROL SHALL BE PROVIDED BY THE CONTRACTOR AND SHALL BE ESTABLISHED PER THE REQUIREMENTS OF THE MINNESOTA MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD) AND THE CITY. THIS SHALL INCLUDE ALL SIGNAGE, BARRICADES, FLASHERS AND FLAGGERS AS NEEDED. ALL PUBLIC STREETS SHALL BE OPEN TO TRAFFIC AT ALL TIMES. NO ROAD CLOSURES SHALL BE PERMITTED WITHOUT THE EXPRESSED AUTHORITY OF OF THE CITY.
7. ALL UTILITY PIPE BEDDING SHALL BE COMPACTED SAND OR FINE GRANULAR MATERIAL PER THE REQUIREMENTS OF THE CITY. ALL COMPACTION SHALL BE PERFORMED PER THE REQUIREMENTS OF THE CEAM SPECIFICATION.
8. ADJUST ALL EXISTING STRUCTURES, BOTH PUBLIC AND PRIVATE TO THE PROPOSED GRADES WHERE DISTURBED AND COMPLY WITH ALL REQUIREMENTS OF THE UTILITY OWNERS. STRUCTURES BEING RESET TO PAVED AREAS MUST MEET OWNERS REQUIREMENTS FOR TRAFFIC LOADING.
9. BUILDING FOUNDATION TO BE FLOOD PROOFED.
10. PIPES WITHIN TREE TRENCHES MUST HAVE TRACE WIRE.
11. CONTACT SAINT PAUL REGIONAL WATER SERVICES (SPRWS) FOR QUESTIONS, PERMITS, FEES, INSPECTIONS, SPECIFICATIONS, PLANS, OR INFORMATION THAT MAY BE REQUIRED FOR THE WATER SERVICE AND/OR THE WATER METER.
12. SANITARY AND/OR STORM SEWER SERVICE PASSING WITHIN 10 FEET OF THE BUILDING ARE GOVERNED BY THE MN PLUMBING CODE. SPECIFICATION FOR PIPE MATERIAL SELECTION AND NOTES FOR REQUIRED AIR TEST OF THE PIPING, COMPLIANT WITH MN STATE PLUMBING CODE 4714 SECTION 1109.0, MUST BE SHOWN ON THE PLAN. THIS SYSTEM MUST BE REVIEWED AND APPROVED BY RICK JACOBS, SENIOR PLUMBING INSPECTOR (651-266-9051) TO ENSURE THAT IT MEETS PLUMBING CODE STANDARDS.
13. CONTACT THE CITY OF SAINT PAUL DEPARTMENT OF PUBLIC WORKS SEWER DIVISION FOR QUESTIONS, PERMITS, FEES, INSPECTIONS, SPECIFICATIONS, PLANS, OR INFORMATION THAT MAY BE REQUIRED FOR SEWER AND STORM PIPING WORK PERFORMED OUTSIDE THE BUILDING, INCLUDING RETENTION SYSTEMS LOCATED OUTSIDE THE BUILDING.
14. ALL PRIMARY ROOF DRAINS SHALL BE CONNECTED TO THE STORM SEWER. MPC 4714.1101.1.
15. SECONDARY ROOF DRAINAGE SHALL DRAIN TO AN APPROVED PLACE OF DISPOSAL IN THE FORM OF SECONDARY ROOF DRAINS AND INSTALLED PER MPC 4714.1101 & 1102, AND MINNESOTA STATE BUILDING CODE 1503.4 1-5. SECONDARY ROOF DRAINAGE MUST DISCHARGE ONTO PERMEABLE SOILS AND CANNOT DRAIN ONTO THE SIDEWALK OR HARD SURFACE. MPC 4714.1101.1. MINNESOTA HAS SPECIFIC REQUIREMENTS TO ADDRESS SEASONAL CONDITIONS OF FREEZE AND THAW WHEN THE DISCHARGE FROM ROOF DRAINS COULD CREATE UNSAFE OR ICY CONDITIONS ON SIDEWALKS. IT IS SUGGESTED THAT A PROPER POINT OF DISCHARGE THAT CAN BE APPROVED BY THE AUTHORITY HAVING JURISDICTION FOR SECONDARY ROOF DRAINAGE IS IN THE FORM OF SECONDARY ROOF DRAINS PIPED INTERNALLY, DOWN TO WITHIN 18 INCHES OF GRADE, THROUGH THE OUTSIDE WALL, ONTO A SPLASH BLOCK INSTALLED PER MPC 1101.5.3, AND LAID OVER PERMEABLE SOILS OF AN ADEQUATE AMOUNT WHERE SATURATION OF THE SOIL WILL NOT OCCUR.
16. PROPOSED PIPE MATERIALS:

STORM SEWER	ALUMINZED CMP	48" DIAMETER
STORM SEWER	PVC SCH 40, CMP & RCP	12" DIAMETER
WATER SERVICE	DIP CLASS 53	4"-6" DIAMETER
	DIPE CLASS 52	8" DIAMETER
SANITARY SERVICE	PVC SDR 26	8" DIAMETER

17. IF PIPE INSTALLED HAS LESS THAN 2% SLOPE, LASER EQUIPMENT IS REQUIRED.
18. CONTRACTOR TO MAINTAIN ACCESS TO THE FIRE DEPARTMENT CONNECTION FOR FIRE DEPARTMENT PERSONNEL AT ALL TIMES DURING THE CONSTRUCTION PERIOD.

ST. PAUL REGIONAL WATER SERVICE NOTES

1. ALL WATER MAIN CONNECTIONS TO BE INSTALLED BY SAINT PAUL REGIONAL WATER SERVICES.
2. ALL PIPE WORK INSIDE OF PROPERTY TO BE PERFORMED BY A PLUMBER LICENSED BY THE STATE OF MINNESOTA AND CERTIFIED BY THE CITY OF SAINT PAUL. SPRWS REQUIRES SEPARATE OUTSIDE AND INSIDE PLUMBING PERMITS FOR EACH NEW WATER SERVICE.
3. MAINTAIN 3 FEET VERTICAL SEPARATION BETWEEN WATER AND SEWER PIPES OR A 12 INCH SEPARATION WITH 4 INCH HIGH DENSITY INSULATION PER SPRWS STANDARD PLATE D-10 FOR TYPICAL WATER MAIN OFFSETS.
4. APPLICATION, PAYMENT FOR NEW WATER SERVICE CONNECTION, BILLING INFORMATION AND PROJECT DATA SHEET TO BE PROVIDED TO SPRWS BEFORE CONSTRUCTION OF NEW WATER SERVICE CONNECTION.
5. WATER SERVICES TO BE INSTALLED ACCORDING TO SPRWS "STANDARDS FOR THE INSTALLATION OF WATER MAINS."
6. A FOUR-SIDED TRENCH BOX IS REQUIRED ON ALL EXCAVATIONS DEEPER THAN 5 FEET WHERE UNDERGROUND WORK OR INSPECTION IS TO BE PERFORMED BY SPRWS. FOR ALL WET TAPS TO BE PERFORMED BY SPRWS, A MINIMUM TRENCH BOX SIZE OF 8 FEET HIGH X 8 FEET WIDE X 10 FEET LONG IS REQUIRED. LADDERS ARE REQUIRED AND MUST EXTEND 3 FEET ABOVE THE SURFACE OF THE TRENCH. SIDEWALKS, PAVEMENTS, DUCTS AND APPURTENANT STRUCTURES SHALL NOT BE UNDERMINED UNLESS A SUPPORT SYSTEM OR ANOTHER METHOD OF PROTECTION IS PROVIDED. TRENCHES IN EXCESS OF 20 FEET IN DEPTH MUST BE SIGNED OFF BY A REGISTERED PROFESSIONAL ENGINEER. EXCAVATED MATERIAL MUST BE KEPT A MINIMUM OF 2 FEET FROM THE EDGE OF THE TRENCH.
7. MAINTAIN 8 FEET OF COVER OVER ALL WATER MAINS AND SERVICES.
8. PIPE MATERIAL FOR 8" DUCTILE IRON PIPE MUST BE CLASS 52, PIPE MATERIAL FOR 6" AND 4" DUCTILE IRON PIPE MUST BE CLASS 53. THE EXTERIOR OF DUCTILE IRON PIPE SHALL BE COATED WITH A LAYER OF ARC-SPRAYED ZINC PER ISO 8179. THE INTERIOR CEMENT MORTAR LINING SHALL BE APPLIED WITHOUT ASPHALT SEAL COAT.
9. PIPE MUST BE WRAPPED IN V-BIO POLYWRAP ENCASEMENT.
10. REFER TO SPRWS "STANDARDS FOR THE INSTALLATION OF WATER MAINS" STANDARD PLATE D-11 FOR RESTRAINED PIPE REQUIREMENT.
11. ALL WATER SERVICE VALVE BOXES WITHIN CONSTRUCTION AREA MUST BE EXPOSED AND BROUGHT TO GRADE UPON COMPLETION OF CONSTRUCTION.
12. ALL UNUSED EXISTING WATER SERVICES TO BE CUT OFF BY SPRWS. EXCAVATION AND RESTORATION BY OWNER'S CONTRACTOR. NEW WATER SERVICES WILL NOT BE TURNED ONUNTIL REQUIRED CUTOFFS HAVE BEEN REMOVED.
13. WATER FACILITY PIPEWORK WITHIN RIGHT OF WAY TO BE INSTALLED BY SPRWS. EXCAVATION AND RESTORATION BY OWNER'S CONTRACTOR. NEW WATER SERVICES WILL NOT BE TURNED ON UNTIL REQUIRED CUTOFFS HAVE BEEN PERFORMED.
14. THE CONTRACTOR PROVIDING EXCAVATION IS RESPONSIBLE FOR OBTAINING ALL EXCAVATION AND OBSTRUCTION PERMITS REQUIRED BY ANY GOVERNING AUTHORITY.
15. CONTRACTOR TO COORDINATE WITH SPRWS FOR WATER MAIN SHUTDOWNS.
16. CONTRACTOR WILL NOTIFY CUSTOMERS FOR NECESSARY SHUTDOWNS.
17. SERVICE CONNECTIONS SHALL BE INSTALLED WITH 8 FEET OF COVER AS PER ESTABLISHED GRADE FROM THE MAIN TO THE PROPERTY LINE OR, IF APPLICABLE, TO THE UTILITY EASEMENT LINE. WHEN SOLID ROCK CONDITIONS ARE ENCOUNTERED WATER SERVICES MAY BE INSTALLED WITH 6.5 FEET OF COVER. AT THIS DEPTH, THE NEED FOR INSULATION WILL BE DETERMINED BY SPRWS INSPECTORS.
18. ALL PIPE 2" AND SMALLER MUST BE TYPE K COPPER. ALL PIPE 4" AND LARGER MUST BE DUCTILE IRON.

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C8-1	CIVIL DETAILS
L1-1	LANDSCAPE PLAN
L1-2	LANDSCAPE NOTES

CIVIL NOTES

C0-1

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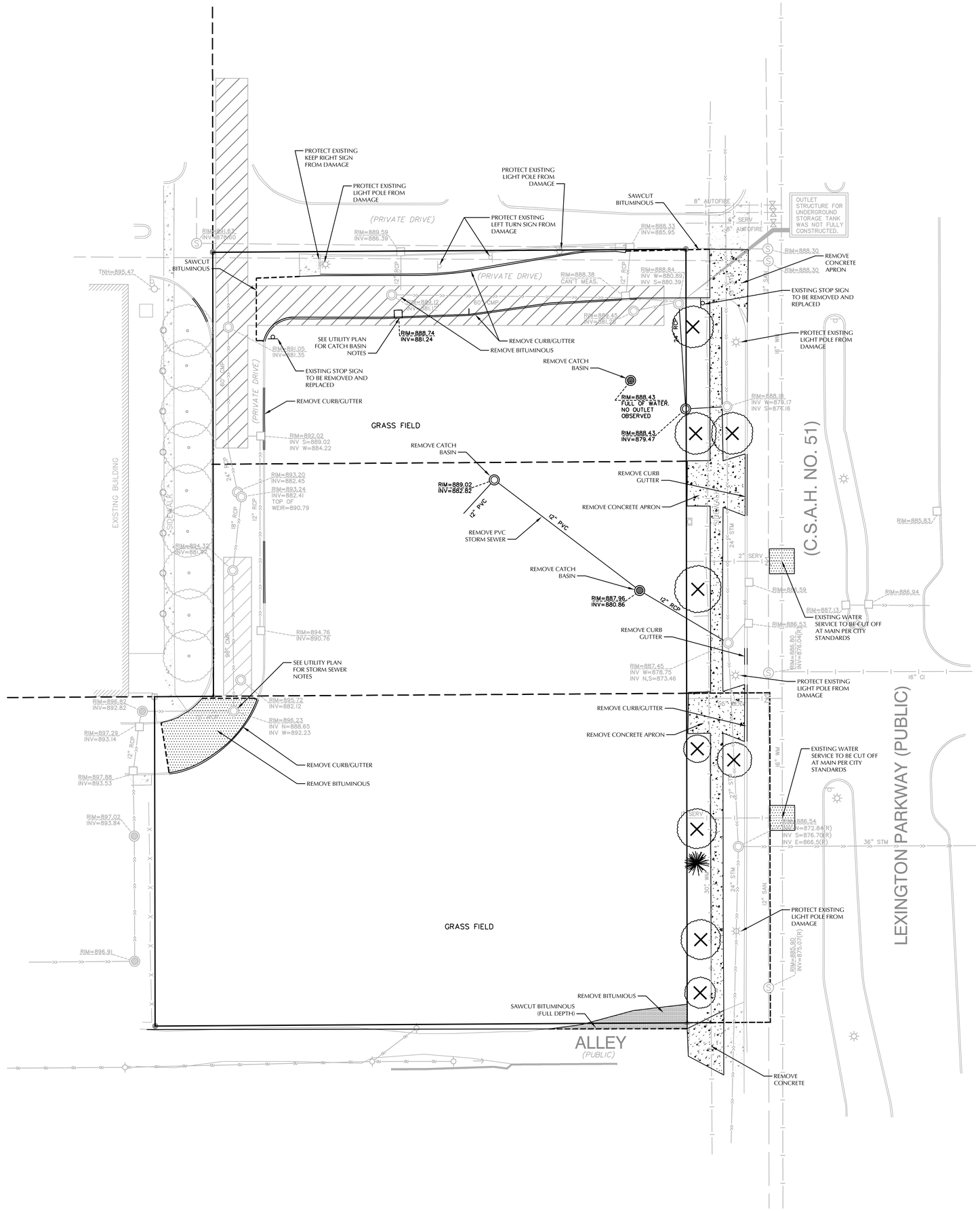

0 20 40
SCALE IN FEET

N

SURVEY LEGEND

AS	ASH		CATCH BASIN		STORM SEWER
EL	ELM		STORM MANHOLE		SANITARY SEWER
LO	LOCUST		SANITARY MANHOLE		WATERMAIN
SP	SPRUCE		HYDRANT	ELE	UNDERGROUND ELECTRIC
THSD	ELEV @ THRESHOLD		GATE VALVE	GAS	UNDERGROUND GAS
TC	TOP OF CURB		POWER POLE	OH	OVERHEAD UTILITY
CC	CURB CUT		LIGHT POLE	X	CHAIN LINK FENCE
TW	TOP OF WALL		GUY WIRE		GUARDRAIL
BW	BOTTOM OF WALL		SIGN		WALL
972.5	SPOT ELEVATION		ELECTRIC TRANSFORMER		CONCRETE CURB
( )	PER MAP / RECORD		HAND HOLE		CONCRETE
		RO	ROOF DRAIN	872	CONTOUR
		EO	ELECTRIC OUTLET		CONIFEROUS TREE
			FIRE CONNECTION		DECIDUOUS TREE
			GUARD POST		RESTRICTED ACCESS
			FLAG POLE		

DEMOLITION LEGEND:

- REMOVE EXISTING BITUMINOUS PAVING
- REMOVE EXISTING CONCRETE PAVING, SIDEWALKS, ETC.
- REMOVE EXISTING CURB & GUTTER, RETAINING WALLS, FENCE, ETC.
- REMOVE EXISTING TREES

DEMO NOTES

SEE SHEET C0-1 FOR NOTES.

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C4-1	UTILITY PLAN
C8-1	CIVIL DETAILS
L1-1	LANDSCAPE PLAN
L1-2	LANDSCAPE NOTES

DEMOLITION PLAN

C1-1

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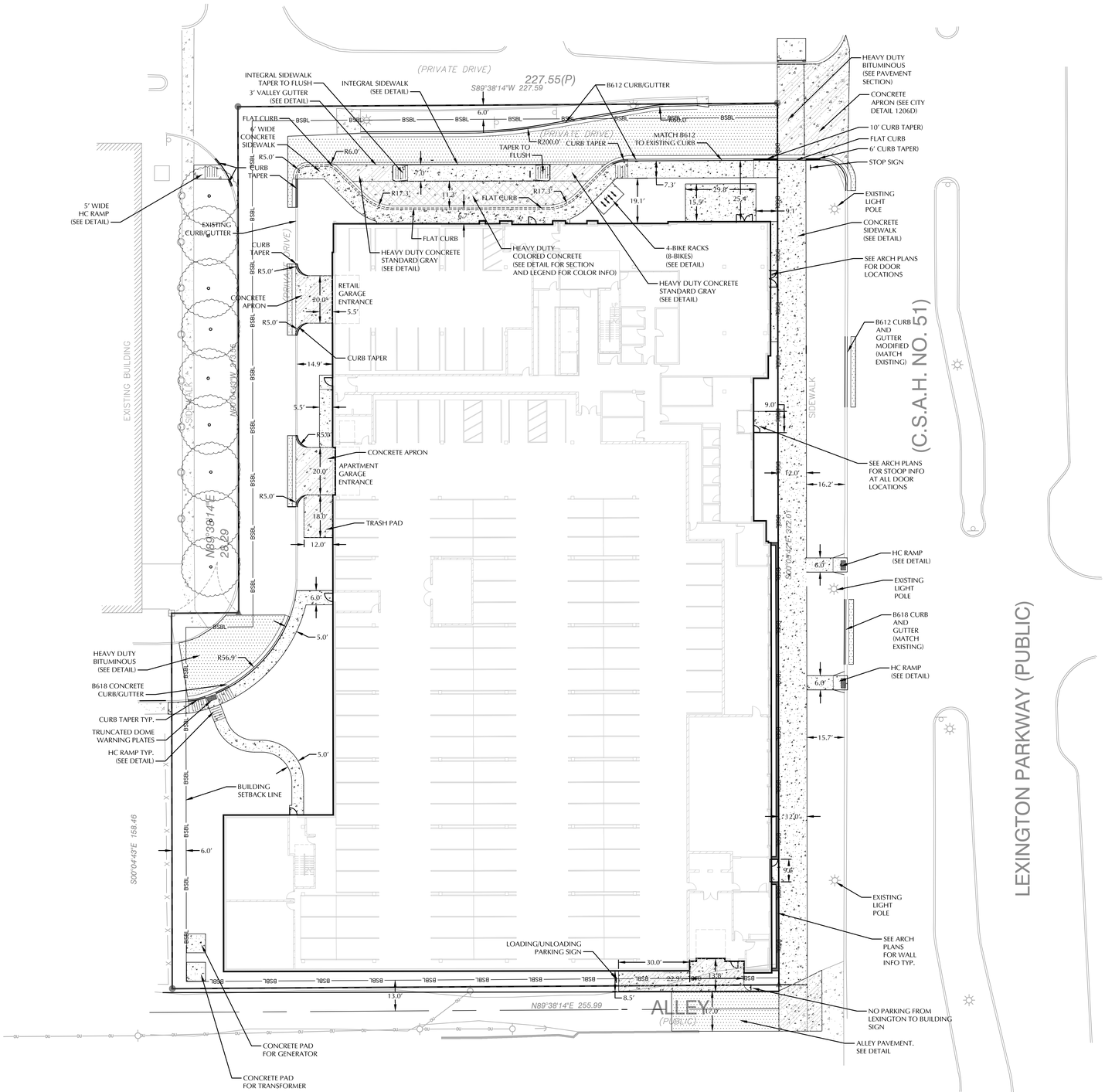

0 20 40
SCALE IN FEET

LEGEND

EXISTING		PROPOSED
	CATCH BASIN	
	STORM MANHOLE	
	FLARED END SECTION	
	SANITARY MANHOLE	
	HYDRANT	
	GATE VALVE	
	POST INDICATOR VALVE	PIV
	WATER MANHOLE / WELL	
	LIGHT POLE	
	POWER POLE	
	ELECTRIC METER	
	GAS METER	
	TELEPHONE PEDESTAL	
	SIGN	
BM#	BENCHMARK	
B#	SOIL BORING	
2	PARKING STALL COUNT	2
	ACCESSIBLE PARKING STALL	
SS	STORM SEWER	
DT	DRAINTILE	DT
S	SANITARY SEWER	
FM	FORCEMAIN	FM
W	WATERMAIN	W
S	SANITARY SEWER SERVICE	
W	WATER SERVICE	W
ELE	UNDERGROUND ELECTRIC	ELE
FO	UNDERGROUND FIBER OPTIC	FO
GAS	UNDERGROUND GAS	GAS
TEL	UNDERGROUND TELEPHONE	TEL
OH	OVERHEAD UTILITY	OH
X	FENCE	X
O	CHAIN LINK FENCE	O
	CONCRETE CURB	
	RETAINING WALL	
	CONCRETE	
	NO PARKING	
	BUILDING	
972	CONTOUR	972
972.5	SPOT ELEVATION	972.5
1.0%	DIRECTION OF FLOW	1.0%
	TREE LINE	
	PARKING SETBACK LINE	PSBL
	BUILDING SETBACK LINE	BSBL

PAVEMENT LEGEND

- DENOTES LIGHT DUTY BITUMINOUS PAVEMENT
- DENOTES HEAVY DUTY BITUMINOUS PAVEMENT
- DENOTES CONCRETE PAVEMENT
- DENOTES CONCRETE PAVEMENT

SITE DATA

CURRENT ZONING: T4 TRADITIONAL NEIGHBORHOOD

PROPERTY AREA:	2.047 AC
DISTURBED AREA:	2.20± AC
EXISTING IMPERVIOUS AREA:	0.272 AC (13.3%)
PROPOSED IMPERVIOUS AREA:	1.786 AC (87.2%)

TOTAL PARKING: SEE ARCHITECTUREAL PLANS FOR PARKING INFORMATION

SITE NOTES

SEE SHEET C0-1 FOR NOTES.

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C4-1	UTILITY PLAN
C8-1	CIVIL DETAILS
L1-1	LANDSCAPE PLAN
L1-2	LANDSCAPE NOTES

SITE PLAN

C2-1

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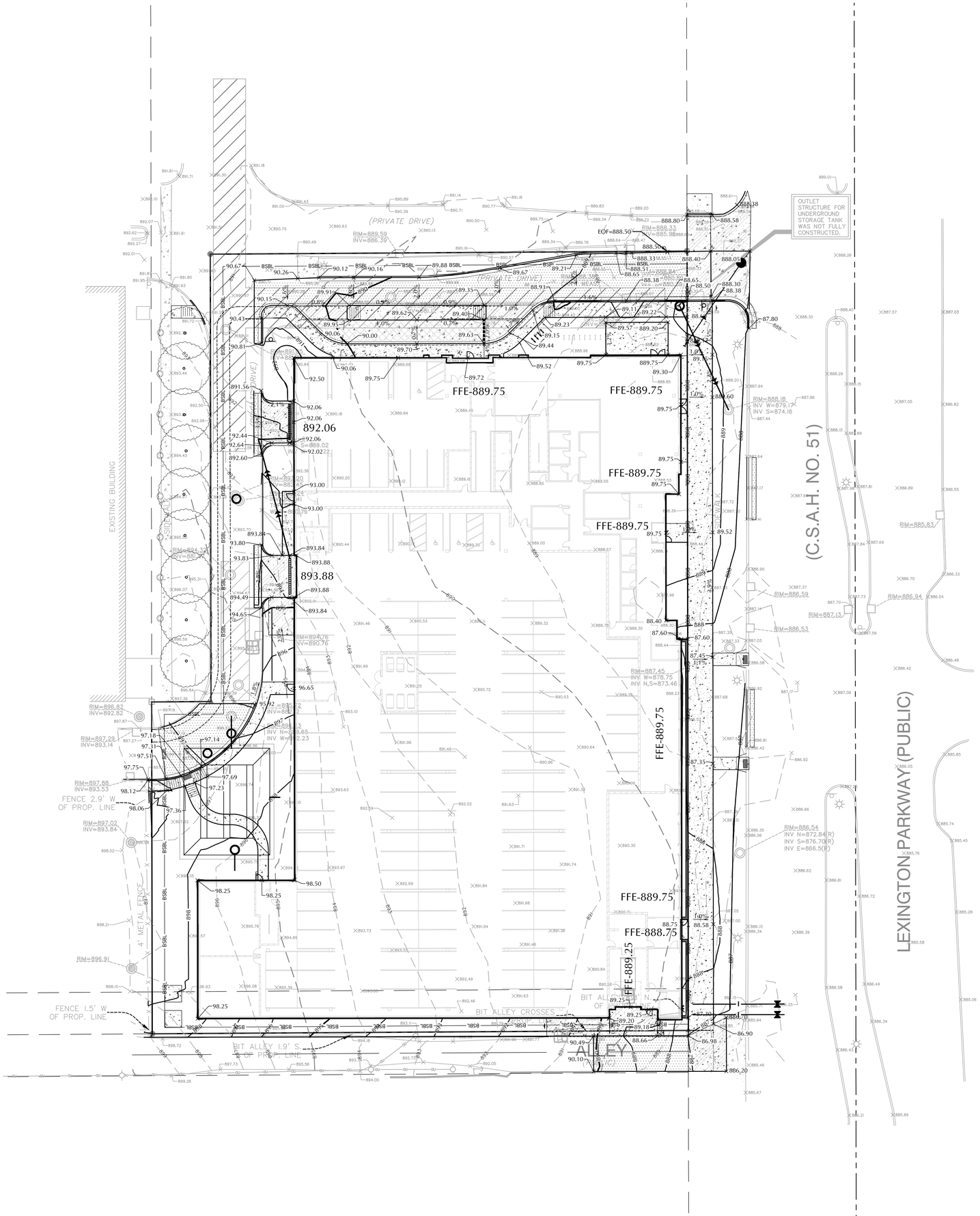

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SCALE IN FEET

N

GRADING NOTES

SEE SHEET C0-1 FOR NOTES.

LEGEND

EXISTING		PROPOSED
	CATCH BASIN	
	STORM MANHOLE	
	FLARED END SECTION	
	SANITARY MANHOLE	
	HYDRANT	
	GATE VALVE	
	POST INDICATOR VALVE	PIV
	WATER MANHOLE / WELL	
	LIGHT POLE	
	POWER POLE	
	ELECTRIC METER	
	GAS METER	
	TELEPHONE PEDESTAL	
	SIGN	
BM#	BENCHMARK	
	SOIL BORING	
2	PARKING STALL COUNT	2
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DT	DRAINTILE	DT
	SANITARY SEWER	
FM	FORCEMAIN	FM
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S	SANITARY SEWER SERVICE	
W	WATER SERVICE	
ELE	UNDERGROUND ELECTRIC	ELE
FO	UNDERGROUND FIBER OPTIC	FO
GAS	UNDERGROUND GAS	GAS
TEL	UNDERGROUND TELEPHONE	TEL
OH	OVERHEAD UTILITY	OH
X	FENCE	X
O	CHAIN LINK FENCE	O
	CONCRETE CURB	
	RETAINING WALL	
	CONCRETE	
	NO PARKING	
	BUILDING	
972	CONTOUR	972
972.5	SPOT ELEVATION	972.5
1.0%	DIRECTION OF FLOW	1.0%
	TREE LINE	
	PARKING SETBACK LINE	PSBL
	BUILDING SETBACK LINE	BSBL

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GRADING PLAN

C3-1

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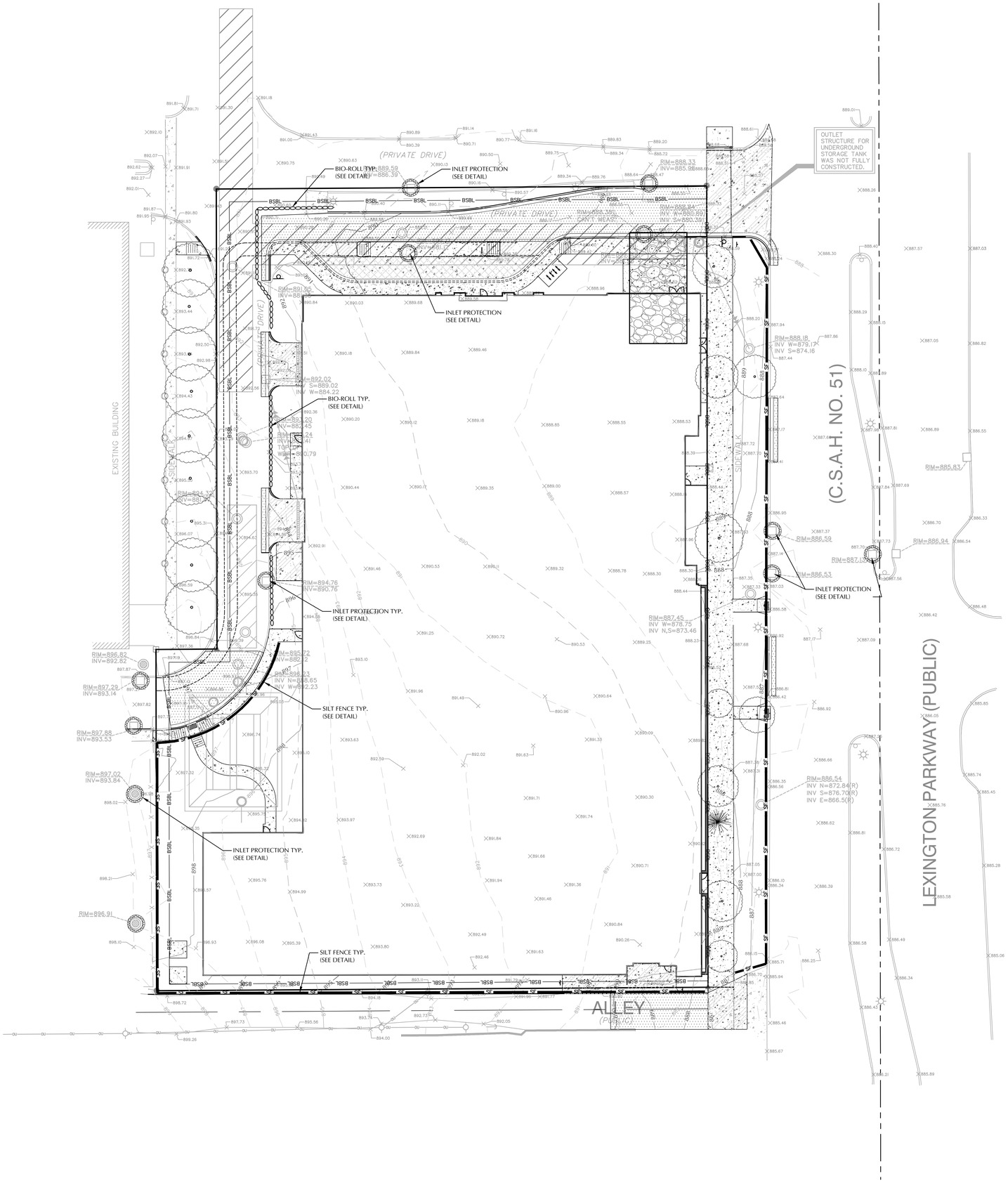

0 20 40
SCALE IN FEET

LEGEND

EXISTING		PROPOSED
	CATCH BASIN	
	STORM MANHOLE	
	FLARED END SECTION	
	SANITARY MANHOLE	
	HYDRANT	
	GATE VALVE	
	POST INDICATOR VALVE	PIV
	WATER MANHOLE / WELL	
	LIGHT POLE	
	POWER POLE	
	ELECTRIC METER	
	GAS METER	
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OH	OVERHEAD UTILITY	OH
X	FENCE	
O	CHAIN LINK FENCE	
	CONCRETE CURB	
	RETAINING WALL	
	CONCRETE	
	NO PARKING	
	BUILDING	
972	CONTOUR	972
972.5	SPOT ELEVATION	972.5
1.0%	DIRECTION OF FLOW	1.0%
	TREE LINE	
	PARKING SETBACK LINE	PSBL
	BUILDING SETBACK LINE	BSBL

SWPPP LEGEND

SF	SILT FENCE
	BIO-ROLL
	INLET PROTECTION
	EROSION CONTROL BLANKET
	ROCK CONSTRUCTION ENTRANCE

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SWPPP
C3-2

Plotted: 12 /10 / 2020 11:37 AM W:\2019\19114\CADD DATA\CIVIL_dwg Sheet Files\C3-2 SWPPP

SWPPP NOTES

1. THE NATURE OF THIS PROJECT WILL CONSIST OF CONSTRUCTING AN APARTMENT BUILDING, SURFACE PAVEMENTS, AND UTILITIES.

2. THE INTENDED SEQUENCING OF MAJOR CONSTRUCTION ACTIVITIES ARE AS FOLLOWS:

1. INSTALL VEHICLE TRACKING BMP
2. INSTALL PERIMETER EROSION CONTROL AROUND SITE
3. CLEAR AND GRUB SITE
4. STRIP AND STOCKPILE TOPSOIL
5. REMOVE PAVEMENTS AND UTILITIES
6. CONSTRUCT STORMWATER MANAGEMENT FACILITY/FACILITIES
7. ROUGH GRADE SITE
8. IMPORT CLEAN FILL FOR REPLACEMENT AND BALANCE
9. INSTALL UTILITIES
10. INSTALL BUILDING FOUNDATIONS
11. INSTALL CURB AND GUTTER
12. INSTALL PAVEMENTS AND WALKS
13. INSTALL MINOR UTILITIES
14. FINAL GRADE SITE
15. REMOVE ACCUMULATED SEDIMENT FROM STORMWATER SYSTEMS
16. SEED AND MULCH
17. WHEN ALL CONSTRUCTION ACTIVITY IS COMPLETE AND THE SITE IS STABILIZED, REMOVE SILT FENCE AND RESEED ANY AREAS DISTURBED BY THE REMOVAL.

3. SITE DATA:

AREA OF DISTURBANCE:	±XXX AC
PRE-CONSTRUCTION IMPERVIOUS AREA:	±XXX AC
POST-CONSTRUCTION IMPERVIOUS AREA:	±XXX AC
GENERAL SOIL TYPE:	SEE GEOTECHNICAL EVALUATION REPORT

4. THE LOCATION OF AREAS NOT TO BE DISTURBED MUST BE IDENTIFIED WITH FLAGS, STAKES, SIGNS, SILT FENCE, ETC. BEFORE CONSTRUCTION BEGINS.

5. ALL DISTURBED GROUND LEFT INACTIVE FOR SEVEN (7) SHALL BE STABILIZED BY SEEDING OR SODDING (ONLY AVAILABLE PRIOR TO SEPTEMBER 15) OR BY MULCHING OR COVERING OR OTHER EQUIVALENT CONTROL MEASURE.

6. ON SLOPES 3:1 OR GREATER MAINTAIN SHEET FLOW AND MINIMIZE RILLS AND/OR GULLIES, SLOPE LENGTHS CAN NOT BE GREATER THAN 75 FEET.

7. ALL STORM DRAINS AND INLETS MUST BE PROTECTED UNTIL ALL SOURCES OF POTENTIAL DISCHARGE ARE STABILIZED. INLET PROTECTION WITH IN RIGHT OF WAY TO BE CONSISTANTLY MONITORED TO MAKE SURE INLET PROTECTION IS IN GOOD WORKING ORDER AND EMERGENCY OVERFLOWS ARE NOT BLOCKED BY DEBRIS.

8. TEMPORARY SOIL STOCKPILES MUST HAVE EFFECTIVE SEDIMENT CONTROL AND CAN NOT BE PLACED IN SURFACE WATERS OR STORM WATER CONVEYANCE SYSTEMS. TEMPORARY STOCKPILES WITHOUT SIGNIFICANT AMOUNT OF SILT, CLAY, OR ORGANIC COMPOUNDS ARE EXEPMT EX: CLEAN AGGREGATE STOCK PILES, DEMOLITION CONCRETE STOCKPILES, SAND STOCKPILES.

9. SEDIMENT LADEN WATER MUST BE DISCHARGED TO A SEDIMENTATION BASIN WHENEVER POSSIBLE. IF NOT POSSIBLE, IT MUST BE TREATED WITH THE APPROPRIATE BMP'S.

10. SOLID WASTE MUST BE DISPOSED OF PROPERLY AND MUST COMPLY WITH MPCA DISPOSAL REQUIREMENTS.

11. EXTERNAL WASHING OF CONSTRUCTION VEHICLES MUST BE LIMITED TO A DEFINED AREA OF THE SITE. RUNOFF MUST BE PROPERLY CONTAINED.

12. NO ENGINE DEGREASING IS ALLOWED ON SITE.

13. THE OWNER WHO SIGNS THE NPDES PERMIT APPLICATION IS A PERMITTEE AND IS RESPONSIBLE FOR COMPLIANCE WITH ALL TERMS AND CONDITIONS OF THE PERMIT. THE OPERATOR (CONTRACTOR) WHO SIGNS THE NPDES PERMIT APPLICATION IS A PERMITTEE FOR PARTS II.B., PART II.C, PART II.B-F, PART V, PART IV AND APPLICABLE CONSTRUCTION ACTIVITY REQUIREMENTS FOUND IN APPENDIX A, PART C. OF THE NPDES PERMIT AND IS JOINTLY RESPONSIBLE WITH THE OWNER FOR COMPLIANCE WITH THOSE PORTIONS OF THE PERMIT.

14. TERMINATION OF COVERAGE-PERMITTEE(S) WISHING TO TERMINATE COVERAGE MUST SUBMIT A NOTICE OF TERMINATION (NOT) TO THE MPCA. ALL PERMITTEE(S) MUST SUBMIT A NOT WITHIN 30 DAYS AFTER ONE OR MORE OF THE FOLLOWING CONDITIONS HAVE BEEN MET:

   A. FINAL STABILIZATION, PER NPDES PERMIT PART IV.G. HAS BEEN ACHIEVED ON ALL PORTIONS OF THE SITE FOR WHICH THE PERMITTEE IS RESPONSIBLE.
   B. TRANSFER OF OWNERSHIP AS DESCRIBED IN THE PERMIT.

15. INSPECTIONS
   A. INITIAL INSPECTION FOLLOWING SILT FENCE INSTALLATION BY CITY REPRESENTATIVE IS REQUIRED.
   B. EXPOSED SOIL AREAS: ONCE EVERY 7 DAYS AND WITHIN 24 HOURS FOLLOWING A 0.5" OVER 24 HOUR RAIN EVENT.
   C. STABILIZED AREAS: ONCE EVERY 30 DAYS
   D. FROZEN GROUND: AS SOON AS RUNOFF OCCURS OR PRIOR TO RESUMING CONSTRUCTION.
   E. INSPECTION AND MAINTENANCE RECORDS MUST BE RETAINED FOR 3 YEARS AFTER FILING OF THE NOTICE OF TERMINATION AND MUST INCLUDE: DATE AND TIME OF ACTION, NAME OF PERSON(S) CONDUCTING WORK, FINDING OF INSPECTIONS AND RECOMMENDATIONS FOR CORRECTIVE ACTION, DATE AND AMOUNT OF RAINFALL EVENTS GREATER THAN 0.5 INCHES IN A 24 HOUR PERIOD.

16. MINIMUM MAINTENANCE
   A. SILT FENCE TO BE REPAIRED, REPLACED, SUPPLEMENTED WHEN NONFUNCTIONAL, OR 1/3 FULL; WITHIN 24 HOURS
   B. SEDIMENT BASINS DRAINED AND SEDIMENT REMOVED WHEN REACHES 1/2 STORAGE VOLUME. REMOVAL MUST BE COMPLETE WITHIN 72 HOURS OF DISCOVERY.
   C. SEDIMENT REMOVED FROM SURFACE WATERS WITHIN (7)SEVEN DAYS
   D. CONSTRUCTION SITE EXITS INSPECTED, TRACKED SEDIMENT REMOVED WITH 24 HOURS.
   E. PROVIDE COPIES OF EROSION INSPECTION RESULTS TO CITY ENGINEER FOR ALL EVENTS GREATER THAN ½" IN 24 HOURS
   F. STREETS TO BE SWEPT AS NECESSARY TO LIMIT DEBRIS FROM REACHING STORM INLETS WITH IN RIGHT OF WAY.
   G. CONTRACTOR SHALL BE RESPONSIBLE TO INSPECT AND MAINTAIN INLET PROTECTION PLACED WITHIN THE PUBLIC RIGHT OF WAY UNTIL FINAL STABILIZATION IS ACHIEVED. CONTRACTOR SHALL CONSISTENTLY MAKE SURE INLET PROTECTION IS IN GOOD WORKING ORDER AND EMERGENCY OVERFLOWS ARE NOT BLOCKED OF DEBRIS.

17. THE SWPPP, INCLUDING ALL CHANGES TO IT, AND INSPECTIONS AND MAINTENANCE RECORDS MUST BE KEPT AT THE SITE DURING CONSTRUCTION ACTIVITY BY THE PERMITTEE(S) WHO HAVE OPERATIONAL CONTROL OF THE SITE AS SITE CONDITIONS REQUIRE, OR AT THE DIRECTION OF THE CITY.

18. OWNER MUST KEEP RECORDS OF ALL PERMITS REQUIRED FOR THE PROJECT, THE SWPPP, ALL INSPECTIONS AND MAINTENANCE, PERMANENT OPERATION AND MAINTENANCE AGREEMENTS, AND REQUIRED CALCULATIONS FOR TEMPORARY AND PERMANENT STORM WATER MANAGEMENT SYSTEMS. THESE RECORDS MUST BE RETAINED FOR THREE YEARS AFTER FILING NPDES NOTICE OF TERMINATION.

19. SWPPP MUST BE AMENDED WHEN:
   A. THERE IS A CHANGE IN DESIGN, OPERATION, MAINTENANCE, WEATHER OR SEASONAL CONDITIONS THAT HAS A SIGNIFICANT EFFECT ON DISCHARGE
   B. INSPECTIONS INDICATE THAT THE SWPPP IS NOT EFFECTIVE AND DISCHARGE IS EXCEEDING WATER QUALITY STANDARDS.
   C. THE BMP'S IN THE SWPPP ARE NOT CONTROLLING POLLUTANTS IN DISCHARGES OR IS NOT CONSISTENT WITH THE TERMS AND CONDITIONS OF THE PERMIT.

19. CONCRETE WASHOUT AREA
   A. CONTRACTOR TO PROVIDE PREFABRICATED CONCRETE WASH-OUT CONTAINER WITH RAIN PROTECTION PER PLAN.
   B. CONCRETE WASH-OUT TO BE IDENTIFIED WITH SIGNAGE STATING "CONCRETE WASHOUT AREA DO NOT OVERFILL".
   C. CONCRETE WASHOUT WATER NEEDS TO BE PUMPED WITHIN 24 HOURS OF STANDING WATER IN WASHOUT AREA.

20. IN THE EVENT OF ENCOUNTERING A WELL OR SPRING DURING CONSTRUCTION CONTRACTOR TO CEASE CONSTRUCTION ACTIVITY AND NOTIFY ENGINEER.

21. PIPE OULTETS MUST BE PROVIDED WITH TEMPORARY OR PERMANENT ENERGY DISSIPATION WITHIN 24 HOURS AFTER CONNECTION TO A SURFACE WATER.

22. FINAL STABILIZATION

FINAL STABILIZATION REQUIRES THAT ALL SOIL DISTURBING ACVTIVITIES HAVE BEEN COMPLETED AND THAT DISTURBED AREAS ARE STABILIZED BY A UNIFORM PERENNIAL VEGETATIVE COVER WITH 70% OF THE EXPECTED FINAL DENSITY, AND THAT ALL PERMANENT PAVEMENTS HAVE BEEN INSTALLED. ALL TEMPORARY BMP'S SHALL BE REMOVED, DITCHES STABILIZED, AND SEDIMENT SHALL BE REMOVED FROM PERMANENT CONVEYANCES AND SEDIMENTATION BASINS IN ORDER TO RETURN THE POND TO DESIGN CAPACITY.

23. RESPONSIBILITIES
   A. THE OWNER MUST IDENTIFY A PERSON WHO WILL OVERSEE THE SWPPP IMPLEMENTATION AND THE PERSON RESPONSIBLE FOR INSPECTION AND MAINTENANCE:

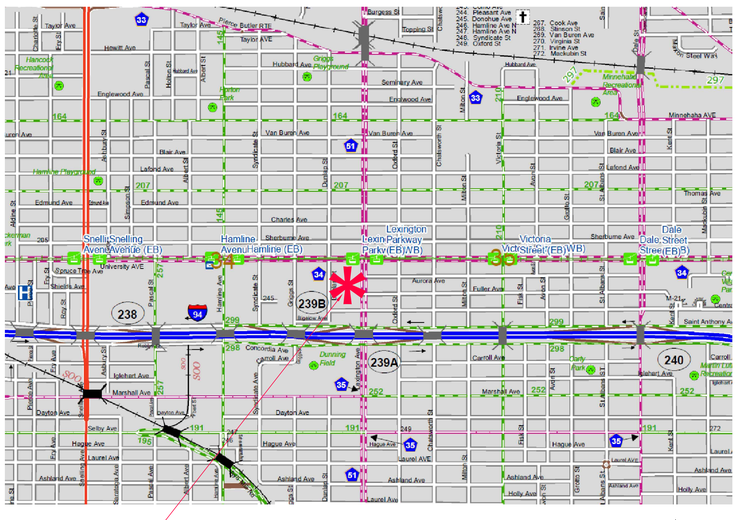
CONTACT: _____
COMPANY: _____
PHONE: _____

   B. THE CITY REQUIRES THAT WSB & ASSOCIATES TO PREFORM NPDES INSPECTIONS DURING THE CONSTRUCTION PHASE. THE COST OF THE INSPECTIONS WILL BE PAID FOR BY THE OWNER. THIS IS A REQUIREMENT FOR RELEASE OF THE BUILDING PERMIT.

CONTACT: _____
COMPANY: WSB & ASSOCIATES
PHONE: _____

24. THE WATERSHED DISTRICT OR THE CITY MAY HAVE REQUIREMENTS FOR INSPECTIONS OR AS-BUILT DRAWINGS VERIFYING PROPER CONSTRUCTION OF THE BMPS.

SITE VICINITY MAP



ESTIMATED QUANTITIES

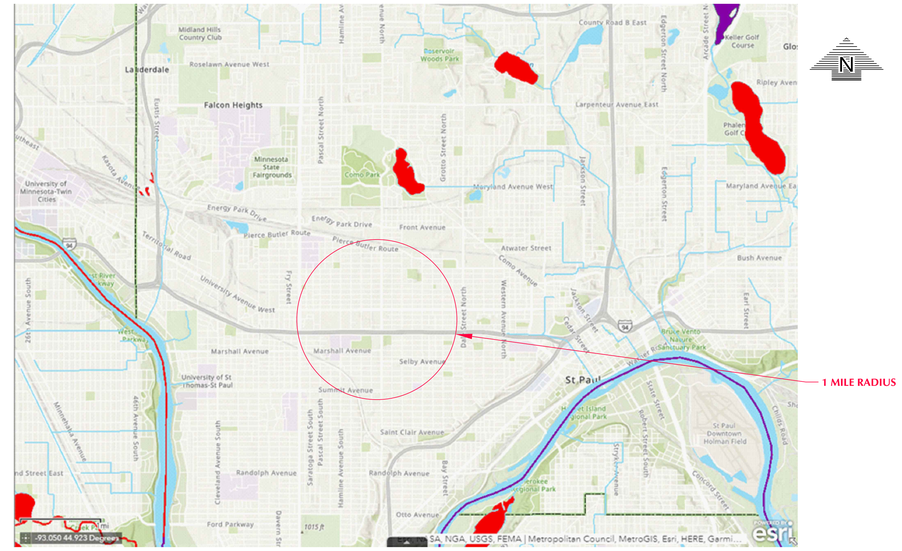
DESCRIPTION	UNIT	QUANTITY
TEMPORARY ROCK CONSTRUCTION ENTRANCE	EA	1
EROSION CONTROL BLANKET	SF	NA
SILT FENCE	LF	805
INLET PROTECTION	EA	12
BIO-ROLLS	LF	175

UNIVERSITY OF MINNESOTA

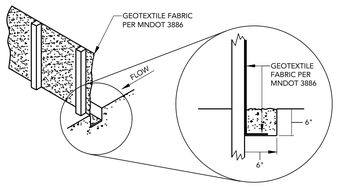
Zachary H. Webber

Design of Construction SWPPP (May 31 2021)

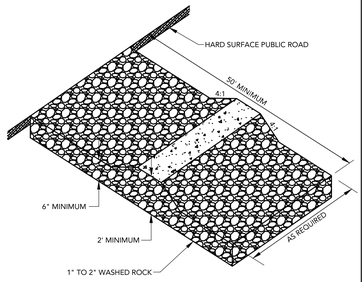
CONSTRUCTION STORMWATER SPECIAL WATERS SEARCH MAP



NOTES:
1. PLACE BOTTOM EDGE OF FENCE INTO 6 IN DEEP TRENCH AND BACKFILL IMMEDIATELY.
2. POSTS SHALL BE:
   - 6 FT MAX. SPACING.
   - 2 IN X 2IN HARDWOOD, OR STANDARD STEEL T-TYPE FENCE POSTS.
   - 5' MIN. LENGTH POSTS, DRIVEN 2 FT INTO THE GROUND.
3. ATTACH FABRIC TO WOOD POST WITH A MIN. OF 5, 1 INCH LONG STAPLES.
4. ATTACH FABRIC TO STEEL POST WITH A MIN. OF 3 ZIP TIES IN TOP 8 INCHES OF FABRIC.

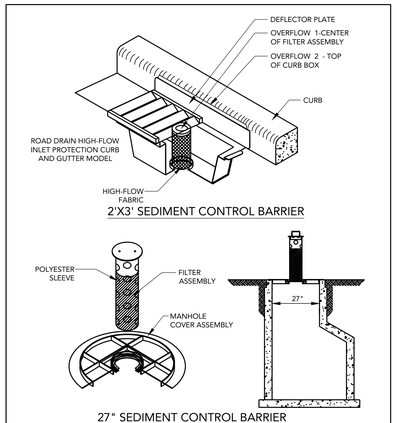


LOUCKS | SILT FENCE PRE-ASSEMBLED OR MACHINE SLICED | LOUCKS PLATE NO. 3000 | DRAWN 2/2016



NOTES:
1. ROCK SIZE SHOULD BE 1" TO 2" IN SIZE SUCH AS MN/DOT CA-1 OR CA-2 COURSE AGGREGATE. (WASHED)
2. A GEOTEXTILE FABRIC MAY BE USED UNDER THE ROCK TO PREVENT MIGRATION OF THE UNDERLYING SOIL INTO THE STONE.

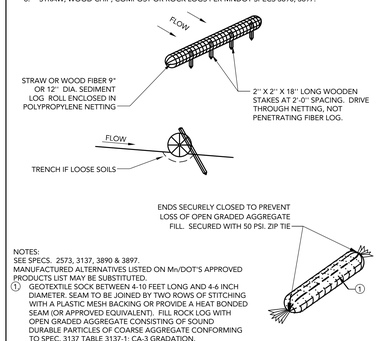
LOUCKS | ROCK ENTRANCE TO CONSTRUCTION SITE | LOUCKS PLATE NO. 3004 | DRAWN 2/2016



WIMCO ROAD DRAIN, OR APPROVED EQUAL

LOUCKS | INLET PROTECTION - EXISTING STORM STRUCTURES | LOUCKS PLATE NO. 3011 | DRAWN 2/2016

NOTES:
1. PLACE BOTTOM EDGE OF WIRE FENCE INTO 6 IN DEEP TRENCH.
2. POSTS SHALL BE:
   - 6 FT MAX. SPACING.
   - STANDARD STEEL T-TYPE POSTS.
   - 5' MIN. LENGTH POSTS, DRIVEN 2 FT INTO THE GROUND.
3. ATTACH WIRE FENCE TO STEEL POSTS WITH NO. 9 GA. ALUMINUM WIRE OR NO. 9 GALVANIZED STEEL PRE-FORMED CLIPS.
4. ATTACH FABRIC TO WIRE FENCING WITH WIRE OR ZIP TIES. A MIN. OF 3 ZIP TIES PER POST. EXTEND BOTTOM OF FABRIC INTO TRENCH.
5. BACKFILL TRENCH & COMPACT.
6. STRAW, WOOD CHIP, COMPOST OR ROCK LOGS PER MNDOT SPECS 3890, 3897.



NOTES:
SEE SPECS. 2573, 3137, 3890 & 3897.
MANUFACTURED ALTERNATIVES LISTED ON Mn/DOT'S APPROVED PRODUCTS LIST MAY BE SUBSTITUTED.
(1) GEOTEXTILE SOCK BETWEEN 4-10 FEET LONG AND 4-6 INCH DIAMETER. SEAM TO BE JOINED BY TWO ROWS OF STITCHING WITH A PLASTIC MESH BACKING OR PROVIDE A HEAT BONDED SEAM (OR APPROVED EQUIVALENT). FILL ROCK LOG WITH OPEN GRADED AGGREGATE CONSISTING OF SOUND DURABLE PARTICLES OF COARSE AGGREGATE CONFORMING TO SPEC. 3137 TABLE 3137-1; CA-3 GRADATION.

LOUCKS | BIO-ROLL OR ROCK LOG | LOUCKS PLATE NO. 3002 | DRAWN 11/2016

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SUBMITTAL/REVISIONS

11/19/20	CITY SUBMITTAL
12/10/20	CITY SUBMITTAL

PROFESSIONAL SIGNATURE

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

PJ Disch - PE
License No. 49933
Date -

QUALITY CONTROL

Loucks Project No.	19114A
Project Lead	PJD
Drawn By	DDL
Checked By	PJD
Review Date	12/10/20

SHEET INDEX

C0-1	CIVIL NOTES
C1-1	DEMO SHEET
C2-1	SITE PLAN
C3-1	GRADING PLAN
C3-2	SWPPP
C3-3	SWPPP NOTES
C4-1	UTILITY PLAN
C8-1	CIVIL DETAILS
L1-1	LANDSCAPE PLAN
L1-2	LANDSCAPE NOTES

SWPPP
C3-3

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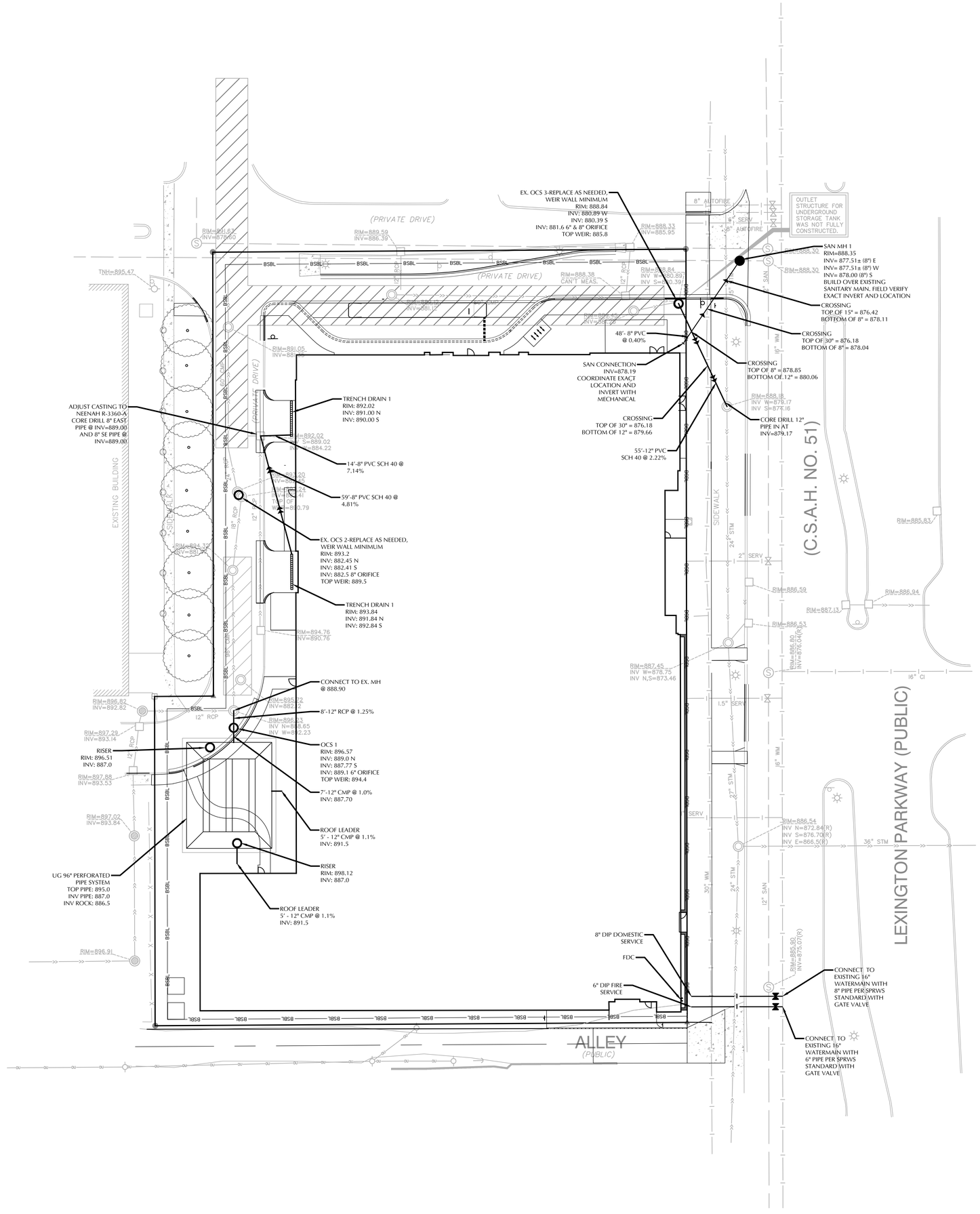

0 20 40
SCALE IN FEET

UTILITY NOTES

SEE SHEET C0-1 FOR NOTES.

LEGEND

EXISTING		PROPOSED
	CATCH BASIN	
	STORM MANHOLE	
	FLARED END SECTION	
	SANITARY MANHOLE	
	HYDRANT	
	GATE VALVE	
	POST INDICATOR VALVE	PIV
	WATER MANHOLE / WELL	
	LIGHT POLE	
	POWER POLE	
	ELECTRIC METER	
	GAS METER	
	TELEPHONE PEDESTAL	
	SIGN	
BM#	BENCHMARK	
	SOIL BORING	
2	PARKING STALL COUNT	2
	ACCESSIBLE PARKING STALL	
	STORM SEWER	
DT	DRAINTILE	DT
S	SANITARY SEWER	
FM	FORCEMAIN	FM
W	WATERMAIN	W
S	SANITARY SEWER SERVICE	
W	WATER SERVICE	W
ELE	UNDERGROUND ELECTRIC	ELE
FO	UNDERGROUND FIBER OPTIC	FO
GAS	UNDERGROUND GAS	GAS
TEL	UNDERGROUND TELEPHONE	TEL
OH	OVERHEAD UTILITY	OH
X	FENCE	X
O	CHAIN LINK FENCE	O
	CONCRETE CURB	
	RETAINING WALL	
	CONCRETE	
	NO PARKING	
	BUILDING	
972	CONTOUR	972
972.5	SPOT ELEVATION	972.5
1.0%	DIRECTION OF FLOW	1.0%
	TREE LINE	
	PARKING SETBACK LINE	PSBL
	BUILDING SETBACK LINE	BSBL

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C4-1	UTILITY PLAN
C8-1	CIVIL DETAILS
L1-1	LANDSCAPE PLAN
L1-2	LANDSCAPE NOTES

CALL BEFORE YOU DIG!
Gopher State One Call
TWIN CITY AREA: 651-454-0002
TOLL FREE: 1-800-252-1166

WARNING:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CALLING FOR LOCATIONS OF ALL EXISTING UTILITIES. THEY SHALL COOPERATE WITH ALL UTILITY COMPANIES IN MAINTAINING THEIR SERVICE AND / OR RELOCATION OF LINES.

THE CONTRACTOR SHALL CONTACT GOPHER STATE ONE CALL AT 651-454-0002 AT LEAST 48 HOURS IN ADVANCE FOR THE LOCATIONS OF ALL UNDERGROUND WIRES, CABLES, CONDUITS, PIPES, MANHOLES, VALVES OR OTHER BURIED STRUCTURES BEFORE DIGGING. THE CONTRACTOR SHALL REPAIR OR REPLACE THE ABOVE WHEN DAMAGED DURING CONSTRUCTION AT NO COST TO THE OWNER.

UTILITY PLAN

C4-1

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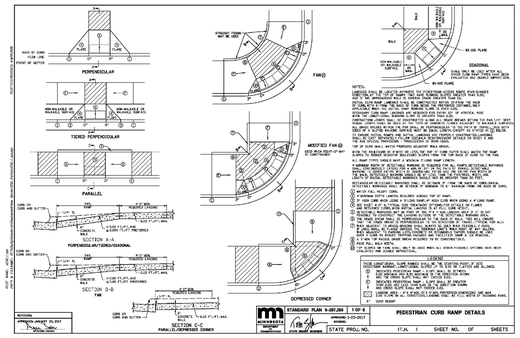
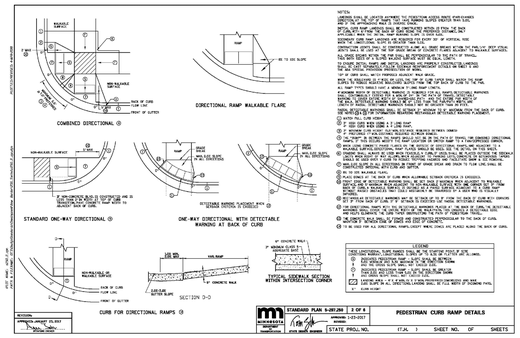
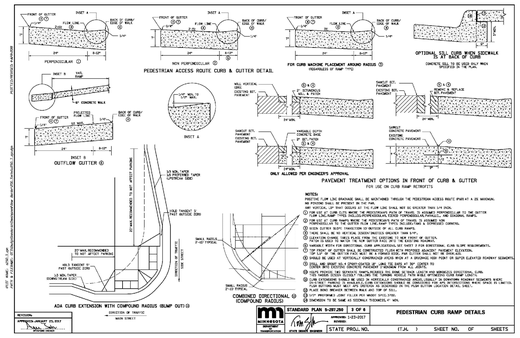
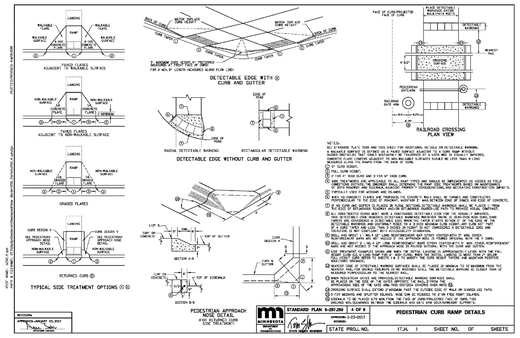
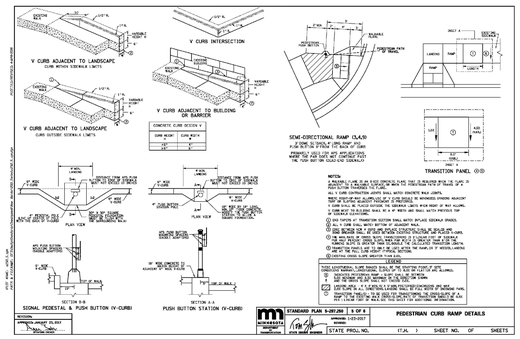
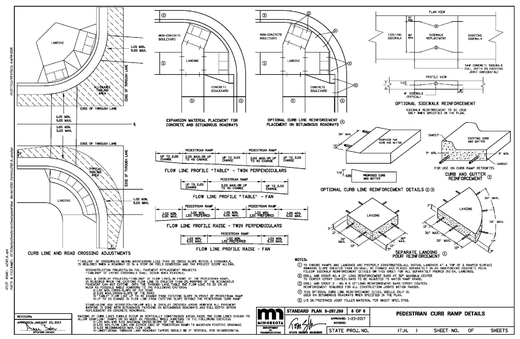


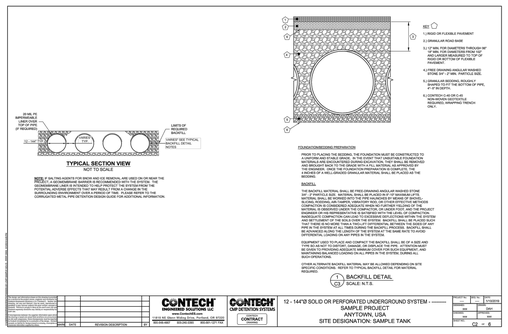


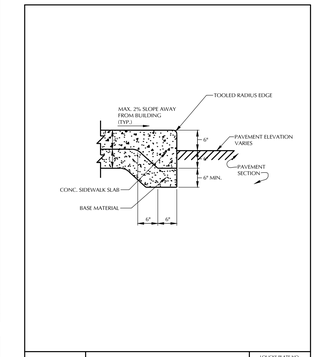




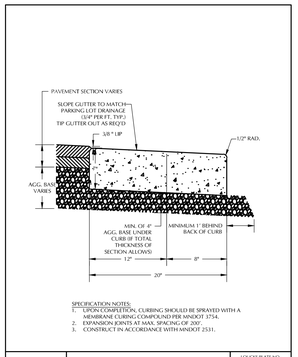




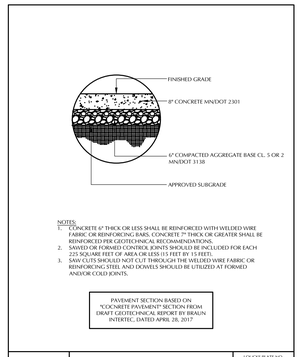




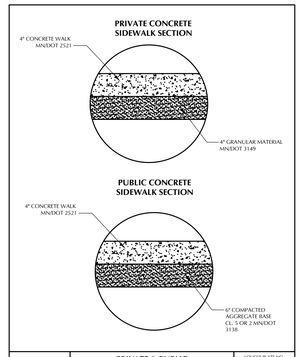
LOUCKS | INTEGRAL CURB AND WALK | LOUCKS PLATE NO. 2017 | DRAWN 2/2016



LOUCKS | FLAT CURB AND GUTTER (12") | LOUCKS PLATE NO. 2012 | DRAWN 2/2016

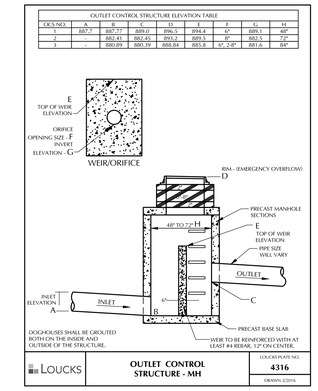


LOUCKS | CONCRETE PAVEMENT SECTION | LOUCKS PLATE NO. 2033 | DRAWN 12/2016



LOUCKS | PRIVATE & PUBLIC CONCRETE SIDEWALK SECTION | LOUCKS PLATE NO. 2034 | DRAWN 12/2016

OUTLET CONTROL STRUCTURE ELEVATION TABLE								
OCS NO.	A	B	D	E	F	G	H
1	887.7	887.77	889.0	896.5	894.4	6"	889.1	48"
2	-	882.41	882.45	893.2	889.5	8"	882.5	72"
3	-	880.99	880.99	888.84	885.8	6", 2-48"	881.6	84"



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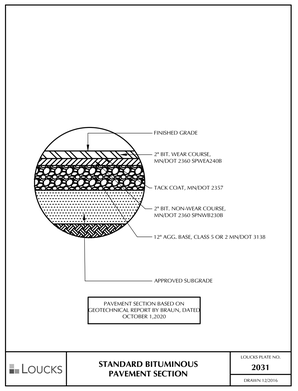

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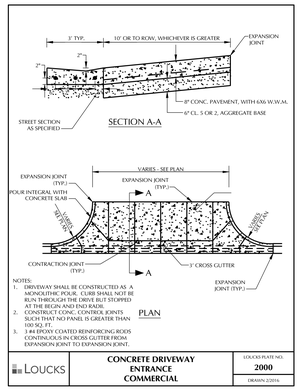

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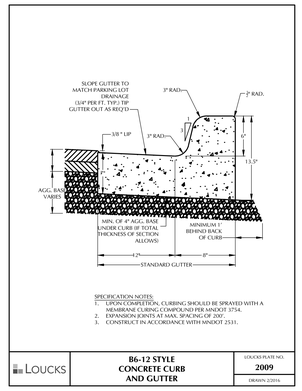
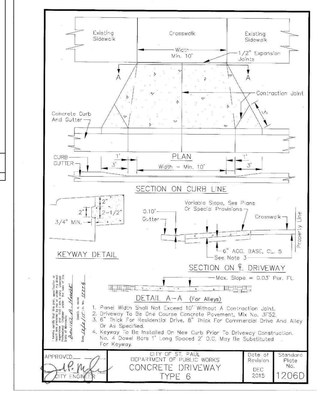
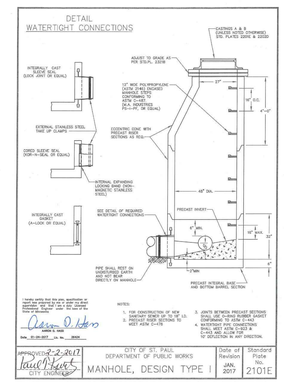
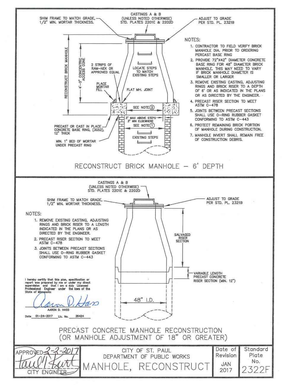
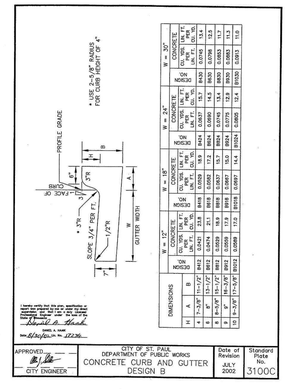


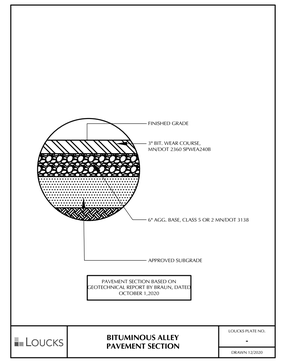
LOUCKS | B6-12 STYLE CONCRETE CURB AND GUTTER | LOUCKS PLATE NO. 2009 | DRAWN 2/2016

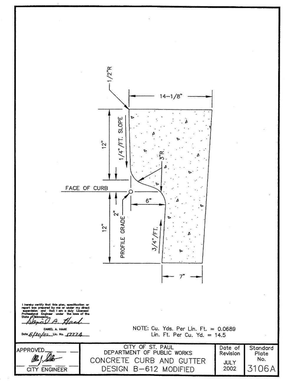












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SUBMITTAL/REVISIONS

11/19/20	CITY SUBMITTAL
12/10/20	CITY SUBMITTAL

PROFESSIONAL SIGNATURE

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

PJ Disch - PE

License No. 49933
Date -

QUALITY CONTROL

Loucks Project No.	19114A
Project Lead	PJD
Drawn By	DDL
Checked By	PJD
Review Date	12/10/20

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C4-1	UTILITY PLAN
C8-1	CIVIL DETAILS
L1-1	LANDSCAPE PLAN
L1-2	LANDSCAPE NOTES

CIVIL DETAILS

C8-1

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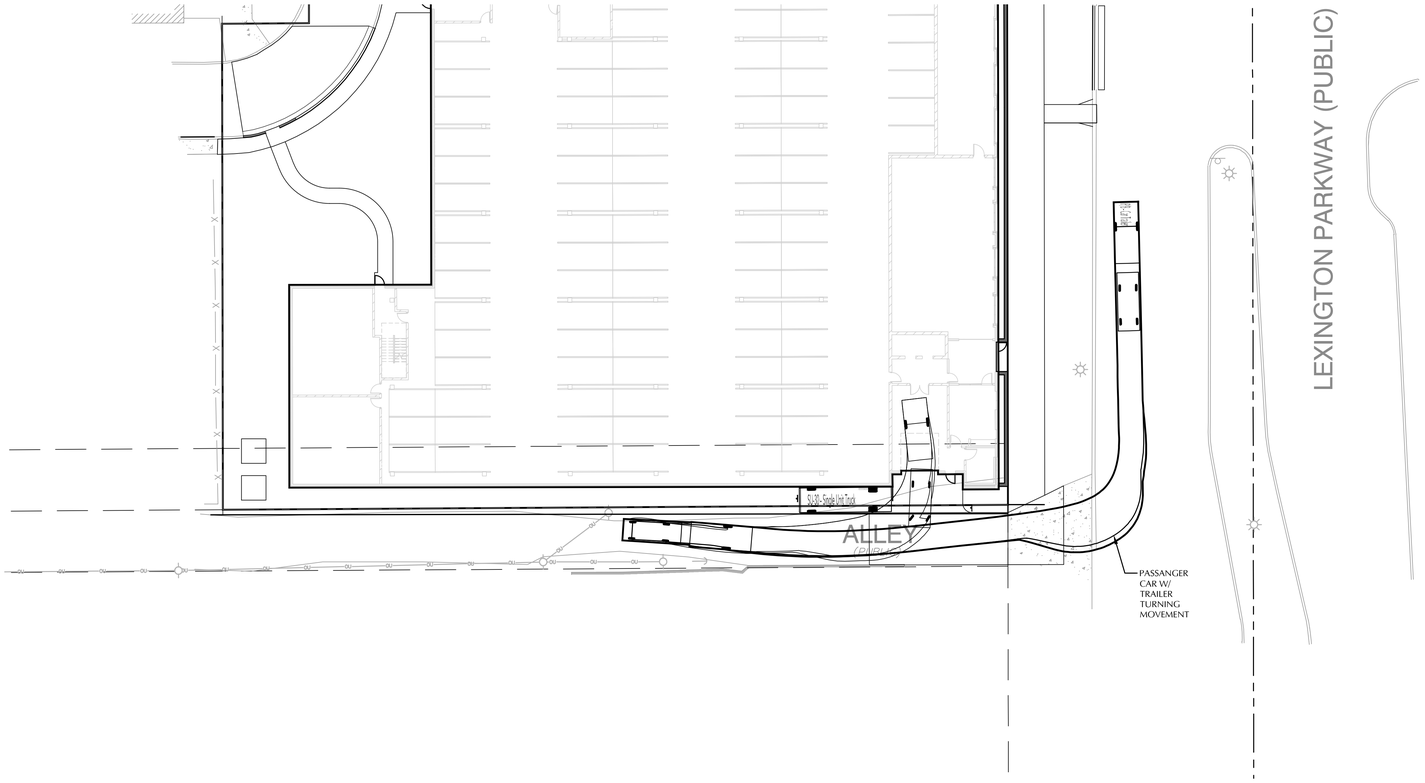

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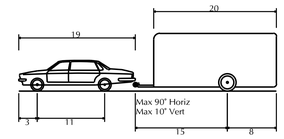
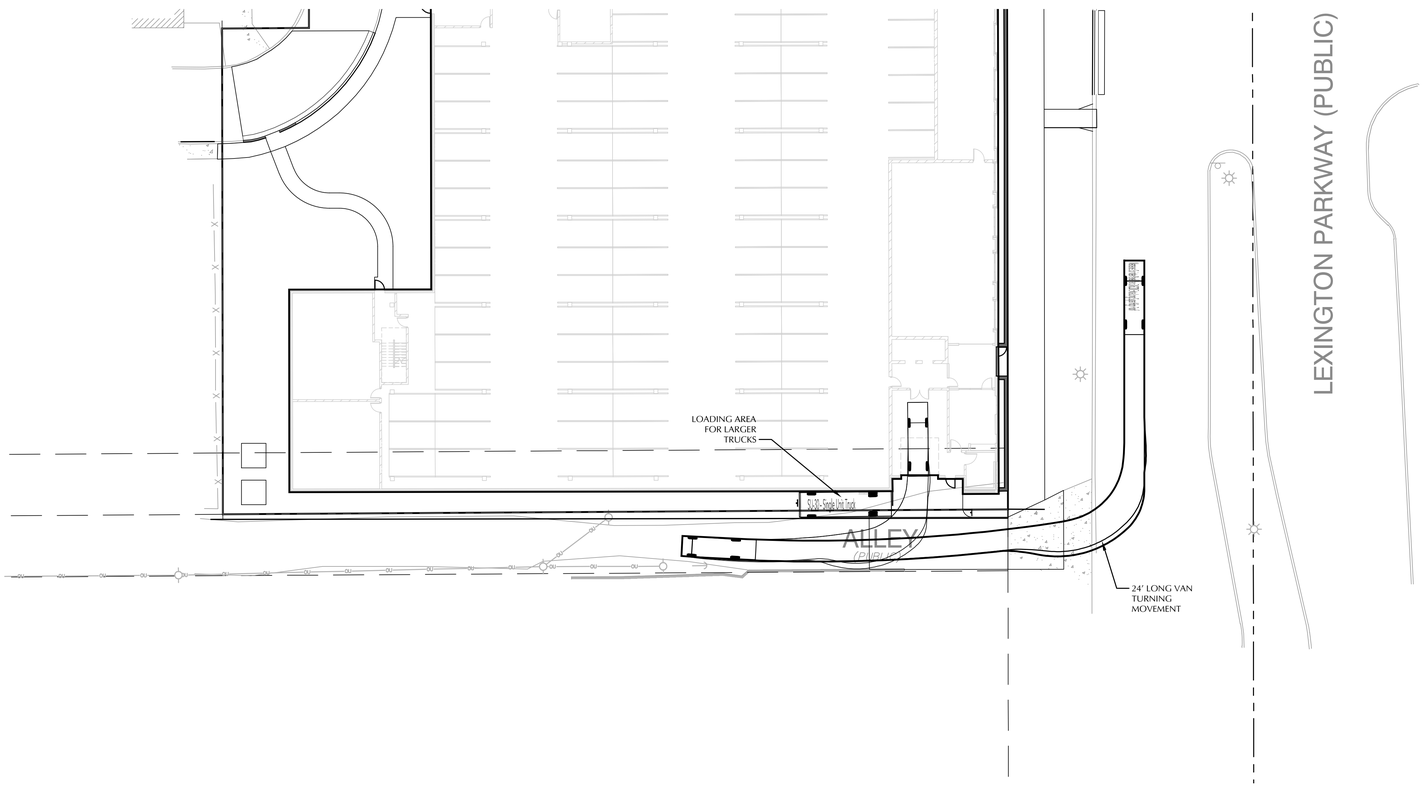
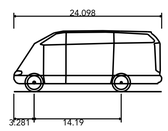


P/B - Car and Trailer	
Overall Length	42.000ft
Overall Width	8.000ft
Overall Body Height	6.305ft
Min Body Ground Clearance	0.681ft
Max Track Width	8.000ft
Lock-to-lock time	4.00s
Max Steering Angle (Virtual)	31.60°





Mercedes Sprinter Panel Van 518CDI Extra Long Super High Roof	
Overall Length	24.098ft
Overall Width	6.539ft
Overall Body Height	9.942ft
Min Body Ground Clearance	1.312ft
Track Width	6.539ft
Lock-to-lock time	5.00s
Wall to Wall Turning Radius	25.591ft

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L1-2	LANDSCAPE NOTES

TRUCK TURNING EXHIBIT

EX-1

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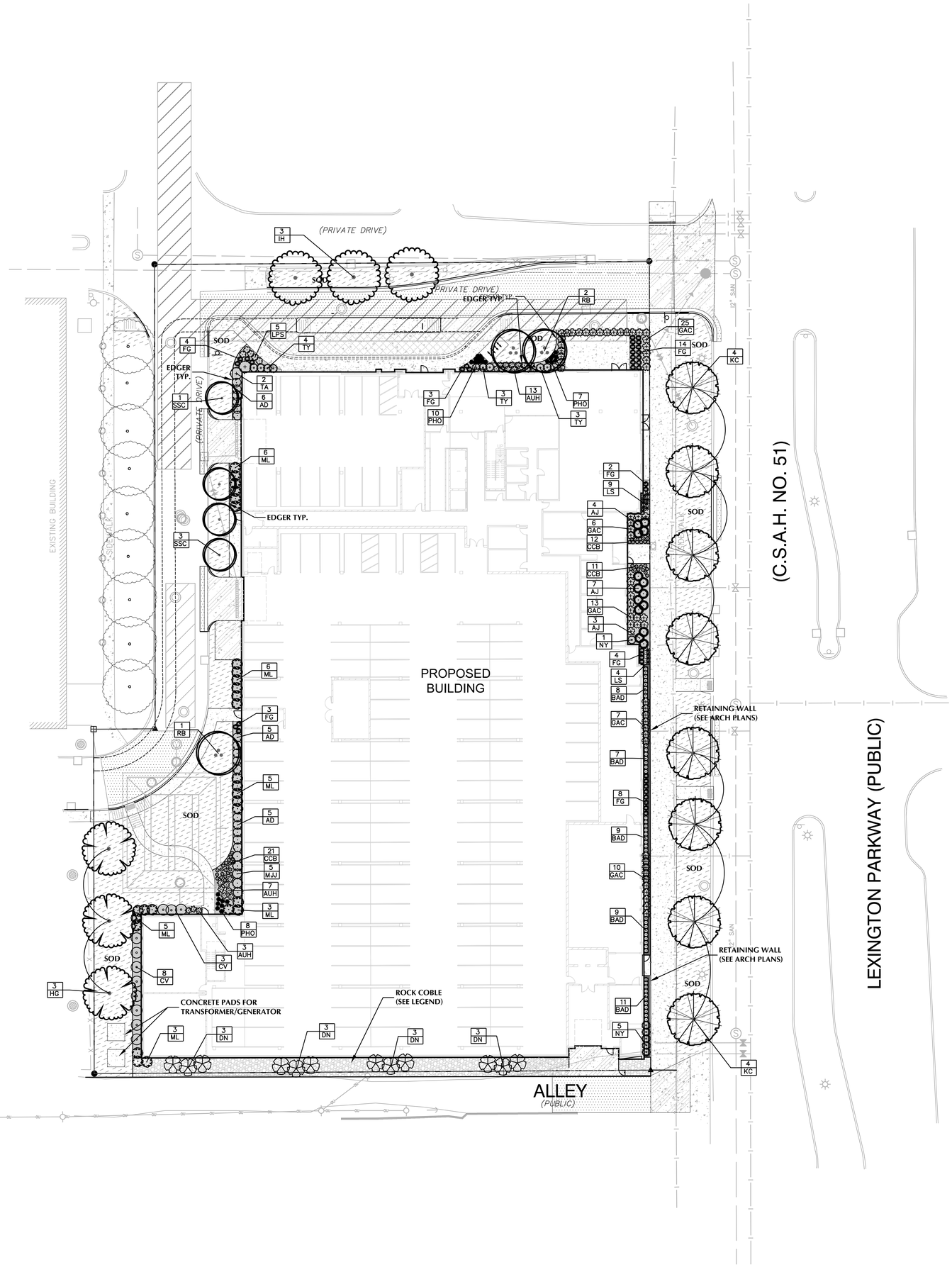

PLANT SCHEDULE

DECIDUOUS TREES	QTY	COMMON NAME	BOTANICAL NAME	CONT	SIZE
	3	HARVEST GOLD LINDEN	Tilia mongolica `Harvest Gold`	B & B	2.5"Cal
	3	IMPERIAL HONEYLOCUST	Gleditsia triacanthos `Impcole` TM	B & B	2.5"Cal
	3	RIVER BIRCH CLUMP	Betula nigra	B & B	8` HGT
	8	SIENNA GLEN MAPLE	Acer freemanii `Sienna Glen`	B & B	2.5"Cal
ORNAMENTAL TREES	**QTY**	**COMMON NAME**	**BOTANICAL NAME**	**CONT**	**SIZE**
	4	SPRING SNOW CRABAPPLE	Malus x `Spring Snow`	B & B	1.5"Cal
SHRUBS	**QTY**	**COMMON NAME**	**BOTANICAL NAME**	**MIN CONT**	**MIN SIZE**
AD	16	ARCTIC FIRE DOGWOOD	Cornus sericea `Artic Fire`	5 gal	24" HGT
CV	11	COMPACT AMERICAN VIBURNUM	Viburnum trilobum `Bailey Compact`	5 gal	24" HGT
DN	12	DIABLO PURPLE NINEBARK	Physocarpus opulifolius `Monlo` TM	5 gal	24" HGT
GAC	61	GREEN MOUND ALPINE CURRANT	Ribes alpinum `Green Mound`	5 gal	24" HGT
LPS	5	LITTLE PRINCESS SPIREA	Spirea japonica `Little Princess`	5 gal	24" HGT
ML	28	MISS KIM LILAC	Syringa patula `Miss Kim`	5 gal	24" HGT
GRASSES	**QTY**	**COMMON NAME**	**BOTANICAL NAME**	**MIN CONT**	**MIN SIZE**
FG	38	FEATHER REED GRASS	Calamagrostis x acutiflora `Karl Foerster`	1 gal	
CONIFEROUS SHRUBS	**QTY**	**COMMON NAME**	**BOTANICAL NAME**	**MIN CONT**	**MIN SIZE**
AJ	14	ANDORRA COMPACT JUNIPER	Juniperus horizontalis `Plumosa Compacta`	5 gal	18" SPRD
MJJ	5	MINT JULEP JUNIPER	Juniperus chinensis `Monlep`	5 gal	18" SPRD
NY	6	NOVA YEW	Taxus cuspidata `Nova`	5 gal	36" HGT
TY	10	TAUNTON YEW	Taxus x media `Taunton`	5 gal	18" SPRD
TA	2	TECHNY ARBORVITAE	Thuja occidentalis `Techny`	10 gal	36" HGT
PERENNIALS	**QTY**	**COMMON NAME**	**BOTANICAL NAME**	**MIN CONT**	**MIN SIZE**
AUH	23	AUREOMARGINATA HOSTA	Hosta montana `Aureomarginata`	1 gal	
BAD	44	BAJA DAYLILY	Hemerocallis x `Baja`	1 gal	
CCB	44	CARAMEL CORAL BELLS	Heuchera x `Caramel`	1 gal	
LS	13	LITTLE SPIRE RUSSIAN SAGE	Perovskia x `Little Spire`	1 gal	
PHO	25	PATRIOT HOSTA	Hosta x `Patriot`	1 gal	

GENERAL NOTES

CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING BID. HE SHALL INSPECT SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS RELATING TO THE NATURE AND SCOPE OF WORK.

VERIFY LAYOUT AND ANY DIMENSIONS SHOWN AND BRING TO THE ATTENTION OF THE LANDSCAPE ARCHITECT ANY DISCREPANCIES WHICH MAY COMPROMISE THE DESIGN AND/OR INTENT OF THE PROJECT'S LAYOUT.

ASSURE COMPLIANCE WITH ALL APPLICABLE CODES AND REGULATIONS GOVERNING THE WORK OR MATERIALS SUPPLIED.

CONTRACTOR SHALL PROTECT ALL EXISTING ROADS, CURBS/GUTTERS, TRAILS, TREES, LAWNS AND SITE ELEMENTS DURING PLANTING OPERATIONS. ANY DAMAGE TO SAME SHALL BE REPAIRED AT NO COST TO THE OWNER.

CONTRACTOR SHALL VERIFY ALIGNMENT AND LOCATION OF ALL UNDERGROUND AND ABOVE GRADE UTILITIES AND PROVIDE THE NECESSARY PROTECTION FOR SAME BEFORE CONSTRUCTION / MATERIAL INSTALLATION BEGINS (MINIMUM 10' - 0" CLEARANCE).

ALL UNDERGROUND UTILITIES SHALL BE LAID SO THAT TRENCHES DO NOT CUT THROUGH ROOT SYSTEMS OF ANY EXISTING TREES TO REMAIN.

EXISTING CONTOURS, TRAILS, VEGETATION, CURB/GUTTER AND OTHER EXISTING ELEMENTS BASED UPON INFORMATION SUPPLIED TO LANDSCAPE ARCHITECT BY OTHERS. CONTRACTOR SHALL VERIFY ANY AND ALL DISCREPANCIES PRIOR TO CONSTRUCTION AND NOTIFY LANDSCAPE ARCHITECT OF SAME.

THE ALIGNMENT AND GRADES OF THE PROPOSED WALKS, TRAILS AND/OR ROADWAYS ARE SUBJECT TO FIELD ADJUSTMENT REQUIRED TO CONFORM TO LOCALIZED TOPOGRAPHIC CONDITIONS AND TO MINIMIZE TREE REMOVAL AND GRADING. ANY CHANGE IN ALIGNMENT MUST BE APPROVED BY LANDSCAPE ARCHITECT.

IRRIGATION NOTES:

VERIFY EXISTING/PROPOSED IRRIGATION SYSTEM LAYOUT AND CONFIRM COMPLETE LIMITS OF IRRIGATION PRIOR TO SUPPLYING SHOP DRAWINGS.

LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN IRRIGATION LAYOUT PLAN AND SPECIFICATION AS A PART OF THE SCOPE OF WORK WHEN BIDDING. THESE SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO ORDER AND/OR INSTALLATION. IT SHALL BE THE LANDSCAPE CONTRACTORS RESPONSIBILITY TO INSURE THAT ALL SODDED/SEEDED AND PLANTED AREAS ARE IRRIGATED PROPERLY, INCLUDING THOSE AREAS DIRECTLY AROUND AND ABUTTING BUILDING FOUNDATION.

THE LANDSCAPE CONTRACTOR SHALL PROVIDE THE OWNER WITH AN IRRIGATION SCHEDULE APPROPRIATE TO THE PROJECT SITE CONDITIONS AND TO PLANT MATERIAL GROWTH REQUIREMENTS.

IRRIGATION SYSTEM IS NOT TO SPRINKLE ACROSS PAVEMENT. THE SYSTEM SHALL INCORPORATE A RAIN SENSOR INTO IRRIGATION SYSTEM.

PLANTINGS OUTSIDE THE LIMITS OF IRRIGATION ARE TO BE WATERED REGULARLY UNTIL PLANTING/SOD/SEED HAS BEEN ESTABLISHED.

CALL BEFORE YOU DIG!
Gopher State One Call
TWIN CITY AREA: 651-454-0002
TOLL FREE: 1-800-252-1166

0 20 40
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WARNING:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CALLING FOR LOCATIONS OF ALL EXISTING UTILITIES. THEY SHALL COOPERATE WITH ALL UTILITY COMPANIES IN MAINTAINING THEIR SERVICE AND / OR RELOCATION OF LINES.

THE CONTRACTOR SHALL CONTACT GOPHER STATE ONE CALL AT 651-454-0002 AT LEAST 48 HOURS IN ADVANCE FOR THE LOCATIONS OF ALL UNDERGROUND WIRES, CABLES, CONDUITS, PIPES, MANHOLES, VALVES OR OTHER BURIED STRUCTURES BEFORE DIGGING. THE CONTRACTOR SHALL REPAIR OR REPLACE THE ABOVE WHEN DAMAGED DURING CONSTRUCTION AT NO COST TO THE OWNER.

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Douglas D. Loken - LA

License No. 45591
Date

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LANDSCAPE PLAN

L1-1

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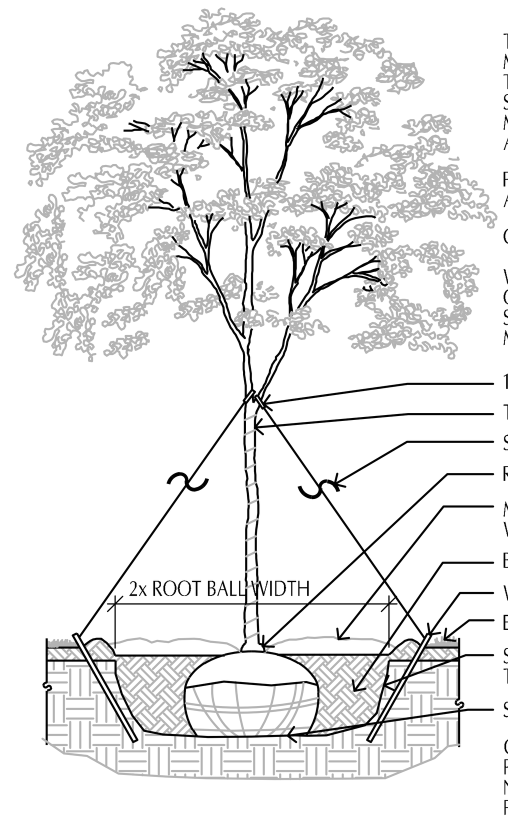
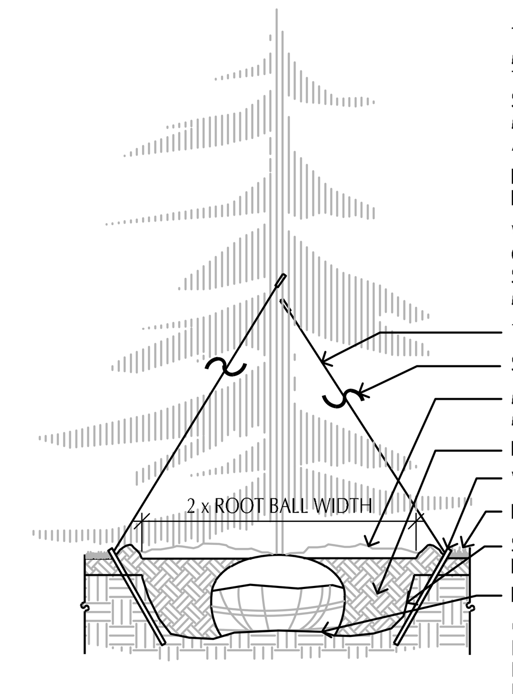


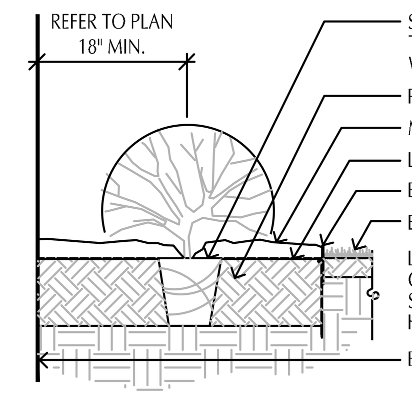
X / XX — DECIDUOUS TREE PLANTING DETAIL

SCALE: 1/2" = 1'-0"   Deciduous Tree.DWG



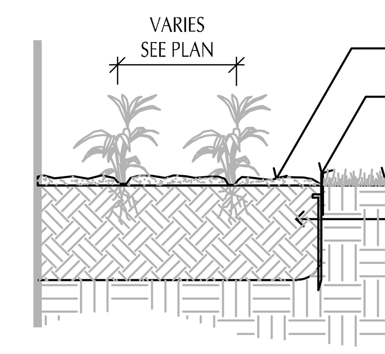
X / XX — CONIFEROUS TREE PLANTING DETAIL

SCALE: 1/2" = 1'-0"   Coniferous Tree.DWG



X / XX — SHRUB PLANTING DETAIL

SCALE: 3/4" = 1'-0"



X / XX — PERENNIAL PLANTING

SCALE: 3/4" = 1'-0"   Perennial.Dwg

LANDSCAPE INSTALLATION: [redacted]

COORDINATE THE PHASES OF CONSTRUCTION AND PLANTING INSTALLATION WITH OTHER CONTRACTORS WORKING ON SITE.

NO PLANTING WILL BE INSTALLED UNTIL COMPLETE GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.

WHERE SOD/SEED ABUTS PAVED SURFACES, FINISHED GRADE OF SOD/SEED SHALL BE HELD 1" BELOW SURFACE ELEVATION OF TRAIL, SLAB, CURB, ETC.

SEED ALL AREAS DISTURBED DUE TO GRADING OTHER THAN THOSE AREAS NOTED TO RECEIVE SOD. SEED SHALL BE INSTALLED AND MULCHED AS PER MNDOT SPECS.

SOD ALL DESIGNATED AREAS DISTURBED DUE TO GRADING. SOD SHALL BE LAID PARALLEL TO THE CONTOURS AND SHALL HAVE STAGGERED JOINTS. ON SLOPES STEEPER THAN 3:1 OR IN DRAINAGE SWALES, THE SOD SHALL BE STAKED TO THE GROUND.

ALL PLANT MATERIAL SHALL COMPLY WITH THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, AMERICAN ASSOCIATION OF NURSERYMEN. UNLESS NOTED OTHERWISE, ALL SHRUBS SHALL HAVE AT LEAST 5 CANES AT THE SPECIFIED MINIMUM SHRUB HEIGHT OR WIDTH. ORNAMENTAL TREES SHALL HAVE NO V CROTCHES AND SHALL BEGIN BRANCHING NO LOWER THAN 3' ABOVE ROOT BALL. STREET AND BOULEVARD TREES SHALL BEGIN BRANCHING NO LOWER THAN 5' ABOVE FINISHED GRADE.

ANY CONIFEROUS TREE PREVIOUSLY PRUNED FOR CHRISTMAS TREE SALES SHALL NOT BE USED. ALL CONIFEROUS TREES SHALL BE FULL FORM, NATURAL TO THE SPECIES, WITHOUT PRUNING.

PLAN TAKES PRECEDENCE OVER PLANT SCHEDULE IF DISCREPANCIES IN QUANTITIES EXIST. SPECIFICATIONS TAKE PRECEDENCE OVER NOTES.

NO PLANT MATERIAL SUBSTITUTIONS WILL BE ACCEPTED UNLESS APPROVAL IS REQUESTED OF THE LANDSCAPE ARCHITECT BY THE LANDSCAPE CONTRACTOR PRIOR TO THE SUBMISSION OF A BID AND/OR QUOTATION.

ALL PROPOSED PLANTS SHALL BE LOCATED AND STAKED AS SHOWN ON PLAN. ADJUSTMENTS IN LOCATION OF PROPOSED PLANT MATERIALS MAY BE NEEDED IN FIELD. SHOULD AN ADJUSTMENT BE ADVISED, THE LANDSCAPE ARCHITECT MUST BE NOTIFIED.

ALL PLANT MATERIALS SHALL BE FERTILIZED UPON INSTALLATION WITH A 27-3-3 SLOW RELEASE FERTILIZER MIXED IN WITH THE PLANTING SOIL PER THE MANUFACTURER'S INSTRUCTIONS. PLANTS MAY BE TREATED FOR SUMMER AND FALL INSTALLATION WITH AN APPLICATION OF GRANULAR 27-3-3 AT 6 OZ PER 2.5" CALIPER PER TREE AND 3 OZ PER SHRUB WITH AN ADDITIONAL APPLICATION OF 27-3-3 THE FOLLOWING SPRING IN THE TREE SAUCER.

ALL PLANTING AREAS RECEIVING GROUND COVER, PERENNIALS, ANNUALS, AND/OR VINES SHALL RECEIVE A MINIMUM OF 12" DEPTH OF PLANTING SOIL CONSISTING OF AT LEAST 45 PARTS TOPSOIL, 45 PARTS PEAT OR MANURE AND 10 PARTS SAND.

ALL PLANTS TO BE INSTALLED AS PER PLANTING DETAILS. REMOVE ALL FLAGGING AND LABELS FROM PLANTS.

WRAPPING MATERIAL SHALL BE CORRUGATED PVC PIPING 1" GREATER IN CALIPER THAN THE TREE BEING PROTECTED OR QUALITY, HEAVY, WATERPROOF CREPE PAPER MANUFACTURED FOR THIS PURPOSE. WRAP ALL DECIDUOUS TREES PLANTED IN THE FALL PRIOR TO 12-1 AND REMOVE ALL WRAPPING AFTER 5-1.

BLACK POLY EDGER TO BE USED TO CONTAIN SHRUBS, PERENNIALS, AND ANNUALS WHERE BED MEETS SOD/SEED UNLESS NOTED OTHERWISE.

ALL ANNUAL AND PERENNIAL PLANTING BEDS TO RECEIVE 3" DEEP SHREDDED HARDWOOD MULCH WITH NO WEED BARRIER.

ALL SHRUB BED MASSINGS TO RECEIVE 3" DEEP SHREDDED HARDWOOD MULCH AND FIBER MAT WEED BARRIER.

ALL TREES TO RECEIVE 4" DEEP SHREDDED HARDWOOD MULCH WITH NO MULCH IN DIRECT CONTACT WITH TREE TRUNK.

SPREAD GRANULAR PRE EMERGENT HERBICIDE (PREEN OR EQUAL) PER MANUFACTURER'S RECOMMENDATIONS UNDER ALL MULCHED AREAS.

MAINTENANCE STRIPS TO HAVE EDGER AND MULCH AS SPECIFIED/INDICATED ON DRAWING OR IN SPECIFICATION.

IF THE LANDSCAPE CONTRACTOR IS CONCERNED OR PERCEIVES ANY DEFICIENCIES IN THE PLANT SELECTIONS, SOIL CONDITIONS OR ANY OTHER SITE CONDITION WHICH MIGHT NEGATIVELY AFFECT PLANT ESTABLISHMENT, SURVIVAL OR GUARANTEE, HE MUST BRING THESE DEFICIENCIES TO THE ATTENTION OF THE LANDSCAPE ARCHITECT PRIOR TO PROCUREMENT AND/OR INSTALLATION.

CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST FOR THE OWNER ACCEPTANCE INSPECTION OF ALL LANDSCAPE AND SITE IMPROVEMENTS.

CONTRACTOR IS RESPONSIBLE FOR ON-GOING MAINTENANCE OF ALL NEWLY INSTALLED MATERIALS UNTIL TIME OF OWNER ACCEPTANCE. ANY ACTS OF VANDALISM OR DAMAGE WHICH MAY OCCUR PRIOR TO OWNER ACCEPTANCE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL PROVIDE THE OWNER WITH A MAINTENANCE PROGRAM INCLUDING, BUT NOT NECESSARILY LIMITED TO, PRUNING, FERTILIZATION AND DISEASE/PEST CONTROL.

CONTRACTOR SHALL GUARANTEE NEW PLANT MATERIAL THROUGH ONE CALENDAR YEAR FROM THE DATE OF OWNER ACCEPTANCE.

WARRANTY (ONE FULL GROWING SEASON) FOR LANDSCAPE MATERIALS SHALL BEGIN ON THE DATE OF ACCEPTANCE BY THE LANDSCAPE ARCHITECT AFTER THE COMPLETION OF PLANTING OF ALL LANDSCAPE MATERIALS. NO PARTIAL ACCEPTANCE WILL BE CONSIDERED.

UNLESS NOTED OTHERWISE THE APPROPRIATE DATES FOR SPRING PLANT MATERIAL INSTALLATION AND SEED/SOD PLACEMENT IS FROM THE TIME GROUND HAS THAWED TO JUNE 15.

FALL SODDING IS GENERALLY ACCEPTABLE FROM AUGUST 15 - NOVEMBER 1. FALL SEEDING FROM AUGUST 15 - SEPTEMBER 15; DORMANT SEEDING IN THE FALL SHALL NOT OCCUR PRIOR TO NOVEMBER 1. FALL CONIFEROUS PLANTING MAY OCCUR FROM AUGUST 15 - OCTOBER 1 AND DECIDUOUS PLANTING FROM THE FIRST FROST UNTIL NOVEMBER 15. PLANTING OUTSIDE THESE DATES IS NOT RECOMMENDED. ANY ADJUSTMENT MUST BE APPROVED IN WRITING BY THE LANDSCAPE ARCHITECT.

PROTECT ALL EXISTING OAKS ON SITE SCHEDULED TO REMAIN. IF EXISTING OAKS ARE DAMAGED IN ANY MANNER, ABOVE OR BELOW GROUND IN THE ROOT SYSTEM, AN ASPHALTIC TREE PRUNING PAINT SHOULD BE APPLIED IMMEDIATELY AFTER WOUNDING. OAKS ARE NOT TO BE PRUNED, REMOVED OR TRANSPLANTED BETWEEN APRIL 15 AND JULY 1. NOTIFY LANDSCAPE ARCHITECT IF THESE DATES ARE UNAVOIDABLE.

LANDSCAPE CONTRACTOR SHALL ESTABLISH TO HIS SATISFACTION THAT SOIL AND COMPACTION CONDITIONS ARE ADEQUATE TO ALLOW FOR PROPER DRAINAGE AT AND AROUND THE BUILDING SITE.

LEXINGTON APARTMENTS

St. Paul, MN

ALATUS

80 S. 8th Street, Suite 4155
Minneapolis, MN 55402

LOUCKS
PLANNING
CIVIL ENGINEERING
LAND SURVEYING
LANDSCAPE ARCHITECTURE
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CADD QUALIFICATION

CADD files prepared by the Consultant for this project are instruments of the Consultant professional services for use solely with respect to this project. These CADD files shall not be used on other projects, for additions to this project, or for completion of this project by others without written approval by the Consultant. With the Consultant's approval, others may be permitted to obtain copies of the CADD drawing files for information and reference only. All intentional or unintentional revisions, additions, or deletions to these CADD files shall be made at the full risk of that party making such revisions, additions or deletions and that party shall hold harmless and indemnify the Consultant from any & all responsibilities, claims, and liabilities.

SUBMITTAL/REVISIONS

11/19/20	CITY SUBMITTAL
12/10/20	CITY SUBMITTAL

PROFESSIONAL SIGNATURE

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Landscape Architect under the laws of the State of Minnesota.

Douglas D. Loken - LA

License No.	45591
Date	-

QUALITY CONTROL

Loucks Project No.	19114A
Project Lead	PJD
Drawn By	DDL
Checked By	DDL
Review Date	12/10/20

SHEET INDEX

C0-1	CIVIL NOTES
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LANDSCAPE DETAILS

L1-2

Plotted: 12 /10 / 2020 11:41 AM W:\2019\19114A\CADD DATA\LANDSCAPE_dwg Sheet Files\L1-2 Landscape Details

Stormwater Management Plan

Lexington Apartments
St. Paul, MN

Prepared by Loucks
December 9, 2020

Loucks Project No. 19114.0A

Lexington Apartments

St. Paul, Minnesota

Stormwater Management Plan

Introduction

This stormwater management plan was created for the Lexington Mixed-Use project located 411 & 417 Lexington Parkway North in St. Paul, Minnesota. The total project area encompasses 2.2 +/- acres.

The project generally consists of constructing an apartment building, with retail on the first floor, below ground parking and stormwater management systems.

Included in this plan are calculations for the proposed discharges of stormwater from each property area. The stormwater for all of the project area ultimately discharges to storm sewer in Lexington Parkway. A larger drainage area is analyzed based on the existing overall stormwater system in the shared road.

Requirements and Methodology

City of St. Paul and Capitol Region Watershed District Requirements

1. Rate Control – Peak rates shall not exceed 1.64 cubic feet per second per acre.
   – Runoff rates for the proposed activity shall not exceed existing runoff rates for the 2, 10, and 100-year critical storm events.

2. Volume Control – Stormwater runoff volume retention shall be achieved onsite in the amount equivalent to the runoff generated from 1.1-inch rainfall over the impervious surfaces of the development. The required stormwater runoff volume reduction shall be calculated as follows:

   Required Volume (ft^3) = Impervious Surfaces (ft^2) * 1.1 (in) * 1/12 (ft/in)

Methodology

The stormwater calculations were made utilizing the stormwater-modeling program HydroCAD 10.00. Calculations were performed for the Type II 24-hour 100-year rainfall events of 5.90 inches to meet the city of St. Paul requirements and ATLAS 14 2-year, 10-year, and 100-year rainfall events of 2.81 inches, 4.19 inches, and 7.36 inches respectively to meet the watershed requirements.

Existing Conditions

The existing site is currently vacant with the shared private roads on the north and west side of the site. There are currently two vaults in the shared private roads that treat stormwater. Infiltration is was a part of design but not utilized since infiltration was not required at the time of original design. The original design was recreated using the previous hydrology report and

current storm events. The existing stormwater treatment system does account for the north half of the proposed lot being to the requirements at that time.
The As-built model was created based on the survey, noting that the survey says the weir wall was never installed on the ultimate outlet from the system.

Proposed Conditions

The proposed plan will have two main drainage areas and two runoff drainage areas. The two main areas are the proposed building roof that will drain to an underground 8-foot pipe system. The storm vault will provide infiltration of the storm water to assist in meeting the watershed requirement of 1.1 inches of rainfall over new impervious area, as well as rate control to the larger vault system. The remainder of the infiltration will come from adjusting outlets within the existing vault system to utilize infiltration. Outlying areas will drain off site to the streets or into drainage areas that are captured in the existing vault system. To accommodate our proposed building, we will need to make modifications to the existing storm vault in terms of outlet control structures only. We will be adjusting the outlet and overflow elevations of the two existing structures to meet infiltration and rate control needs. It is noted on the survey that the ultimate outlet control structure for the system was never constructed, just a manhole that allows it to free flow off site. This will be rectified with the replacement of the structure.
The site consists of 1.67 acres of disturbed impervious surface within the site including disturbed existing roadway. There is an additional 0.2 acres of replaced and disturbed impervious outside the site boundary.
Modeling was done with the as-built storm, as that is what is in place with great effort to meet original design rates and high water level elevations.

Rate Control
The rate control requirements are that peak rates shall not exceed existing rates for the 2, 10, and 100-year events or 1.64 cfs/acre for the St. Paul 100-year event, whichever is less. Rate control is not required for the central drainage area. City streets will only be held to water quality standards, not rate control.

City rate control for the current site is achieved but hard to quantify as the larger area goes to the same system. The building is less and can be quantified because it goes to its own treatment system. Direct off is offset by reducing the total offsite. There are three direct off areas with impervious that would affect the rate control. The south and east are their own areas and can be quantified, the north direct to street is quantified by the change in rate from the existing to proposed for the drainage area to determine how much is increases by the site improvements. The existing conditions took into account a possible future development on the north side of our site with runoff to the north with rate control, the proposed condition, reduces the runoff to the north, see table 1.1 below. Table 1.2 shows the reduction of the remainder of the site, through reduction of the overall from the existing system as the system is reduced by more than just from our site through additional infiltration and outlet alterations. The existing systems reduced rates, including almost half of the proposed site already, making the north half of the site doubly reduced.

Table 1.1 – City Rate Off Site North

Street Rates (not to meet City 5.9")	Existing Runoff CFS	Proposed Runoff CFS	Different from Proposed
SE.LEX	0.84	0.79	-0.05
SW.LEX	2.51	2.48	-0.03

Table 1.2 – City Rate Off Site Total Remainder

Site (to meet City 5.9")	Drainage Area	Proposed Runoff	Allowed Runoff
SE.LP	0.035	0.19	0.06
E.LP	0.051	0.4	0.1
PROP	1.377	2.27	2.24
Total Site	1.463	**2.86**	**2.4**
LEX. Existing		26.79	
LEX. Proposed		25.25	
Difference		6.79-5.25 = 1.54	
Total Runoff		**2.86-1.54 =1.32**	**2.4**

Tables 1.3-1.5 below compare the existing peak runoff rate, and proposed peak runoff rates.

Table 1.3 – Peak Runoff Rates, Existing Design

	Area	2-Yr Storm Event		10-Yr Storm Event		5.9" Storm Event		100-Yr Storm Event	
Drainage Area	(Ac.)	Rate (cfs)	Volume (ac.ft.)	Rate (cfs)	Volume (ac.ft.)	Rate (cfs)	Volume (ac.ft.)	Rate (cfs)	Volume (ac.ft.)
E.HOU	0.01	0.01	0	**0.02**	0.001	0.05	0.002	**0.07**	0.003
EXSO	0.89	0.42	0.043	1.16	0.105	2.26	0.197	3.29	0.284
108"	1.05	0.68	0.134	0.93	0.23	1.41	0.36	7.22	0.475
SYS	7.46	6.33	1.157	8.46	1.926	30.29	2.917	48.33	3.782
TOTAL TO LEXINGTON	**8.36**	**6.75**	**1.201**	**9.6**	**2.032**	**32.08**	**3.116**	**50.14**	**4.069**

Table 1.4 – Peak Runoff Rates, Existing As-Built

Drainage Area	Area (Ac.)	2-Yr Storm Event Rate (cfs)	2-Yr Storm Event Volume (ac.ft.)	10-Yr Storm Event Rate (cfs)	10-Yr Storm Event Volume (ac.ft.)	5.9" Storm Event Rate (cfs)	5.9" Storm Event Volume (ac.ft.)	100-Yr Storm Event Rate (cfs)	100-Yr Storm Event Volume (ac.ft.)
E.HOU	0.01	0.01	0	**0.02**	0.001	0.05	0.002	**0.07**	0.003
EXSO	0.89	0.42	0.043	1.16	0.105	2.26	0.197	3.29	0.284
108"	1.05	0.68	0.125	0.94	0.221	2.1	0.35	6.9	0.466
SYS	7.46	6.08	1.179	7.83	1.948	24.67	2.938	40.2	3.803
TOTAL TO LEXINGTON	**8.36**	**6.5**	**1.223**	**8.96**	**2.054**	**26.79**	**3.138**	**40.22**	**4.09**

Table 1.5 – Peak Runoff Rates, Proposed As-Built

Drainage Area	Area (Ac.)	2-Yr Storm Event Rate (cfs)	2-Yr Storm Event Volume (ac.ft.)	10-Yr Storm Event Rate (cfs)	10-Yr Storm Event Volume (ac.ft.)	5.9" Storm Event Rate (cfs)	5.9" Storm Event Volume (ac.ft.)	100-Yr Storm Event Rate (cfs)	100-Yr Storm Event Volume (ac.ft.)
E.LP	0.051	0.15	0.007	0.26	0.012	0.4	0.019	0.52	0.024
SE.LP	0.035	0.04	0.002	0.1	0.004	0.19	0.008	0.27	0.012
PROP	1.377	1.02	0.142	1.6	0.29	2.27	0.48	8.48	0.645
108"	2.427	2.07	0.257	3.15	0.501	4.29	0.82	11.82	1.084
SYS	8.261	6.44	1.113	8.22	1.961	25.1	3.058	39.44	4
TOTAL TO LEXINGTON	**8.35**	**6.47**	**1.122**	**8.26**	**1.978**	**25.23**	**3.085**	**39.64**	**4.036**

<u>Water Quality</u>
To provide additional water quality, infiltration will be provided.

Based on the soil boring logs an infiltration type design is proposed to treat the stormwater runoff. The boring within the new proposed pipe system area shows SP type soils at the bottom of the system. The previous model used 0.25 in/hr for the larger existing system and none for the 108-inch pipe system, with the outlets at the bottom. As-built survey shows outlet elevations higher for the 108-inch system and no outlet control for the larger system. We are proposing raising the outlet and continuing to use the 0.25 in/hr for all existing even though borings show that at least 0.45 in/hr is practical for this area.

The proposed underground stormwater tank system is designed to meet the Capitol Region Watershed districts requirement of retaining 1.1 inch of rainfall over the impervious surfaces of the development with a maximum drawdown time of 48 hours. The calculations for the required volumes are shown below:

Required Volume (ft^3) = Impervious Surfaces (ft^2) * 1.1 (in) * 1/12 (ft/in)
= 1.87 x 1.1 x 1/12 = 0.1714 AC-FT or 7,467 CF

Volume below outlets:
SYS (881.35): 0.082 AC-FT
108" (881.5): 0.017 AC-FT
PROP (883.5): 0.091 AC-FT

The proposed volume under the outlets is = 0.190 AC-FT or 8,276 CF which is greater than required volume.

Best Management Practices

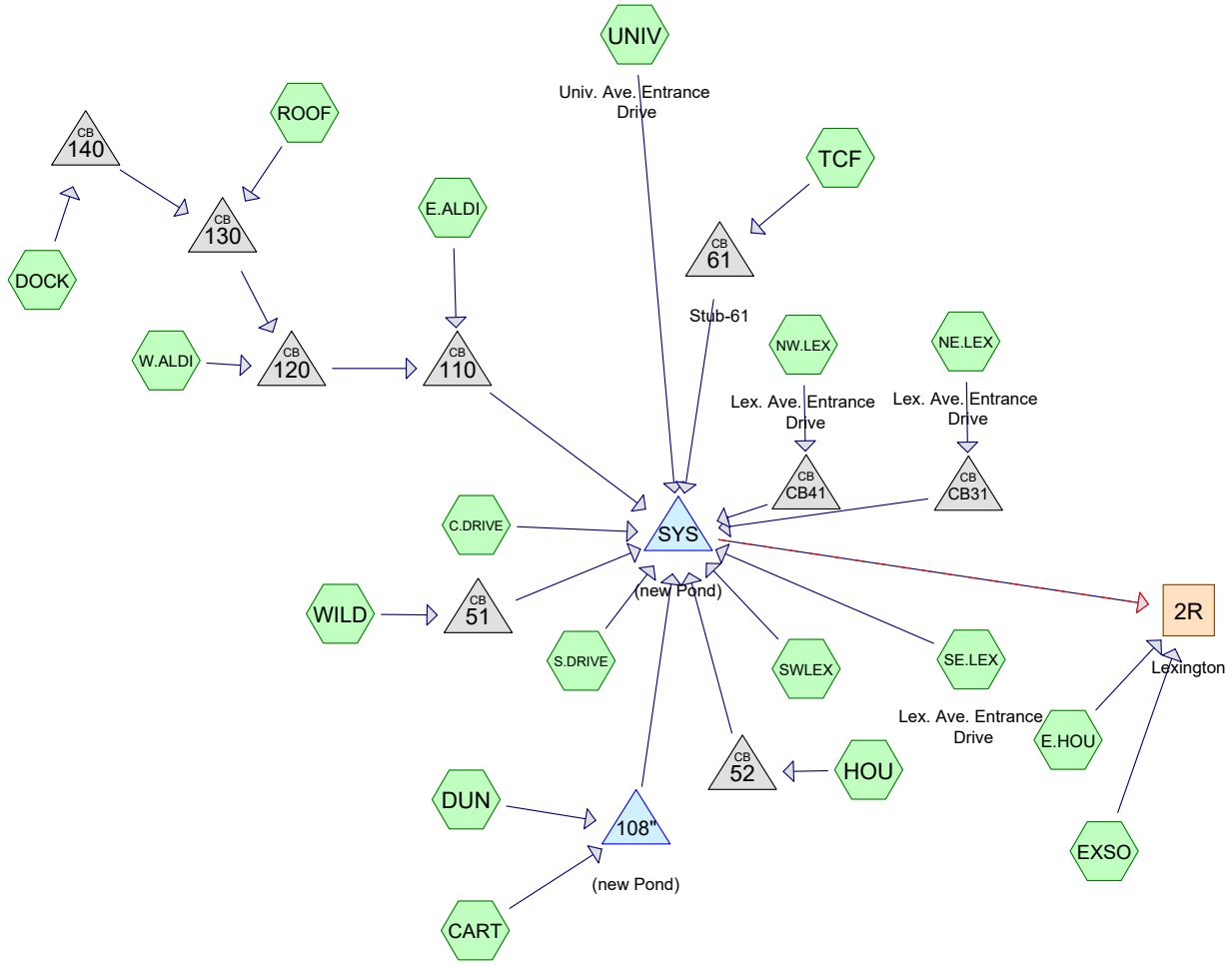
Best management practices (BMP's) will be implemented during construction per the project's stormwater pollution prevention plan. During construction, erosion control measures will include dust control, silt fencing, and a temporary rock construction entrance. Permanent BMP's will include stormwater management systems, surface pavements, and turf establishment (vegetation) of disturbed areas.

Conclusion

The proposed Stormwater Management Plan for the Lexington Apartment project provides an improved solution for the conveyance of stormwater on this site. The infiltration system will capture runoff and provide additional rate control and water quality on the site.

Appendix A

HydroCAD Report, Existing



Subcat Reach Pond Link

Routing Diagram for 19114-overall ex
Prepared by {enter your company name here}, Printed 12/9/2020
HydroCAD® 10.10-4b s/n 02676 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.316	98	(C.DRIVE, CART, DOCK, DUN, E.ALDI, EXSO, HOU, NE.LEX, S.DRIVE, SWLEX, W.ALDI, WILD)
2.414	69	(C.DRIVE, CART, DOCK, DUN, E.ALDI, E.HOU, EXSO, HOU, S.DRIVE, SWLEX, W.ALDI, WILD)
0.110	85	(WILD)
0.190	69	50-75% Grass cover, Fair, HSG B (NE.LEX, NW.LEX, SE.LEX, TCF, UNIV)
0.110	98	Paved parking, HSG B (NW.LEX)
0.540	98	Paved parking, HSG C (TCF)
0.250	96	ROADWAY (UNIV)
0.350	98	ROOF (ROOF)
0.080	98	Water Surface, HSG B (SE.LEX)

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	CART	0.00	0.00	172.0	0.0100	0.013	0.0	12.0	0.0
2	DUN	0.00	0.00	166.0	0.0200	0.013	0.0	12.0	0.0
3	WILD	0.00	0.00	159.0	0.0100	0.013	0.0	12.0	0.0
4	WILD	0.00	0.00	126.0	0.0100	0.013	0.0	15.0	0.0
5	WILD	0.00	0.00	54.0	0.0055	0.013	0.0	18.0	0.0
6	51	884.05	884.00	10.0	0.0050	0.013	0.0	18.0	0.0
7	52	884.05	884.00	10.0	0.0050	0.013	0.0	15.0	0.0
8	61	884.11	884.00	22.0	0.0050	0.013	0.0	12.0	0.0
9	108"	881.00	881.00	11.0	0.0000	0.013	0.0	24.0	0.0
10	110	885.11	884.00	86.0	0.0129	0.013	0.0	15.0	0.0
11	120	885.90	885.11	132.0	0.0060	0.013	0.0	15.0	0.0
12	130	886.78	886.10	68.0	0.0100	0.013	0.0	12.0	0.0
13	140	887.11	886.78	108.0	0.0031	0.013	0.0	12.0	0.0
14	CB31	884.23	884.00	23.0	0.0100	0.013	0.0	12.0	0.0
15	CB41	884.19	884.00	19.0	0.0100	0.013	0.0	12.0	0.0
16	SYS	879.31	878.81	50.0	0.0100	0.013	0.0	24.0	0.0

Summary for Subcatchment C.DRIVE:

Runoff = 0.51 cfs @ 12.10 hrs, Volume= 0.025 af, Depth= 2.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 1.27 cfs @ 12.23 hrs, Volume= 0.093 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.340	98	
*	0.420	69	
	0.760	82	Weighted Average
	0.420	69	55.26% Pervious Area
	0.340	98	44.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	156	0.0615	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	93	0.1150	5.09		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	172	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.8	421	Total			

Summary for Subcatchment DOCK:

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 0.64 cfs @ 12.22 hrs, Volume= 0.046 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 1.32 cfs @ 12.23 hrs, Volume= 0.097 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.HOU:

Runoff = 0.01 cfs @ 12.16 hrs, Volume= 0.000 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.000	98	
*	0.010	69	
	0.010	69	Weighted Average
	0.010	69	100.00% Pervious Area

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

Summary for Subcatchment EXSO:

Runoff = 0.42 cfs @ 12.43 hrs, Volume= 0.043 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.006	98	
*	0.884	69	
	0.890	69	Weighted Average
	0.884	69	99.33% Pervious Area
	0.006	98	0.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.1	240	0.0300	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment HOU:

Runoff = 2.60 cfs @ 12.14 hrs, Volume= 0.144 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.650	98	
*	0.080	69	
	0.730	95	Weighted Average
	0.080	69	10.96% Pervious Area
	0.650	98	89.04% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.26 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 0.52 cfs @ 12.06 hrs, Volume= 0.024 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 1.62 cfs @ 12.06 hrs, Volume= 0.075 af, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 0.65 cfs @ 12.10 hrs, Volume= 0.031 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.130	98	
*	0.070	69	
	0.200	88	Weighted Average
	0.070	69	35.00% Pervious Area
	0.130	98	65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	19	0.0520	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.34 cfs @ 12.14 hrs, Volume= 0.019 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
0.040	69	50-75% Grass cover, Fair, HSG B
0.080	98	Water Surface, HSG B
0.120	88	Weighted Average
0.040	69	33.33% Pervious Area
0.080	98	66.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 0.98 cfs @ 12.10 hrs, Volume= 0.047 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.190	98	
*	0.140	69	
	0.330	86	Weighted Average
	0.140	69	42.42% Pervious Area
	0.190	98	57.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 2.14 cfs @ 12.14 hrs, Volume= 0.118 af, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 1.10 cfs @ 12.10 hrs, Volume= 0.048 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.250	96	ROADWAY
	0.070	69	50-75% Grass cover, Fair, HSG B
	0.320	90	Weighted Average
	0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 1.91 cfs @ 12.09 hrs, Volume= 0.093 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 5.78 cfs @ 12.22 hrs, Volume= 0.410 af, Depth= 2.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: Lexington

Inflow Area = 8.360 ac, 64.55% Impervious, Inflow Depth = 1.72" for 2-Year event
Inflow = 6.75 cfs @ 12.43 hrs, Volume= 1.201 af
Outflow = 6.75 cfs @ 12.43 hrs, Volume= 1.201 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 2.11" for 2-Year event
Inflow = 5.78 cfs @ 12.22 hrs, Volume= 0.410 af
Outflow = 5.78 cfs @ 12.22 hrs, Volume= 0.410 af, Atten= 0%, Lag= 0.0 min
Primary = 5.78 cfs @ 12.22 hrs, Volume= 0.410 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.55' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.67 cfs @ 12.22 hrs HW=885.53' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.67 cfs @ 4.05 fps)

Summary for Pond 52:

Inflow Area = 0.730 ac, 89.04% Impervious, Inflow Depth = 2.36" for 2-Year event
Inflow = 2.60 cfs @ 12.14 hrs, Volume= 0.144 af
Outflow = 2.60 cfs @ 12.14 hrs, Volume= 0.144 af, Atten= 0%, Lag= 0.0 min
Primary = 2.60 cfs @ 12.14 hrs, Volume= 0.144 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.05' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=2.52 cfs @ 12.14 hrs HW=885.03' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.52 cfs @ 3.34 fps)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 2.44" for 2-Year event
Inflow = 2.14 cfs @ 12.14 hrs, Volume= 0.118 af
Outflow = 2.14 cfs @ 12.14 hrs, Volume= 0.118 af, Atten= 0%, Lag= 0.0 min
Primary = 2.14 cfs @ 12.14 hrs, Volume= 0.118 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.18' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.07 cfs @ 12.14 hrs HW=885.16' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.07 cfs @ 3.14 fps)

Summary for Pond 108": (new Pond)

Inflow Area = 1.050 ac, 50.48% Impervious, Inflow Depth = 1.58" for 2-Year event
Inflow = 1.90 cfs @ 12.23 hrs, Volume= 0.139 af
Outflow = 0.68 cfs @ 12.52 hrs, Volume= 0.134 af, Atten= 64%, Lag= 17.7 min
Primary = 0.68 cfs @ 12.52 hrs, Volume= 0.134 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 883.76' @ 12.52 hrs Surf.Area= 0.023 ac Storage= 0.043 af

Plug-Flow detention time= 60.0 min calculated for 0.134 af (97% of inflow)
Center-of-Mass det. time= 41.6 min (820.7 - 779.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	0.056 af	**15.00'W x 66.00'L x 10.00'H Field A** 0.227 af Overall - 0.088 af Embedded = 0.140 af x 40.0% Voids
#2A	881.00'	0.088 af	**CMP Round 108** x 3 Inside #1 Effective Size= 108.0"W x 108.0"H => 63.62 sf x 20.00'L = 1,272.3 cf Overall Size= 108.0"W x 108.0"H x 20.00'L
		0.143 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	**24.0" Round Culvert** L= 11.0' Ke= 0.500 Inlet / Outlet Invert= 881.00' / 881.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	881.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.68 cfs @ 12.52 hrs HW=883.76' (Free Discharge)
└─**1=Culvert** (Passes 0.68 cfs of 17.14 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.68 cfs @ 7.75 fps)
  └─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 2.29" for 2-Year event
Inflow = 4.43 cfs @ 12.09 hrs, Volume= 0.279 af
Outflow = 4.43 cfs @ 12.09 hrs, Volume= 0.279 af, Atten= 0%, Lag= 0.0 min
Primary = 4.43 cfs @ 12.09 hrs, Volume= 0.279 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 886.28' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=4.27 cfs @ 12.09 hrs HW=886.25' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.27 cfs @ 3.64 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 2.44" for 2-Year event
Inflow = 3.69 cfs @ 12.08 hrs, Volume= 0.181 af
Outflow = 3.69 cfs @ 12.08 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min
Primary = 3.69 cfs @ 12.08 hrs, Volume= 0.181 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.03' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.48 cfs @ 12.08 hrs HW=886.99' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.48 cfs @ 4.11 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 2.53" for 2-Year event
Inflow = 1.86 cfs @ 12.06 hrs, Volume= 0.089 af
Outflow = 1.86 cfs @ 12.06 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min
Primary = 1.86 cfs @ 12.06 hrs, Volume= 0.089 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.54' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.78 cfs @ 12.06 hrs HW=887.52' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.78 cfs @ 4.00 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 2.29" for 2-Year event
Inflow = 0.28 cfs @ 12.09 hrs, Volume= 0.013 af
Outflow = 0.28 cfs @ 12.09 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.09 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.45' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.27 cfs @ 12.09 hrs HW=887.44' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.27 cfs @ 1.77 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 1.83" for 2-Year event
Inflow = 0.26 cfs @ 12.07 hrs, Volume= 0.012 af
Outflow = 0.26 cfs @ 12.07 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min
Primary = 0.26 cfs @ 12.07 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.50' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.25 cfs @ 12.07 hrs HW=884.49' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.25 cfs @ 2.33 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 2.41" for 2-Year event
Inflow = 0.52 cfs @ 12.06 hrs, Volume= 0.024 af
Outflow = 0.52 cfs @ 12.06 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min
Primary = 0.52 cfs @ 12.06 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.58' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.49 cfs @ 12.06 hrs HW=884.57' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.49 cfs @ 2.68 fps)

Summary for Pond SYS: (new Pond)

Inflow Area = 7.460 ac, 72.25% Impervious, Inflow Depth = 2.08" for 2-Year event
Inflow = 17.06 cfs @ 12.12 hrs, Volume= 1.292 af
Outflow = 6.39 cfs @ 12.42 hrs, Volume= 1.292 af, Atten= 63%, Lag= 18.5 min
Discarded = 0.05 cfs @ 6.25 hrs, Volume= 0.134 af
Primary = 6.33 cfs @ 12.42 hrs, Volume= 1.157 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 883.48' @ 12.42 hrs Surf.Area= 9,472 sf Storage= 17,198 cf

Plug-Flow detention time= 77.1 min calculated for 1.292 af (100% of inflow)
Center-of-Mass det. time= 76.7 min (846.0 - 769.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A** 35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.00'	12,272 cf	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.50'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B** 21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.00'	7,707 cf	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.00'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.00'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.00'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.00'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.00'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.00'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.00'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.00'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.00'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.00'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.00'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.00'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.50'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	879.31'	**24.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 879.31' / 878.81' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.00'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	885.80'	**7.0' long x 1.0' 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

Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

#6 Secondary 888.40' **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=0.05 cfs @ 6.25 hrs HW=880.61' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=6.33 cfs @ 12.42 hrs HW=883.47' (Free Discharge)
└─**2=Culvert** (Passes 6.33 cfs of 26.90 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 1.41 cfs @ 7.18 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 4.92 cfs @ 7.04 fps)
  └─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.50' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 0.80 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 2.25 cfs @ 12.23 hrs, Volume= 0.161 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.340	98	
*	0.420	69	
	0.760	82	Weighted Average
	0.420	69	55.26% Pervious Area
	0.340	98	44.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	156	0.0615	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	93	0.1150	5.09		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	172	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.8	421	Total			

Summary for Subcatchment DOCK:

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 3.59"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 1.05 cfs @ 12.22 hrs, Volume= 0.074 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 2.11 cfs @ 12.23 hrs, Volume= 0.156 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.HOU:

Runoff = 0.02 cfs @ 12.15 hrs, Volume= 0.001 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.000	98	
*	0.010	69	
	0.010	69	Weighted Average
	0.010	69	100.00% Pervious Area

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

Summary for Subcatchment EXSO:

Runoff = 1.16 cfs @ 12.40 hrs, Volume= 0.105 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.006	98	
*	0.884	69	
	0.890	69	Weighted Average
	0.884	69	99.33% Pervious Area
	0.006	98	0.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.1	240	0.0300	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment HOU:

Runoff = 4.00 cfs @ 12.14 hrs, Volume= 0.223 af, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.650	98	
*	0.080	69	
	0.730	95	Weighted Average
	0.080	69	10.96% Pervious Area
	0.650	98	89.04% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 2.43 cfs @ 12.06 hrs, Volume= 0.115 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 1.06 cfs @ 12.10 hrs, Volume= 0.051 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.130	98	
*	0.070	69	
	0.200	88	Weighted Average
	0.070	69	35.00% Pervious Area
	0.130	98	65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	19	0.0520	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.56 cfs @ 12.14 hrs, Volume= 0.031 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
0.040	69	50-75% Grass cover, Fair, HSG B
0.080	98	Water Surface, HSG B
0.120	88	Weighted Average
0.040	69	33.33% Pervious Area
0.080	98	66.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 1.64 cfs @ 12.10 hrs, Volume= 0.079 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.190	98	
*	0.140	69	
	0.330	86	Weighted Average
	0.140	69	42.42% Pervious Area
	0.190	98	57.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 1.83 cfs @ 12.10 hrs, Volume= 0.083 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.250	96	ROADWAY
	0.070	69	50-75% Grass cover, Fair, HSG B
	0.320	90	Weighted Average
	0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 2.93 cfs @ 12.09 hrs, Volume= 0.144 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: Lexington

Inflow Area = 8.360 ac, 64.55% Impervious, Inflow Depth = 2.92" for 10-Year event
Inflow = 9.60 cfs @ 12.43 hrs, Volume= 2.032 af
Outflow = 9.60 cfs @ 12.43 hrs, Volume= 2.032 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 3.37" for 10-Year event
Inflow = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af
Outflow = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af, Atten= 0%, Lag= 0.0 min
Primary = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 886.21' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=9.01 cfs @ 12.22 hrs HW=886.18' (Free Discharge)
└**1=Culvert** (Barrel Controls 9.01 cfs @ 5.10 fps)

Summary for Pond 52:

Inflow Area = 0.730 ac, 89.04% Impervious, Inflow Depth = 3.67" for 10-Year event
Inflow = 4.00 cfs @ 12.14 hrs, Volume= 0.223 af
Outflow = 4.00 cfs @ 12.14 hrs, Volume= 0.223 af, Atten= 0%, Lag= 0.0 min
Primary = 4.00 cfs @ 12.14 hrs, Volume= 0.223 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.37' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.87 cfs @ 12.14 hrs HW=885.34' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.87 cfs @ 3.78 fps)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af
Outflow = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af, Atten= 0%, Lag= 0.0 min
Primary = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.79' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=3.16 cfs @ 12.14 hrs HW=885.73' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.16 cfs @ 4.02 fps)

Summary for Pond 108": (new Pond)

Inflow Area = 1.050 ac, 50.48% Impervious, Inflow Depth = 2.69" for 10-Year event
Inflow = 3.29 cfs @ 12.23 hrs, Volume= 0.235 af
Outflow = 0.93 cfs @ 12.59 hrs, Volume= 0.230 af, Atten= 72%, Lag= 21.5 min
Primary = 0.93 cfs @ 12.59 hrs, Volume= 0.230 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 886.08' @ 12.59 hrs Surf.Area= 0.023 ac Storage= 0.081 af

Plug-Flow detention time= 58.0 min calculated for 0.230 af (98% of inflow)
Center-of-Mass det. time= 46.4 min (822.4 - 776.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	0.056 af	**15.00'W x 66.00'L x 10.00'H Field A** 0.227 af Overall - 0.088 af Embedded = 0.140 af x 40.0% Voids
#2A	881.00'	0.088 af	**CMP Round 108** x 3 Inside #1 Effective Size= 108.0"W x 108.0"H => 63.62 sf x 20.00'L = 1,272.3 cf Overall Size= 108.0"W x 108.0"H x 20.00'L
		0.143 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	**24.0" Round Culvert** L= 11.0' Ke= 0.500 Inlet / Outlet Invert= 881.00' / 881.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	881.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.93 cfs @ 12.59 hrs HW=886.08' (Free Discharge)
└─**1=Culvert** (Passes 0.93 cfs of 30.55 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.93 cfs @ 10.67 fps)
  └─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 3.59" for 10-Year event
Inflow = 6.81 cfs @ 12.09 hrs, Volume= 0.436 af
Outflow = 6.81 cfs @ 12.09 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min
Primary = 6.81 cfs @ 12.09 hrs, Volume= 0.436 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.05' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=6.56 cfs @ 12.09 hrs HW=886.97' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.56 cfs @ 5.35 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 5.62 cfs @ 12.08 hrs, Volume= 0.280 af
Outflow = 5.62 cfs @ 12.08 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Primary = 5.62 cfs @ 12.08 hrs, Volume= 0.280 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.78' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.16 cfs @ 12.08 hrs HW=887.62' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.16 cfs @ 4.21 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 3.89" for 10-Year event
Inflow = 2.81 cfs @ 12.06 hrs, Volume= 0.136 af
Outflow = 2.81 cfs @ 12.06 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min
Primary = 2.81 cfs @ 12.06 hrs, Volume= 0.136 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.82' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.68 cfs @ 12.06 hrs HW=887.78' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.68 cfs @ 3.42 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 3.59" for 10-Year event
Inflow = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af
Outflow = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.53' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 12.09 hrs HW=887.52' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.42 cfs @ 2.01 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 2.99" for 10-Year event
Inflow = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af
Outflow = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.58' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.41 cfs @ 12.07 hrs HW=884.57' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.41 cfs @ 2.62 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 3.74" for 10-Year event
Inflow = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af
Outflow = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.69' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.06 hrs HW=884.67' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.76 cfs @ 2.94 fps)

Summary for Pond SYS: (new Pond)

Inflow Area = 7.460 ac, 72.25% Impervious, Inflow Depth = 3.33" for 10-Year event
Inflow = 26.78 cfs @ 12.11 hrs, Volume= 2.067 af
Outflow = 8.52 cfs @ 12.47 hrs, Volume= 2.067 af, Atten= 68%, Lag= 21.2 min
Discarded = 0.05 cfs @ 4.85 hrs, Volume= 0.141 af
Primary = 8.46 cfs @ 12.47 hrs, Volume= 1.926 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.17' @ 12.47 hrs Surf.Area= 9,472 sf Storage= 28,404 cf

Plug-Flow detention time= 67.8 min calculated for 2.067 af (100% of inflow)
Center-of-Mass det. time= 67.4 min (832.8 - 765.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A** 35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.00'	12,272 cf	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.50'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B** 21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.00'	7,707 cf	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.00'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.00'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.00'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.00'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.00'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.00'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.00'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.00'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.00'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.00'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.00'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.00'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.50'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	879.31'	**24.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 879.31' / 878.81' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.00'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	885.80'	**7.0' long x 1.0' 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

Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

#6 Secondary 888.40' **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=0.05 cfs @ 4.85 hrs HW=880.61' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=8.46 cfs @ 12.47 hrs HW=885.17' (Free Discharge)
└─**2=Culvert** (Passes 8.46 cfs of 33.35 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 1.87 cfs @ 9.53 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 6.58 cfs @ 9.43 fps)
  └─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.50' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 1.49 cfs @ 12.10 hrs, Volume= 0.075 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 4.76 cfs @ 12.23 hrs, Volume= 0.335 af, Depth= 5.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.340	98	
*	0.420	69	
	0.760	82	Weighted Average
	0.420	69	55.26% Pervious Area
	0.340	98	44.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	156	0.0615	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	93	0.1150	5.09		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	172	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.8	421	Total			

Summary for Subcatchment DOCK:

Runoff = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 6.65"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 2.05 cfs @ 12.22 hrs, Volume= 0.145 af, Depth= 5.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 4.01 cfs @ 12.23 hrs, Volume= 0.297 af, Depth= 6.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.HOU:

Runoff = 0.07 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.000	98	
*	0.010	69	
	0.010	69	Weighted Average
	0.010	69	100.00% Pervious Area

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

Summary for Subcatchment EXSO:

Runoff = 3.29 cfs @ 12.38 hrs, Volume= 0.284 af, Depth= 3.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.006	98	
*	0.884	69	
	0.890	69	Weighted Average
	0.884	69	99.33% Pervious Area
	0.006	98	0.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.1	240	0.0300	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment HOU:

Runoff = 7.25 cfs @ 12.14 hrs, Volume= 0.411 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.650	98	
*	0.080	69	
	0.730	95	Weighted Average
	0.080	69	10.96% Pervious Area
	0.650	98	89.04% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af, Depth= 5.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af, Depth= 6.84"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 4.29 cfs @ 12.06 hrs, Volume= 0.208 af, Depth= 7.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 2.06 cfs @ 12.10 hrs, Volume= 0.099 af, Depth= 5.96"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.130	98	
*	0.070	69	
	0.200	88	Weighted Average
	0.070	69	35.00% Pervious Area
	0.130	98	65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	19	0.0520	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 1.08 cfs @ 12.14 hrs, Volume= 0.060 af, Depth= 6.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
0.040	69	50-75% Grass cover, Fair, HSG B
0.080	98	Water Surface, HSG B
0.120	88	Weighted Average
0.040	69	33.33% Pervious Area
0.080	98	66.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 3.28 cfs @ 12.10 hrs, Volume= 0.157 af, Depth= 5.72"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.190	98	
*	0.140	69	
	0.330	86	Weighted Average
	0.140	69	42.42% Pervious Area
	0.190	98	57.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af, Depth= 6.89"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 3.49 cfs @ 12.10 hrs, Volume= 0.165 af, Depth= 6.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.250	96	ROADWAY
	0.070	69	50-75% Grass cover, Fair, HSG B
	0.320	90	Weighted Average
	0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 5.31 cfs @ 12.09 hrs, Volume= 0.265 af, Depth= 6.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af, Depth= 6.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: Lexington

Inflow Area = 8.360 ac, 64.55% Impervious, Inflow Depth = 5.84" for 100-Year event
Inflow = 50.14 cfs @ 12.17 hrs, Volume= 4.069 af
Outflow = 50.14 cfs @ 12.17 hrs, Volume= 4.069 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 6.38" for 100-Year event
Inflow = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af
Outflow = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af, Atten= 0%, Lag= 0.0 min
Primary = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 888.91' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=16.95 cfs @ 12.22 hrs HW=888.77' (Free Discharge)
└**1=Culvert** (Inlet Controls 16.95 cfs @ 9.59 fps)

Summary for Pond 52:

Inflow Area = 0.730 ac, 89.04% Impervious, Inflow Depth = 6.76" for 100-Year event
Inflow = 7.25 cfs @ 12.14 hrs, Volume= 0.411 af
Outflow = 7.25 cfs @ 12.14 hrs, Volume= 0.411 af, Atten= 0%, Lag= 0.0 min
Primary = 7.25 cfs @ 12.14 hrs, Volume= 0.411 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 886.18' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=7.02 cfs @ 12.14 hrs HW=886.13' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.02 cfs @ 5.72 fps)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 6.89" for 100-Year event
Inflow = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af
Outflow = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af, Atten= 0%, Lag= 0.0 min
Primary = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 888.43' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=5.66 cfs @ 12.14 hrs HW=888.21' (Free Discharge)
└**1=Culvert** (Inlet Controls 5.66 cfs @ 7.21 fps)

Summary for Pond 108": (new Pond)

Inflow Area = 1.050 ac, 50.48% Impervious, Inflow Depth = 5.48" for 100-Year event
Inflow = 6.79 cfs @ 12.23 hrs, Volume= 0.480 af
Outflow = 7.22 cfs @ 12.35 hrs, Volume= 0.475 af, Atten= 0%, Lag= 7.5 min
Primary = 7.22 cfs @ 12.35 hrs, Volume= 0.475 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 892.18' @ 12.35 hrs Surf.Area= 0.023 ac Storage= 0.143 af

Plug-Flow detention time= 53.3 min calculated for 0.475 af (99% of inflow)
Center-of-Mass det. time= 47.5 min (818.5 - 770.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	0.056 af	**15.00'W x 66.00'L x 10.00'H Field A** 0.227 af Overall - 0.088 af Embedded = 0.140 af x 40.0% Voids
#2A	881.00'	0.088 af	**CMP Round 108** x 3 Inside #1 Effective Size= 108.0"W x 108.0"H => 63.62 sf x 20.00'L = 1,272.3 cf Overall Size= 108.0"W x 108.0"H x 20.00'L
		0.143 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	**24.0" Round Culvert** L= 11.0' Ke= 0.500 Inlet / Outlet Invert= 881.00' / 881.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	881.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=7.21 cfs @ 12.35 hrs HW=892.17' (Free Discharge)
└─**1=Culvert** (Passes 7.21 cfs of 48.25 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.39 cfs @ 15.97 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 5.81 cfs @ 4.35 fps)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 6.64" for 100-Year event
Inflow = 12.36 cfs @ 12.09 hrs, Volume= 0.808 af
Outflow = 12.36 cfs @ 12.09 hrs, Volume= 0.808 af, Atten= 0%, Lag= 0.0 min
Primary = 12.36 cfs @ 12.09 hrs, Volume= 0.808 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 890.74' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=11.93 cfs @ 12.09 hrs HW=890.40' (Free Discharge)
└─**1=Culvert** (Barrel Controls 11.93 cfs @ 9.72 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 6.90" for 100-Year event
Inflow = 10.09 cfs @ 12.08 hrs, Volume= 0.512 af
Outflow = 10.09 cfs @ 12.08 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.0 min
Primary = 10.09 cfs @ 12.08 hrs, Volume= 0.512 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 891.06' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.51 cfs @ 12.08 hrs HW=890.63' (Free Discharge)
└**1=Culvert** (Barrel Controls 9.51 cfs @ 7.75 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 7.04" for 100-Year event
Inflow = 4.99 cfs @ 12.06 hrs, Volume= 0.246 af
Outflow = 4.99 cfs @ 12.06 hrs, Volume= 0.246 af, Atten= 0%, Lag= 0.0 min
Primary = 4.99 cfs @ 12.06 hrs, Volume= 0.246 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 889.36' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=4.77 cfs @ 12.06 hrs HW=889.18' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.77 cfs @ 6.07 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 6.65" for 100-Year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af
Outflow = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.70' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.09 hrs HW=887.68' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.76 cfs @ 2.37 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 5.88" for 100-Year event
Inflow = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af
Outflow = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.74' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.80 cfs @ 12.07 hrs HW=884.72' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.80 cfs @ 3.04 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 6.84" for 100-Year event
Inflow = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af
Outflow = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
Primary = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.90' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.06 hrs HW=884.88' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.36 cfs @ 3.34 fps)

Summary for Pond SYS: (new Pond)

Inflow Area = 7.460 ac, 72.25% Impervious, Inflow Depth = 6.32" for 100-Year event
Inflow = 49.68 cfs @ 12.11 hrs, Volume= 3.930 af
Outflow = 48.39 cfs @ 12.17 hrs, Volume= 3.930 af, Atten= 3%, Lag= 3.5 min
Discarded = 0.06 cfs @ 12.16 hrs, Volume= 0.148 af
Primary = 47.65 cfs @ 12.17 hrs, Volume= 3.778 af
Secondary = 0.84 cfs @ 12.15 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 888.88' @ 12.17 hrs Surf.Area= 12,000 sf Storage= 35,687 cf

Plug-Flow detention time= 49.6 min calculated for 3.930 af (100% of inflow)
Center-of-Mass det. time= 49.2 min (809.2 - 760.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A** 35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.00'	12,272 cf	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.50'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B** 21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.00'	7,707 cf	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.00'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.00'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.00'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.00'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.00'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.00'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.00'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.00'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.00'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.00'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.00'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.00'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.50'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	879.31'	**24.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 879.31' / 878.81' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.00'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	885.80'	**7.0' long x 1.0' 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

Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

#6 Secondary 888.40' **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=0.06 cfs @ 12.16 hrs HW=888.55' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=43.30 cfs @ 12.17 hrs HW=888.50' (Free Discharge)
└─**2=Culvert** (Inlet Controls 43.30 cfs @ 13.78 fps)
  ├─**3=Orifice/Grate** (Passes < 2.55 cfs potential flow)
  ├─**4=Orifice/Grate** (Passes < 9.00 cfs potential flow)
  └─**5=Broad-Crested Rectangular Weir** (Passes < 103.14 cfs potential flow)

Secondary OutFlow Max=0.81 cfs @ 12.15 hrs HW=888.57' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 0.81 cfs @ 0.96 fps)

Summary for Subcatchment C.DRIVE:

Runoff = 1.17 cfs @ 12.10 hrs, Volume= 0.058 af, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 3.58 cfs @ 12.23 hrs, Volume= 0.253 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.340	98	
*	0.420	69	
	0.760	82	Weighted Average
	0.420	69	55.26% Pervious Area
	0.340	98	44.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	156	0.0615	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	93	0.1150	5.09		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	172	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.8	421	Total			

Summary for Subcatchment DOCK:

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 1.58 cfs @ 12.22 hrs, Volume= 0.112 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 3.13 cfs @ 12.23 hrs, Volume= 0.231 af, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.HOU:

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 0.002 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.000	98	
*	0.010	69	
	0.010	69	Weighted Average
	0.010	69	100.00% Pervious Area

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

Summary for Subcatchment EXSO:

Runoff = 2.26 cfs @ 12.39 hrs, Volume= 0.197 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.006	98	
*	0.884	69	
	0.890	69	Weighted Average
	0.884	69	99.33% Pervious Area
	0.006	98	0.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.1	240	0.0300	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment HOU:

Runoff = 5.75 cfs @ 12.14 hrs, Volume= 0.324 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.650	98	
*	0.080	69	
	0.730	95	Weighted Average
	0.080	69	10.96% Pervious Area
	0.650	98	89.04% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af, Depth= 5.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 3.44 cfs @ 12.06 hrs, Volume= 0.165 af, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 1.59 cfs @ 12.10 hrs, Volume= 0.077 af, Depth= 4.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.130	98	
*	0.070	69	
	0.200	88	Weighted Average
	0.070	69	35.00% Pervious Area
	0.130	98	65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	19	0.0520	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.84 cfs @ 12.14 hrs, Volume= 0.047 af, Depth= 4.65"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (ac)	CN	Description
0.040	69	50-75% Grass cover, Fair, HSG B
0.080	98	Water Surface, HSG B
0.120	88	Weighted Average
0.040	69	33.33% Pervious Area
0.080	98	66.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 2.51 cfs @ 12.10 hrs, Volume= 0.120 af, Depth= 4.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.190	98	
*	0.140	69	
	0.330	86	Weighted Average
	0.140	69	42.42% Pervious Area
	0.190	98	57.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af, Depth= 5.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 2.73 cfs @ 12.10 hrs, Volume= 0.127 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.250	96	ROADWAY
	0.070	69	50-75% Grass cover, Fair, HSG B
	0.320	90	Weighted Average
	0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 4.21 cfs @ 12.09 hrs, Volume= 0.209 af, Depth= 5.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: Lexington

Inflow Area = 8.360 ac, 64.55% Impervious, Inflow Depth = 4.47" for 100-Year St. Paul event
Inflow = 32.08 cfs @ 12.26 hrs, Volume= 3.116 af
Outflow = 32.08 cfs @ 12.26 hrs, Volume= 3.116 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 4.98" for 100-Year St. Paul event
Inflow = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af
Outflow = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af, Atten= 0%, Lag= 0.0 min
Primary = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.32' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=13.26 cfs @ 12.22 hrs HW=887.23' (Free Discharge)
└**1=Culvert** (Inlet Controls 13.26 cfs @ 7.51 fps)

Summary for Pond 52:

Inflow Area = 0.730 ac, 89.04% Impervious, Inflow Depth = 5.33" for 100-Year St. Paul event
Inflow = 5.75 cfs @ 12.14 hrs, Volume= 0.324 af
Outflow = 5.75 cfs @ 12.14 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min
Primary = 5.75 cfs @ 12.14 hrs, Volume= 0.324 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.85' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.56 cfs @ 12.14 hrs HW=885.80' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.56 cfs @ 4.53 fps)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 5.45" for 100-Year St. Paul event
Inflow = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af
Outflow = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af, Atten= 0%, Lag= 0.0 min
Primary = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.03' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.51 cfs @ 12.14 hrs HW=886.89' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.51 cfs @ 5.74 fps)

Summary for Pond 108": (new Pond)

Inflow Area = 1.050 ac, 50.48% Impervious, Inflow Depth = 4.16" for 100-Year St. Paul event
Inflow = 5.15 cfs @ 12.23 hrs, Volume= 0.364 af
Outflow = 1.41 cfs @ 12.60 hrs, Volume= 0.360 af, Atten= 73%, Lag= 22.2 min
Primary = 1.41 cfs @ 12.60 hrs, Volume= 0.360 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 889.77' @ 12.60 hrs Surf.Area= 0.023 ac Storage= 0.137 af

Plug-Flow detention time= 61.9 min calculated for 0.360 af (99% of inflow)
Center-of-Mass det. time= 53.9 min (827.0 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	0.056 af	**15.00'W x 66.00'L x 10.00'H Field A** 0.227 af Overall - 0.088 af Embedded = 0.140 af x 40.0% Voids
#2A	881.00'	0.088 af	**CMP Round 108** x 3 Inside #1 Effective Size= 108.0"W x 108.0"H => 63.62 sf x 20.00'L = 1,272.3 cf Overall Size= 108.0"W x 108.0"H x 20.00'L
		0.143 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	881.00'	**24.0" Round Culvert** L= 11.0' Ke= 0.500 Inlet / Outlet Invert= 881.00' / 881.00' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	881.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.40 cfs @ 12.60 hrs HW=889.77' (Free Discharge)
└─**1=Culvert** (Passes 1.40 cfs of 42.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.23 cfs @ 14.12 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.17 cfs @ 1.25 fps)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 5.23" for 100-Year St. Paul event
Inflow = 9.79 cfs @ 12.09 hrs, Volume= 0.636 af
Outflow = 9.79 cfs @ 12.09 hrs, Volume= 0.636 af, Atten= 0%, Lag= 0.0 min
Primary = 9.79 cfs @ 12.09 hrs, Volume= 0.636 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 888.68' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.45 cfs @ 12.09 hrs HW=888.48' (Free Discharge)
└─**1=Culvert** (Barrel Controls 9.45 cfs @ 7.70 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 5.46" for 100-Year St. Paul event
Inflow = 8.03 cfs @ 12.08 hrs, Volume= 0.405 af
Outflow = 8.03 cfs @ 12.08 hrs, Volume= 0.405 af, Atten= 0%, Lag= 0.0 min
Primary = 8.03 cfs @ 12.08 hrs, Volume= 0.405 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 889.34' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=7.56 cfs @ 12.08 hrs HW=889.06' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.56 cfs @ 6.16 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 5.59" for 100-Year St. Paul event
Inflow = 3.99 cfs @ 12.06 hrs, Volume= 0.196 af
Outflow = 3.99 cfs @ 12.06 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min
Primary = 3.99 cfs @ 12.06 hrs, Volume= 0.196 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 888.54' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.81 cfs @ 12.06 hrs HW=888.43' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.81 cfs @ 4.85 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 5.23" for 100-Year St. Paul event
Inflow = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Primary = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.63' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.60 cfs @ 12.09 hrs HW=887.61' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.60 cfs @ 2.22 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 4.53" for 100-Year St. Paul event
Inflow = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af
Outflow = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Primary = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.67' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.62 cfs @ 12.07 hrs HW=884.66' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.62 cfs @ 2.87 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 5.41" for 100-Year St. Paul event
Inflow = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af
Outflow = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.80' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.08 cfs @ 12.06 hrs HW=884.79' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.08 cfs @ 3.18 fps)

Summary for Pond SYS: (new Pond)

Inflow Area = 7.460 ac, 72.25% Impervious, Inflow Depth = 4.93" for 100-Year St. Paul event
Inflow = 39.07 cfs @ 12.11 hrs, Volume= 3.063 af
Outflow = 30.34 cfs @ 12.26 hrs, Volume= 3.063 af, Atten= 22%, Lag= 8.5 min
Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.146 af
Primary = 30.29 cfs @ 12.26 hrs, Volume= 2.917 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 886.79' @ 12.26 hrs Surf.Area= 9,623 sf Storage= 34,839 cf

Plug-Flow detention time= 57.4 min calculated for 3.063 af (100% of inflow)
Center-of-Mass det. time= 57.0 min (819.9 - 762.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.50'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A** 35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.00'	12,272 cf	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.50'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B** 21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.00'	7,707 cf	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.00'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.00'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.00'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.00'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.00'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.00'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.00'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.00'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.00'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.00'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.00'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.00'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.50'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	879.31'	**24.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 879.31' / 878.81' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.00'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	885.80'	**7.0' long x 1.0' 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

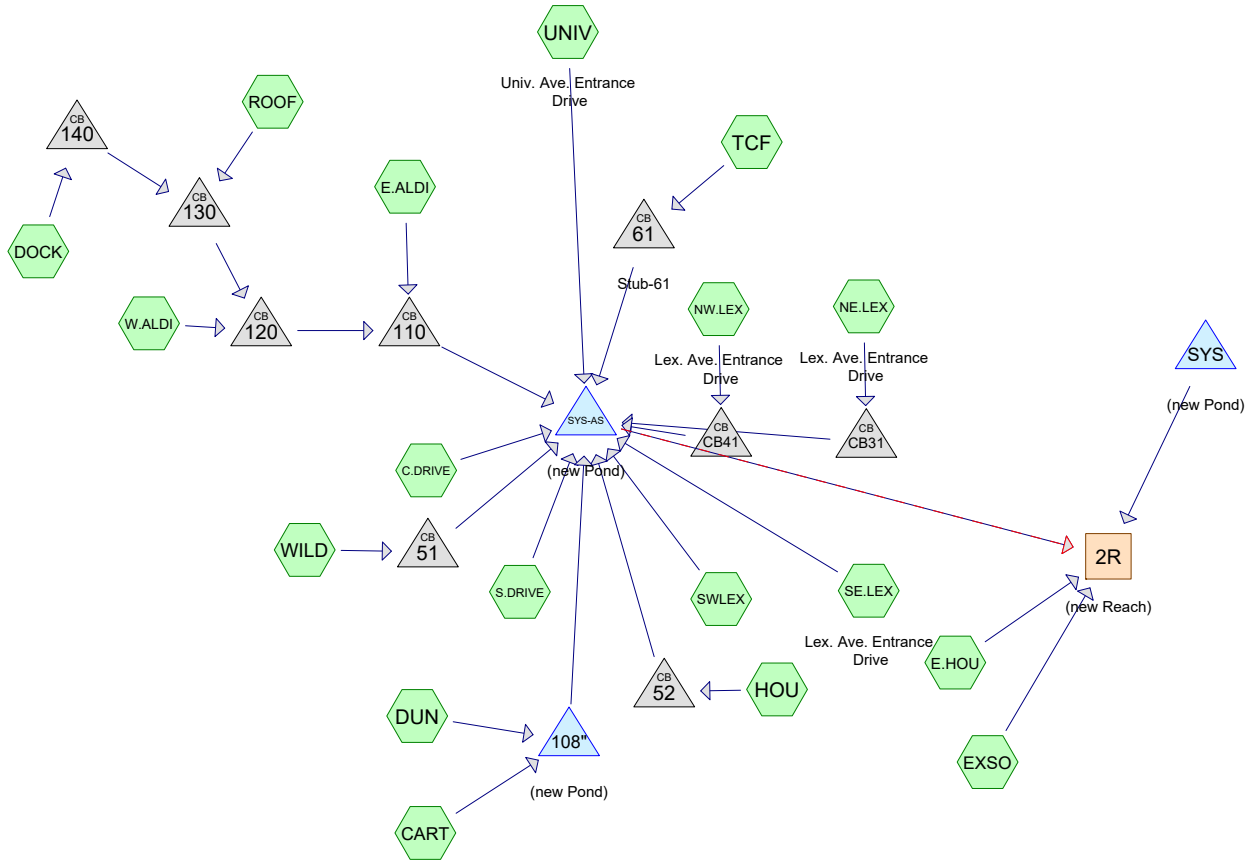
Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

#6 Secondary 888.40' **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=0.06 cfs @ 12.20 hrs HW=886.17' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=28.58 cfs @ 12.26 hrs HW=886.73' (Free Discharge)
└─**2=Culvert** (Passes 28.58 cfs of 38.34 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 2.21 cfs @ 11.28 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 7.81 cfs @ 11.19 fps)
  └─**5=Broad-Crested Rectangular Weir** (Weir Controls 18.55 cfs @ 2.84 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.50' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)



Subcat Reach Pond Link

Routing Diagram for 19114-overall ex asbuilt cr
Prepared by {enter your company name here}, Printed 12/9/2020
HydroCAD® 10.10-4b s/n 02676 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.316	98	(C.DRIVE, CART, DOCK, DUN, E.ALDI, EXSO, HOU, NE.LEX, S.DRIVE, SWLEX, W.ALDI, WILD)
2.414	69	(C.DRIVE, CART, DOCK, DUN, E.ALDI, E.HOU, EXSO, HOU, S.DRIVE, SWLEX, W.ALDI, WILD)
0.110	85	(WILD)
0.190	69	50-75% Grass cover, Fair, HSG B (NE.LEX, NW.LEX, SE.LEX, TCF, UNIV)
0.110	98	Paved parking, HSG B (NW.LEX)
0.540	98	Paved parking, HSG C (TCF)
0.250	96	ROADWAY (UNIV)
0.350	98	ROOF (ROOF)
0.080	98	Water Surface, HSG B (SE.LEX)

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	CART	0.00	0.00	172.0	0.0100	0.013	0.0	12.0	0.0
2	DUN	0.00	0.00	166.0	0.0200	0.013	0.0	12.0	0.0
3	WILD	0.00	0.00	159.0	0.0100	0.013	0.0	12.0	0.0
4	WILD	0.00	0.00	126.0	0.0100	0.013	0.0	15.0	0.0
5	WILD	0.00	0.00	54.0	0.0055	0.013	0.0	18.0	0.0
6	51	884.05	884.00	10.0	0.0050	0.013	0.0	18.0	0.0
7	52	884.05	884.00	10.0	0.0050	0.013	0.0	15.0	0.0
8	61	884.11	884.00	22.0	0.0050	0.013	0.0	12.0	0.0
9	108"	882.45	882.15	20.0	0.0150	0.013	0.0	24.0	0.0
10	110	885.11	884.00	86.0	0.0129	0.013	0.0	15.0	0.0
11	120	885.90	885.11	132.0	0.0060	0.013	0.0	15.0	0.0
12	130	886.78	886.10	68.0	0.0100	0.013	0.0	12.0	0.0
13	140	887.11	886.78	108.0	0.0031	0.013	0.0	12.0	0.0
14	CB31	884.23	884.00	23.0	0.0100	0.013	0.0	12.0	0.0
15	CB41	884.19	884.00	19.0	0.0100	0.013	0.0	12.0	0.0
16	SYS	880.39	879.47	50.0	0.0184	0.013	0.0	24.0	0.0
17	SYS-AS	880.39	879.47	50.0	0.0184	0.013	0.0	12.0	0.0

Summary for Subcatchment C.DRIVE:

Runoff = 0.51 cfs @ 12.10 hrs, Volume= 0.025 af, Depth= 2.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 1.27 cfs @ 12.23 hrs, Volume= 0.093 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.340	98	
*	0.420	69	
	0.760	82	Weighted Average
	0.420	69	55.26% Pervious Area
	0.340	98	44.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	156	0.0615	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	93	0.1150	5.09		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	172	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.8	421	Total			

Summary for Subcatchment DOCK:

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 0.64 cfs @ 12.22 hrs, Volume= 0.046 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 1.32 cfs @ 12.23 hrs, Volume= 0.097 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.HOU:

Runoff = 0.01 cfs @ 12.16 hrs, Volume= 0.000 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.000	98	
*	0.010	69	
	0.010	69	Weighted Average
	0.010	69	100.00% Pervious Area

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

Summary for Subcatchment EXSO:

Runoff = 0.42 cfs @ 12.43 hrs, Volume= 0.043 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.006	98	
*	0.884	69	
	0.890	69	Weighted Average
	0.884	69	99.33% Pervious Area
	0.006	98	0.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.1	240	0.0300	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment HOU:

Runoff = 2.60 cfs @ 12.14 hrs, Volume= 0.144 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.650	98	
*	0.080	69	
	0.730	95	Weighted Average
	0.080	69	10.96% Pervious Area
	0.650	98	89.04% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.26 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 0.52 cfs @ 12.06 hrs, Volume= 0.024 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 1.62 cfs @ 12.06 hrs, Volume= 0.075 af, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 0.65 cfs @ 12.10 hrs, Volume= 0.031 af, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.130	98	
*	0.070	69	
	0.200	88	Weighted Average
	0.070	69	35.00% Pervious Area
	0.130	98	65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	19	0.0520	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.34 cfs @ 12.14 hrs, Volume= 0.019 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
0.040	69	50-75% Grass cover, Fair, HSG B
0.080	98	Water Surface, HSG B
0.120	88	Weighted Average
0.040	69	33.33% Pervious Area
0.080	98	66.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 0.98 cfs @ 12.10 hrs, Volume= 0.047 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.190	98	
*	0.140	69	
	0.330	86	Weighted Average
	0.140	69	42.42% Pervious Area
	0.190	98	57.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 2.14 cfs @ 12.14 hrs, Volume= 0.118 af, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 1.10 cfs @ 12.10 hrs, Volume= 0.048 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.250	96	ROADWAY
	0.070	69	50-75% Grass cover, Fair, HSG B
	0.320	90	Weighted Average
	0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 1.91 cfs @ 12.09 hrs, Volume= 0.093 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 5.78 cfs @ 12.22 hrs, Volume= 0.410 af, Depth= 2.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: (new Reach)

Inflow Area = 8.360 ac, 64.55% Impervious, Inflow Depth = 1.76" for 2-Year event
Inflow = 6.50 cfs @ 12.44 hrs, Volume= 1.223 af
Outflow = 6.50 cfs @ 12.44 hrs, Volume= 1.223 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 2.11" for 2-Year event
Inflow = 5.78 cfs @ 12.22 hrs, Volume= 0.410 af
Outflow = 5.78 cfs @ 12.22 hrs, Volume= 0.410 af, Atten= 0%, Lag= 0.0 min
Primary = 5.78 cfs @ 12.22 hrs, Volume= 0.410 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.55' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.67 cfs @ 12.22 hrs HW=885.53' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.67 cfs @ 4.05 fps)

Summary for Pond 52:

Inflow Area = 0.730 ac, 89.04% Impervious, Inflow Depth = 2.36" for 2-Year event
Inflow = 2.60 cfs @ 12.14 hrs, Volume= 0.144 af
Outflow = 2.60 cfs @ 12.14 hrs, Volume= 0.144 af, Atten= 0%, Lag= 0.0 min
Primary = 2.60 cfs @ 12.14 hrs, Volume= 0.144 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.05' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=2.52 cfs @ 12.14 hrs HW=885.03' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.52 cfs @ 3.34 fps)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 2.44" for 2-Year event
Inflow = 2.14 cfs @ 12.14 hrs, Volume= 0.118 af
Outflow = 2.14 cfs @ 12.14 hrs, Volume= 0.118 af, Atten= 0%, Lag= 0.0 min
Primary = 2.14 cfs @ 12.14 hrs, Volume= 0.118 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.18' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.07 cfs @ 12.14 hrs HW=885.16' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.07 cfs @ 3.14 fps)

Summary for Pond 108": (new Pond)

Inflow Area = 1.050 ac, 50.48% Impervious, Inflow Depth = 1.58" for 2-Year event
Inflow = 1.90 cfs @ 12.23 hrs, Volume= 0.139 af
Outflow = 0.68 cfs @ 12.52 hrs, Volume= 0.125 af, Atten= 64%, Lag= 17.7 min
Primary = 0.68 cfs @ 12.52 hrs, Volume= 0.125 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.07' @ 12.52 hrs Surf.Area= 0.021 ac Storage= 0.052 af

Plug-Flow detention time= 96.4 min calculated for 0.125 af (90% of inflow)
Center-of-Mass det. time= 52.5 min (831.6 - 779.1)

Volume	Invert	Avail.Storage	Storage Description
#1	881.45'	0.088 af	**108.0" Round Pipe Storage** Inside #2 L= 60.0' S= 0.0123 '/'
#2	881.00'	0.052 af	**14.00'W x 66.00'L x 10.25'H Prismatoid** 0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
		0.140 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.30'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	890.79'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.68 cfs @ 12.52 hrs HW=885.06' (Free Discharge)
└─**1=Culvert** (Passes 0.68 cfs of 18.67 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.68 cfs @ 7.76 fps)
  └─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 2.29" for 2-Year event
Inflow = 4.43 cfs @ 12.09 hrs, Volume= 0.279 af
Outflow = 4.43 cfs @ 12.09 hrs, Volume= 0.279 af, Atten= 0%, Lag= 0.0 min
Primary = 4.43 cfs @ 12.09 hrs, Volume= 0.279 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 886.28' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=4.27 cfs @ 12.09 hrs HW=886.25' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.27 cfs @ 3.64 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 2.44" for 2-Year event
Inflow = 3.69 cfs @ 12.08 hrs, Volume= 0.181 af
Outflow = 3.69 cfs @ 12.08 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min
Primary = 3.69 cfs @ 12.08 hrs, Volume= 0.181 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 887.03' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.48 cfs @ 12.08 hrs HW=886.99' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.48 cfs @ 4.11 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 2.53" for 2-Year event
Inflow = 1.86 cfs @ 12.06 hrs, Volume= 0.089 af
Outflow = 1.86 cfs @ 12.06 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min
Primary = 1.86 cfs @ 12.06 hrs, Volume= 0.089 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.54' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.78 cfs @ 12.06 hrs HW=887.52' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.78 cfs @ 4.00 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 2.29" for 2-Year event
Inflow = 0.28 cfs @ 12.09 hrs, Volume= 0.013 af
Outflow = 0.28 cfs @ 12.09 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.09 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.45' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.27 cfs @ 12.09 hrs HW=887.44' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.27 cfs @ 1.77 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 1.83" for 2-Year event
Inflow = 0.26 cfs @ 12.07 hrs, Volume= 0.012 af
Outflow = 0.26 cfs @ 12.07 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min
Primary = 0.26 cfs @ 12.07 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.50' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.25 cfs @ 12.07 hrs HW=884.49' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.25 cfs @ 2.33 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 2.41" for 2-Year event
Inflow = 0.52 cfs @ 12.06 hrs, Volume= 0.024 af
Outflow = 0.52 cfs @ 12.06 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min
Primary = 0.52 cfs @ 12.06 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.58' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.49 cfs @ 12.06 hrs HW=884.57' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.49 cfs @ 2.68 fps)

Summary for Pond SYS: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	0.209 af	**18.50'W x 316.00'L x 6.00'H Field A** 0.805 af Overall - 0.282 af Embedded = 0.524 af x 40.0% Voids
#2A	881.25'	0.282 af	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	0.129 af	**18.50'W x 196.00'L x 6.00'H Field B** 0.499 af Overall - 0.177 af Embedded = 0.323 af x 40.0% Voids
#4B	881.25'	0.177 af	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	0.001 af	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	0.001 af	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	0.001 af	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	0.001 af	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	0.001 af	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	0.001 af	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	0.001 af	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	0.001 af	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	0.001 af	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	0.002 af	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	0.001 af	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	0.001 af	**4.00'D x 4.92'H CBMH-100**
		0.811 af	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**24.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.25'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.25'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	886.05'	**7.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SYS-AS: (new Pond)

Inflow Area =	7.460 ac,	72.25% Impervious,	Inflow Depth =	2.06"	for 2-Year event
Inflow =	17.06 cfs @	12.12 hrs,	Volume=	1.282 af	
Outflow =	6.13 cfs @	12.44 hrs,	Volume=	1.282 af,	Atten= 64%, Lag= 19.2 min
Discarded =	0.05 cfs @	6.25 hrs,	Volume=	0.103 af	
Primary =	6.08 cfs @	12.44 hrs,	Volume=	1.179 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 883.47' @ 12.44 hrs Surf.Area= 9,472 sf Storage= 15,463 cf

Plug-Flow detention time= 43.5 min calculated for 1.281 af (100% of inflow)
Center-of-Mass det. time= 43.8 min (813.9 - 770.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A**
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	**CMP Round 60** x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B**
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	**CMP Round 60** x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
			12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Low Road cb (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**12.0" Round Culvert** L= 50.0' Ke= 0.500
			Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf
#3	Device 2	880.89'	**24.0" Vert. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads
#4	Secondary	888.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.05 cfs @ 6.25 hrs HW=880.86' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=6.07 cfs @ 12.44 hrs HW=883.47' (Free Discharge)
└─**2=Culvert** (Inlet Controls 6.07 cfs @ 7.73 fps)
  └─**3=Orifice/Grate** (Passes 6.07 cfs of 19.01 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.75' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 0.80 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 2.25 cfs @ 12.23 hrs, Volume= 0.161 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.340	98	
*	0.420	69	
	0.760	82	Weighted Average
	0.420	69	55.26% Pervious Area
	0.340	98	44.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	156	0.0615	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	93	0.1150	5.09		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	172	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.8	421	Total			

Summary for Subcatchment DOCK:

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 3.59"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 1.05 cfs @ 12.22 hrs, Volume= 0.074 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 2.11 cfs @ 12.23 hrs, Volume= 0.156 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.HOU:

Runoff = 0.02 cfs @ 12.15 hrs, Volume= 0.001 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.000	98	
*	0.010	69	
	0.010	69	Weighted Average
	0.010	69	100.00% Pervious Area

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

Summary for Subcatchment EXSO:

Runoff = 1.16 cfs @ 12.40 hrs, Volume= 0.105 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.006	98	
*	0.884	69	
	0.890	69	Weighted Average
	0.884	69	99.33% Pervious Area
	0.006	98	0.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.1	240	0.0300	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment HOU:

Runoff = 4.00 cfs @ 12.14 hrs, Volume= 0.223 af, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.650	98	
*	0.080	69	
	0.730	95	Weighted Average
	0.080	69	10.96% Pervious Area
	0.650	98	89.04% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 2.43 cfs @ 12.06 hrs, Volume= 0.115 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 1.06 cfs @ 12.10 hrs, Volume= 0.051 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.130	98	
*	0.070	69	
	0.200	88	Weighted Average
	0.070	69	35.00% Pervious Area
	0.130	98	65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	19	0.0520	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.56 cfs @ 12.14 hrs, Volume= 0.031 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
0.040	69	50-75% Grass cover, Fair, HSG B
0.080	98	Water Surface, HSG B
0.120	88	Weighted Average
0.040	69	33.33% Pervious Area
0.080	98	66.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 1.64 cfs @ 12.10 hrs, Volume= 0.079 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.190	98	
*	0.140	69	
	0.330	86	Weighted Average
	0.140	69	42.42% Pervious Area
	0.190	98	57.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 1.83 cfs @ 12.10 hrs, Volume= 0.083 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.250	96	ROADWAY
	0.070	69	50-75% Grass cover, Fair, HSG B
	0.320	90	Weighted Average
	0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 2.93 cfs @ 12.09 hrs, Volume= 0.144 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: (new Reach)

Inflow Area = 8.360 ac, 64.55% Impervious, Inflow Depth = 2.95" for 10-Year event
Inflow = 8.96 cfs @ 12.43 hrs, Volume= 2.054 af
Outflow = 8.96 cfs @ 12.43 hrs, Volume= 2.054 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 3.37" for 10-Year event
Inflow = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af
Outflow = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af, Atten= 0%, Lag= 0.0 min
Primary = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 886.21' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=9.01 cfs @ 12.22 hrs HW=886.18' (Free Discharge)
└**1=Culvert** (Barrel Controls 9.01 cfs @ 5.10 fps)

Summary for Pond 52:

Inflow Area = 0.730 ac, 89.04% Impervious, Inflow Depth = 3.67" for 10-Year event
Inflow = 4.00 cfs @ 12.14 hrs, Volume= 0.223 af
Outflow = 4.00 cfs @ 12.14 hrs, Volume= 0.223 af, Atten= 0%, Lag= 0.0 min
Primary = 4.00 cfs @ 12.14 hrs, Volume= 0.223 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.37' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.87 cfs @ 12.14 hrs HW=885.34' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.87 cfs @ 3.78 fps)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af
Outflow = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af, Atten= 0%, Lag= 0.0 min
Primary = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.79' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=3.16 cfs @ 12.14 hrs HW=885.73' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.16 cfs @ 4.02 fps)

Summary for Pond 108": (new Pond)

Inflow Area = 1.050 ac, 50.48% Impervious, Inflow Depth = 2.69" for 10-Year event
Inflow = 3.29 cfs @ 12.23 hrs, Volume= 0.235 af
Outflow = 0.94 cfs @ 12.58 hrs, Volume= 0.221 af, Atten= 71%, Lag= 21.3 min
Primary = 0.94 cfs @ 12.58 hrs, Volume= 0.221 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.46' @ 12.58 hrs Surf.Area= 0.021 ac Storage= 0.089 af

Plug-Flow detention time= 85.5 min calculated for 0.221 af (94% of inflow)
Center-of-Mass det. time= 55.8 min (831.8 - 776.0)

Volume	Invert	Avail.Storage	Storage Description
#1	881.45'	0.088 af	**108.0" Round Pipe Storage** Inside #2 L= 60.0' S= 0.0123 '/'
#2	881.00'	0.052 af	**14.00'W x 66.00'L x 10.25'H Prismatoid** 0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
		0.140 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.30'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	890.79'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.94 cfs @ 12.58 hrs HW=887.45' (Free Discharge)
└─**1=Culvert** (Passes 0.94 cfs of 30.26 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.94 cfs @ 10.75 fps)
  └─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 3.59" for 10-Year event
Inflow = 6.81 cfs @ 12.09 hrs, Volume= 0.436 af
Outflow = 6.81 cfs @ 12.09 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min
Primary = 6.81 cfs @ 12.09 hrs, Volume= 0.436 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.05' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=6.56 cfs @ 12.09 hrs HW=886.97' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.56 cfs @ 5.35 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 5.62 cfs @ 12.08 hrs, Volume= 0.280 af
Outflow = 5.62 cfs @ 12.08 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Primary = 5.62 cfs @ 12.08 hrs, Volume= 0.280 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 887.78' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.16 cfs @ 12.08 hrs HW=887.62' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.16 cfs @ 4.21 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 3.89" for 10-Year event
Inflow = 2.81 cfs @ 12.06 hrs, Volume= 0.136 af
Outflow = 2.81 cfs @ 12.06 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min
Primary = 2.81 cfs @ 12.06 hrs, Volume= 0.136 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.82' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.68 cfs @ 12.06 hrs HW=887.78' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.68 cfs @ 3.42 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 3.59" for 10-Year event
Inflow = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af
Outflow = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.53' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 12.09 hrs HW=887.52' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.42 cfs @ 2.01 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 2.99" for 10-Year event
Inflow = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af
Outflow = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.58' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.41 cfs @ 12.07 hrs HW=884.57' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.41 cfs @ 2.62 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 3.74" for 10-Year event
Inflow = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af
Outflow = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.69' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.06 hrs HW=884.67' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.76 cfs @ 2.94 fps)

Summary for Pond SYS: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	0.209 af	**18.50'W x 316.00'L x 6.00'H Field A** 0.805 af Overall - 0.282 af Embedded = 0.524 af x 40.0% Voids
#2A	881.25'	0.282 af	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	0.129 af	**18.50'W x 196.00'L x 6.00'H Field B** 0.499 af Overall - 0.177 af Embedded = 0.323 af x 40.0% Voids
#4B	881.25'	0.177 af	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	0.001 af	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	0.001 af	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	0.001 af	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	0.001 af	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	0.001 af	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	0.001 af	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	0.001 af	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	0.001 af	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	0.001 af	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	0.002 af	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	0.001 af	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	0.001 af	**4.00'D x 4.92'H CBMH-100**
		0.811 af	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**24.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.25'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.25'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	886.05'	**7.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SYS-AS: (new Pond)

Inflow Area =	7.460 ac,	72.25% Impervious,	Inflow Depth =	3.31"	for 10-Year event
Inflow =	26.77 cfs @	12.11 hrs,	Volume=	2.058 af	
Outflow =	7.89 cfs @	12.49 hrs,	Volume=	2.058 af,	Atten= 71%, Lag= 22.7 min
Discarded =	0.05 cfs @	4.85 hrs,	Volume=	0.110 af	
Primary =	7.83 cfs @	12.49 hrs,	Volume=	1.948 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.21' @ 12.49 hrs Surf.Area= 9,472 sf Storage= 27,094 cf

Plug-Flow detention time= 46.5 min calculated for 2.058 af (100% of inflow)
Center-of-Mass det. time= 45.8 min (812.0 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A**
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	**CMP Round 60** x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B**
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	**CMP Round 60** x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
			12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Low Road cb (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**12.0" Round Culvert** L= 50.0' Ke= 0.500
			Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf
#3	Device 2	880.89'	**24.0" Vert. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads
#4	Secondary	888.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.05 cfs @ 4.85 hrs HW=880.86' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=7.83 cfs @ 12.49 hrs HW=885.21' (Free Discharge)
└─**2=Culvert** (Barrel Controls 7.83 cfs @ 9.97 fps)
  └─**3=Orifice/Grate** (Passes 7.83 cfs of 27.56 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.75' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 1.49 cfs @ 12.10 hrs, Volume= 0.075 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 4.76 cfs @ 12.23 hrs, Volume= 0.335 af, Depth= 5.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.340	98	
*	0.420	69	
	0.760	82	Weighted Average
	0.420	69	55.26% Pervious Area
	0.340	98	44.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	156	0.0615	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	93	0.1150	5.09		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	172	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.8	421	Total			

Summary for Subcatchment DOCK:

Runoff = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 6.65"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 2.05 cfs @ 12.22 hrs, Volume= 0.145 af, Depth= 5.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 4.01 cfs @ 12.23 hrs, Volume= 0.297 af, Depth= 6.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.HOU:

Runoff = 0.07 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 3.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.000	98	
*	0.010	69	
	0.010	69	Weighted Average
	0.010	69	100.00% Pervious Area

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

Summary for Subcatchment EXSO:

Runoff = 3.29 cfs @ 12.38 hrs, Volume= 0.284 af, Depth= 3.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.006	98	
*	0.884	69	
	0.890	69	Weighted Average
	0.884	69	99.33% Pervious Area
	0.006	98	0.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.1	240	0.0300	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment HOU:

Runoff = 7.25 cfs @ 12.14 hrs, Volume= 0.411 af, Depth= 6.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.650	98	
*	0.080	69	
	0.730	95	Weighted Average
	0.080	69	10.96% Pervious Area
	0.650	98	89.04% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af, Depth= 5.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af, Depth= 6.84"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 4.29 cfs @ 12.06 hrs, Volume= 0.208 af, Depth= 7.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 2.06 cfs @ 12.10 hrs, Volume= 0.099 af, Depth= 5.96"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.130	98	
*	0.070	69	
	0.200	88	Weighted Average
	0.070	69	35.00% Pervious Area
	0.130	98	65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	19	0.0520	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 1.08 cfs @ 12.14 hrs, Volume= 0.060 af, Depth= 6.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
0.040	69	50-75% Grass cover, Fair, HSG B
0.080	98	Water Surface, HSG B
0.120	88	Weighted Average
0.040	69	33.33% Pervious Area
0.080	98	66.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 3.28 cfs @ 12.10 hrs, Volume= 0.157 af, Depth= 5.72"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.190	98	
*	0.140	69	
	0.330	86	Weighted Average
	0.140	69	42.42% Pervious Area
	0.190	98	57.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af, Depth= 6.89"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 3.49 cfs @ 12.10 hrs, Volume= 0.165 af, Depth= 6.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.250	96	ROADWAY
	0.070	69	50-75% Grass cover, Fair, HSG B
	0.320	90	Weighted Average
	0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 5.31 cfs @ 12.09 hrs, Volume= 0.265 af, Depth= 6.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af, Depth= 6.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: (new Reach)

Inflow Area = 8.360 ac, 64.55% Impervious, Inflow Depth = 5.87" for 100-Year event
Inflow = 40.22 cfs @ 12.23 hrs, Volume= 4.090 af
Outflow = 40.22 cfs @ 12.23 hrs, Volume= 4.090 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 6.38" for 100-Year event
Inflow = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af
Outflow = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af, Atten= 0%, Lag= 0.0 min
Primary = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 888.91' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=16.95 cfs @ 12.22 hrs HW=888.77' (Free Discharge)
└**1=Culvert** (Inlet Controls 16.95 cfs @ 9.59 fps)

Summary for Pond 52:

Inflow Area = 0.730 ac, 89.04% Impervious, Inflow Depth = 6.76" for 100-Year event
Inflow = 7.25 cfs @ 12.14 hrs, Volume= 0.411 af
Outflow = 7.25 cfs @ 12.14 hrs, Volume= 0.411 af, Atten= 0%, Lag= 0.0 min
Primary = 7.25 cfs @ 12.14 hrs, Volume= 0.411 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 886.18' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=7.02 cfs @ 12.14 hrs HW=886.13' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.02 cfs @ 5.72 fps)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 6.89" for 100-Year event
Inflow = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af
Outflow = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af, Atten= 0%, Lag= 0.0 min
Primary = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 888.43' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=5.66 cfs @ 12.14 hrs HW=888.21' (Free Discharge)
└**1=Culvert** (Inlet Controls 5.66 cfs @ 7.21 fps)

Summary for Pond 108": (new Pond)

Inflow Area = 1.050 ac, 50.48% Impervious, Inflow Depth = 5.48" for 100-Year event
Inflow = 6.79 cfs @ 12.23 hrs, Volume= 0.480 af
Outflow = 6.90 cfs @ 12.31 hrs, Volume= 0.466 af, Atten= 0%, Lag= 4.9 min
Primary = 6.90 cfs @ 12.31 hrs, Volume= 0.466 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 893.46' @ 12.31 hrs Surf.Area= 0.021 ac Storage= 0.140 af

Plug-Flow detention time= 67.9 min calculated for 0.465 af (97% of inflow)
Center-of-Mass det. time= 51.7 min (822.7 - 770.9)

Volume	Invert	Avail.Storage	Storage Description
#1	881.45'	0.088 af	**108.0" Round Pipe Storage** Inside #2 L= 60.0' S= 0.0123 '/'
#2	881.00'	0.052 af	**14.00'W x 66.00'L x 10.25'H Prismatoid** 0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
		0.140 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.30'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	890.79'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=6.31 cfs @ 12.31 hrs HW=893.19' (Free Discharge)
└─**1=Culvert** (Passes 6.31 cfs of 47.21 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.38 cfs @ 15.77 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 4.94 cfs @ 4.12 fps)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 6.64" for 100-Year event
Inflow = 12.36 cfs @ 12.09 hrs, Volume= 0.808 af
Outflow = 12.36 cfs @ 12.09 hrs, Volume= 0.808 af, Atten= 0%, Lag= 0.0 min
Primary = 12.36 cfs @ 12.09 hrs, Volume= 0.808 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 890.74' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=11.93 cfs @ 12.09 hrs HW=890.40' (Free Discharge)
└─**1=Culvert** (Barrel Controls 11.93 cfs @ 9.72 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 6.90" for 100-Year event
Inflow = 10.09 cfs @ 12.08 hrs, Volume= 0.512 af
Outflow = 10.09 cfs @ 12.08 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.0 min
Primary = 10.09 cfs @ 12.08 hrs, Volume= 0.512 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 891.06' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.51 cfs @ 12.08 hrs HW=890.63' (Free Discharge)
└**1=Culvert** (Barrel Controls 9.51 cfs @ 7.75 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 7.04" for 100-Year event
Inflow = 4.99 cfs @ 12.06 hrs, Volume= 0.246 af
Outflow = 4.99 cfs @ 12.06 hrs, Volume= 0.246 af, Atten= 0%, Lag= 0.0 min
Primary = 4.99 cfs @ 12.06 hrs, Volume= 0.246 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 889.36' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=4.77 cfs @ 12.06 hrs HW=889.18' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.77 cfs @ 6.07 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 6.65" for 100-Year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af
Outflow = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.70' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.09 hrs HW=887.68' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.76 cfs @ 2.37 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 5.88" for 100-Year event
Inflow = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af
Outflow = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.74' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.80 cfs @ 12.07 hrs HW=884.72' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.80 cfs @ 3.04 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 6.84" for 100-Year event
Inflow = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af
Outflow = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
Primary = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.90' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.06 hrs HW=884.88' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.36 cfs @ 3.34 fps)

Summary for Pond SYS: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	0.209 af	**18.50'W x 316.00'L x 6.00'H Field A** 0.805 af Overall - 0.282 af Embedded = 0.524 af x 40.0% Voids
#2A	881.25'	0.282 af	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	0.129 af	**18.50'W x 196.00'L x 6.00'H Field B** 0.499 af Overall - 0.177 af Embedded = 0.323 af x 40.0% Voids
#4B	881.25'	0.177 af	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	0.001 af	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	0.001 af	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	0.001 af	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	0.001 af	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	0.001 af	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	0.001 af	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	0.001 af	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	0.001 af	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	0.001 af	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	0.002 af	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	0.001 af	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	0.001 af	**4.00'D x 4.92'H CBMH-100**
		0.811 af	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**24.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.25'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.25'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	886.05'	**7.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SYS-AS: (new Pond)

Inflow Area =	7.460 ac, 72.25% Impervious, Inflow Depth = 6.31" for 100-Year event				
Inflow =	49.69 cfs @	12.11 hrs,	Volume=	3.921 af	
Outflow =	40.35 cfs @	12.22 hrs,	Volume=	3.921 af,	Atten= 19%, Lag= 6.6 min
Discarded =	0.10 cfs @	12.22 hrs,	Volume=	0.118 af	
Primary =	10.81 cfs @	12.20 hrs,	Volume=	3.215 af	
Secondary =	29.39 cfs @	12.22 hrs,	Volume=	0.588 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 889.50' @ 12.20 hrs Surf.Area= 16,669 sf Storage= 38,576 cf

Plug-Flow detention time= 40.0 min calculated for 3.921 af (100% of inflow)
Center-of-Mass det. time= 39.3 min (799.7 - 760.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A**
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	**CMP Round 60** x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B**
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	**CMP Round 60** x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
			12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Low Road cb (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**12.0" Round Culvert** L= 50.0' Ke= 0.500
			Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf
#3	Device 2	880.89'	**24.0" Vert. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads
#4	Secondary	888.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.10 cfs @ 12.22 hrs HW=889.50' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=10.81 cfs @ 12.20 hrs HW=889.50' (Free Discharge)
└─**2=Culvert** (Barrel Controls 10.81 cfs @ 13.77 fps)
  └─**3=Orifice/Grate** (Passes 10.81 cfs of 41.74 cfs potential flow)

Secondary OutFlow Max=26.83 cfs @ 12.22 hrs HW=889.50' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 26.83 cfs @ 2.68 fps)

Summary for Subcatchment C.DRIVE:

Runoff = 1.17 cfs @ 12.10 hrs, Volume= 0.058 af, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 3.58 cfs @ 12.23 hrs, Volume= 0.253 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.340	98	
*	0.420	69	
	0.760	82	Weighted Average
	0.420	69	55.26% Pervious Area
	0.340	98	44.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	156	0.0615	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	93	0.1150	5.09		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	172	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.8	421	Total			

Summary for Subcatchment DOCK:

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 1.58 cfs @ 12.22 hrs, Volume= 0.112 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 3.13 cfs @ 12.23 hrs, Volume= 0.231 af, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.HOU:

Runoff = 0.05 cfs @ 12.15 hrs, Volume= 0.002 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.000	98	
*	0.010	69	
	0.010	69	Weighted Average
	0.010	69	100.00% Pervious Area

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

Summary for Subcatchment EXSO:

Runoff = 2.26 cfs @ 12.39 hrs, Volume= 0.197 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.006	98	
*	0.884	69	
	0.890	69	Weighted Average
	0.884	69	99.33% Pervious Area
	0.006	98	0.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.1	240	0.0300	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment HOU:

Runoff = 5.75 cfs @ 12.14 hrs, Volume= 0.324 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.650	98	
*	0.080	69	
	0.730	95	Weighted Average
	0.080	69	10.96% Pervious Area
	0.650	98	89.04% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af, Depth= 5.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 3.44 cfs @ 12.06 hrs, Volume= 0.165 af, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 1.59 cfs @ 12.10 hrs, Volume= 0.077 af, Depth= 4.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.130	98	
*	0.070	69	
	0.200	88	Weighted Average
	0.070	69	35.00% Pervious Area
	0.130	98	65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	19	0.0520	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	72	Total			

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.84 cfs @ 12.14 hrs, Volume= 0.047 af, Depth= 4.65"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (ac)	CN	Description
0.040	69	50-75% Grass cover, Fair, HSG B
0.080	98	Water Surface, HSG B
0.120	88	Weighted Average
0.040	69	33.33% Pervious Area
0.080	98	66.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SWLEX:

Runoff = 2.51 cfs @ 12.10 hrs, Volume= 0.120 af, Depth= 4.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.190	98	
*	0.140	69	
	0.330	86	Weighted Average
	0.140	69	42.42% Pervious Area
	0.190	98	57.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af, Depth= 5.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 2.73 cfs @ 12.10 hrs, Volume= 0.127 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.250	96	ROADWAY
	0.070	69	50-75% Grass cover, Fair, HSG B
	0.320	90	Weighted Average
	0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 4.21 cfs @ 12.09 hrs, Volume= 0.209 af, Depth= 5.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: (new Reach)

Inflow Area = 8.360 ac, 64.55% Impervious, Inflow Depth = 4.50" for 100-Year St. Paul event
Inflow = 26.79 cfs @ 12.31 hrs, Volume= 3.138 af
Outflow = 26.79 cfs @ 12.31 hrs, Volume= 3.138 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 4.98" for 100-Year St. Paul event
Inflow = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af
Outflow = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af, Atten= 0%, Lag= 0.0 min
Primary = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.32' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=13.26 cfs @ 12.22 hrs HW=887.23' (Free Discharge)
└**1=Culvert** (Inlet Controls 13.26 cfs @ 7.51 fps)

Summary for Pond 52:

Inflow Area = 0.730 ac, 89.04% Impervious, Inflow Depth = 5.33" for 100-Year St. Paul event
Inflow = 5.75 cfs @ 12.14 hrs, Volume= 0.324 af
Outflow = 5.75 cfs @ 12.14 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min
Primary = 5.75 cfs @ 12.14 hrs, Volume= 0.324 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 885.85' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.56 cfs @ 12.14 hrs HW=885.80' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.56 cfs @ 4.53 fps)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 5.45" for 100-Year St. Paul event
Inflow = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af
Outflow = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af, Atten= 0%, Lag= 0.0 min
Primary = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.03' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.51 cfs @ 12.14 hrs HW=886.89' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.51 cfs @ 5.74 fps)

Summary for Pond 108": (new Pond)

Inflow Area = 1.050 ac, 50.48% Impervious, Inflow Depth = 4.16" for 100-Year St. Paul event
Inflow = 5.15 cfs @ 12.23 hrs, Volume= 0.364 af
Outflow = 2.10 cfs @ 12.50 hrs, Volume= 0.350 af, Atten= 59%, Lag= 16.7 min
Primary = 2.10 cfs @ 12.50 hrs, Volume= 0.350 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 891.52' @ 12.50 hrs Surf.Area= 0.021 ac Storage= 0.140 af

Plug-Flow detention time= 80.2 min calculated for 0.350 af (96% of inflow)
Center-of-Mass det. time= 59.7 min (832.8 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1	881.45'	0.088 af	**108.0" Round Pipe Storage** Inside #2 L= 60.0' S= 0.0123 '/'
#2	881.00'	0.052 af	**14.00'W x 66.00'L x 10.25'H Prismatoid** 0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
		0.140 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.30'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	890.79'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=2.06 cfs @ 12.50 hrs HW=891.49' (Free Discharge)
└─**1=Culvert** (Passes 2.06 cfs of 42.90 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.26 cfs @ 14.47 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.79 cfs @ 2.26 fps)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 5.23" for 100-Year St. Paul event
Inflow = 9.79 cfs @ 12.09 hrs, Volume= 0.636 af
Outflow = 9.79 cfs @ 12.09 hrs, Volume= 0.636 af, Atten= 0%, Lag= 0.0 min
Primary = 9.79 cfs @ 12.09 hrs, Volume= 0.636 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 888.68' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.45 cfs @ 12.09 hrs HW=888.48' (Free Discharge)
└─**1=Culvert** (Barrel Controls 9.45 cfs @ 7.70 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 5.46" for 100-Year St. Paul event
Inflow = 8.03 cfs @ 12.08 hrs, Volume= 0.405 af
Outflow = 8.03 cfs @ 12.08 hrs, Volume= 0.405 af, Atten= 0%, Lag= 0.0 min
Primary = 8.03 cfs @ 12.08 hrs, Volume= 0.405 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Peak Elev= 889.34' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=7.56 cfs @ 12.08 hrs HW=889.06' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.56 cfs @ 6.16 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 5.59" for 100-Year St. Paul event
Inflow = 3.99 cfs @ 12.06 hrs, Volume= 0.196 af
Outflow = 3.99 cfs @ 12.06 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min
Primary = 3.99 cfs @ 12.06 hrs, Volume= 0.196 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 888.54' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.81 cfs @ 12.06 hrs HW=888.43' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.81 cfs @ 4.85 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 5.23" for 100-Year St. Paul event
Inflow = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Primary = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 887.63' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.60 cfs @ 12.09 hrs HW=887.61' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.60 cfs @ 2.22 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 4.53" for 100-Year St. Paul event
Inflow = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af
Outflow = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Primary = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.67' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.62 cfs @ 12.07 hrs HW=884.66' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.62 cfs @ 2.87 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 5.41" for 100-Year St. Paul event
Inflow = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af
Outflow = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 884.80' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.08 cfs @ 12.06 hrs HW=884.79' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.08 cfs @ 3.18 fps)

Summary for Pond SYS: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	0.209 af	**18.50'W x 316.00'L x 6.00'H Field A** 0.805 af Overall - 0.282 af Embedded = 0.524 af x 40.0% Voids
#2A	881.25'	0.282 af	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	0.129 af	**18.50'W x 196.00'L x 6.00'H Field B** 0.499 af Overall - 0.177 af Embedded = 0.323 af x 40.0% Voids
#4B	881.25'	0.177 af	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	0.001 af	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	0.001 af	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	0.001 af	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	0.001 af	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	0.001 af	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	0.001 af	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	0.001 af	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	0.001 af	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	0.001 af	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	0.002 af	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	0.001 af	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	0.001 af	**4.00'D x 4.92'H CBMH-100**
		0.811 af	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**24.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#3	Device 2	881.25'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.25'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	886.05'	**7.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SYS-AS: (new Pond)

Inflow Area =	7.460 ac,	72.25% Impervious,	Inflow Depth =	4.91"	for 100-Year St. Paul event
Inflow =	39.07 cfs @	12.11 hrs,	Volume=	3.053 af	
Outflow =	24.75 cfs @	12.31 hrs,	Volume=	3.053 af,	Atten= 37%, Lag= 11.9 min
Discarded =	0.08 cfs @	12.31 hrs,	Volume=	0.115 af	
Primary =	10.60 cfs @	12.32 hrs,	Volume=	2.771 af	
Secondary =	14.07 cfs @	12.31 hrs,	Volume=	0.167 af	

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 889.15' @ 12.32 hrs Surf.Area= 13,859 sf Storage= 36,564 cf

Plug-Flow detention time= 45.2 min calculated for 3.053 af (100% of inflow)
Center-of-Mass det. time= 44.5 min (807.8 - 763.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A**
			35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	**CMP Round 60** x 30 Inside #1
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			30 Chambers in 2 Rows
			12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B**
			21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	**CMP Round 60** x 18 Inside #3
			Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf
			Overall Size= 60.0"W x 60.0"H x 20.00'L
			Row Length Adjustment= +10.00' x 19.63 sf x 2 rows
			12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Low Road cb (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**12.0" Round Culvert** L= 50.0' Ke= 0.500
			Inlet / Outlet Invert= 880.39' / 879.47' S= 0.0184 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf
#3	Device 2	880.89'	**24.0" Vert. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads
#4	Secondary	888.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

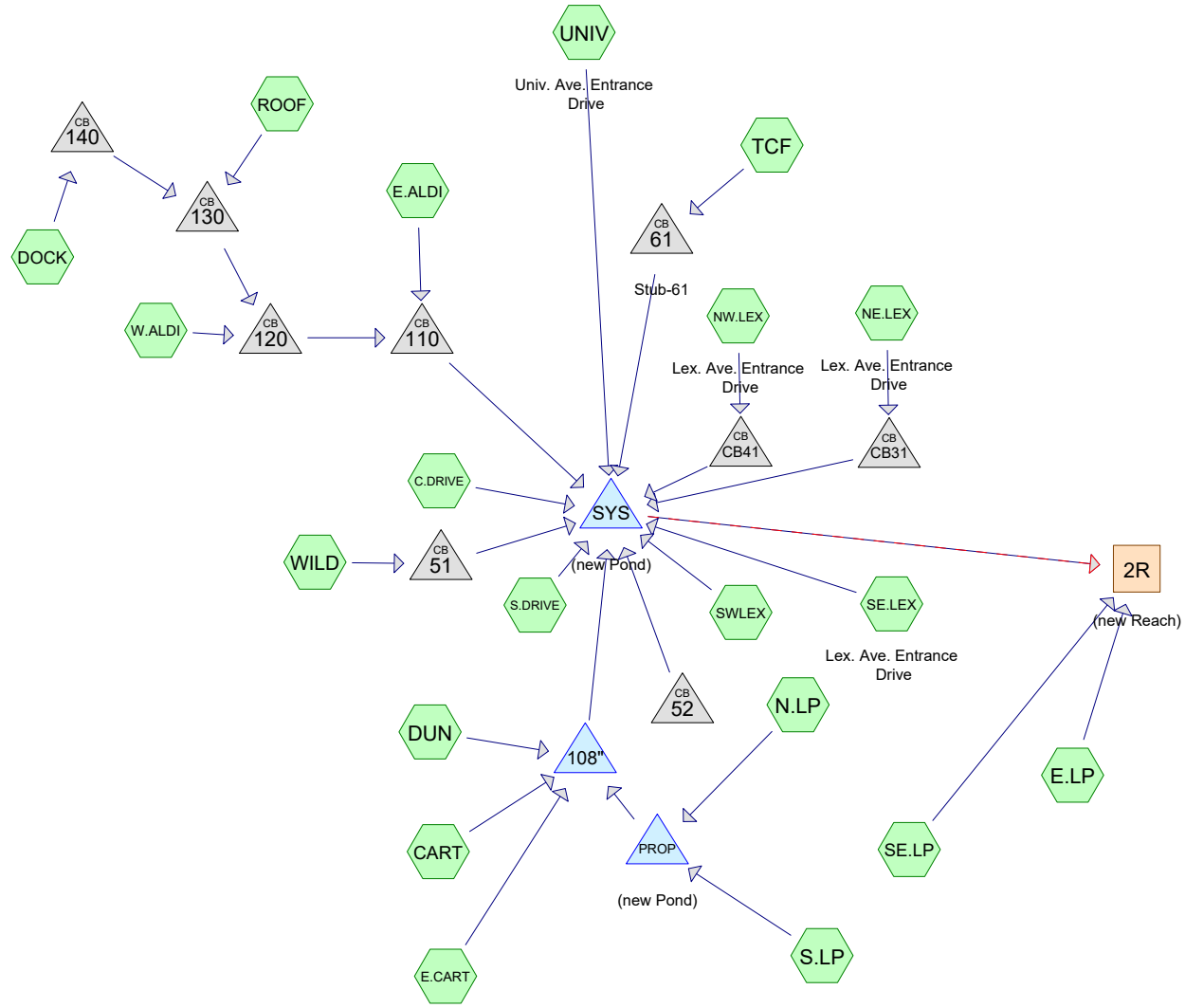
Discarded OutFlow Max=0.08 cfs @ 12.31 hrs HW=889.11' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=10.57 cfs @ 12.32 hrs HW=889.10' (Free Discharge)
└─**2=Culvert** (Barrel Controls 10.57 cfs @ 13.46 fps)
  └─**3=Orifice/Grate** (Passes 10.57 cfs of 40.63 cfs potential flow)

Secondary OutFlow Max=12.76 cfs @ 12.31 hrs HW=889.11' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 12.76 cfs @ 2.10 fps)

Appendix B

HydroCAD Report, Proposed



Subcat Reach Pond Link

Routing Diagram for 19114-overall PROP as built cr
Prepared by {enter your company name here}, Printed 12/9/2020
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.108	98	(C.DRIVE, CART, DOCK, DUN, E.ALDI, E.CART, E.LP, N.LP, NE.LEX, S.DRIVE, S.LP, SE.LP, SWLEX, W.ALDI, WILD)
1.622	69	(C.DRIVE, CART, DOCK, DUN, E.ALDI, E.CART, E.LP, S.DRIVE, SE.LP, SWLEX, W.ALDI, WILD)
0.110	85	(WILD)
0.174	69	50-75% Grass cover, Fair, HSG B (NE.LEX, NW.LEX, SE.LEX, TCF, UNIV)
0.110	98	Paved parking, HSG B (NW.LEX)
0.540	98	Paved parking, HSG C (TCF)
0.250	96	ROADWAY (UNIV)
0.350	98	ROOF (ROOF)
0.083	98	Water Surface, HSG B (SE.LEX)

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	CART	0.00	0.00	85.0	0.0100	0.013	0.0	12.0	0.0
2	CART	0.00	0.00	255.0	0.0100	0.013	0.0	15.0	0.0
3	DUN	0.00	0.00	166.0	0.0200	0.013	0.0	12.0	0.0
4	E.CART	0.00	0.00	75.0	0.0100	0.013	0.0	12.0	0.0
5	WILD	0.00	0.00	159.0	0.0100	0.013	0.0	12.0	0.0
6	WILD	0.00	0.00	126.0	0.0100	0.013	0.0	15.0	0.0
7	WILD	0.00	0.00	54.0	0.0055	0.013	0.0	18.0	0.0
8	51	884.05	884.00	10.0	0.0050	0.013	0.0	18.0	0.0
9	52	884.05	884.00	10.0	0.0050	0.013	0.0	15.0	0.0
10	61	884.11	884.00	22.0	0.0050	0.013	0.0	12.0	0.0
11	108"	882.45	882.15	20.0	0.0150	0.013	0.0	24.0	0.0
12	110	885.11	884.00	86.0	0.0129	0.013	0.0	15.0	0.0
13	120	885.90	885.11	132.0	0.0060	0.013	0.0	15.0	0.0
14	130	886.78	886.10	68.0	0.0100	0.013	0.0	12.0	0.0
15	140	887.11	886.78	108.0	0.0031	0.013	0.0	12.0	0.0
16	CB31	884.23	884.00	23.0	0.0100	0.013	0.0	12.0	0.0
17	CB41	884.19	884.00	19.0	0.0100	0.013	0.0	12.0	0.0
18	PROP	889.00	887.00	50.0	0.0400	0.013	0.0	12.0	0.0
19	SYS	880.39	879.17	55.0	0.0222	0.013	0.0	12.0	0.0

Summary for Subcatchment C.DRIVE:

Runoff = 0.43 cfs @ 12.10 hrs, Volume= 0.021 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 0.59 cfs @ 12.23 hrs, Volume= 0.043 af, Depth= 1.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.210	98	
*	0.120	69	
	0.330	87	Weighted Average
	0.120	69	36.36% Pervious Area
	0.210	98	63.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	62	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	85	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.8	255	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
14.8	402	Total			

Summary for Subcatchment DOCK:

Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 0.54 cfs @ 12.22 hrs, Volume= 0.038 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 1.13 cfs @ 12.23 hrs, Volume= 0.083 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.CART:

Runoff = 0.45 cfs @ 12.24 hrs, Volume= 0.034 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.130	98	
*	0.300	69	
	0.430	78	Weighted Average
	0.300	69	69.77% Pervious Area
	0.130	98	30.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	156	0.0600	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	70	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	75	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.7	301	Total			

Summary for Subcatchment E.LP:

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 1.43"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.029	98	
*	0.022	69	
	0.051	85	Weighted Average
	0.022	69	43.14% Pervious Area
	0.029	98	56.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	16	0.0300	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment N.LP:

Runoff = 2.05 cfs @ 12.14 hrs, Volume= 0.112 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.607	98	
*	0.000	69	
	0.607	98	Weighted Average
	0.607	98	100.00% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.22 cfs @ 12.07 hrs, Volume= 0.010 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 0.45 cfs @ 12.06 hrs, Volume= 0.021 af, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 1.40 cfs @ 12.06 hrs, Volume= 0.065 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 0.70 cfs @ 12.13 hrs, Volume= 0.038 af, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.168	98	
*	0.206	69	
	0.374	82	Weighted Average
	0.206	69	55.08% Pervious Area
	0.168	98	44.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	35	0.0400	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.7	88	Total			

Summary for Subcatchment S.LP:

Runoff = 2.60 cfs @ 12.14 hrs, Volume= 0.143 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.770	98	
*	0.000	69	
	0.770	98	Weighted Average
	0.770	98	100.00% Impervious Area

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

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.29 cfs @ 12.14 hrs, Volume= 0.016 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

Area (ac)	CN	Description
0.024	69	50-75% Grass cover, Fair, HSG B
0.083	98	Water Surface, HSG B
0.107	91	Weighted Average
0.024	69	22.43% Pervious Area
0.083	98	77.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SE.LP:

Runoff = 0.03 cfs @ 12.12 hrs, Volume= 0.001 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.002	98	
*	0.033	69	
	0.035	71	Weighted Average
	0.033	69	94.29% Pervious Area
	0.002	98	5.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	22	0.0300	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment SWLEX:

Runoff = 0.82 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.192	98	
*	0.131	69	
	0.323	86	Weighted Average
	0.131	69	40.56% Pervious Area
	0.192	98	59.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 1.85 cfs @ 12.14 hrs, Volume= 0.101 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 0.91 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

Area (ac)	CN	Description
* 0.250	96	ROADWAY
0.070	69	50-75% Grass cover, Fair, HSG B
0.320	90	Weighted Average
0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 1.65 cfs @ 12.10 hrs, Volume= 0.079 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 4.92 cfs @ 12.22 hrs, Volume= 0.348 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.45"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: (new Reach)

Inflow Area = 8.347 ac, 74.17% Impervious, Inflow Depth = 1.31" for 1-Year event
Inflow = 5.78 cfs @ 12.44 hrs, Volume= 0.908 af
Outflow = 5.78 cfs @ 12.44 hrs, Volume= 0.908 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 1.79" for 1-Year event
Inflow = 4.92 cfs @ 12.22 hrs, Volume= 0.348 af
Outflow = 4.92 cfs @ 12.22 hrs, Volume= 0.348 af, Atten= 0%, Lag= 0.0 min
Primary = 4.92 cfs @ 12.22 hrs, Volume= 0.348 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 885.40' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=4.83 cfs @ 12.22 hrs HW=885.38' (Free Discharge)
└**1=Culvert** (Barrel Controls 4.83 cfs @ 3.87 fps)

Summary for Pond 52:

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 2.10" for 1-Year event
Inflow = 1.85 cfs @ 12.14 hrs, Volume= 0.101 af
Outflow = 1.85 cfs @ 12.14 hrs, Volume= 0.101 af, Atten= 0%, Lag= 0.0 min
Primary = 1.85 cfs @ 12.14 hrs, Volume= 0.101 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 885.07' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.79 cfs @ 12.14 hrs HW=885.05' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.79 cfs @ 3.01 fps)

Summary for Pond 108":

Inflow Area =	2.427 ac, 78.57% Impervious, Inflow Depth = 1.09" for 1-Year event				
Inflow =	2.26 cfs @	12.25 hrs,	Volume=	0.220 af	
Outflow =	1.73 cfs @	12.40 hrs,	Volume=	0.220 af,	Atten= 23%, Lag= 8.8 min
Discarded =	0.01 cfs @	7.00 hrs,	Volume=	0.023 af	
Primary =	1.72 cfs @	12.40 hrs,	Volume=	0.197 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 883.89' @ 12.40 hrs Surf.Area= 0.021 ac Storage= 0.034 af

Plug-Flow detention time= 131.6 min calculated for 0.220 af (100% of inflow)
Center-of-Mass det. time= 132.9 min (923.8 - 790.9)

Volume	Invert	Avail.Storage	Storage Description
#1	890.50'	0.003 af	**4.00'D x 4.50'H Vertical Cone/Cylinder** x 2
#2	881.00'	0.052 af	**14.00'W x 66.00'L x 10.25'H Prismatoid** 0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
#3	881.45'	0.088 af	**108.0" Round Pipe Storage** Inside #2 L= 60.0' S= 0.0123 '/'
		0.142 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.50'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#4	Discarded	881.00'	**0.250 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 7.00 hrs HW=881.14' (Free Discharge)
└─**4=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.72 cfs @ 12.40 hrs HW=883.89' (Free Discharge)
└─**1=Culvert** (Passes 1.72 cfs of 8.53 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.72 cfs @ 4.94 fps)
  └─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 1.96" for 1-Year event
Inflow = 3.82 cfs @ 12.09 hrs, Volume= 0.238 af
Outflow = 3.82 cfs @ 12.09 hrs, Volume= 0.238 af, Atten= 0%, Lag= 0.0 min
Primary = 3.82 cfs @ 12.09 hrs, Volume= 0.238 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 886.16' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.67 cfs @ 12.09 hrs HW=886.13' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.67 cfs @ 3.43 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 2.10" for 1-Year event
Inflow = 3.19 cfs @ 12.08 hrs, Volume= 0.156 af
Outflow = 3.19 cfs @ 12.08 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.0 min
Primary = 3.19 cfs @ 12.08 hrs, Volume= 0.156 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 886.93' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.01 cfs @ 12.08 hrs HW=886.88' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.01 cfs @ 3.98 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 2.18" for 1-Year event
Inflow = 1.62 cfs @ 12.06 hrs, Volume= 0.076 af
Outflow = 1.62 cfs @ 12.06 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min
Primary = 1.62 cfs @ 12.06 hrs, Volume= 0.076 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 887.47' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.54 cfs @ 12.06 hrs HW=887.45' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.54 cfs @ 3.88 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 1.96" for 1-Year event
Inflow = 0.24 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.24 cfs @ 12.09 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.24 cfs @ 12.09 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 887.42' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.23 cfs @ 12.09 hrs HW=887.42' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.23 cfs @ 1.70 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 1.54" for 1-Year event
Inflow = 0.22 cfs @ 12.07 hrs, Volume= 0.010 af
Outflow = 0.22 cfs @ 12.07 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min
Primary = 0.22 cfs @ 12.07 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 884.47' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.21 cfs @ 12.07 hrs HW=884.46' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.21 cfs @ 2.24 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 2.07" for 1-Year event
Inflow = 0.45 cfs @ 12.06 hrs, Volume= 0.021 af
Outflow = 0.45 cfs @ 12.06 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.45 cfs @ 12.06 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 884.55' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.06 hrs HW=884.54' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.43 cfs @ 2.60 fps)

Summary for Pond PROP: (new Pond)

Inflow Area = 1.377 ac,100.00% Impervious, Inflow Depth = 2.22" for 1-Year event
Inflow = 4.66 cfs @ 12.14 hrs, Volume= 0.255 af
Outflow = 0.86 cfs @ 12.46 hrs, Volume= 0.255 af, Atten= 81%, Lag= 19.0 min
Discarded = 0.05 cfs @ 9.15 hrs, Volume= 0.150 af
Primary = 0.82 cfs @ 12.46 hrs, Volume= 0.105 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 890.10' @ 12.46 hrs Surf.Area= 0.057 ac Storage= 0.137 af

Plug-Flow detention time= 508.6 min calculated for 0.255 af (100% of inflow)
Center-of-Mass det. time= 509.2 min (1,266.6 - 757.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	886.50'	0.102 af	**45.00'W x 55.00'L x 9.00'H Field A** 0.511 af Overall - 0.256 af Embedded = 0.255 af x 40.0% Voids
#2A	887.00'	0.256 af	**CMP Round 96** x 8 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= -5.00' x 50.27 sf x 4 rows 41.00' Header x 50.27 sf x 2 = 4,121.8 cf Inside
#3	896.00'	0.003 af	**4.00'D x 5.00'H Vertical Cone/Cylinder** x 2
		0.361 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	889.00'	**12.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 889.00' / 887.00' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	889.10'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	886.50'	**0.800 in/hr Exfiltration over Surface area**
#4	Device 1	894.40'	**4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.05 cfs @ 9.15 hrs HW=886.65' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.82 cfs @ 12.46 hrs HW=890.10' (Free Discharge)
└─**1=Culvert** (Passes 0.82 cfs of 2.92 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.82 cfs @ 4.16 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SYS: (new Pond)

Inflow Area =	8.261 ac,	74.57% Impervious,	Inflow Depth =	1.56"	for 1-Year event
Inflow =	13.01 cfs @	12.12 hrs,	Volume=	1.071 af	
Outflow =	5.81 cfs @	12.45 hrs,	Volume=	1.071 af,	Atten= 55%, Lag= 19.9 min
Discarded =	0.05 cfs @	7.15 hrs,	Volume=	0.170 af	
Primary =	5.75 cfs @	12.45 hrs,	Volume=	0.901 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 883.45' @ 12.45 hrs Surf.Area= 9,472 sf Storage= 15,329 cf

Plug-Flow detention time= 144.1 min calculated for 1.071 af (100% of inflow)
Center-of-Mass det. time= 143.5 min (917.9 - 774.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A** 35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B** 21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**12.0" Round Culvert** L= 55.0' Ke= 0.500 Inlet / Outlet Invert= 880.39' / 879.17' S= 0.0222 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	881.60'	**7.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.60'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	885.60'	**7.0' long x 1.0' 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

			Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#6	Secondary	888.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.05 cfs @ 7.15 hrs HW=880.86' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=5.75 cfs @ 12.45 hrs HW=883.45' (Free Discharge)
└─**2=Culvert** (Passes 5.75 cfs of 6.05 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 1.61 cfs @ 6.02 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 4.14 cfs @ 5.93 fps)
  └─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.75' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 0.80 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 1.15 cfs @ 12.23 hrs, Volume= 0.083 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.210	98	
*	0.120	69	
	0.330	87	Weighted Average
	0.120	69	36.36% Pervious Area
	0.210	98	63.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	62	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	85	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.8	255	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
14.8	402	Total			

Summary for Subcatchment DOCK:

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 3.59"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 1.05 cfs @ 12.22 hrs, Volume= 0.074 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 2.11 cfs @ 12.23 hrs, Volume= 0.156 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.CART:

Runoff = 1.10 cfs @ 12.24 hrs, Volume= 0.078 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.130	98	
*	0.300	69	
	0.430	78	Weighted Average
	0.300	69	69.77% Pervious Area
	0.130	98	30.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	156	0.0600	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	70	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	75	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.7	301	Total			

Summary for Subcatchment E.LP:

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.012 af, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.029	98	
*	0.022	69	
	0.051	85	Weighted Average
	0.022	69	43.14% Pervious Area
	0.029	98	56.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	16	0.0300	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment N.LP:

Runoff = 3.56 cfs @ 12.14 hrs, Volume= 0.200 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.607	98	
*	0.000	69	
	0.607	98	Weighted Average
	0.607	98	100.00% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 2.43 cfs @ 12.06 hrs, Volume= 0.115 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 1.52 cfs @ 12.13 hrs, Volume= 0.079 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.168	98	
*	0.206	69	
	0.374	82	Weighted Average
	0.206	69	55.08% Pervious Area
	0.168	98	44.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	35	0.0400	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.7	88	Total			

Summary for Subcatchment S.LP:

Runoff = 4.51 cfs @ 12.14 hrs, Volume= 0.254 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.770	98	
*	0.000	69	
	0.770	98	Weighted Average
	0.770	98	100.00% Impervious Area

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

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.54 cfs @ 12.14 hrs, Volume= 0.030 af, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
0.024	69	50-75% Grass cover, Fair, HSG B
0.083	98	Water Surface, HSG B
0.107	91	Weighted Average
0.024	69	22.43% Pervious Area
0.083	98	77.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SE.LP:

Runoff = 0.10 cfs @ 12.11 hrs, Volume= 0.004 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.002	98	
*	0.033	69	
	0.035	71	Weighted Average
	0.033	69	94.29% Pervious Area
	0.002	98	5.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	22	0.0300	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment SWLEX:

Runoff = 1.63 cfs @ 12.10 hrs, Volume= 0.078 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.192	98	
*	0.131	69	
	0.323	86	Weighted Average
	0.131	69	40.56% Pervious Area
	0.192	98	59.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 1.83 cfs @ 12.10 hrs, Volume= 0.083 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
* 0.250	96	ROADWAY
0.070	69	50-75% Grass cover, Fair, HSG B
0.320	90	Weighted Average
0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 2.93 cfs @ 12.09 hrs, Volume= 0.144 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: (new Reach)

Inflow Area = 8.347 ac, 74.17% Impervious, Inflow Depth = 2.84" for 10-Year event
Inflow = 8.26 cfs @ 12.53 hrs, Volume= 1.978 af
Outflow = 8.26 cfs @ 12.53 hrs, Volume= 1.978 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 3.37" for 10-Year event
Inflow = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af
Outflow = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af, Atten= 0%, Lag= 0.0 min
Primary = 9.18 cfs @ 12.22 hrs, Volume= 0.654 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 886.21' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=9.01 cfs @ 12.22 hrs HW=886.18' (Free Discharge)
└**1=Culvert** (Barrel Controls 9.01 cfs @ 5.10 fps)

Summary for Pond 52:

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af
Outflow = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af, Atten= 0%, Lag= 0.0 min
Primary = 3.26 cfs @ 12.14 hrs, Volume= 0.183 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 885.79' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=3.16 cfs @ 12.14 hrs HW=885.73' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.16 cfs @ 4.02 fps)

Summary for Pond 108":

Inflow Area =	2.427 ac, 78.57% Impervious, Inflow Depth = 2.60" for 10-Year event				
Inflow =	4.78 cfs @	12.24 hrs,	Volume=	0.525 af	
Outflow =	3.15 cfs @	12.45 hrs,	Volume=	0.525 af,	Atten= 34%, Lag= 12.6 min
Discarded =	0.01 cfs @	5.05 hrs,	Volume=	0.024 af	
Primary =	3.15 cfs @	12.45 hrs,	Volume=	0.501 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 886.34' @ 12.45 hrs Surf.Area= 0.021 ac Storage= 0.072 af

Plug-Flow detention time= 64.6 min calculated for 0.525 af (100% of inflow)
Center-of-Mass det. time= 65.9 min (864.3 - 798.4)

Volume	Invert	Avail.Storage	Storage Description
#1	890.50'	0.003 af	**4.00'D x 4.50'H Vertical Cone/Cylinder** x 2
#2	881.00'	0.052 af	**14.00'W x 66.00'L x 10.25'H Prismatoid** 0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
#3	881.45'	0.088 af	**108.0" Round Pipe Storage** Inside #2 L= 60.0' S= 0.0123 '/'
		0.142 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.50'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#4	Discarded	881.00'	**0.250 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 5.05 hrs HW=881.14' (Free Discharge)
└─**4=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=3.14 cfs @ 12.45 hrs HW=886.33' (Free Discharge)
└─**1=Culvert** (Passes 3.14 cfs of 25.69 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 3.14 cfs @ 9.01 fps)
  └─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 3.59" for 10-Year event
Inflow = 6.81 cfs @ 12.09 hrs, Volume= 0.436 af
Outflow = 6.81 cfs @ 12.09 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min
Primary = 6.81 cfs @ 12.09 hrs, Volume= 0.436 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 887.05' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=6.56 cfs @ 12.09 hrs HW=886.97' (Free Discharge)
└**1=Culvert** (Inlet Controls 6.56 cfs @ 5.35 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 5.62 cfs @ 12.08 hrs, Volume= 0.280 af
Outflow = 5.62 cfs @ 12.08 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Primary = 5.62 cfs @ 12.08 hrs, Volume= 0.280 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 887.78' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=5.16 cfs @ 12.08 hrs HW=887.62' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.16 cfs @ 4.21 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 3.89" for 10-Year event
Inflow = 2.81 cfs @ 12.06 hrs, Volume= 0.136 af
Outflow = 2.81 cfs @ 12.06 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min
Primary = 2.81 cfs @ 12.06 hrs, Volume= 0.136 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 887.82' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.68 cfs @ 12.06 hrs HW=887.78' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.68 cfs @ 3.42 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 3.59" for 10-Year event
Inflow = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af
Outflow = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.44 cfs @ 12.09 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 887.53' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 12.09 hrs HW=887.52' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.42 cfs @ 2.01 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 2.99" for 10-Year event
Inflow = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af
Outflow = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.07 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 884.58' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.41 cfs @ 12.07 hrs HW=884.57' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.41 cfs @ 2.62 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 3.74" for 10-Year event
Inflow = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af
Outflow = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min
Primary = 0.79 cfs @ 12.06 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 884.69' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.06 hrs HW=884.67' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.76 cfs @ 2.94 fps)

Summary for Pond PROP: (new Pond)

Inflow Area = 1.377 ac,100.00% Impervious, Inflow Depth = 3.95" for 10-Year event
Inflow = 8.06 cfs @ 12.14 hrs, Volume= 0.454 af
Outflow = 1.64 cfs @ 12.42 hrs, Volume= 0.454 af, Atten= 80%, Lag= 17.2 min
Discarded = 0.05 cfs @ 6.15 hrs, Volume= 0.164 af
Primary = 1.60 cfs @ 12.42 hrs, Volume= 0.290 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 892.21' @ 12.42 hrs Surf.Area= 0.057 ac Storage= 0.236 af

Plug-Flow detention time= 339.0 min calculated for 0.454 af (100% of inflow)
Center-of-Mass det. time= 339.6 min (1,088.2 - 748.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	886.50'	0.102 af	**45.00'W x 55.00'L x 9.00'H Field A** 0.511 af Overall - 0.256 af Embedded = 0.255 af x 40.0% Voids
#2A	887.00'	0.256 af	**CMP Round 96** x 8 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= -5.00' x 50.27 sf x 4 rows 41.00' Header x 50.27 sf x 2 = 4,121.8 cf Inside
#3	896.00'	0.003 af	**4.00'D x 5.00'H Vertical Cone/Cylinder** x 2
		0.361 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	889.00'	**12.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 889.00' / 887.00' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	889.10'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	886.50'	**0.800 in/hr Exfiltration over Surface area**
#4	Device 1	894.40'	**4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.05 cfs @ 6.15 hrs HW=886.65' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=1.60 cfs @ 12.42 hrs HW=892.20' (Free Discharge)
└─**1=Culvert** (Passes 1.60 cfs of 6.22 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.60 cfs @ 8.13 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SYS: (new Pond)

Inflow Area =	8.261 ac,	74.57% Impervious,	Inflow Depth =	3.11"	for 10-Year event
Inflow =	24.71 cfs @	12.12 hrs,	Volume=	2.142 af	
Outflow =	8.27 cfs @	12.55 hrs,	Volume=	2.142 af,	Atten= 67%, Lag= 26.2 min
Discarded =	0.05 cfs @	5.05 hrs,	Volume=	0.180 af	
Primary =	8.22 cfs @	12.55 hrs,	Volume=	1.961 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 885.66' @ 12.55 hrs Surf.Area= 9,472 sf Storage= 29,768 cf

Plug-Flow detention time= 101.4 min calculated for 2.142 af (100% of inflow)
Center-of-Mass det. time= 100.8 min (873.8 - 773.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A** 35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B** 21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**12.0" Round Culvert** L= 55.0' Ke= 0.500 Inlet / Outlet Invert= 880.39' / 879.17' S= 0.0222 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	881.60'	**7.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.60'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	885.60'	**7.0' long x 1.0' 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

			Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#6	Secondary	888.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.05 cfs @ 5.05 hrs HW=880.86' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=8.22 cfs @ 12.55 hrs HW=885.65' (Free Discharge)
└─**2=Culvert** (Barrel Controls 8.22 cfs @ 10.46 fps)
  ├─**3=Orifice/Grate** (Passes < 2.50 cfs potential flow)
  ├─**4=Orifice/Grate** (Passes < 6.48 cfs potential flow)
  └─**5=Broad-Crested Rectangular Weir** (Passes < 0.24 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=880.75' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment C.DRIVE:

Runoff = 1.49 cfs @ 12.10 hrs, Volume= 0.075 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 2.26 cfs @ 12.23 hrs, Volume= 0.163 af, Depth= 5.92"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.210	98	
*	0.120	69	
	0.330	87	Weighted Average
	0.120	69	36.36% Pervious Area
	0.210	98	63.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	62	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	85	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.8	255	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
14.8	402	Total			

Summary for Subcatchment DOCK:

Runoff = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af, Depth= 6.65"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 2.05 cfs @ 12.22 hrs, Volume= 0.145 af, Depth= 5.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 4.01 cfs @ 12.23 hrs, Volume= 0.297 af, Depth= 6.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.CART:

Runoff = 2.50 cfs @ 12.23 hrs, Volume= 0.172 af, Depth= 4.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.130	98	
*	0.300	69	
	0.430	78	Weighted Average
	0.300	69	69.77% Pervious Area
	0.130	98	30.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	156	0.0600	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	70	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	75	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.7	301	Total			

Summary for Subcatchment E.LP:

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 5.69"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.029	98	
*	0.022	69	
	0.051	85	Weighted Average
	0.022	69	43.14% Pervious Area
	0.029	98	56.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	16	0.0300	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment N.LP:

Runoff = 6.28 cfs @ 12.14 hrs, Volume= 0.360 af, Depth= 7.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.607	98	
*	0.000	69	
	0.607	98	Weighted Average
	0.607	98	100.00% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af, Depth= 5.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af, Depth= 6.84"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 4.29 cfs @ 12.06 hrs, Volume= 0.208 af, Depth= 7.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 3.20 cfs @ 12.13 hrs, Volume= 0.165 af, Depth= 5.30"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.168	98	
*	0.206	69	
	0.374	82	Weighted Average
	0.206	69	55.08% Pervious Area
	0.168	98	44.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	35	0.0400	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.7	88	Total			

Summary for Subcatchment S.LP:

Runoff = 7.96 cfs @ 12.14 hrs, Volume= 0.457 af, Depth= 7.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.770	98	
*	0.000	69	
	0.770	98	Weighted Average
	0.770	98	100.00% Impervious Area

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

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 1.01 cfs @ 12.14 hrs, Volume= 0.057 af, Depth= 6.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
0.024	69	50-75% Grass cover, Fair, HSG B
0.083	98	Water Surface, HSG B
0.107	91	Weighted Average
0.024	69	22.43% Pervious Area
0.083	98	77.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SE.LP:

Runoff = 0.27 cfs @ 12.10 hrs, Volume= 0.012 af, Depth= 4.00"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.002	98	
*	0.033	69	
	0.035	71	Weighted Average
	0.033	69	94.29% Pervious Area
	0.002	98	5.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	22	0.0300	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment SWLEX:

Runoff = 3.23 cfs @ 12.10 hrs, Volume= 0.156 af, Depth= 5.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.192	98	
*	0.131	69	
	0.323	86	Weighted Average
	0.131	69	40.56% Pervious Area
	0.192	98	59.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af, Depth= 6.89"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 3.49 cfs @ 12.10 hrs, Volume= 0.165 af, Depth= 6.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
* 0.250	96	ROADWAY
0.070	69	50-75% Grass cover, Fair, HSG B
0.320	90	Weighted Average
0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 5.31 cfs @ 12.09 hrs, Volume= 0.265 af, Depth= 6.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af, Depth= 6.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: (new Reach)

Inflow Area = 8.347 ac, 74.17% Impervious, Inflow Depth = 5.80" for 100-Year event
Inflow = 39.64 cfs @ 12.27 hrs, Volume= 4.036 af
Outflow = 39.64 cfs @ 12.27 hrs, Volume= 4.036 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 6.38" for 100-Year event
Inflow = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af
Outflow = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af, Atten= 0%, Lag= 0.0 min
Primary = 17.27 cfs @ 12.22 hrs, Volume= 1.238 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 888.91' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=16.95 cfs @ 12.22 hrs HW=888.77' (Free Discharge)
└**1=Culvert** (Inlet Controls 16.95 cfs @ 9.59 fps)

Summary for Pond 52:

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 6.89" for 100-Year event
Inflow = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af
Outflow = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af, Atten= 0%, Lag= 0.0 min
Primary = 5.85 cfs @ 12.14 hrs, Volume= 0.333 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 888.43' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=5.66 cfs @ 12.14 hrs HW=888.21' (Free Discharge)
└─**1=Culvert** (Inlet Controls 5.66 cfs @ 7.21 fps)

Summary for Pond 108":

Inflow Area =	2.427 ac, 78.57% Impervious, Inflow Depth = 5.56" for 100-Year event				
Inflow =	15.23 cfs @	12.24 hrs,	Volume=	1.124 af	
Outflow =	11.83 cfs @	12.26 hrs,	Volume=	1.109 af,	Atten= 22%, Lag= 1.5 min
Discarded =	0.01 cfs @	12.25 hrs,	Volume=	0.024 af	
Primary =	11.82 cfs @	12.26 hrs,	Volume=	1.084 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 892.59' @ 12.27 hrs Surf.Area= 0.022 ac Storage= 0.141 af

Plug-Flow detention time= 48.5 min calculated for 1.109 af (99% of inflow)
Center-of-Mass det. time= 40.4 min (838.0 - 797.6)

Volume	Invert	Avail.Storage	Storage Description
#1	890.50'	0.003 af	**4.00'D x 4.50'H Vertical Cone/Cylinder** x 2
#2	881.00'	0.052 af	**14.00'W x 66.00'L x 10.25'H Prismatoid** 0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
#3	881.45'	0.088 af	**108.0" Round Pipe Storage** Inside #2 L= 60.0' S= 0.0123 '/'
		0.142 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.50'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#4	Discarded	881.00'	**0.250 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 12.25 hrs HW=892.30' (Free Discharge)
└─**4=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=10.84 cfs @ 12.26 hrs HW=892.14' (Free Discharge)
└─**1=Culvert** (Passes 10.84 cfs of 44.60 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 5.13 cfs @ 14.69 fps)
  └─**3=Broad-Crested Rectangular Weir** (Weir Controls 5.71 cfs @ 4.32 fps)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 6.64" for 100-Year event
Inflow = 12.36 cfs @ 12.09 hrs, Volume= 0.808 af
Outflow = 12.36 cfs @ 12.09 hrs, Volume= 0.808 af, Atten= 0%, Lag= 0.0 min
Primary = 12.36 cfs @ 12.09 hrs, Volume= 0.808 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 890.74' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=11.93 cfs @ 12.09 hrs HW=890.40' (Free Discharge)
└**1=Culvert** (Barrel Controls 11.93 cfs @ 9.72 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 6.90" for 100-Year event
Inflow = 10.09 cfs @ 12.08 hrs, Volume= 0.512 af
Outflow = 10.09 cfs @ 12.08 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.0 min
Primary = 10.09 cfs @ 12.08 hrs, Volume= 0.512 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 891.06' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.51 cfs @ 12.08 hrs HW=890.63' (Free Discharge)
└**1=Culvert** (Barrel Controls 9.51 cfs @ 7.75 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 7.04" for 100-Year event
Inflow = 4.99 cfs @ 12.06 hrs, Volume= 0.246 af
Outflow = 4.99 cfs @ 12.06 hrs, Volume= 0.246 af, Atten= 0%, Lag= 0.0 min
Primary = 4.99 cfs @ 12.06 hrs, Volume= 0.246 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 889.36' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=4.77 cfs @ 12.06 hrs HW=889.18' (Free Discharge)
└─**1=Culvert** (Barrel Controls 4.77 cfs @ 6.07 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 6.65" for 100-Year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af
Outflow = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.09 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 887.70' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.09 hrs HW=887.68' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.76 cfs @ 2.37 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 5.88" for 100-Year event
Inflow = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af
Outflow = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min
Primary = 0.85 cfs @ 12.07 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 884.74' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.80 cfs @ 12.07 hrs HW=884.72' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.80 cfs @ 3.04 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 6.84" for 100-Year event
Inflow = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af
Outflow = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
Primary = 1.43 cfs @ 12.06 hrs, Volume= 0.068 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 884.90' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.06 hrs HW=884.88' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.36 cfs @ 3.34 fps)

Summary for Pond PROP: (new Pond)

Inflow Area = 1.377 ac,100.00% Impervious, Inflow Depth = 7.12" for 100-Year event
Inflow = 14.24 cfs @ 12.14 hrs, Volume= 0.817 af
Outflow = 8.53 cfs @ 12.24 hrs, Volume= 0.817 af, Atten= 40%, Lag= 6.2 min
Discarded = 0.05 cfs @ 4.05 hrs, Volume= 0.172 af
Primary = 8.48 cfs @ 12.24 hrs, Volume= 0.645 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 895.11' @ 12.24 hrs Surf.Area= 0.057 ac Storage= 0.349 af

Plug-Flow detention time= 229.9 min calculated for 0.817 af (100% of inflow)
Center-of-Mass det. time= 230.7 min (972.1 - 741.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	886.50'	0.102 af	**45.00'W x 55.00'L x 9.00'H Field A** 0.511 af Overall - 0.256 af Embedded = 0.255 af x 40.0% Voids
#2A	887.00'	0.256 af	**CMP Round 96** x 8 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= -5.00' x 50.27 sf x 4 rows 41.00' Header x 50.27 sf x 2 = 4,121.8 cf Inside
#3	896.00'	0.003 af	**4.00'D x 5.00'H Vertical Cone/Cylinder** x 2
		0.361 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	889.00'	**12.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 889.00' / 887.00' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	889.10'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	886.50'	**0.800 in/hr Exfiltration over Surface area**
#4	Device 1	894.40'	**4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.05 cfs @ 4.05 hrs HW=886.65' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=8.57 cfs @ 12.24 hrs HW=895.08' (Free Discharge)
└─**1=Culvert** (Passes 8.57 cfs of 8.94 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.26 cfs @ 11.53 fps)
  └─**4=Broad-Crested Rectangular Weir** (Weir Controls 6.30 cfs @ 2.31 fps)

Summary for Pond SYS: (new Pond)

Inflow Area =	8.261 ac,	74.57% Impervious,	Inflow Depth =	6.09"	for 100-Year event
Inflow =	46.14 cfs @	12.11 hrs,	Volume=	4.189 af	
Outflow =	39.54 cfs @	12.27 hrs,	Volume=	4.189 af,	Atten= 14%, Lag= 9.1 min
Discarded =	0.10 cfs @	12.27 hrs,	Volume=	0.189 af	
Primary =	10.74 cfs @	12.27 hrs,	Volume=	3.284 af	
Secondary =	28.70 cfs @	12.27 hrs,	Volume=	0.716 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 889.55' @ 12.27 hrs Surf.Area= 17,081 sf Storage= 38,879 cf

Plug-Flow detention time= 68.4 min calculated for 4.187 af (100% of inflow)
Center-of-Mass det. time= 69.2 min (838.7 - 769.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A** 35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B** 21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**12.0" Round Culvert** L= 55.0' Ke= 0.500 Inlet / Outlet Invert= 880.39' / 879.17' S= 0.0222 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	881.60'	**7.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.60'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	885.60'	**7.0' long x 1.0' 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

			Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#6	Secondary	888.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.10 cfs @ 12.27 hrs HW=889.54' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=10.74 cfs @ 12.27 hrs HW=889.54' (Free Discharge)
└─**2=Culvert** (Barrel Controls 10.74 cfs @ 13.67 fps)
  ├─**3=Orifice/Grate** (Passes < 3.56 cfs potential flow)
  ├─**4=Orifice/Grate** (Passes < 9.27 cfs potential flow)
  └─**5=Broad-Crested Rectangular Weir** (Passes < 181.62 cfs potential flow)

Secondary OutFlow Max=28.37 cfs @ 12.27 hrs HW=889.54' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 28.37 cfs @ 2.73 fps)

Summary for Subcatchment C.DRIVE:

Runoff = 1.17 cfs @ 12.10 hrs, Volume= 0.058 af, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.110	98	
*	0.030	69	
	0.140	92	Weighted Average
	0.030	69	21.43% Pervious Area
	0.110	98	78.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	13	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.1	5	0.0200	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	34	0.0170	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.2	36	0.0195	2.83		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	88	Total			

Summary for Subcatchment CART:

Runoff = 1.74 cfs @ 12.23 hrs, Volume= 0.125 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.210	98	
*	0.120	69	
	0.330	87	Weighted Average
	0.120	69	36.36% Pervious Area
	0.210	98	63.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	62	0.0100	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.3	85	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.8	255	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
14.8	402	Total			

Summary for Subcatchment DOCK:

Runoff = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.060	98	
*	0.010	69	
	0.070	94	Weighted Average
	0.010	69	14.29% Pervious Area
	0.060	98	85.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	85	0.0400	1.65		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.0	98	Total			

Summary for Subcatchment DUN:

Runoff = 1.58 cfs @ 12.22 hrs, Volume= 0.112 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.190	98	
*	0.100	69	
	0.290	88	Weighted Average
	0.100	69	34.48% Pervious Area
	0.190	98	65.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	150	0.0700	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.9	137	0.0310	2.64		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	166	0.0200	6.42	5.04	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.1	453	Total			

Summary for Subcatchment E.ALDI:

Runoff = 3.13 cfs @ 12.23 hrs, Volume= 0.231 af, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.420	98	
*	0.150	69	
	0.570	90	Weighted Average
	0.150	69	26.32% Pervious Area
	0.420	98	73.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	115	0.0300	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	100	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.2	215	Total			

Summary for Subcatchment E.CART:

Runoff = 1.84 cfs @ 12.23 hrs, Volume= 0.127 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.130	98	
*	0.300	69	
	0.430	78	Weighted Average
	0.300	69	69.77% Pervious Area
	0.130	98	30.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	156	0.0600	0.19		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	70	0.0400	3.00		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.3	75	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
14.7	301	Total			

Summary for Subcatchment E.LP:

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.019 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.029	98	
*	0.022	69	
	0.051	85	Weighted Average
	0.022	69	43.14% Pervious Area
	0.029	98	56.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	16	0.0300	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment N.LP:

Runoff = 5.02 cfs @ 12.14 hrs, Volume= 0.286 af, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.607	98	
*	0.000	69	
	0.607	98	Weighted Average
	0.607	98	100.00% Impervious Area

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

Summary for Subcatchment NE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.050	98	
	0.030	69	50-75% Grass cover, Fair, HSG B
	0.080	87	Weighted Average
	0.030	69	37.50% Pervious Area
	0.050	98	62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	12	0.2500	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.5	36	0.0240	1.13		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.5	48	Total			

Summary for Subcatchment NW.LEX: Lex. Ave. Entrance Drive

Runoff = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af, Depth= 5.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (ac)	CN	Description
0.010	69	50-75% Grass cover, Fair, HSG B
0.110	98	Paved parking, HSG B
0.120	96	Weighted Average
0.010	69	8.33% Pervious Area
0.110	98	91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	33	0.0215	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.6	27	0.0108	0.78		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
1.1	60	Total			

Summary for Subcatchment ROOF:

Runoff = 3.44 cfs @ 12.06 hrs, Volume= 0.165 af, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.350	98	ROOF
	0.350	98	100.00% Impervious Area

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

Summary for Subcatchment S.DRIVE:

Runoff = 2.41 cfs @ 12.13 hrs, Volume= 0.124 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.168	98	
*	0.206	69	
	0.374	82	Weighted Average
	0.206	69	55.08% Pervious Area
	0.168	98	44.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	35	0.0400	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.2	7	0.0200	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	28	0.0370	1.28		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.1	18	0.0295	3.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.7	88	Total			

Summary for Subcatchment S.LP:

Runoff = 6.37 cfs @ 12.14 hrs, Volume= 0.363 af, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.770	98	
*	0.000	69	
	0.770	98	Weighted Average
	0.770	98	100.00% Impervious Area

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

Summary for Subcatchment SE.LEX: Lex. Ave. Entrance Drive

Runoff = 0.79 cfs @ 12.14 hrs, Volume= 0.044 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (ac)	CN	Description
0.024	69	50-75% Grass cover, Fair, HSG B
0.083	98	Water Surface, HSG B
0.107	91	Weighted Average
0.024	69	22.43% Pervious Area
0.083	98	77.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	43	0.0280	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.4	33	0.0333	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
7.2	76	Total			

Summary for Subcatchment SE.LP:

Runoff = 0.19 cfs @ 12.10 hrs, Volume= 0.008 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.002	98	
*	0.033	69	
	0.035	71	Weighted Average
	0.033	69	94.29% Pervious Area
	0.002	98	5.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	22	0.0300	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"

Summary for Subcatchment SWLEX:

Runoff = 2.48 cfs @ 12.10 hrs, Volume= 0.119 af, Depth= 4.43"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.192	98	
*	0.131	69	
	0.323	86	Weighted Average
	0.131	69	40.56% Pervious Area
	0.192	98	59.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	11	0.0150	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.7	48	0.0225	1.17		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.6	59	Total			

Summary for Subcatchment TCF:

Runoff = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af, Depth= 5.45"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

Area (ac)	CN	Description
0.540	98	Paved parking, HSG C
0.040	69	50-75% Grass cover, Fair, HSG B
0.580	96	Weighted Average
0.040	69	6.90% Pervious Area
0.540	98	93.10% Impervious Area

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

Summary for Subcatchment UNIV: Univ. Ave. Entrance Drive

Runoff = 2.73 cfs @ 12.10 hrs, Volume= 0.127 af, Depth= 4.75"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.250	96	ROADWAY
	0.070	69	50-75% Grass cover, Fair, HSG B
	0.320	90	Weighted Average
	0.320	90	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	15	0.0500	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.3	130	0.0307	1.61		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
0.4	50	0.0125	2.27		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	195	Total			

Summary for Subcatchment W.ALDI:

Runoff = 4.21 cfs @ 12.09 hrs, Volume= 0.209 af, Depth= 5.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	0.420	98	
*	0.050	69	
	0.470	95	Weighted Average
	0.050	69	10.64% Pervious Area
	0.420	98	89.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	13	0.0500	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
1.4	105	0.0187	1.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.81"
3.5	118	Total			

Summary for Subcatchment WILD:

Runoff = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year St. Paul Rainfall=5.90"

	Area (ac)	CN	Description
*	1.750	98	
*	0.470	69	
*	0.110	85	
	2.330	92	Weighted Average
	0.580	72	24.89% Pervious Area
	1.750	98	75.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	58	0.0100	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.81"
0.6	159	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.4	126	0.0100	5.26	6.46	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.2	54	0.0055	4.41	7.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
14.2	397	Total			

Summary for Reach 2R: (new Reach)

Inflow Area = 8.347 ac, 74.17% Impervious, Inflow Depth = 4.43" for 100-Year St. Paul event
Inflow = 25.23 cfs @ 12.31 hrs, Volume= 3.085 af
Outflow = 25.23 cfs @ 12.31 hrs, Volume= 3.085 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs

Summary for Pond 51:

Inflow Area = 2.330 ac, 75.11% Impervious, Inflow Depth = 4.98" for 100-Year St. Paul event
Inflow = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af
Outflow = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af, Atten= 0%, Lag= 0.0 min
Primary = 13.52 cfs @ 12.22 hrs, Volume= 0.966 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 887.32' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**18.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=13.26 cfs @ 12.22 hrs HW=887.23' (Free Discharge)
└**1=Culvert** (Inlet Controls 13.26 cfs @ 7.51 fps)

Summary for Pond 52:

Device	Routing	Invert	Outlet Devices
#1	Primary	884.05'	**15.0" Round Culvert** L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 884.05' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Summary for Pond 61: Stub-61

Inflow Area = 0.580 ac, 93.10% Impervious, Inflow Depth = 5.45" for 100-Year St. Paul event
Inflow = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af
Outflow = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af, Atten= 0%, Lag= 0.0 min
Primary = 4.65 cfs @ 12.14 hrs, Volume= 0.264 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 887.03' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.11'	**12.0" Round Culvert** L= 22.0' Ke= 0.900 Inlet / Outlet Invert= 884.11' / 884.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.51 cfs @ 12.14 hrs HW=886.89' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.51 cfs @ 5.74 fps)

Summary for Pond 108":

Inflow Area =	2.427 ac, 78.57% Impervious, Inflow Depth = 4.18" for 100-Year St. Paul event				
Inflow =	7.13 cfs @	12.23 hrs,	Volume=	0.844 af	
Outflow =	4.30 cfs @	12.48 hrs,	Volume=	0.844 af,	Atten= 40%, Lag= 14.8 min
Discarded =	0.01 cfs @	4.05 hrs,	Volume=	0.024 af	
Primary =	4.29 cfs @	12.48 hrs,	Volume=	0.820 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 889.36' @ 12.48 hrs Surf.Area= 0.021 ac Storage= 0.118 af

Plug-Flow detention time= 46.9 min calculated for 0.844 af (100% of inflow)
Center-of-Mass det. time= 48.1 min (851.3 - 803.2)

Volume	Invert	Avail.Storage	Storage Description
#1	890.50'	0.003 af	**4.00'D x 4.50'H Vertical Cone/Cylinder** x 2
#2	881.00'	0.052 af	**14.00'W x 66.00'L x 10.25'H Prismatoid** 0.217 af Overall - 0.088 af Embedded = 0.130 af x 40.0% Voids
#3	881.45'	0.088 af	**108.0" Round Pipe Storage** Inside #2 L= 60.0' S= 0.0123 '/'
		0.142 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	882.45'	**24.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 882.45' / 882.15' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	882.50'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	889.50'	**0.5' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#4	Discarded	881.00'	**0.250 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 4.05 hrs HW=881.14' (Free Discharge)
└─**4=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=4.29 cfs @ 12.48 hrs HW=889.34' (Free Discharge)
└─**1=Culvert** (Passes 4.29 cfs of 36.71 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 4.29 cfs @ 12.28 fps)
  └─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 110:

Inflow Area = 1.460 ac, 85.62% Impervious, Inflow Depth = 5.23" for 100-Year St. Paul event
Inflow = 9.79 cfs @ 12.09 hrs, Volume= 0.636 af
Outflow = 9.79 cfs @ 12.09 hrs, Volume= 0.636 af, Atten= 0%, Lag= 0.0 min
Primary = 9.79 cfs @ 12.09 hrs, Volume= 0.636 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 888.68' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.11'	**15.0" Round Culvert** L= 86.0' Ke= 0.500 Inlet / Outlet Invert= 885.11' / 884.00' S= 0.0129 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=9.45 cfs @ 12.09 hrs HW=888.48' (Free Discharge)
└**1=Culvert** (Barrel Controls 9.45 cfs @ 7.70 fps)

Summary for Pond 120:

Inflow Area = 0.890 ac, 93.26% Impervious, Inflow Depth = 5.46" for 100-Year St. Paul event
Inflow = 8.03 cfs @ 12.08 hrs, Volume= 0.405 af
Outflow = 8.03 cfs @ 12.08 hrs, Volume= 0.405 af, Atten= 0%, Lag= 0.0 min
Primary = 8.03 cfs @ 12.08 hrs, Volume= 0.405 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 889.34' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	885.90'	**15.0" Round Culvert** L= 132.0' Ke= 0.500 Inlet / Outlet Invert= 885.90' / 885.11' S= 0.0060 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=7.56 cfs @ 12.08 hrs HW=889.06' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.56 cfs @ 6.16 fps)

Summary for Pond 130:

Inflow Area = 0.420 ac, 97.62% Impervious, Inflow Depth = 5.59" for 100-Year St. Paul event
Inflow = 3.99 cfs @ 12.06 hrs, Volume= 0.196 af
Outflow = 3.99 cfs @ 12.06 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min
Primary = 3.99 cfs @ 12.06 hrs, Volume= 0.196 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 888.54' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	886.78'	**12.0" Round Culvert** L= 68.0' Ke= 0.500 Inlet / Outlet Invert= 886.78' / 886.10' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.81 cfs @ 12.06 hrs HW=888.43' (Free Discharge)
└─**1=Culvert** (Barrel Controls 3.81 cfs @ 4.85 fps)

Summary for Pond 140:

Inflow Area = 0.070 ac, 85.71% Impervious, Inflow Depth = 5.23" for 100-Year St. Paul event
Inflow = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af
Outflow = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Primary = 0.63 cfs @ 12.09 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 887.63' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	887.11'	**12.0" Round Culvert** L= 108.0' Ke= 0.500 Inlet / Outlet Invert= 887.11' / 886.78' S= 0.0031 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.60 cfs @ 12.09 hrs HW=887.61' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.60 cfs @ 2.22 fps)

Summary for Pond CB31:

Inflow Area = 0.080 ac, 62.50% Impervious, Inflow Depth = 4.53" for 100-Year St. Paul event
Inflow = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af
Outflow = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Primary = 0.65 cfs @ 12.07 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 884.67' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.23'	**12.0" Round Culvert** L= 23.0' Ke= 0.500 Inlet / Outlet Invert= 884.23' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.62 cfs @ 12.07 hrs HW=884.66' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.62 cfs @ 2.87 fps)

Summary for Pond CB41:

Inflow Area = 0.120 ac, 91.67% Impervious, Inflow Depth = 5.41" for 100-Year St. Paul event
Inflow = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af
Outflow = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.06 hrs, Volume= 0.054 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 884.80' @ 12.06 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	884.19'	**12.0" Round Culvert** L= 19.0' Ke= 0.500 Inlet / Outlet Invert= 884.19' / 884.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.08 cfs @ 12.06 hrs HW=884.79' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.08 cfs @ 3.18 fps)

Summary for Pond PROP: (new Pond)

Inflow Area = 1.377 ac,100.00% Impervious, Inflow Depth = 5.66" for 100-Year St. Paul event
Inflow = 11.40 cfs @ 12.14 hrs, Volume= 0.650 af
Outflow = 2.32 cfs @ 12.43 hrs, Volume= 0.650 af, Atten= 80%, Lag= 17.3 min
Discarded = 0.05 cfs @ 4.80 hrs, Volume= 0.169 af
Primary = 2.27 cfs @ 12.43 hrs, Volume= 0.480 af

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 894.45' @ 12.43 hrs Surf.Area= 0.057 ac Storage= 0.330 af

Plug-Flow detention time= 273.2 min calculated for 0.650 af (100% of inflow)
Center-of-Mass det. time= 272.9 min (1,016.9 - 744.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	886.50'	0.102 af	**45.00'W x 55.00'L x 9.00'H Field A** 0.511 af Overall - 0.256 af Embedded = 0.255 af x 40.0% Voids
#2A	887.00'	0.256 af	**CMP Round 96** x 8 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.27 sf x 20.00'L = 1,005.3 cf Overall Size= 96.0"W x 96.0"H x 20.00'L Row Length Adjustment= -5.00' x 50.27 sf x 4 rows 41.00' Header x 50.27 sf x 2 = 4,121.8 cf Inside
#3	896.00'	0.003 af	**4.00'D x 5.00'H Vertical Cone/Cylinder** x 2
		0.361 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	889.00'	**12.0" Round Culvert** L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 889.00' / 887.00' S= 0.0400 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	889.10'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	886.50'	**0.800 in/hr Exfiltration over Surface area**
#4	Device 1	894.40'	**4.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.05 cfs @ 4.80 hrs HW=886.65' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=2.26 cfs @ 12.43 hrs HW=894.45' (Free Discharge)
└─**1=Culvert** (Passes 2.26 cfs of 8.41 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.14 cfs @ 10.87 fps)
  └─**4=Broad-Crested Rectangular Weir** (Weir Controls 0.12 cfs @ 0.60 fps)

Summary for Pond SYS: (new Pond)

Inflow Area =	8.261 ac,	74.57% Impervious,	Inflow Depth =	4.71"	for 100-Year St. Paul event
Inflow =	36.27 cfs @	12.11 hrs,	Volume=	3.244 af	
Outflow =	25.18 cfs @	12.31 hrs,	Volume=	3.244 af,	Atten= 31%, Lag= 11.5 min
Discarded =	0.08 cfs @	12.31 hrs,	Volume=	0.186 af	
Primary =	10.52 cfs @	12.31 hrs,	Volume=	2.816 af	
Secondary =	14.58 cfs @	12.31 hrs,	Volume=	0.242 af	

Routing by Stor-Ind method, Time Span= 0.00-90.00 hrs, dt= 0.05 hrs
Peak Elev= 889.16' @ 12.31 hrs Surf.Area= 13,927 sf Storage= 36,601 cf

Plug-Flow detention time= 82.5 min calculated for 3.244 af (100% of inflow)
Center-of-Mass det. time= 81.8 min (854.3 - 772.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	880.75'	9,122 cf	**18.50'W x 316.00'L x 6.00'H Field A** 35,076 cf Overall - 12,272 cf Embedded = 22,804 cf x 40.0% Voids
#2A	881.25'	12,272 cf	**CMP Round 60** x 30 Inside #1 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L 30 Chambers in 2 Rows 12.50' Header x 19.63 sf x 2 = 490.9 cf Inside
#3B	880.75'	5,620 cf	**18.50'W x 196.00'L x 6.00'H Field B** 21,756 cf Overall - 7,707 cf Embedded = 14,049 cf x 40.0% Voids
#4B	881.25'	7,707 cf	**CMP Round 60** x 18 Inside #3 Effective Size= 60.0"W x 60.0"H => 19.63 sf x 20.00'L = 392.7 cf Overall Size= 60.0"W x 60.0"H x 20.00'L Row Length Adjustment= +10.00' x 19.63 sf x 2 rows 12.50' Header x 19.63 sf x 1 = 245.4 cf Inside
#5	886.25'	25 cf	**4.00'D x 2.00'H CBMH-30**
#6	886.25'	29 cf	**4.00'D x 2.29'H CBMH-31**
#7	886.25'	35 cf	**4.00'D x 2.82'H CBMH-40**
#8	886.25'	40 cf	**4.00'D x 3.18'H CBMH-41**
#9	886.25'	57 cf	**4.00'D x 4.50'H CBMH-50**
#10	886.25'	59 cf	**4.00'D x 4.70'H CBMH-51**
#11	886.25'	60 cf	**4.00'D x 4.80'H CBMH-52**
#12	886.25'	62 cf	**4.00'D x 4.95'H CBMH-60**
#13	886.25'	60 cf	**4.00'D x 4.75'H CBMH-70**
#14	886.25'	66 cf	**4.00'D x 5.26'H CBMH-80**
#15	886.25'	59 cf	**4.00'D x 4.70'H CBMH-90**
#16	886.25'	62 cf	**4.00'D x 4.92'H CBMH-100**
#17	888.33'	8,117 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
		43,451 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
888.33	15	0	0
888.50	345	31	31
889.00	3,000	836	867
889.50	7,000	2,500	3,367
890.00	12,000	4,750	8,117

Device	Routing	Invert	Outlet Devices
#1	Discarded	880.75'	**0.250 in/hr Exfiltration over Surface area**
#2	Primary	880.39'	**12.0" Round Culvert** L= 55.0' Ke= 0.500 Inlet / Outlet Invert= 880.39' / 879.17' S= 0.0222 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	881.60'	**7.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	881.60'	**8.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	885.60'	**7.0' long x 1.0' 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

Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

#6 Secondary 888.50' **10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.08 cfs @ 12.31 hrs HW=889.15' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=10.52 cfs @ 12.31 hrs HW=889.15' (Free Discharge)
└─**2=Culvert** (Barrel Controls 10.52 cfs @ 13.39 fps)
  ├─**3=Orifice/Grate** (Passes < 3.47 cfs potential flow)
  ├─**4=Orifice/Grate** (Passes < 9.03 cfs potential flow)
  └─**5=Broad-Crested Rectangular Weir** (Passes < 155.53 cfs potential flow)

Secondary OutFlow Max=14.18 cfs @ 12.31 hrs HW=889.15' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 14.18 cfs @ 2.18 fps)

Figures A

Existing Drainage Map
Proposed Drainage Map

LEXINGTON APARTMENTS
St. Paul, MN

OWNER NAME
OWNER ADDRESS

LOUCKS
PLANNING
CIVIL ENGINEERING
LAND SURVEYING
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL
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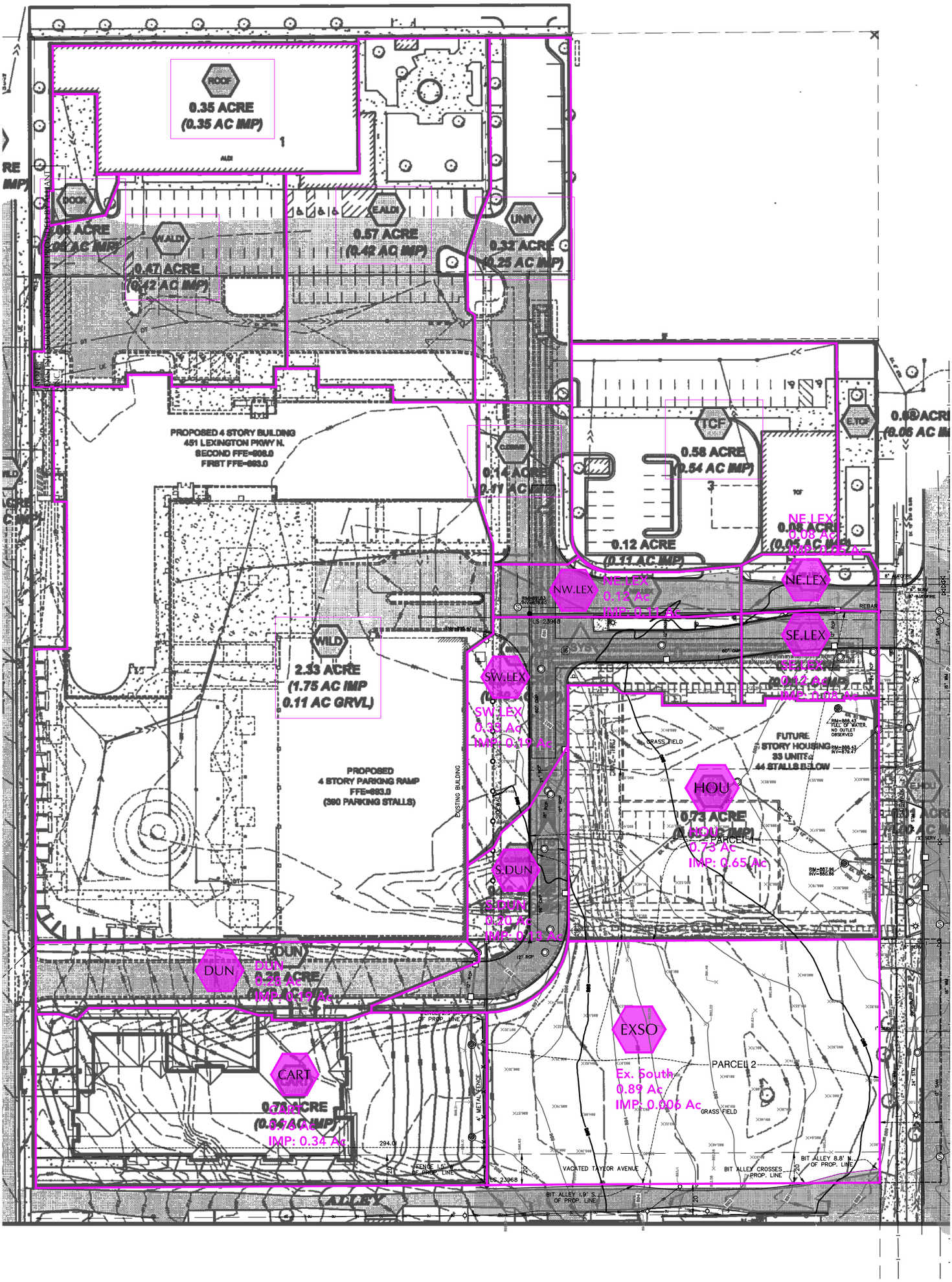
CADD QUALIFICATIONS

SUBMITTAL/REVISIONS

PROFESSIONAL SIGNATURE

QUALITY CONTROL

EXISTING DRAINAGE AREAS
H1-1



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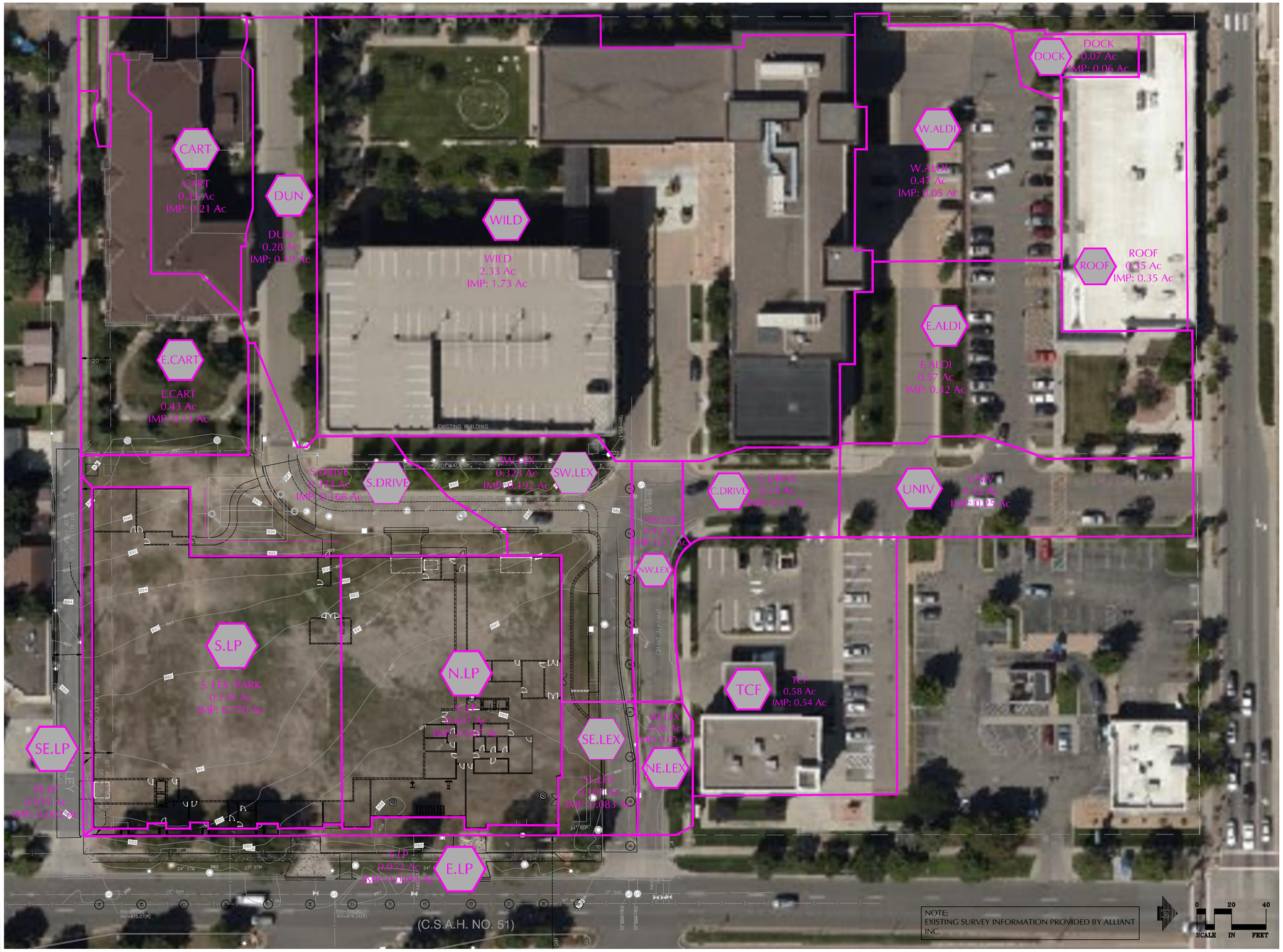

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St. Paul, MN

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CADD QUALIFICATION

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QUALITY CONTROL

PROPOSED HYDROLOGY AREAS

H2-1

Revised: 11/12/2020 12:7 PM W:\2019\191144\HYDROLOGY\CAD\H2-1 PROPOSED Drainage

Figure B

Geotechnical Report

Geotechnical Evaluation Report

Proposed Mixed-Use Building
Southwest of North Lexington Parkway and University Avenue West
St. Paul, Minnesota

Prepared for

Alatus, LLC

Professional Certification:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Mark L. Jenkins, PE
Senior Engineer
License Number: 41770
October 1, 2019

MARK L. JENKINS
LICENSED PROFESSIONAL ENGINEER
41770
STATE OF MINNESOTA

Project B1907294

Braun Intertec Corporation

BRAUN INTERTEC
The Science You Build On.

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The Science You Build On.

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October 1, 2019 Project B1907294

Ms. Carla Dunham
Alatus, LLC
800 Nicollet Mall, Suite 2850
Minneapolis, MN 55402

Re: Geotechnical Evaluation
Proposed Mixed-Use Building
Southwest of North Lexington Parkway and University Avenue West
St. Paul, Minnesota

Dear Ms. Dunham:

We are pleased to present this Geotechnical Evaluation Report for the proposed Mixed-Used Building to be located southwest of North Lexington parkway and University Avenue West in St. Paul, Minnesota.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Dan Martin at 952.995.2227 (dmartin@braunintertec.com), Mark Jenkins at 651.487.7010 (mjenkins@braunintertec.com), or Ray Huber (rhuber@braunintertec.com).

Sincerely,

BRAUN INTERTEC CORPORATION

Mark L. Jenkins, PE
Senior Engineer

Daniel E. Martin
Principal – Senior Project Manager

Ray A. Huber, PE
Vice President – Principal Engineer

AA/EOE

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Appendix

Soil Boring Location Sketch
Log of Boring Sheets ST-1 through ST-6
Laboratory Test Results Summary
Descriptive Terminology of Soil

A. Introduction

A.1. Project Description

This Geotechnical Evaluation Report addresses the proposed design and construction of the Mixed-Use Building, located southwest of University Avenue and Lexington Parkway in St. Paul, Minnesota. The project will include the construction of a building with below-grade parking, one level of commercial use and five levels of residential use. Tables 1 and 2 provide project details.

Table 1. Building Description

Aspect	Description
Below-grade levels	One (Provided)
Above-grade levels	Six (Provided)
Lowest level floor elevation	881.5 (Provided)
Grade level floor elevation	890 (Provided)
Column loads (kips)	650 (Assumed)
Wall loads (kips/foot)	15 (Assumed)
Cuts or fills for buildings	Cuts of 9 1/2 to 14 1/2 feet to establish basement subgrade elevation; mostly 9 1/2 to 11 feet (Provided)
Tolerable building settlement	1 inch (Assumed)
Comments	Below-grade parking below building, with commercial space on first level (pre-cast concrete walls and precast plank flooring likely) and residential space to be wood-framed

Table 2. Site Aspects and Grading Description

Aspect	Description
Pavement type(s)	Concrete (below grade) and bituminous (exterior)
Assumed pavement loads	Medium-duty: 150,000 ESALs*
Grade changes	Exterior cuts and fills of less than 5 feet

*Equivalent 18,000-lb single axle loads based on 20-year design.

The figure below shows an illustration of the proposed site layout.

Figure 1. Site Layout

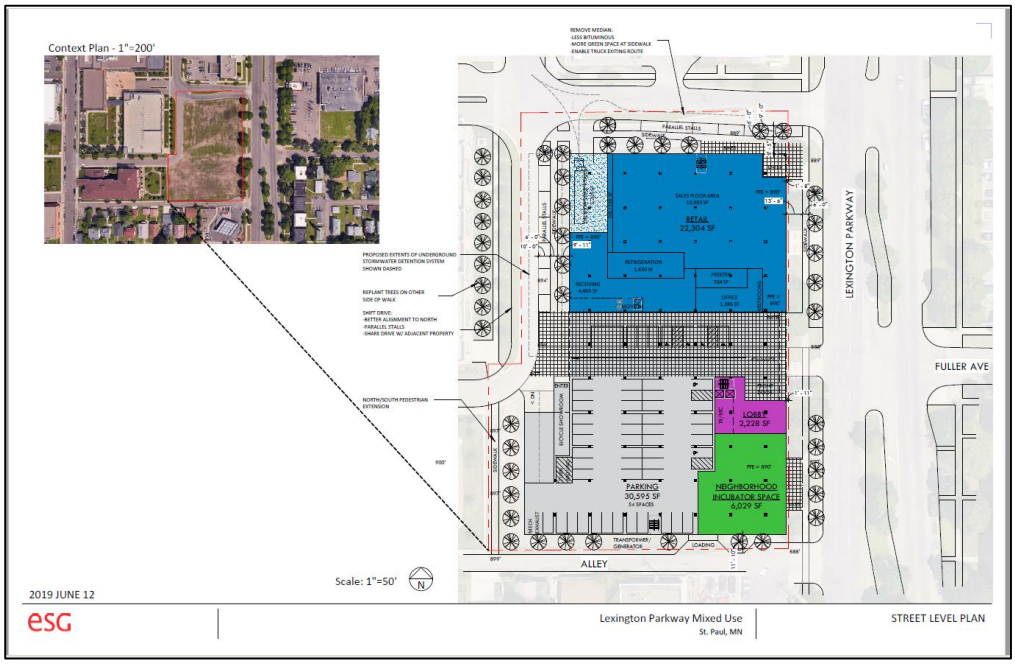


Figure provided by ESG dated June 12, 2019.

A.2. Site Conditions and History

Currently, the site exists as an open parcel with sparse grass.

Current grades range from 889 to 895 1/2 at the boring locations (mostly 889 to 892 1/2). Generally, the site is relatively level, sloping from the northeast to the southwest.

Historically, the site has been impacted by previous development. Previous buildings that were constructed on this site have been demolished and the site is currently graded relatively level.

Photograph 1. Aerial Photograph of the Site in 2018

Photograph provided by Google Earth™.

A.3. Purpose

The purpose of our geotechnical evaluation was to characterize the subsurface geologic conditions at the selected exploration locations and evaluate their impact on the design and construction of building foundations, grade-bearing slabs, below-grade walls, pavements and utilities. Estimated infiltration rates are provided per Minnesota Stormwater Manual guidelines.

A.4. Background Information and Reference Documents

We reviewed the following information:

- Lower and upper level plans prepared by ESG dated June 20, 2019.
- Site survey and topographic plan prepared by Alliant Engineering dated February 26, 2019.
- Previous geotechnical report for this site prepared by Braun Intertec dated April 27, 2001.

In addition to the provided sources, we have used several publicly available sources of information.

We have described our understanding of the proposed construction and site to the extent others reported it to us. Depending on the extent of available information, we may have made assumptions based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, the project team should notify us. New or changed information could require additional evaluation, analyses and/or recommendations.

A.5. Scope of Services

We performed our scope of services for the project in accordance with our Proposal QTB102873 to Ms. Carla Dunham, dated June 27, 2019, and authorized shortly thereafter. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Reviewing the background information and reference documents previously cited.

- Staking and clearing the exploration location of underground utilities. We selected and staked the new exploration locations in locations that supplement existing boring data. We acquired the surface elevations and locations with GPS technology using the State of Minnesota's permanent GPS base station network. The Soil Boring Location Sketch included in the Appendix shows the approximate locations of the borings.

- Performing 6 standard penetration test (SPT) borings, denoted as ST-1 to ST-6, to nominal depths of 31 feet below grade across the site.

- Performing laboratory testing on select samples to aid in soil classification and engineering analysis.

- Perform engineering analysis including bearing capacity, settlement and pavement design.

- Preparing this report containing a boring location sketch, logs of soil borings, a summary of the soils encountered, results of laboratory tests, and recommendations for structure and pavement subgrade preparation and the design of foundations, floor slabs, exterior slabs, utilities, stormwater improvements and pavements.

Our authorized scope of services for the project also included a Phase II Environmental Site Assessment, which will be submitted separately.

B. Results

B.1. Geologic Overview

The native soils on this site consist of glacial outwash sands (poorly graded sand and poorly graded sand with silt). Existing fill associated with previous developments covers the site in variable thicknesses.

We based the geologic origins used in this report on the soil types, in-situ and laboratory testing, and available common knowledge of the geological history of the site. Because of the complex depositional history, geologic origins can be difficult to ascertain. We did not perform a detailed investigation of the geologic history for the site.

B.2. Previous Geotechnical Information

We performed 23 borings within, or in close proximity to, this site in 2001. Those historic borings were performed at the locations shown on our Boring Location Sketch in the Appendix.

We could not obtain permission to include those historic boring logs with this report. The data obtained from those historic borings are summarized below in Table 4.

The previous borings were very similar to our current borings, but did encounter isolated layers of lean clay and a few encountered buried topsoil beneath the fill. We accounted for the removal of those materials in Table 4.

B.3. Boring Results

Table 3 provides a summary of the soil boring results, in the general order we encountered the strata. Please refer to the Log of Boring sheets in the Appendix for additional details. The Descriptive Terminology sheet in the Appendix includes definitions of abbreviations used in Table 3.

Table 3. Subsurface Profile Summary*

Strata	Soil Type - ASTM Classification	Range of Penetration Resistances	Commentary and Details
Topsoil fill	SM	NA	▪ Typically fine-grained ▪ Dark brown to black ▪ Trace roots ▪ Thicknesses at boring locations varied from 4 to 8 inches (mostly 4 inches) ▪ Moisture condition generally moist
Fill	SM, SC, SP-SM and CL layers in historic borings	3 to 22 BPF	▪ Penetration resistance of 3 to 16 BPF ▪ Moisture condition generally moist ▪ Thicknesses at boring locations varied from 4 to 18 feet (mostly 10 to 11 1/2 feet) ▪ Portions with concrete fragments ▪ Buried topsoil below fill in a few historic borings (accounted for in Table 4)
Glacial Outwash	SP, SP-SM	4 to 22 BPF	▪ General penetration resistances of 6 to 11 BPF ▪ Moisture condition generally moist ▪ May contain cobbles and boulders

*Abbreviations defined in the attached Descriptive Terminology sheet.
BPF = blows-per-foot

For simplicity in this report, we define existing fill to mean existing, uncontrolled or undocumented fill.

B.4. Groundwater

We did not observe groundwater while advancing our borings. Based on the historical borings that extended to depths of up to 50 feet, groundwater appeared to be down 45 feet at the time of that exploration. Due to the layered nature of the existing fill, perched groundwater may exist within granular layers of the fill seasonally and periodically. Project planning should anticipate seasonal and annual fluctuations of groundwater.

B.5. Laboratory Test Results

The boring logs show the results of laboratory testing we performed, next to the tested sample depth. A summary table of laboratory test results is included in the Appendix.

The moisture content of the fill was approximately 13 percent, indicating that the materials were likely near their probable optimum moisture contents. The moisture content of the glacial outwash sands ranged from approximately 4 to 6 percent, indicating they were dry of their optimal moisture content.

Our mechanical analyses indicated that the fill contained 32 percent silt and clay by weight (visually ranging from about 15 to 35 percent, with isolated layers of cleaner sand and sandy lean clay based on the historical borings).

C. Recommendations

C.1. Site Grading and Subgrade Preparation

C.1.a. Building Subgrade Excavations

We recommend removing topsoil fill and existing fill from below building slabs, foundations and their oversize areas. Excavations to establish basement subgrade elevation (assumed to be at about elevation 880.5) will sometimes penetrate the existing fill. Table 4 shows the anticipated excavation depths and bottom elevations for each of the recent and historic borings, and the anticipated depth below basement slab subgrade elevation. We also recommend having a geotechnical engineer, or an engineering technician working under the direction of a geotechnical engineer (geotechnical representative), evaluate the suitability of exposed subgrade soils to support the proposed structure. Note that surface grades at the historic borings that were drilling in 2001 may have changed.

Table 4. Building Excavation Depths

Location	Approximate Surface Elevation (feet)	Anticipated Excavation Depth (feet)	Anticipated Bottom Elevation (feet)	Anticipated Depth Below Floor Subgrade (880.5) (feet)
ST-1	889.9	11 1/2	878 1/2	2
ST-2	889.0	10	879	1 1/2
ST-3	889.0	11 1/2	877 1/2	3
ST-4	890.4	18	872 1/2	8
ST-5	895.4	4	891	---
ST-6	892.6	10	882 1/2	---
HB-1	891.0	14	877	3 1/2
HB-2	890.0	9	881	---
HB-3	890.0	6	884	---
HB-4	889.0	6	883	---
HB-5	891.0	6	885	---
HB-6	890.0	9	881	---
HB-7	889.0	8	881	---
HB-8	889.0	11	878	2 1/2
HB-9	897.0	4	893	---
HB-10	896.0	5	891	---
HB-11	897.0	3	894	---
HB-12	894.0	6	888	---
HB-13	893.0	8	885	---
HB-14	891.0	7	884	---
HB-15	897.0	4	893	---

Location	Approximate Surface Elevation (feet)	Anticipated Excavation Depth (feet)	Anticipated Bottom Elevation (feet)	Anticipated Depth Below Floor Subgrade (880.5) (feet)
HB-16	897.0	2	895	---
HB-17	897.0	3	894	---
HB-18	900.0	2	898	---
HB-19	894.7	4	890 1/2	---
HB-20	890.0	11	879	1 1/2
HB-21	889.0	1	888	---
HB-22	898.0	1	897	---
HB-23	892.0	4	888	---

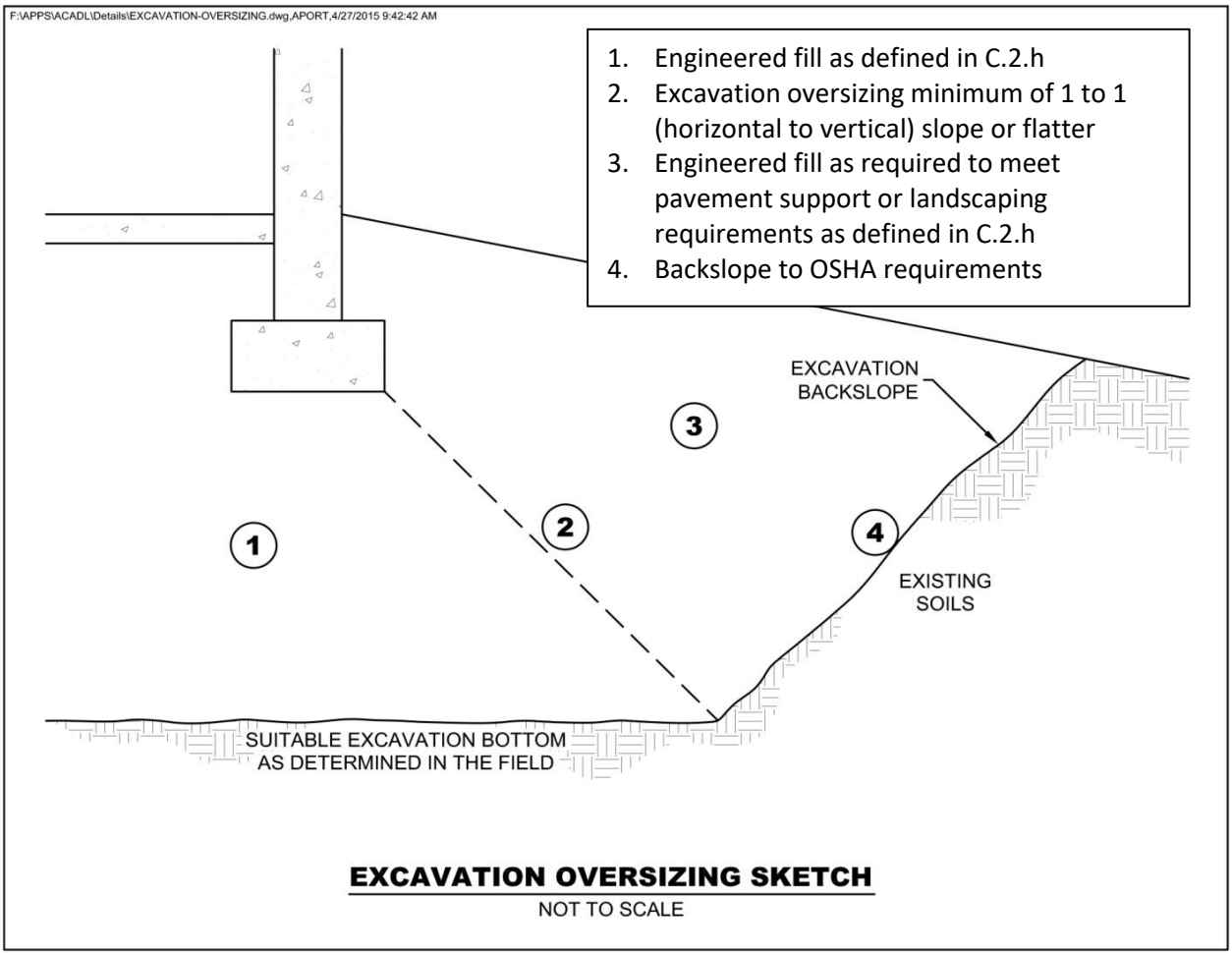
Excavation depths will vary between the borings. Portions of the excavations may also extend deeper than indicated by the borings. A geotechnical representative should observe the excavations to make the necessary field judgments regarding the suitability of the exposed soils.

Prior to the placement of engineered fill or footings, we recommend surface compacting the exposed soils in the bottoms of the excavations with a minimum of 4 passes by a large (minimum diameter of 3 1/2 feet), vibratory smooth-drum compactor, to a minimum of 100 percent of the standard Proctor. The final pass is recommended to be performed in the static mode.

C.1.b. Excavation Oversizing

When removing unsuitable materials below structures or pavements, we recommend the excavation extend outward and downward at a slope of 1H:1V (horizontal:vertical) or lower gradient. See Figure 2 for an illustration of excavation oversizing.

Figure 2. Generalized Illustration of Oversizing



C.1.c. Excavated Slopes

Based on the borings, we anticipate on-site soils in excavations will consist primarily of existing fill (mostly silty sand and clayey sand). These soils are typically considered Type C Soil under OSHA (Occupational Safety and Health Administration) guidelines. OSHA guidelines indicate unsupported excavations in Type C soils should have a gradient no steeper than 1 1/2H:1V. Slopes constructed in this manner may still exhibit surface sloughing. OSHA requires an engineer to evaluate slopes or excavations over 20 feet in depth.

An OSHA-approved qualified person should review the soil classification in the field. Excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, “Excavations and Trenches.” This document states excavation safety is the responsibility of the contractor. The project specifications should reference these OSHA requirements.

C.1.d. Excavation Support

In the event there is insufficient room to slope excavations, or if the excavations are exposed to surcharges and need to be shored, we recommend designing the shoring based on the parameters presented below in Table 5. The parameters shown have not been reduced by safety factors.

Saturated unit weights are recommended to account for the potential buildup of hydrostatic pressure behind undrained support structures within the low permeability fill.

Table 5. Parameters for Shoring Design

Geologic Material	Wet Unit Weight (γ, pcf)	Friction Angle ($\emptyset$, deg)	Cohesion (C, psf)	K_A	K_O	K_P
Existing fill upper 2 to 18 feet (mostly 6 to 11 feet)	125	30	0	0.33	0.50	3.0
Outwash SP and SP-SM	120	34	0	0.28	0.44	3.5

C.1.e. Excavation Dewatering

We recommend removing perched groundwater from the excavations. Project planning should include temporary sumps and pumps for excavations in low-permeability soils, such as the existing fill. Based on groundwater levels observed in 2001 (at a depth of about 45 feet), we do not expect hydrostatic groundwater will be encountered by the excavations that are anticipated for this project.

C.1.f. Exterior Pavement and Slab Subgrade Preparation

We recommend the following steps for exterior pavement and exterior slab subgrade preparation, understanding the site will have exterior grade changes of 5 feet or less. Note that project planning may need to require additional subcuts to limit frost heave.

1. Strip unsuitable soils consisting of topsoil, organic soils, vegetation, existing structures and pavements from the area, within 3 feet of the surface of the proposed pavement grade.

2. Have a geotechnical representative observe the excavated subgrade to evaluate if additional subgrade improvements are necessary.

3. Slope subgrade soils to areas of sand or drain tile to allow the removal of accumulating water.

4. Scarify, moisture condition and surface compact the subgrade with at least 4 passes of a large vibratory roller with a minimum drum diameter of 3 1/2 feet. Surface compact to at least 100 percent of standard Proctor density.

5. Place pavement engineered fill to grade and compact in accordance with Section C.1.h to bottom of pavement and exterior slab section. See Section C.5 for additional considerations related to frost heave.

6. Proofroll the pavement or exterior slab subgrade as described in Section C.1.g.

To improve long-term pavement performance, we recommend incorporating 18 inches of engineered fill (sand with less than 12 percent by weight passing the #200 sieve) in paved areas, in addition to the recommendations above, as a sand subbase. Section C.7 provides recommended pavement design sections with and without the sand subbase. Note, we recommend sloping subgrade soils to promote drainage and removal of accumulated water.

C.1.g. Exterior Pavement Subgrade Proofroll

After preparing the subgrade as described above and prior to the placement of the aggregate base, we recommend proofrolling the exterior subgrade soils with a fully loaded tandem-axle truck. We also recommend having a geotechnical representative observe the proofroll. Areas that fail the proofroll likely indicate soft or weak areas that will require additional soil correction work to support pavements.

The contractor should correct areas that display excessive yielding or rutting during the proofroll, as determined by the geotechnical representative. Possible options for subgrade correction include moisture conditioning and recompaction, subcutting and replacement with soil or crushed aggregate, and/or geotextiles. We recommend performing a second proofroll after the aggregate base material is in place, and prior to placing bituminous or concrete pavement.

C.1.h. Engineered Fill Materials and Compaction

Table 6 below contains our recommendations for engineered fill materials.

Table 6. Engineered Fill Materials*

Locations To Be Used	Engineered Fill Classification	Possible Soil Type Descriptions	Gradation	Additional Requirements
▪ Below foundations ▪ Below interior slabs	Structural fill	SP, SP-SM	100% passing 2-inch sieve < 12% passing #200 sieve	< 2% Organic Content (OC)
▪ Drainage layer ▪ Non-frost-susceptible	▪ Free-draining ▪ Non-frost-susceptible fill	GP, GW, SP, SW	100% passing 1-inch sieve < 50% passing #40 sieve < 5% passing #200 sieve	< 2% OC
Behind below-grade walls, beyond drainage layer	Retained fill	SP, SW, SP-SM, SW-SM, SM	100% passing 3-inch sieve < 20% passing #200 sieve	< 2% OC Plasticity Index (PI) < 4%
Pavements	Pavement fill	SP, SP-SM, SM, SC	100% passing 3-inch sieve	< 2% OC PI < 15%
Below landscaped surfaces, where subsidence is not a concern	Non-structural fill	---	100% passing 6-inch sieve	< 10% OC

* Engineered fill materials should satisfy the approved Response Action Plan (RAP), or applicable environmental requirements.

* More select soils comprised of coarse sands with < 5% passing #200 sieve may be needed to accommodate work occurring in periods of wet or freezing weather.

We recommend spreading engineered fill in loose lifts of approximately 10 inches thick (for silty and clayey sands a maximum thickness of 8 inches is recommended). We recommend compacting engineered fill in accordance with the criteria presented below in Table 7. The project documents should specify relative compaction of engineered fill, based on the structure located above the engineered fill, and vertical proximity to that structure.

Table 7. Compaction Recommendations Summary

Reference	Relative Compaction, percent (ASTM D698 – Standard Proctor)	Moisture Content Variance from Optimum, percentage points	
		< 12% Passing #200 Sieve (typically SP, SP-SM)	> 12% Passing #200 Sieve (typically CL, SC, ML, SM)
Below foundations and oversizing zones	100	±3	-1 to +3
Below interior slabs	100	±3	-1 to +3
Within 3 feet of pavement subgrade	100	±3	-2 to +1
More than 3 feet below pavement subgrade	95	±3	±3
Below landscaped surfaces	90	±5	±5
Adjacent to below-grade wall	95*	±3	-1 to +3

*Increase compaction requirement to meet compaction required for structure supported by this engineered fill.

The project documents should not allow the contractor to use frozen material as engineered fill or to place engineered fill on frozen material. Frost should not penetrate under foundations during construction.

We recommend performing density tests in engineered fill to evaluate if the contractors are effectively compacting the soil and meeting project requirements.

C.1.i. Special Inspections of Soils

We recommend including the site grading and placement of engineered fill within the building pad under the requirements of Special Inspections, as provided in Chapter 17 of the International Building Code, which is part of the Minnesota State Building Code. Special Inspection requires observation of soil conditions below engineered fill or footings, evaluations to determine if excavations extend to the anticipated soils, and if engineered fill materials meet requirements for type of engineered fill and compaction condition of engineered fill. A licensed geotechnical engineer should direct the Special Inspections of site grading and engineered fill placement. The purpose of these Special Inspections is to evaluate whether the work is in accordance with the approved Geotechnical Report for the project. Special Inspections should include evaluation of the subgrade, observing preparation of the subgrade (surface compaction or dewatering, excavation oversizing, placement procedures and materials used for engineered fill, etc.) and compaction testing of the engineered fill.

C.2. Spread Footings

Table 8 below contains our recommended parameters for foundation design.

Table 8. Recommended Spread Footing Design Parameters

Item	Description
Maximum net allowable bearing pressure (psf)	6,000
Minimum factor of safety for bearing capacity failure	3.0
Minimum width (inches)	24 (wall) 48 (column)
Minimum embedment below final exterior grade for heated structures (inches)	42
Minimum embedment below final exterior grade for unheated structures or for footings not protected from freezing temperatures during construction (inches)	60
Total estimated settlement (inches)	1
Differential settlement	Typically about 1/2 of total settlement*

* Actual differential settlement amounts will depend on final loads and foundation layout. We can evaluate differential settlement based on final foundation plans and loadings.

C.3. Below-Grade Walls

We recommend designing the walls based on silty sand backfill having an equivalent fluid pressure of 62 pounds per cubic foot (pcf) for at-rest earth pressure. Designs should also consider the slope of any fill and dead or live loads, including equipment and materials, placed within a horizontal distance behind the walls that is equal to the height of the walls. Our recommended values also assume the wall design provides drainage to prevent water from accumulating behind the walls. The construction documents should clearly identify the material properties of the soil the contractor should use for wall fill.

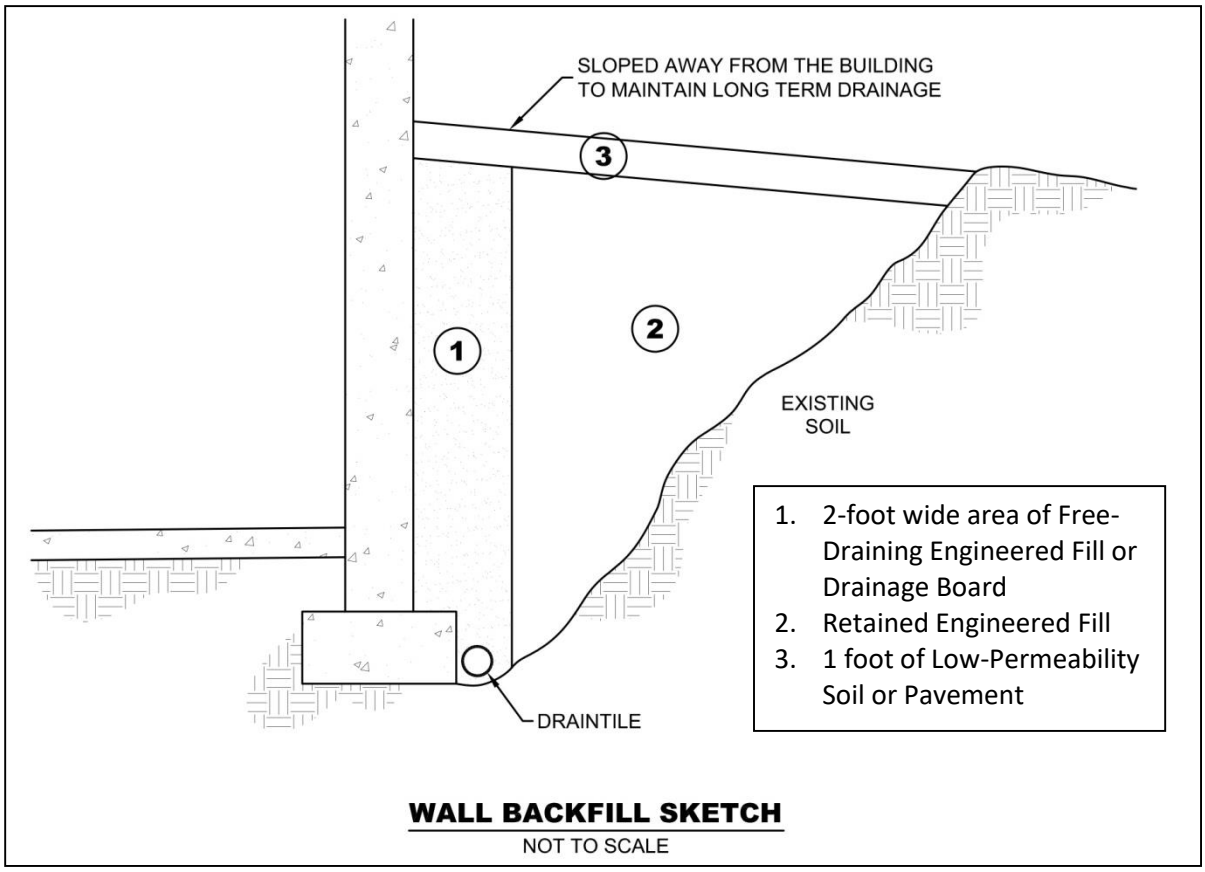
The project documents should indicate if walls need bracing prior to filling and allowable unbalanced fill heights.

C.3.a. Drainage Control

We recommend installing drain tile to remove water behind the below-grade walls, at the location shown in Figure 3. The below-grade wall drainage system should also incorporate free-draining, engineered fill or a drainage board placed against the wall and connected to the drain tile.

Even with the use of free-draining, engineered fill, we recommend general waterproofing of below-grade walls that surround occupied or potentially occupied areas because of the potential cost impacts related to seepage after construction is complete.

Figure 3. Generalized Illustration of Wall Engineered Fill



The materials listed in the sketch should meet the definitions in Section C.1.h. Low-permeability material is capable of directing water away from the wall, like clay, topsoil or pavement. The project documents should indicate if the contractor should brace the walls prior to filling and allowable unbalanced fill heights.

As shown in Figure 3, we recommend Zone 2 consist of retained, engineered fill, and this material will control lateral pressures on the wall. However, we are also providing design parameters for using other engineered fill material. If final design uses non-sand material for engineered fill, project planning should account for the following items:

- Other engineered fill material may result in higher lateral pressure on the wall.
- Other engineered fill material may be more difficult to compact.
- Post-construction consolidation of other engineered fill material may result in settlement-related damage to the structures or slabs supported on the engineered fill. Post-construction settlement of other engineered fill material may also cause drainage towards the structure. The magnitude of consolidation could be up to about 3 percent of the wall fill thickness.

C.3.b. Configuring and Resisting Lateral Loads

Below-grade wall design can use active earth pressure conditions, if the walls can rotate slightly. If the wall design cannot tolerate rotation, then design should use at-rest earth pressure conditions. Rotation up to 0.002 times the wall height is generally required for walls supporting sand. Rotation up to 0.02 times the wall height is required when wall supports clay.

Table 9 presents our recommended lateral coefficients and equivalent fluid pressures for wall design of active, at-rest and passive earth pressure conditions. The table also provides recommended wet unit weights and internal friction angles. Designs should also consider the slope of any engineered fill and dead or live loads placed behind the walls within a horizontal distance that is equal to the height of the walls. Our recommended values assume the wall design provides drainage so water cannot accumulate behind the walls. The construction documents should clearly identify what soils the contractor should use for engineered fill of walls. For areas that will support settlement-sensitive structures, we recommend the wall backfill consist of sand with less than 12 percent by weight particles passing the #200 sieve.

Table 9. Recommended Below-Grade Wall Design Parameters – Drained Conditions

Retained Soil	Wet Unit Weight, (pcf)	Friction Angle, degrees	Active Lateral Coefficient/ Equivalent Fluid Pressure* (pcf)	At-Rest Lateral Coefficient/ Equivalent Fluid Pressure* (pcf)	Passive Lateral Coefficient/ Equivalent Fluid Pressure* (pcf)
On-Site SM Fill	125	30	42	62	375
SP and SP-SM	120	34	34	53	424

* Based on Rankine model for soils in a region behind the wall extending at least 2 horizontal feet beyond the bottom outer edges of the wall footings and then rising up and away from the wall at an angle no steeper than 60 degrees from horizontal.

Sliding resistance between the bottom of the footing and the soil can also resist lateral pressures. We recommend assuming a sliding coefficient equal to 0.4 between the concrete and soil.

The values presented in this section are un-factored.

C.4. Interior Slabs/Pavements

C.4.a. Subgrade Modulus

The anticipated floor subgrade is poorly graded sand and poorly graded sand with silt. We recommend using a modulus of subgrade reaction, k, of 200 pounds per square inch per inch of deflection (pci) to design the slabs. If the slab design requires placing 6 inches of compacted crushed aggregate base immediately below the slab, the slab design may increase the k-value by 50 pci. We recommend that the aggregate base materials be free of bituminous. In addition to improving the modulus of subgrade reaction, an aggregate base facilitates construction activities and is less weather sensitive.

C.4.b. Moisture Vapor Protection

Excess transmission of water vapor could cause floor dampness, certain types of floor bonding agents to separate, or mold to form under floor coverings. If project planning includes using floor coverings or coatings, we recommend placing a vapor retarder or vapor barrier immediately beneath the slab. We also recommend consulting with floor covering manufacturers regarding the appropriate type, use and installation of the vapor retarder or barrier to preserve warranty assurances.

C.5. Frost Protection

C.5.a. General

The on-site silty soil fill will underlie all or some of the exterior slabs and pavements. We consider those materials to be moderately to highly frost susceptible. Soils of this type can retain moisture and heave upon freezing. In general, this characteristic is not an issue unless these soils become saturated, due to surface runoff or infiltration, or are excessively wet in situ. Once frozen, unfavorable amounts of general and isolated heaving of the soils and the surface structures supported on them could develop. This type of heaving could affect design drainage patterns and the performance of exterior slabs and pavements, as well as any isolated exterior footings and piers.

Note that general runoff and infiltration from precipitation are not the only sources of water that can saturate subgrade soils and contribute to frost heave. Roof drainage and irrigation of landscaped areas in close proximity to exterior slabs, pavements, and isolated footings and piers, contribute as well.

C.5.b. Frost Heave Mitigation

To address most of the heave related issues, we recommend setting general site grades and grades for exterior surface features to direct surface drainage away from buildings, across large paved areas and away from walkways. Such grading will limit the potential for saturation of the subgrade and subsequent heaving. General grades should also have enough “slope” to tolerate potential larger areas of heave, which may not fully settle after thawing.

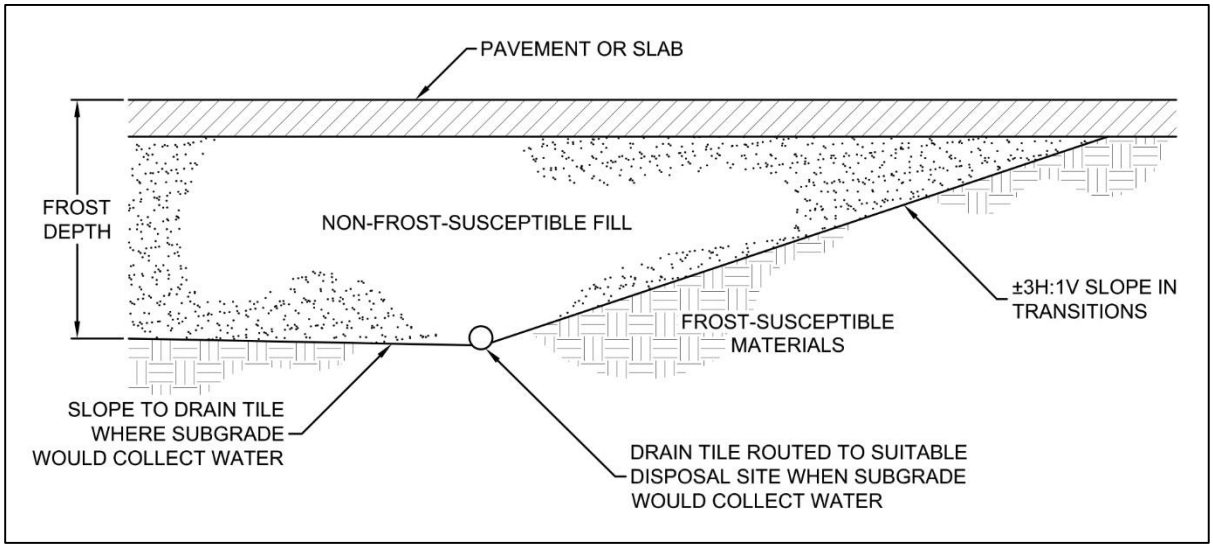
Even small amounts of frost-related differential movement at walkway joints or cracks can create tripping hazards. Project planning can explore several subgrade improvement options to address this condition.

One of the more conservative subgrade improvement options to mitigate potential heave is removing any frost-susceptible soils present below the exterior slab areas down to a minimum depth of 4 feet below subgrade elevations. We recommend filling the resulting excavation with non-frost-susceptible fill. We also recommend sloping the bottom of the excavation toward one or more collection points to remove any water entering the engineered fill. This approach will not be effective in controlling frost heave without removing the water.

An important geometric aspect of the excavation and replacement approach described above is sloping the banks of the excavations to create a more gradual transition between the unexcavated soils considered frost susceptible and the engineered fill in the excavated area, which is not frost susceptible. The slope allows attenuation of differential movement that may occur along the excavation boundary. We recommend slopes that are 3H:1V, or flatter, along transitions between frost-susceptible and non-frost-susceptible soils.

Figure 4 shows an illustration summarizing some of the recommendations.

Figure 4. Frost Protection Geometry Illustration



Another option is to limit frost heave in critical areas, such as doorways and entrances, via frost-depth footings or localized excavations with sloped transitions between frost-susceptible and non-frost-susceptible soils, as described above.

Over the life of slabs and pavements, cracks will develop and joints will open up, which will expose the subgrade and allow water to enter from the surface and either saturate or perch atop the subgrade soils. This water intrusion increases the potential for frost heave or moisture-related distress near the crack or joint. Therefore, we recommend implementing a detailed maintenance program to seal and/or fill any cracks and joints. The maintenance program should give special attention to areas where dissimilar materials abut one another, where construction joints occur and where shrinkage cracks develop.

C.6. Pavements and Exterior Slabs

C.6.a. Design Sections

Our scope of services for this project did not include laboratory tests on subgrade soils to determine an R-value for pavement design. Based on our experience with similar silty and clayey sand soils anticipated at the pavement subgrade elevation, we recommend pavement design assume an R-value of 25. Note the contractor may need to perform limited removal of unsuitable or less suitable soils to achieve this value. Table 10 provides recommended pavement sections, based on the soils support and traffic loads.

We based the concrete pavement designs on a modulus of subgrade reaction (k) of 125 pci (exterior).

Table 10. Recommended Bituminous Pavement Sections

Use	Medium Duty – No Sand Subbase	Medium Duty – With Sand Subbase	Light Duty Walkways	Medium Duty
Minimum asphalt thickness (inches)	4	4	---	---
Minimum concrete thickness (inches)	---	---	4	6
Minimum aggregate base thickness (inches)	12	8	6	6
Minimum granular subbase	NA	18	NA	NA

C.6.b. Concrete Pavements

We assumed the concrete pavement section in Table 10 will have edge support. We recommend placing an aggregate base below the pavement to provide a suitable subgrade for concrete placement, reduce faulting and help dissipate loads. Appropriate mix designs, panel sizing, jointing, doweling and edge reinforcement are critical to performance of rigid pavements. We recommend you contact your civil engineer to determine the final design or consult with us for guidance on these items.

C.6.c. Bituminous Pavement Materials

Appropriate mix designs are critical to the performance of flexible pavements. We can provide recommendations for pavement material selection during final pavement design.

C.6.d. Subgrade Drainage

We recommend installing perforated drainpipes throughout pavement areas at low points, around catch basins, and behind curb in landscaped areas. We also recommend installing drainpipes along pavement and exterior slab edges where exterior grades promote drainage toward those edge areas. The contractor should place drainpipes in small trenches, extended at least 8 inches below the granular subbase layer, or below the aggregate base material where no subbase is present.

C.6.e. Performance and Maintenance

We based the above pavement designs on a 20-year performance life for bituminous and a 35-year life for concrete. This is the amount of time before we anticipate the pavement will require reconstruction. This performance life assumes routine maintenance, such as seal coating and crack sealing. The actual pavement life will vary depending on variations in weather, traffic conditions and maintenance.

It is common to place the non-wear course of bituminous and then delay placement of wear course. For this situation, we recommend evaluating if the reduced pavement section will have sufficient structure to support construction traffic.

Many conditions affect the overall performance of the exterior slabs and pavements. Some of these conditions include the environment, loading conditions and the level of ongoing maintenance. With regard to bituminous pavements in particular, it is common to have thermal cracking develop within the first few years of placement, and continue throughout the life of the pavement. We recommend developing a regular maintenance plan for filling cracks in exterior slabs and pavements to lessen the potential impacts for cold weather distress due to frost heave or warm weather distress due to wetting and softening of the subgrade.

C.7. Utilities

C.7.a. Subgrade Stabilization

Earthwork activities associated with utility installations located inside the building area should adhere to the recommendations in Section C.1.

For exterior utilities, we anticipate the soils at typical invert elevations will generally be suitable for utility support. However, if construction encounters unfavorable conditions such as soft fill, soft clay, organic soils or perched water at invert grades, the unsuitable soils may require some additional subcutting and replacement with sand or crushed rock to prepare a proper subgrade for pipe support. Project design and construction should not place utilities within the 1H:1V oversizing of foundations.

C.7.b. Corrosion Potential

Based on our experience, the fill soils encountered by the borings are moderately corrosive to metallic conduits, but only marginally corrosive to concrete. We recommend specifying non-corrosive materials or providing corrosion protection, unless project planning chooses to perform additional tests to demonstrate the soils are not corrosive.

For interior utilities that will be installed within sandy soils, we consider those soils non- to slightly corrosive to metallic conduits. If utilities extend through exterior fill soils, we recommend bedding the utilities in sandy soil free of any clay lumps or constructing the utilities with non-corrosive materials.

C.8. Stormwater

We estimated infiltration rates for some of the soils we encountered in our soil borings, as listed in Table 11. 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 justify the use of higher infiltration rates. However, we recommend adjusting field test rates by the appropriate correction factor, as provided for in the Minnesota Stormwater Manual or as allowed by the local watershed. We recommend consulting the Minnesota Stormwater Manual for stormwater design.

Table 11. Estimated Design Infiltration Rates Based on Soil Classification

Soil Type	Infiltration Rate * (inches/hour)
Sands with less than 12% fines, poorly graded or well graded sands	0.8
On-site fill with silty and clayey sand layers	0.06

* From Minnesota Stormwater Manual. Rates may differ at individual sites.

Fine-grained soils (silts and clays), topsoil or organic matter that mixes into or washes onto the soil will lower the permeability. The contractor should maintain and protect infiltration areas during construction. Furthermore, organic matter 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 geotechnical 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.

C.9. Equipment Support

The recommendations included in the report may not be applicable to equipment used for the construction and maintenance of this project. We recommend evaluating subgrade conditions in areas of shoring, scaffolding, cranes, pumps, lifts and other construction equipment prior to mobilization to determine if the exposed materials are suitable for equipment support, or require some form of subgrade improvement. We also recommend project planning consider the effect that loads applied by such equipment may have on structures they bear on or surcharge – including pavements, buried utilities, below-grade walls, etc. We can assist you in this evaluation.

D. Procedures

D.1. Penetration Test Borings

We drilled the penetration test borings with an all-terrain mounted core and auger drill equipped with hollow-stem auger. We performed the borings in general accordance with ASTM D6151 taking penetration test samples at 2 1/2- or 5-foot intervals in general accordance to ASTM D1586. The boring logs show the actual sample intervals and corresponding depths.

We sealed penetration test boreholes meeting the Minnesota Department of Health (MDH) Environmental Borehole criteria with an MDH-approved grout. We will forward sealing records for those boreholes to the Minnesota Department of Health Well Management Section.

D.2. Exploration Logs

D.2.a. Log of Boring Sheets

The Appendix includes Log of Boring sheets for our penetration test borings. The logs identify and describe the penetrated geologic materials, and present the results of penetration resistance tests performed. The logs also present the results of laboratory tests performed on penetration test samples, and groundwater measurements.

We inferred strata boundaries from changes in the penetration test samples and the auger cuttings. Because we did not perform continuous sampling, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may occur as gradual rather than abrupt transitions.

D.2.b. Geologic Origins

We assigned geologic origins to the materials shown on the logs and referenced within this report, based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance testing performed for the project, (4) laboratory test results, and (5) available common knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

D.3. Material Classification and Testing

D.3.a. Visual and Manual Classification

We visually and manually classified the geologic materials encountered based on ASTM D2488. When we performed laboratory classification tests, we used the results to classify the geologic materials in accordance with ASTM D2487. The Appendix includes a chart explaining the classification system we used.

D.3.b. Laboratory Testing

The exploration logs in the Appendix note most of the results of the laboratory tests performed on geologic material samples. The remaining laboratory test results follow the exploration logs. We performed the tests in general accordance with ASTM procedures.

D.4. Groundwater Measurements

The drillers checked for groundwater while advancing the penetration test borings, and again after auger withdrawal. We then sealed the boreholes, as noted on the boring logs, preventing further groundwater level observations.

E. Qualifications

E.1. Variations in Subsurface Conditions

E.1.a. Material Strata

We developed our evaluation, analyses and recommendations from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth. Therefore, we must infer strata boundaries and thicknesses to some extent. Strata boundaries may also be gradual transitions, and project planning should expect the strata to vary in depth, elevation and thickness, away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until performing additional exploration work, or starting construction. If future activity for this project reveals any such variations, you should notify us so that we may reevaluate our recommendations. Such variations could increase construction costs, and we recommend including a contingency to accommodate them.

E.1.b. Groundwater Levels

We made groundwater measurements under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. Note that the observation periods were relatively short, and project planning can expect groundwater levels to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

E.2. Continuity of Professional Responsibility

E.2.a. Plan Review

We based this report on a limited amount of information, and we made a number of assumptions to help us develop our recommendations. We should be retained to review the geotechnical aspects of the designs and specifications. This review will allow us to evaluate whether we anticipated the design correctly, if any design changes affect the validity of our recommendations, and if the design and specifications correctly interpret and implement our recommendations.

E.2.b. Construction Observations and Testing

We recommend retaining us to perform the required observations and testing during construction as part of the ongoing geotechnical evaluation. This will allow us to correlate the subsurface conditions exposed during construction with those encountered by the borings and provide professional continuity from the design phase to the construction phase. If we do not perform observations and testing during construction, it becomes the responsibility of others to validate the assumption made during the preparation of this report and to accept the construction-related geotechnical engineer-of-record responsibilities.

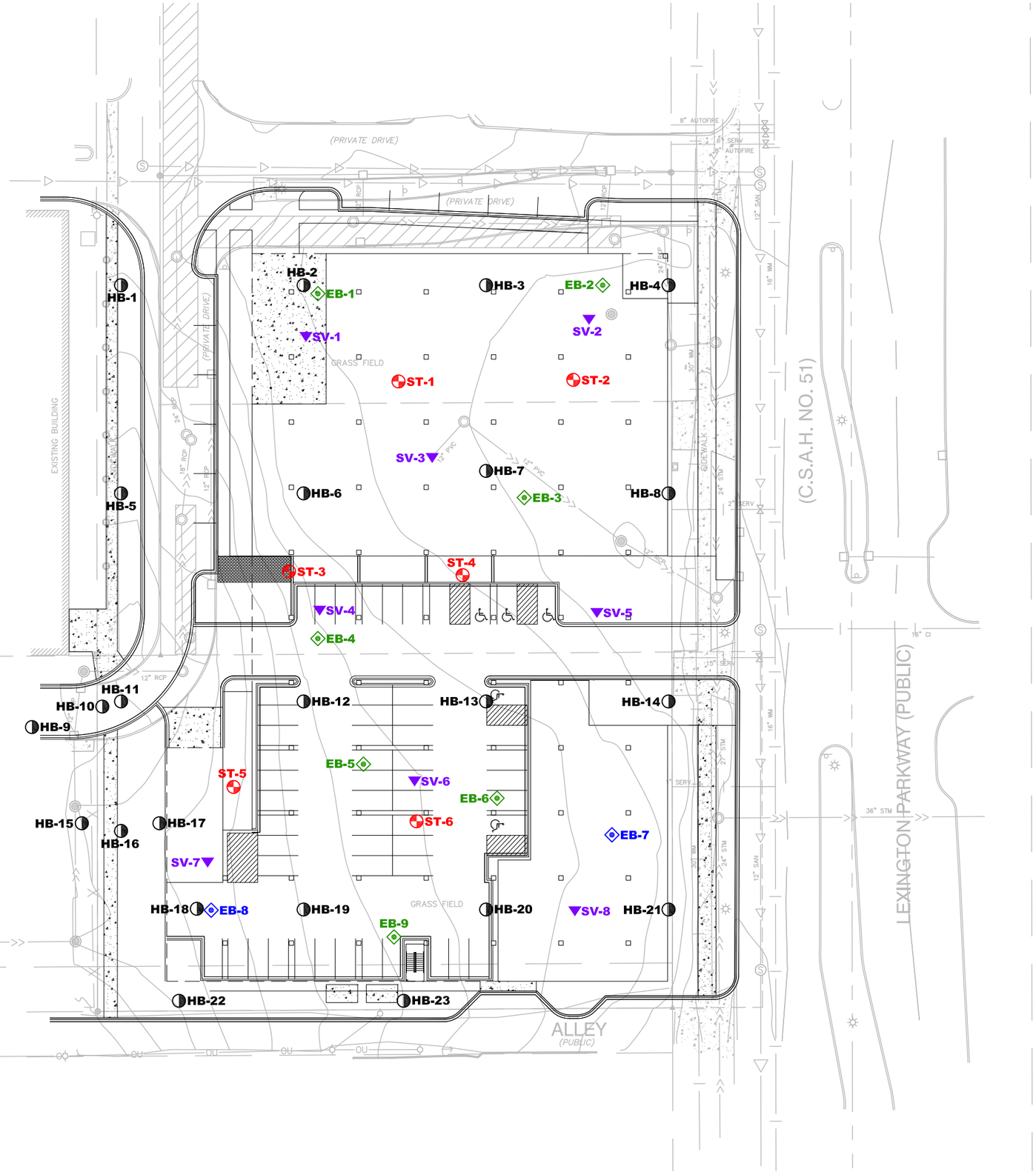
E.3. Use of Report

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

E.4. Standard of Care

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.

Appendix



STANDARD PENETRATION TEST BORING

ENVIRONMENTAL SOIL BORING

ENVIRONMENTAL SOIL BORING WITH GROUNDWATER SAMPLE

SOIL VAPOR PROBE

PREVIOUSLY COMPLETED GEOTECHNICAL SOIL BORING

25' 0 50'

SCALE: 1" = 50'

BRAUN INTERTEC
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11001 Hampshire Avenue S
Minneapolis, MN 55438
952.995.2000
braunintertec.com

Drawing Information

Project No:	B1907294
Drawing No:	B1907294
Drawn By:	BJB
Date Drawn:	7/15/19
Checked By:	MJ
Last Modified:	9/17/19

Project Information

Proposed Lexington Mixed Use Building

SW of North Lexington Parkway and University Avenue

Saint Paul, Minnesota

Investigation Locations

Figure 2

F:\2019\B1907294.dwg,Geo,9/17/2019 11:28:46 AM

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1907294
Geotechnical Evaluation
Proposed Lexington Mixed Use Building
411-417 Lexington Parkway North
St. Paul, Minnesota

BORING: **ST-1**
LOCATION: See attached sketch
NORTHING:
EASTING:

DRILLER: M. Takada	LOGGED BY: M. Jenkins	START DATE: 09/11/19	END DATE: 09/11/19
SURFACE ELEVATION: 889.9 ft	RIG: 7507	METHOD: 3 1/4" HSA	SURFACING:
WEATHER: Rain			

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
889.6 / 0.3		SILTY SAND (SM), fine-grained Sand, trace roots, black, moist (TOPSOIL FILL)				13	OC=3.0%
		FILL: SILTY SAND (SM), fine to medium-grained Gravel, trace Gravel, contains layers of Clayey Sand, trace glass, dark brown, moist		10-8-7 (15) 4"			
			5	5-3-3 (6) 5"			
				3-1-3 (4) 7"			
			10	5-5-5 (10) 8"			
878.4 / 11.5		POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained Sand, trace Gravel, brown, moist, loose (GLACIAL OUTWASH)		3-3-5 (8) 4"		6	P200=7%
			15	3-3-3 (6) 5"			
871.9 / 18.0		POORLY GRADED SAND (SP), fine to medium-grained Sand, trace Gravel, brown, moist, very loose to medium dense (GLACIAL OUTWASH)	20	2-2-2 (4) 4"			
			25	4-3-3 (6) 6"			
			30	8-6-5 (11) 3"			
858.9 / 31.0		END OF BORING					Water not observed while drilling.

Boring immediately grouted.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1907294
Geotechnical Evaluation
Proposed Lexington Mixed Use Building
411-417 Lexington Parkway North
St. Paul, Minnesota

BORING: **ST-2**
LOCATION: See attached sketch
NORTHING:
EASTING:

DRILLER: M. Takada	LOGGED BY: M. Jenkins	START DATE: 09/11/19	END DATE: 09/11/19
SURFACE ELEVATION: 889.0 ft	RIG: 7507	METHOD: 3 1/4" HSA	SURFACING:
WEATHER: Rain			

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
888.7		SILTY SAND (SM), fine-grained Sand, trace roots, black, moist (TOPSOIL FILL)					
0.3		FILL: SILTY SAND (SM), fine to medium-grained Sand, trace Gravel, dark brown, moist					
				9-7-5 (12) 2"			
			5	4-3-2 (5) 4"			
				5-4-3 (7) 5"			
879.0			10	9-7-4 (11) 4"			
10.0		POORLY GRADED SAND (SP), fine to medium-grained Sand, trace Gravel, brown, moist, very loose to medium dense (GLACIAL OUTWASH)					
				2-1-3 (4) 4"			
			15	2-3-3 (6) 6"			
			20	2-3-6 (9) 9"			
			25	5-4-6 (10) 3"			
			30	5-7-4 (11) 3"			
858.0							
31.0		END OF BORING					Water not observed while drilling.

Boring immediately grouted.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1907294
Geotechnical Evaluation
Proposed Lexington Mixed Use Building
411-417 Lexington Parkway North
St. Paul, Minnesota

BORING: **ST-3**
LOCATION: See attached sketch
NORTHING:
EASTING:

DRILLER: M. Takada	LOGGED BY: M. Jenkins	START DATE: 09/11/19	END DATE: 09/11/19
SURFACE ELEVATION: 889.0 ft	RIG: 7507	METHOD: 3 1/4" HSA	SURFACING:
WEATHER: Rain			

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
888.7 / 0.3		SILTY SAND (SM), fine-grained Sand, trace roots, black, moist (TOPSOIL FILL)					
		FILL: SILTY SAND (SM), fine to medium-grained Sand, trace Gravel, contains layers of Clayey Sand, dark brown, moist *Clayey layers from 1 to 5 feet*		8-7-8 (15) 6"			
5				8-6-6 (12) 8"			
				7-5-3 (8) 7"			
10				5-20-2 (22) 2"			
877.5 / 11.5		POORLY GRADED SAND (SP), fine to medium-grained Sand, trace Gravel, brown, moist, loose to medium dense (GLACIAL OUTWASH)		3-2-4 (6) 3"		4	P200=4%
15				6-6-5 (11) 2"			
20				2-3-2 (5) 4"			
25				4-3-5 (8) 4"			
30				4-5-7 (12) 5"			
858.0 / 31.0		END OF BORING					Water not observed while drilling.

Boring immediately grouted.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1907294
Geotechnical Evaluation
Proposed Lexington Mixed Use Building
411-417 Lexington Parkway North
St. Paul, Minnesota

BORING: **ST-4**
LOCATION: See attached sketch
NORTHING:
EASTING:

DRILLER: M. Takada	LOGGED BY: M. Jenkins	START DATE: 09/11/19	END DATE: 09/11/19
SURFACE ELEVATION: 890.4 ft	RIG: 7507	METHOD: 3 1/4" HSA	SURFACING:
WEATHER: Rain			

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
889.7		SILTY SAND (SM), fine-grained Sand, black, moist (TOPSOIL FILL)					
0.7		FILL: SILTY SAND (SM), fine to medium-grained Sand, trace Gravel, and concrete fragments, with Clayey Sand, dark brown, moist					
				6-7-9 (16) 6"			
		5		5-4-5 (9) 8"			
				18-7-4 (11) 3"			
		10		3-2-2 (4) 10"		13	P200=32%
				6-5-5 (10) 6"			
		15		5-5-3 (8) 1"			
872.4							
18.0		POORLY GRADED SAND (SP), fine to medium-grained Sand, trace Gravel, brown, moist, very loose to loose (GLACIAL OUTWASH)					
		20		3-2-3 (5) 4"			
		25		3-2-2 (4) 5"			
		30		4-4-4 (8) 25"			
859.4							
31.0		END OF BORING					Water not observed while drilling.

Boring immediately grouted.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1907294
Geotechnical Evaluation
Proposed Lexington Mixed Use Building
411-417 Lexington Parkway North
St. Paul, Minnesota

BORING: **ST-5**
LOCATION: See attached sketch
NORTHING:
EASTING:

DRILLER: M. Takada	LOGGED BY: M. Jenkins	START DATE: 09/11/19	END DATE: 09/11/19
SURFACE ELEVATION: 895.4 ft	RIG: 7507	METHOD: 3 1/4" HSA	SURFACING:
WEATHER: Rain			

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
895.1		SILTY SAND (SM), fine-grained Sand, trace roots, black, moist (TOPSOIL FILL)					
0.3		FILL: SILTY SAND (SM), fine to medium-grained Sand, trace Gravel, dark brown, moist					
				1-3-2 (5) 4"			
891.4							
4.0		POORLY GRADED SAND (SP), fine to medium-grained Sand, trace Gravel, brown, moist, loose to medium dense (GLACIAL OUTWASH)					
			5	4-3-3 (6) 4"		4	P200=2%
				4-3-2 (5) 3"			
			10	4-4-5 (9) 4"			
				4-5-5 (10) 0"			
			15	5-3-4 (7) 5"			
			20	4-6-5 (11) 4"			
			25	7-6-6 (12) 4"			
			30	12-7-11 (18) 3"			
864.4							
31.0		END OF BORING					Water not observed while drilling.

Boring immediately grouted.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1907294
Geotechnical Evaluation
Proposed Lexington Mixed Use Building
411-417 Lexington Parkway North
St. Paul, Minnesota

BORING: **ST-6**
LOCATION: See attached sketch
NORTHING:
EASTING:

DRILLER: M. Takada	LOGGED BY: M. Jenkins	START DATE: 09/11/19	END DATE: 09/11/19
SURFACE ELEVATION: 892.6 ft	RIG: 7507	METHOD: 3 1/4" HSA	SURFACING:
WEATHER: Rain			

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
892.3 / 0.3		SILTY SAND (SM), fine-grained Sand, black, moist (TOPSOIL FILL)					
		FILL: SILTY SAND (SM), fine to medium-grained Sand, trace Gravel, dark brown, moist		6-5-4 (9) 3"			
			5	2-2-6 (8) 4"			
				2-2-1 (3) 7"			
882.6 / 10.0		POORLY GRADED SAND (SP), fine to medium-grained Sand, trace Gravel, brown, moist, loose to medium dense (GLACIAL OUTWASH)	10	4-3-4 (7) 5"			
				6-4-4 (8) 4"			
			15	5-7-6 (13) 3"			
			20	6-7-7 (14) 4"			
			25	7-11-11 (22) 4"			
			30	6-6-11 (17) 3"			
861.6 / 31.0		END OF BORING					Water not observed while drilling.

Boring immediately grouted.

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Geotechnical Testing

Various ASTM

9/21/2019

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Alatus, LLC
800 Nicollet Mall, Suite 2850
Minneapolis, MN 55402

Project:

B1907294
Proposed Lexington Mixed Use Building
411-417 Lexington Parkway North
St. Paul, MN

Sample Information

Metafield ID: 270856

Completed Date: 09/21/2019

Prepared By: Streier, Jim

Laboratory Results Summary

Boring	Sample	Depth (ft)	MC (%)	Wash Loss (%)	LL	PL	PI	Organic Content %	Dry Density (pcf)	Resistivity (ohm-cm)	Q_u (tsf)	Specific Gravity
ST-1	41	1.0	12.8					3				
ST-1	46	12.5	5.6	7								
ST-3	36	12.5	3.9	3.7								
ST-4	25	10.0	13.2	32								
ST-5	3	5.0	3.9	2.4								

General

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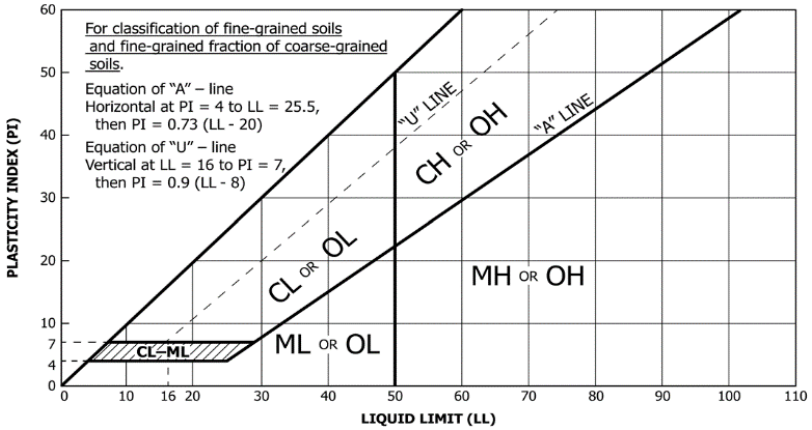
Descriptive Terminology of Soil

Based on Standards ASTM D2487/2488
(Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-grained Soils (more than 50% retained on No. 200 sieve)	Gravels (More than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels (Less than 5% fines[C])	$C_u \geq 4$ and $1 \leq C_c \leq 3$[D]	GW	Well-graded gravel[E]
			$C_u < 4$ and/or ($C_c < 1$ or $C_c > 3$)[D]	GP	Poorly graded gravel[E]
		Gravels with Fines (More than 12% fines[C])	Fines classify as ML or MH	GM	Silty gravel[E F G]
			Fines Classify as CL or CH	GC	Clayey gravel[E F G]
	Sands (50% or more coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% fines[H])	$C_u \geq 6$ and $1 \leq C_c \leq 3$[D]	SW	Well-graded sand[I]
			$C_u < 6$ and/or ($C_c < 1$ or $C_c > 3$)[D]	SP	Poorly graded sand[I]
		Sands with Fines (More than 12% fines[H])	Fines classify as ML or MH	SM	Silty sand[F G I]
			Fines classify as CL or CH	SC	Clayey sand[F G I]
Fine-grained Soils (50% or more passes the No. 200 sieve)	Silts and Clays (Liquid limit less than 50)	Inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K L M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OL	Organic clay[K L M N] / Organic silt[K L M O]
	Silts and Clays (Liquid limit 50 or more)	Inorganic	PI plots on or above "A" line	CH	Fat clay[K L M]
			PI plots below "A" line	MH	Elastic silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OH	Organic clay[K L M P] / Organic silt[K L M Q]
Highly Organic Soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

A. Based on the material passing the 3-inch (75-mm) sieve.
B. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
C. Gravels with 5 to 12% fines require dual symbols:
   GW-GM well-graded gravel with silt
   GW-GC well-graded gravel with clay
   GP-GM poorly graded gravel with silt
   GP-GC poorly graded gravel with clay
D. $C_u = D_{60} / D_{10}$ $C_c = (D_{30})^2 / (D_{10} \, x \, D_{60})$
E. If soil contains ≥ 15% sand, add "with sand" to group name.
F. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
G. If fines are organic, add "with organic fines" to group name.
H. Sands with 5 to 12% fines require dual symbols:
   SW-SM well-graded sand with silt
   SW-SC well-graded sand with clay
   SP-SM poorly graded sand with silt
   SP-SC poorly graded sand with clay
I. If soil contains ≥ 15% gravel, add "with gravel" to group name.
J. If Atterberg limits plot in hatched area, soil is CL-ML, silty clay.
K. If soil contains 15 to < 30% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
L. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
M. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
N. PI ≥ 4 and plots on or above "A" line.
O. PI < 4 or plots below "A" line.
P. PI plots on or above "A" line.
Q. PI plots below "A" line.



Particle Size Identification

Boulders..... over 12"
Cobbles..... 3" to 12"
Gravel
   Coarse..... 3/4" to 3" (19.00 mm to 75.00 mm)
   Fine..... No. 4 to 3/4" (4.75 mm to 19.00 mm)
Sand
   Coarse..... No. 10 to No. 4 (2.00 mm to 4.75 mm)
   Medium..... No. 40 to No. 10 (0.425 mm to 2.00 mm)
   Fine..... No. 200 to No. 40 (0.075 mm to 0.425 mm)
Silt..... No. 200 (0.075 mm) to .005 mm
Clay..... < .005 mm

Relative Proportions[L, M]

trace..... 0 to 5%
little..... 6 to 14%
with..... ≥ 15%

Inclusion Thicknesses

lens..... 0 to 1/8"
seam..... 1/8" to 1"
layer..... over 1"

Apparent Relative Density of Cohesionless Soils

Very loose ..... 0 to 4 BPF
Loose ..... 5 to 10 BPF
Medium dense..... 11 to 30 BPF
Dense..... 31 to 50 BPF
Very dense..... over 50 BPF

Consistency of Cohesive Soils	Blows Per Foot	Approximate Unconfined Compressive Strength
Very soft	0 to 1 BPF	< 0.25 tsf
Soft	2 to 4 BPF	0.25 to 0.5 tsf
Medium	5 to 8 BPF	0.5 to 1 tsf
Stiff	9 to 15 BPF	1 to 2 tsf
Very Stiff	16 to 30 BPF	2 to 4 tsf
Hard	over 30 BPF	> 4 tsf

Moisture Content:

Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp but no visible water.
Wet: Visible free water, usually soil is below water table.

Drilling Notes:

Blows/N-value: Blows indicate the driving resistance recorded for each 6-inch interval. The reported N-value is the blows per foot recorded by summing the second and third interval in accordance with the Standard Penetration Test, ASTM D1586.

Partial Penetration: If the sampler could not be driven through a full 6-inch interval, the number of blows for that partial penetration is shown as #/x" (i.e. 50/2"). The N-value is reported as "REF" indicating refusal.

Recovery: Indicates the inches of sample recovered from the sampled interval. For a standard penetration test, full recovery is 18", and is 24" for a thinwall/shelby tube sample.

WOH: Indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WOR: Indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

Water Level: Indicates the water level measured by the drillers either while drilling (▽), at the end of drilling (▼), or at some time after drilling (▼).

Laboratory Tests

DD	Dry density, pcf	**OC**	Organic content, %	**LL**	Liquid limit
WD	Wet density, pcf	**q_p**	Pocket penetrometer strength, tsf	**PL**	Plastic limit
P200	% Passing #200 sieve	**MC**	Moisture content, %	**PI**	Plasticity index
		q_U	Unconfined compression test, tsf		

TRAVEL DEMAND MANAGEMENT PLAN

STS

Swing Traffic Solutions

Lexington Parkway Apartments

in

ST. PAUL, MN

November 18, 2020

Travel Demand Management Plan

For
Lexington Parkway Apartments
St. Paul, MN

Swing Traffic Solutions, LLC Project No. 2019043
November 18, 2020

I hereby certify that this plan, specification, or report was prepared by me, or under my direct supervision, and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota:

Vernon E. Swing, PE

Date: *November 18, 2020* Lic. No.: *41417*

Travel Demand Management Plan

For
Lexington Parkway Apartments
St. Paul, MN

November 18, 2020

Prepared For:

Alatus
IDS Center, 80 S. 8th Street, Suite 4155
Minneapolis, MN 55402

Prepared By:

Swing Traffic Solutions, LLC
4290 Norwood Lane North
Plymouth, MN 55442
612-968-4142

Swing Traffic Solutions, LLC
Project # 2019043

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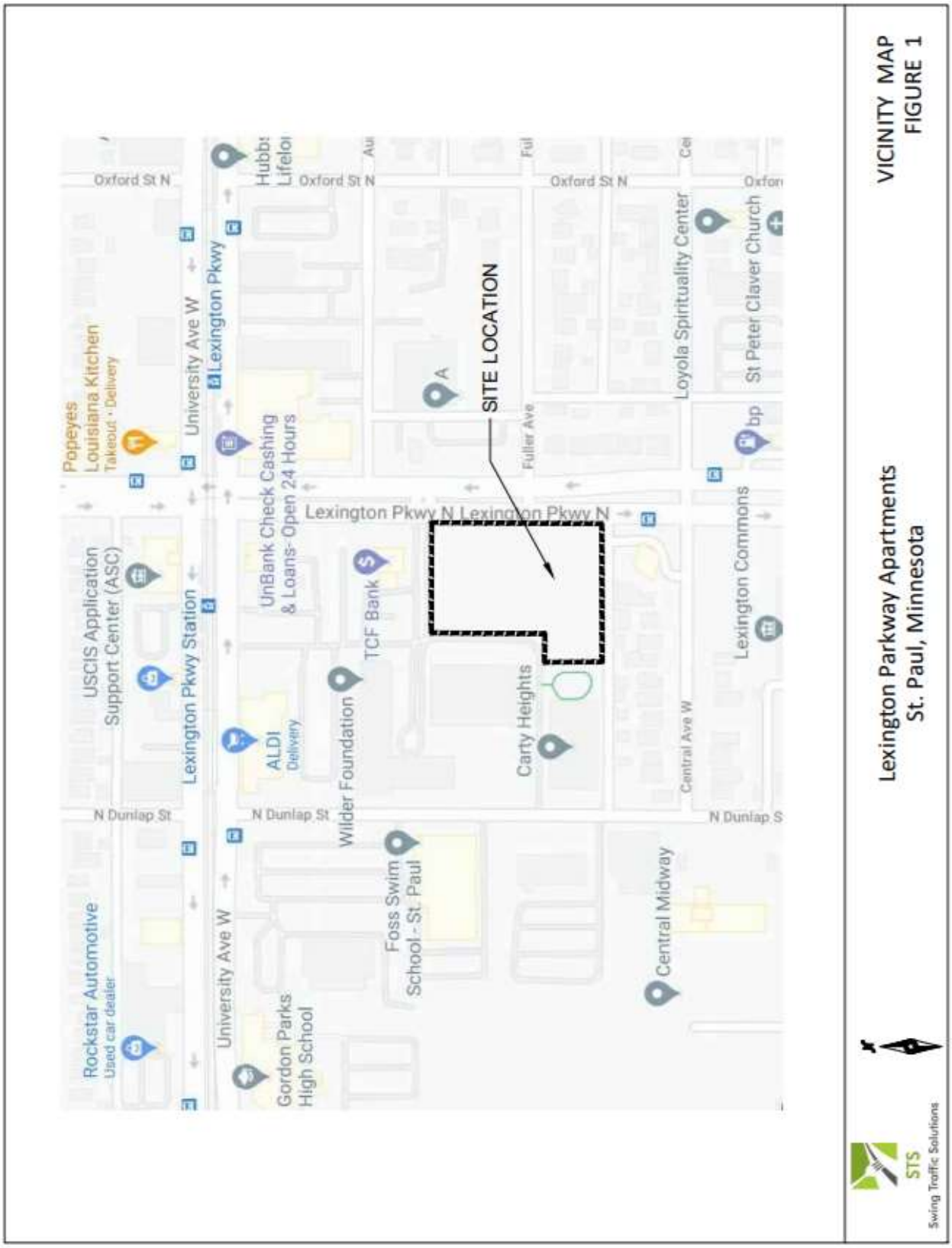
1.0 INTRODUCTION

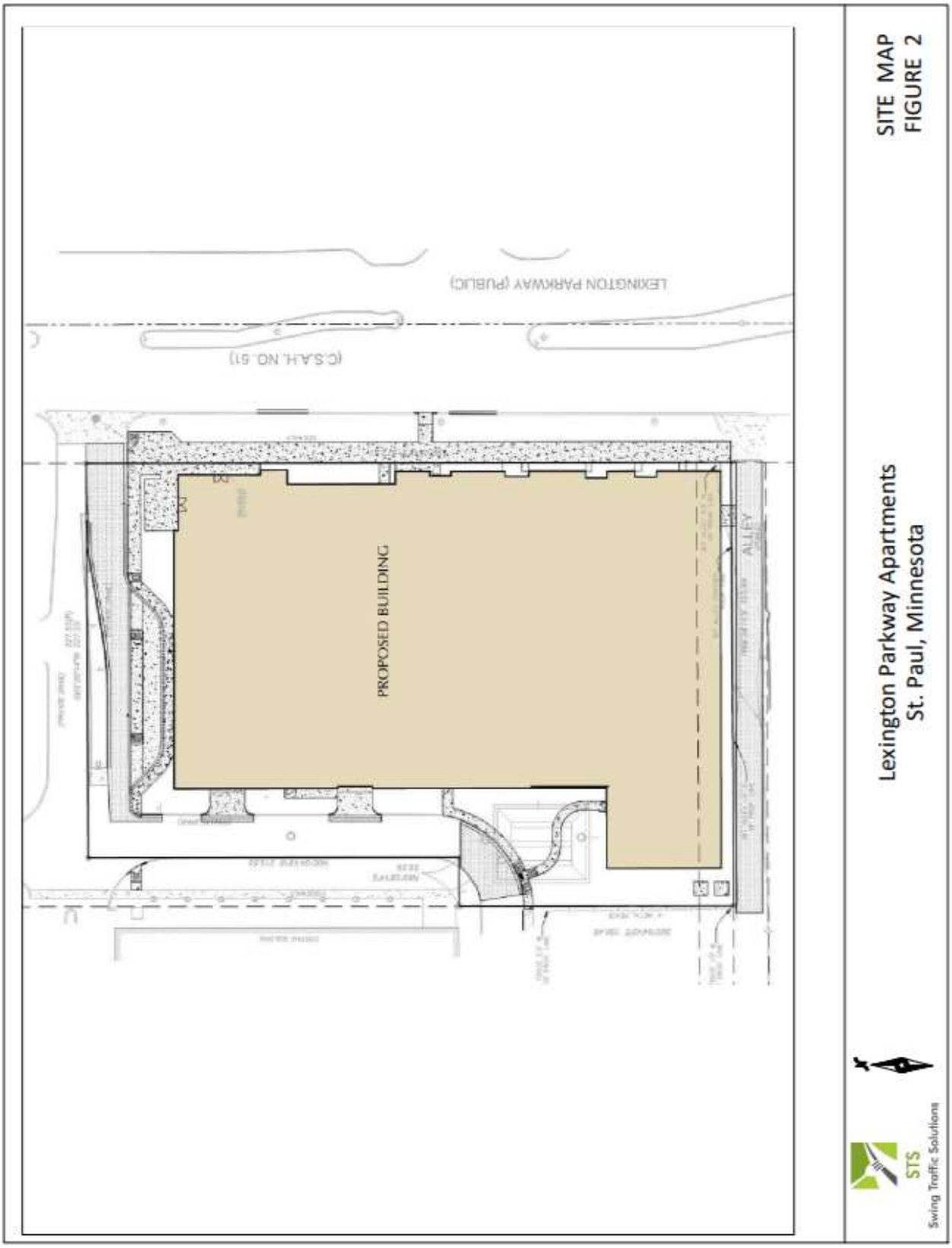
Alatus proposes to develop the remaining parcel on the property formerly referred to as the Wilder Property located in the southwest quadrant of the University Avenue and Lexington Parkway intersection. The site is west of Lexington Parkway N, south of University Avenue N, east of N Dunlap Street, and north of Central Avenue N. The proposed transit oriented project will construct an apartment building with 285 units and 3,000 square feet of commercial space, a connection to the pedestrian facilities on Lexington Avenue, a connection to and extension of the local bicycle trail in the vicinity of the site, and an internal 134 space vehicle parking garage. The project will also include 285 bicycle parking spaces. It is noted the site Wilder site is adjacent to the Green Line LRT with access to the Lexington Station. (See Vicinity Map, Figure 1.)

Vehicle access to the site is currently available from Lexington Parkway to the east and from Dunlap Street to the west. The project will be south of the Lexington Parkway access, and east of the Dunlap Street access. This access drive also serves other uses on site including TCF Bank, Aldi's, White Castle, and the Wilder Foundation offices. (See Site Plan, Figure 2).

As a transit-oriented development it is expected that the residents will seek alternative transportation options. In keeping with the transit oriented development intent, the commercial use is expected to serve the residents and pedestrian traffic in the area and is not expected to generate vehicle trips. This TDMP will identify alternative transportation options in the vicinity of the site, will discuss the new site generated traffic, and will include strategies to encourage the use of these alternative modes.



VICINITY MAP
FIGURE 1


LEXINGTON PARKWAY (PUBLIC)
(C.S.A.H. NO. 51)
PROPOSED BUILDING
ALLEY
SITE MAP
FIGURE 2
Lexington Parkway Apartments
St. Paul, Minnesota
STS
Swing Traffic Solutions

2.0 PEDESTRIAN, BICYCLE AND TRANSIT CONSIDERATIONS

The proposed Lexington Parkway Apartments location on Lexington Parkway and University Avenue affords the residents many opportunities for the use of alternative transportation modes. It is noted the 3,000 square foot commercial use is intended to serve the residents of the building and pedestrians in the area and is not expected to generate vehicle additional traffic. The site is adjacent to roadways with sidewalks with bike trails located within a couple of blocks. (See Exhibit 1.) Located just north of the site along University Avenue is the Lexington Parkway Green Line LRT station, and Metro Transit uses University Avenue and Lexington Parkway for buses with stops near the site. (See Exhibits 2 and 3.)

The designated bike routes in the site vicinity tie into the elaborate bike trail system of St. Paul. The development will provide a route through the site for future connectivity with the on-street route currently existing on Griggs Street, approximately one block west of the site. This system will enable the Lexington Parkway Apartment residents to easily travel to other downtown locations such as the Xcel Center, St. Thomas University, Concordia College and other institutions of higher learning in the area, as well as connecting to the west across the Mississippi River to Minneapolis. There are 285 bike parking location planned within the building. Also, the development is planned to include a bicycle tuning area.

Sidewalks exist along the public streets that are adjacent to the project site. These sidewalks provide pedestrian access to the robust sidewalk and pedestrian trail network in City of St. Paul and connect to the transit system. The proposed development will enhance the sidewalk connectivity by providing a 12 foot wide sidewalk section along Lexington Parkway N and along the Access Road from Lexington Parkway N (See Figure 2).

Another non-traditional transportation option is HOURCAR, which provides an hourly rental of a fuel-efficient vehicle. There is a currently a hub for HOURCAR located at 450 Syndicate St, about two blocks to the west of the site, plus the developer is considering the provision of an HOURCAR on this site. Use of HOURCAR would also be a viable strategy for travel demand management. For those residents who do not own a personal vehicle and who typically rely on transit or non-motorized transportation, an HOURCAR option within walking distance would be a positive amenity when a personal vehicle is needed on a temporary basis.

There are numerous transit opportunities in the vicinity of the site. The Green Line LRT Lexington Parkway Station is adjacent to the Lexington Parkway Apartments site, which connects downtown St. Paul to downtown Minneapolis and offers multiple transfer opportunities. Also, Metro Transit bus routes have stops in the vicinity of the site on University Avenue and Lexington Parkway. Table 1 lists the routes that are near to the site, as well as those that are accessible via stops on University Avenue and Lexington Parkway.

Table 1
Bus Routes Serving Lexington Parkway Apartments

ROUTE #	TYPE OF SERVICE	DESTINATIONS	WEEKDAY	MIDDAY SERVICE w/≤ 30 MIN HEADWAYS	SATURDAY	SUNDAY
Green Line	Local	St. Paul to Minneapolis	4:30 a.m. – 12:30 a.m.	Yes	4:30 a.m. – 12:30 a.m.	4:30 a.m. – 12:30 a.m.
83	Local	Roseville to St. Paul	6:00 a.m. – 7:30 p.m.	No	8:00 a.m. – 7:30 p.m.	8:00 a.m. – 7:30 p.m.
16	Local	Allianz to downtown St. Paul	6:30 a.m. – 9:30 p.m.	No	6:30 a.m. – 9:00 p.m.	6:30 a.m. – 8:30 p.m.

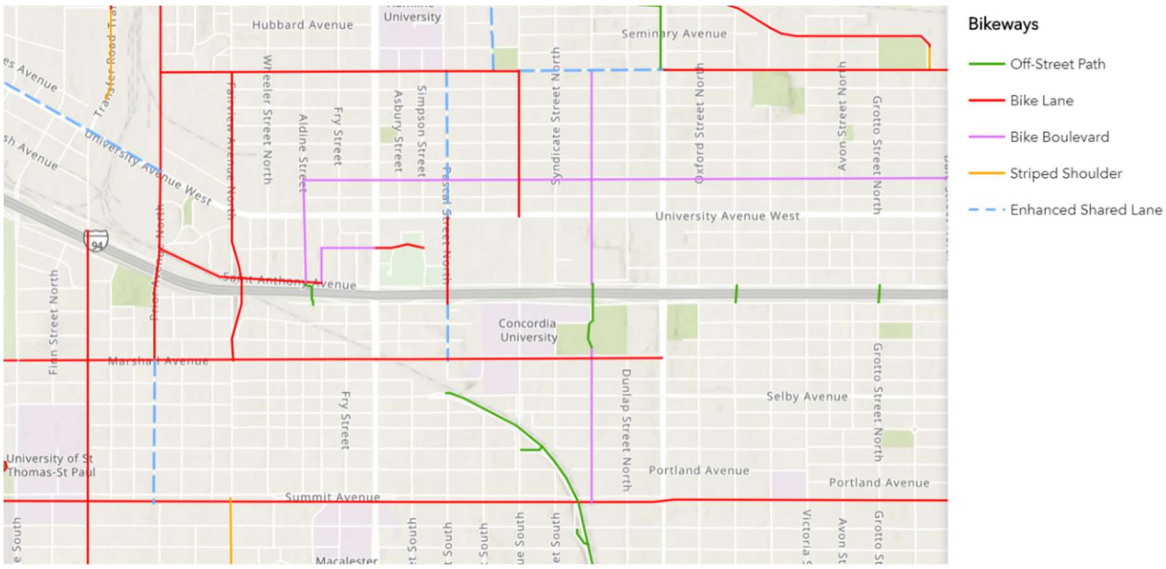


Exhibit 1 – Bike Routes

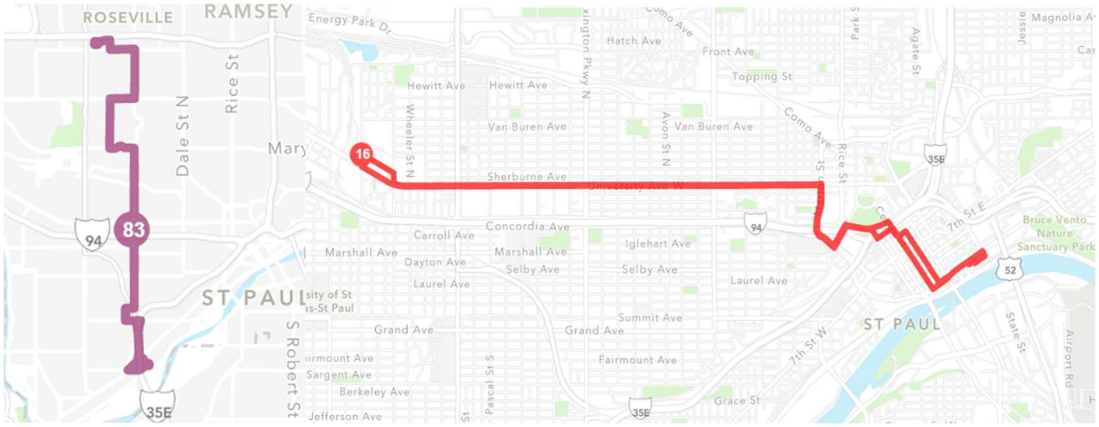


Exhibit 2 – Transit Routes 83 & 16

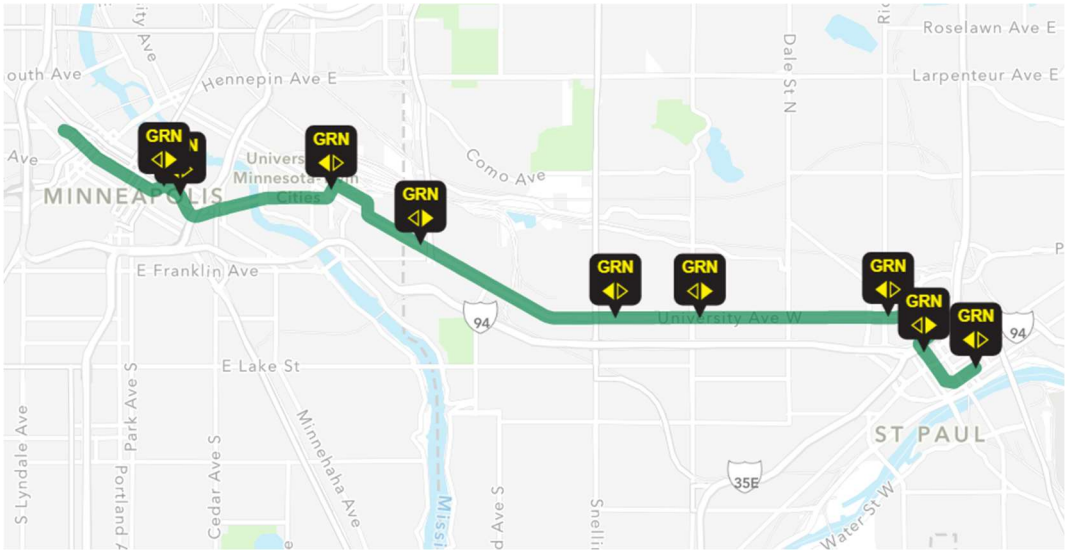


Exhibit 3 – Green Line LRT

3.0 PARKING CONSIDERATIONS

The Lexington Parkway Apartments development is proposed to occupy the remaining parcel in the site formerly known as the Wilder site located in the southwest corner of the Lexington Parkway and University Avenue intersection. The development plan includes a mid-rise apartment building with 285 units, a 3,000 square foot commercial space, and an internal parking garage with 134 parking spaces. It is expected 120 spaces will be dedicated for resident parking with the remainder available for guests.

The site is less than a quarter mile from University Avenue, therefore, per section 63.207 of the City of St. Paul Code of Ordinances is not required to provide a minimum number of on-site parking spaces. Given the proximity of the site to the Green Line LRT, many residents may not own vehicles requiring parking.

Also, the development will provide 285 bicycle parking spaces. Section Sec. 63.210 in the Municipal Code describes bicycle parking requirements, which stipulate that "for dwelling units, a minimum of one (1) secure bicycle parking space shall be provided for every fourteen (14) dwelling units." With 285 dwelling units, a minimum of 21 secured bicycle parking spaces will be required. This project will have sufficient bicycle parking.

4.0 TRAFFIC CONSIDERATIONS

The urban area where this Transit Oriented Development is proposed is characterized by the Institute of Transportation Engineers as Dense Mixed-Use Urban, –

> **Dense Multi-Use Urban**—a fully developed area (or nearly so), with diverse and interacting complementary land uses, good pedestrian connectivity, and convenient and frequent transit. This area type can be a well-developed urban area outside a major metropolitan downtown or a moderate size urban area downtown. The land use mix typically includes office, retail, residential, and often entertainment, hotel, and other commercial uses. The residential uses are typically multifamily or single-family on lots no larger than one-fourth acre. The commercial uses often have little or no setback from the sidewalk. Because the motor vehicle still represents the primary mode of travel to and from the area, there typically is on-street parking and often off-street public parking. The complementary land uses provide the opportunity for short trips within the Dense Multi-Use Urban area, made convenient by walking, biking, or transit. The area is served by significant transit (either rail or bus) that enables a high level of transit usage to and from area development.

The area characteristics and alternative transportation opportunities impact the trip generation tendencies for proposed land developments. In this case ITE provides vehicle trip generation data and person trip generation data as current research suggest residents within Transit Oriented Development do not drive as much as in more suburban or rural area. Table 2 summarizes the vehicle trip generation estimate calculated for the proposed Lexington Parkway Apartments using the Institute of Transportation Engineers' (ITE's) Trip Generation Manual, 10th Edition. While the 3,000 square foot commercial space is expected to serve the residents and pedestrian traffic and is not expected to generate vehicular traffic, for the purposes of this study it is assumed the space will be occupied by a restaurant/bar use. The numbers shown reflect the statistics associated with Dense Mixed Use Urban type of development.

Table 2
Trip Generation Estimates – Proposed Land Use

Land Use	ITE Code	Size	AM Peak Hour		PM Peak Hour	
			Enter	Exit	Enter	Exit
Apartment	221	285 Units	7	50	37	14
Restaurant/Bar	931	3,000 sq.ft	1	1	16	7
Gross Total Trips			8	51	53	21
Shared Trips			-1	-1	-11	-5
Net New Trips			**7**	**50**	**42**	**16**

The ITE Trip Generation Handbook, 3rd Edition, outlines a procedure to account for shared trips and pass-by trips. Shared trips are trips that visit more than one use within a multi-use development. For example, a resident of an apartment may also be a patron of a coffee shop within a development and would not generate a new trip to visit the coffee shop. Also, since the proposed development is within a shopping district in an urban environment, visitors to the area may eat at the restaurant within this development and may go to shop at the Aldi's all in one "shared" trip. Pass-by trips are those trips already using the adjacent roadway and enter the site as an intermediate stop on their way to another destination. The estimated trip generation is not adjusted for pass-by trips in this analysis. The proposed redevelopment is expected to generate 57 AM Peak hour vehicle trips, and 58 PM Peak hour vehicle trips.

Swing Traffic Solutions analyzed several intersections around the Lexington Parkway Apartments site and assessed for traffic operational performance. Intersections analyzed include:

a) University Avenue W and Lexington Parkway N
b) Lexington Parkway N and Site Access

c) Lexington Parkway N and Fuller Avenue
d) Lexington Parkway N and Central Avenue W
e) Lexington Parkway N and St Anthony Avenue
f) Lexington Parkway N and Concordia Avenue
g) University Avenue W and N Dunlap Street
h) University Avenue W and Aldi's Access
i) N Dunlap Street and Site Access
j) N Dunlap Street and Central Avenue W

The distributed traffic destined to and from the proposed Lexington Parkway Apartments site was added to the roadway network. Operations at the intersections were again reviewed and compared to the No-Build conditions. The intersection operational analysis shows that the project traffic does not change the Level of Service at the studied intersections. A full traffic impact study detailing the methodology and results of the analysis has been completed and is attached as Appendix A.

5. TRAVEL DEMAND MANAGEMENT STRATEGIES

A. City of St. Paul 2040 Plan

The City of St. Paul has established a vison of the future with that supports the listed core values:

Equity and opportunity. We are a city where opportunities in education, employment, housing, health and safety are equitably distributed and not pre-determined by race, gender identity, sexual orientation or age; we are a city that creates opportunities for all residents to achieve their highest potential.

Building on our assets. We are a city that recognizes and builds on the unique human, physical and cultural assets of our diverse residents and neighborhoods.

Resiliency and sustainability. We are a city that understands the importance of environmental stewardship of our abundant natural resources.

Celebrating parks. We are a city that ensures its parks and open space system meets the needs of a growing and more diverse population and is accessible to all.

Innovation. We are a city that builds on a strong core of innovation and creativity to address our challenges, celebrate our strengths, and take advantage of our assets.

People-centered. We are a city that puts people first, recognizes and celebrates our complex and interrelated histories, and treasures our young and older residents as integral members of our community.

Health. We are a city that recognizes that everything we do impacts the health of our residents, and that housing, transportation, land use, parks and economic development opportunities need to be designed to enhance personal health.

Welcoming and safe. We are a city that welcomes all, where everyone feels safe and empowered to participate in decisions that impact them.

Growth and prosperity through density. We are a city that supports well-designed development that responds to its neighborhood context, fosters diversity and prosperity, and brings economic opportunity to all residents.

Integration and coordination. We are a city where policies, programs and departments collaborate and coordinate to provide an integrated set of services for all residents.

With these values in mind, the City of St Paul has key goals including:

A. Investment that reflects the City's priorities.
B. Safety and accessibility for all users.
C. A transportation system that supports access to employment and economic opportunity.
D. True transportation choice throughout the city, with a shift from single-occupant vehicles toward other modes.
E. Sustainable and equitable maintenance models.
F. Environmentally sustainable design.
G. Functional and attractive Parkways.
H. A system that responds to technology and shapes its implementation.

Further, the City has implemented the following policies to assist with achieving true transportation choices and shifting from single-occupant vehicles toward other modes:

Policy T-21. Reduce vehicle miles traveled (VMT) by 40% by 2040 by improving transportation options beyond single-occupant vehicles.
Policy T-22. Shift mode share towards walking, biking, public transit, carpooling, ridesharing and carsharing in order to reduce the need for car ownership.
Policy T-23. Formulate responses to traffic issues identified through traffic studies based on desired, rather than current, mode share.
Policy T-24. Implement the Bicycle Plan to make bicycling safe and comfortable throughout the city, and to increase bicycling mode share.
Policy T-25. Implement the forthcoming Pedestrian Plan to make walking safe and comfortable throughout the city, increase pedestrian mode share for short trips, and increase physical activity in people's daily routines. Until the Pedestrian Plan is adopted, focus pedestrian infrastructure improvements in areas with acute pedestrian safety hazards, with existing or anticipated high pedestrian activity, and/or in racially concentrated areas of poverty.
Policy T-26. Provide sidewalks throughout the city, generally on both sides of the street, except potentially in portions of Highwood as directed via other officially adopted City plans (See Map T-1).
Policy T-27. Improve public transit mode share and support quality public transit in all parts of the city through strategic establishment of transit-supportive land use intensity and design, increased traffic signal optimization for transit, working with transit providers to improve their service offerings and supporting transit facilities (See Maps T-5 and T-6).
Policy T-28. Facilitate intermodal trips at mobility hubs (where walking, biking, public transit, ridesharing and carsharing are intentionally designed to connect) by providing enhanced security, lighting, information, shelter, placemaking, comfort and convenience.
Policy T-29. Expand commuter options with Travel Demand Management (TDM) and support of carpooling facilities.

1. Require a TDM Plan for all large developments and large employers.
2. Create incentives, employer programs and parking policies that encourage and accelerate use of walking, biking, transit and carshare.
3. Support the work of other agencies, organizations and the private sector to market and support transit, carshare, rideshare, carpooling, biking, walking, flexible work hours and telecommuting.
4. Consider options to enforce and improve implementation of TDM Plans.

Policy T-30. Design holistically for all mode users, especially pedestrians and bicycles, in any bridge reconstruction or maintenance project such as for bridges (or lids) over interstate highways or the Mississippi River. Ensure that the project scope incorporates adjacent intersections as necessary.
Policy T-31. Establish (or re-establish) the right of-way grid with block lengths of 300 to 600 feet as redevelopment occurs on large sites in order to increase neighborhood connectivity and accommodate pedestrian-oriented, higher density development.
Policy T-32. Accommodate access to community events and around construction projects by all mode users, including by working with Metro Transit to provide additional transit service, providing sufficient bicycle parking, generally avoiding the closure of bicycle lanes and sidewalks and providing detours for all modes.
Policy T-33. Improve pedestrian and recreational connections to the Mississippi River.
Policy T-34. Promote safe walking and bicycling to school by supporting Safe Routes to School efforts and investing in sidewalk connectivity and crossing enhancements near schools.

B. Goal of the Travel Demand Management Plan

To succeed, this Travel Demand Management (TDM) plan must assist the City of St. Paul to achieve their transportation goals. Based on previous TDM Plans in the area and the types of proposed land uses, the following mode split goals for the project have been identified by the developer:

Table 3
Mode Split Goals

Mode Split	Goal
Auto	40%
Transit	40%
Bike/Walk	20%

The owners and/or TDM Liaison will work to achieve a mode share goal percentage of 40% non-single-occupant-vehicles for the office development.

D. Specific Travel Demand Management Strategies

This section outlines specific Travel Demand Management strategies to be implemented by the owner/end user/property manager/etc. of this site. The strategies detail the responsibilities of the site's responsible party in addressing the issues regarding transportation cited above. Lexington Parkway Apartments, by accepting the responsibility of implementing the items below, desire to help St. Paul to achieve their goals of enhancing the local transportation system. Implementation of the items noted will help to encourage use of alternate modes of travel, enhance pedestrian friendliness, and achieve a balance in the needs of all users of the transportation system. Lexington Parkway Apartments specifically commits to the implementation of the following measures:

1. The OWNER will designate a Travel Demand Management (TDM) Liaison to contact and work with Move Minnesota to coordinate the various TDM strategies that require ongoing attention. The responsibilities of the Coordinator will include upkeep of transit information displays and other communications, bicycle/pedestrian commuter information and/or maps.

2. Monitor the implementation of the proposed TDM actions and progress made toward achieving the TDM mode split goals outlined in Table 6 of this report. The monitoring program shall include the following actions:

    - Conduct statistically valid baseline resident commuter surveys within the first six months of opening of the proposed development.
    - Conduct resident commuter surveys every two years after the original baseline survey, for five years or until the TDM mode split goals for alternative modes of transportation are met.
    - After each year of biennial commuter surveys, review the TDMP to determine its effectiveness. As part of the review, consider providing a status report for Move Minnesota and City of Saint Paul PED and Public Works to review.

3. Provide welcome/orientation packets to new residents detailing ways to reduce vehicle travel and travel-associated costs, including information on and website links to nearby transit, and bicycle/pedestrian amenities.

4. Promote use of transit for residents by maintaining information on available transportation alternatives through a variety of mediums such as an informational kiosk in the building's lobby and common space, Facebook page, and periodic distribution of pamphlets and brochures. Provide internet links, route maps, and information regarding the Metro Transit bus and future BRT system, transit go-cards, and other relevant transportation alternatives.

5. Install and maintain an electronic monitor in the lobby of apartment building that displays 'real-time' transit information.

6. Promote development of a Rideshare program by working with Move Minnesota to set up a rideshare program tailored for the residents. Metro Transit offers a free rideshare database for Twin Cities residents to help identify others looking to share a ride to work.

7. Promote biking as a mode of transportation for residents by encouraging them to use the on-site bicycle parking spaces. Promote bicycle use through regularly updated presentation of maps and information on the kiosks in the building lobby and common spaces.

8. Promote biking as a viable transportation mode by installing and maintaining a bicycle tuning station in the garages on Level 1 that include a repair stand, tire pump, and attached tools.

9. Coordinate with tenants moving into and out of dwelling units to encourage them to schedule moving vans to arrive at times where traffic congestion within the study area is low (during off-peak periods). This does not include FedEx/UPS-type deliveries. Ensure that designated on-site areas for loading and unloading are available during these off-peak times of the day.

10. Set aside funding for the above actions. All costs associated with implementation of the above TDM commitments will be borne by the OWNER, who will set aside funding for the expressed purpose of implementing the identified, site-specific TDM strategies.

11. A member of the OWNER's on-site management team will serve as the TDM Liaison. The team will be responsible for conducting research and collecting data that will inform the development of its site-specific TDM program. The management team will also be responsible for implementing the identified site-specific TDM strategies.

12. It is estimated that approximately $9,500 in first-year costs will be required for:
    - Monitoring and survey activities
    - Development, printing, and distribution of welcome/orientation packets
    - Coordination with Metro Transit and Move Minnesota to encourage participation in Metro Pass and ridesharing programs
    - Updating and distributing TDM-related information that will be displayed on-site for review by users of the proposed development
    - Installation and maintenance of monitor that displays 'real-time' transit information
    - Installation and maintenance of bicycle tuning stations

The estimated first-year costs of implementing the above actions are detailed by line item below.

TDM Activity	Estimated Budget
Monitor implementation of the TDMP actions and progress made toward satisfying the TDMP mode split goals	$1,500
Production and distribution of welcome packets	$1,000
Interact with residents to promote increased use of alternative travel modes	$2,000
Coordinate with public agencies/Move MN and prepare reports	$1,500
'Real-time' transit display monitor	$1,500
Bicycle tuning station	$2,000
TOTAL	**$9,500**

TRAVEL DEMAND MANAGEMENT PLAN
LEXINGTON PARKWAY APARTMENTS
ST. PAUL, MN

PLAN APPROVAL

Alatus

By:_____Dated: _____
Alatus

City of St. Paul

By:_____Dated: _____
Planning Director

APPENDIX A
TRAFFIC IMPACT STUDY

A-1. EXISTING TRAFFIC CONDITIONS

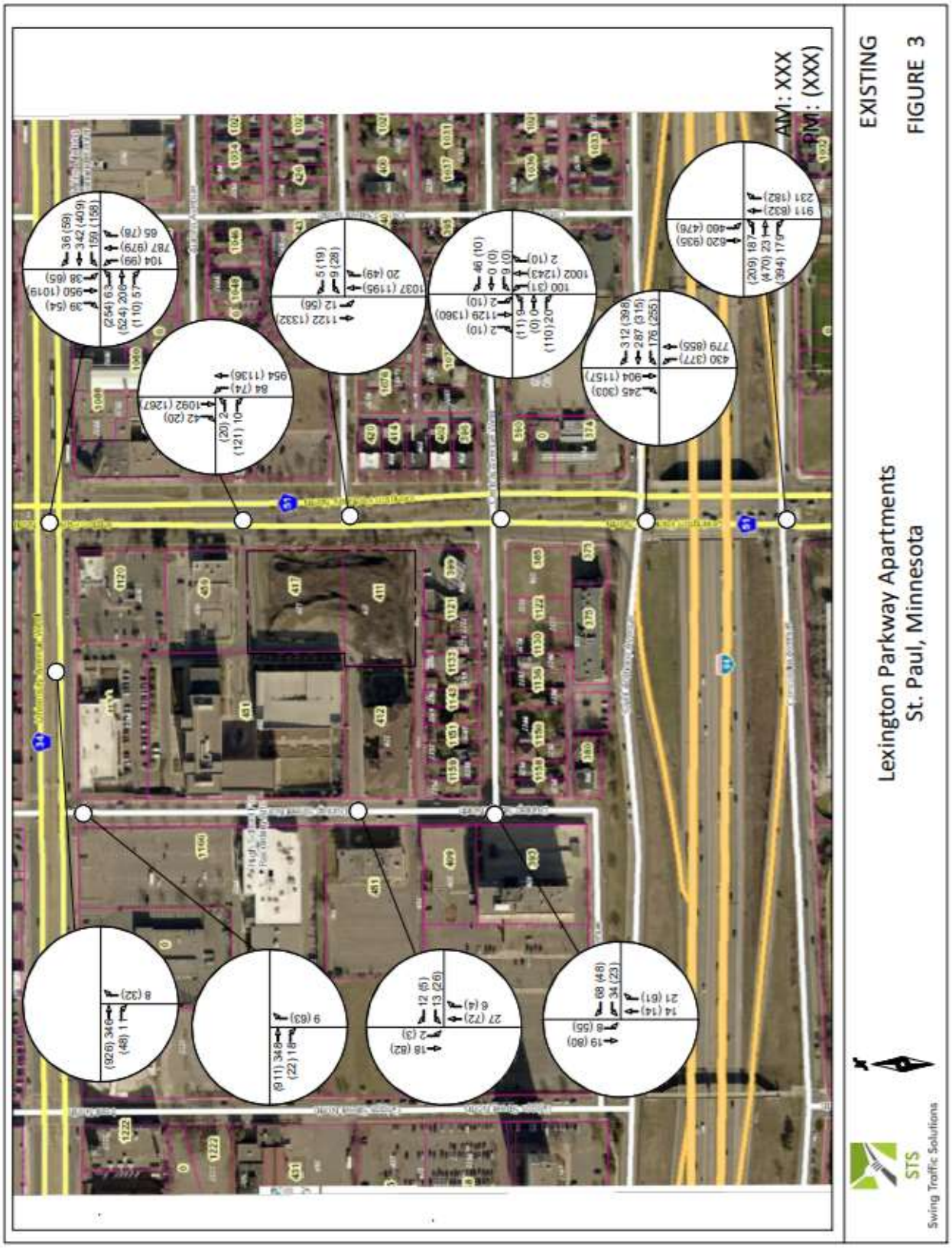
A. Data Collection

Traffic volumes were analyzed at the following intersections adjacent to the Lexington Parkway Apartment development:

a) University Avenue W and Lexington Parkway N
b) Lexington Parkway N and Site Access
c) Lexington Parkway N and Fuller Avenue
d) Lexington Parkway N and Central Avenue W
e) Lexington Parkway N and St Anthony Avenue
f) Lexington Parkway N and Concordia Avenue
g) University Avenue W and N Dunlap Street
h) University Avenue W and Aldi's Access
i) N Dunlap Street and Site Access
j) N Dunlap Street and Central Avenue W

Vehicle turning movement counts were conducted by Westwood Professional Services on behalf of Swing Traffic Solutions during the week of May 10, 2019 and the 2018 counts at the I-94 and Lexington Parkway/St Anthony Avenue/Concordia Avenue Ramps were provided by MnDOT for use in our analysis. Figure 3 illustrates the existing AM Peak Hour and PM Peak Hour vehicle turning movement traffic counts.

Also, a review of ADT traffic counts from MnDOT on the Lexington Parkway corridor was conducted revealing that traffic in the area has declined over the last 20 years at a rate of approximately 0.67 percent per year.


AM: XXX
PM: (XXX)
EXISTING
FIGURE 3
Lexington Parkway Apartments
St. Paul, Minnesota
STS
Swing Traffic Solutions

A-2. NO-BUILD ALTERNATIVE

To quantify the impacts of a development on the surrounding roadway system, it is necessary to first analyze traffic conditions that would be present on the roadway system without the inclusion of the proposed development. The anticipated construction completion date for this development is 2022, thus the year 2023 was selected for analysis so as to compare traffic conditions after initial traffic patterns to and from the Lexington Parkway Apartments site have become established. Therefore, the 2023 No-Build will serve as the basis of comparison with the 2023 Build scenario.

A. Background Growth

Review of daily traffic counts conducted by MnDOT on Lexington Parkway N indicated the overall daily traffic in the area has declined over the last 20 years. With the existing Green Line LRT it is likely this trend will continue. However, to remain consistent with other studies in the area, an annual background growth rate of one half percent (0.5%) was used for this study. The 0.5% annual rate of growth assumed for background traffic was applied to 2019 traffic volumes to arrive at the estimate of the 2023 No-Build AM and PM Peak hour traffic volumes shown on Figure 4.

It is note, the analysis conducted reflect pre-COVID 19 conditions and may well be conservative as preliminary projections from the Transportation Research Board and ITE indicate peak traffic flows after the pandemic may be 15-20 percent lower on average from pre-pandemic conditions due to increased telecommuting and other changes in driving demand.

B. Operational Analysis Methodology

Traffic operations for peak hour conditions within the study area were analyzed using the industry-standard Synchro/SimTraffic 10 software package, which uses the data and methodology contained in the 6th Edition, Highway Capacity Manual, published by the Transportation Research Board. The software model includes input of speed limit, number of lanes, signal timing, and peak hour factor using existing conditions.

The operating conditions of transportation facilities, such as traffic signals and stop-controlled intersections, are evaluated based on the relationship of the theoretical capacity of a facility to the actual traffic volumes on that facility. Various factors affect capacity, including travel speed, roadway geometry, grade, number and width of travel lanes, and intersection control. The procedures describe operating conditions in terms of a Level of Service (LOS). Facilities are given letter designations from "A," representing the best operating conditions, to "F," representing the worst. Generally, Level of Service "D" represents the threshold for acceptable overall intersection operating conditions during a peak hour. The Chart below summarizes the level of service and delay criteria for signalized and unsignalized intersections.

LOS Designation	Signalized Intersection Average Delay/Vehicle (Sec.)	Unsignalized Intersection Average Delay/Vehicle (Sec.)
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

The acceptable threshold for a particular movement at an intersection is defined by the agency and depends on both the priority assigned to that movement and its traffic volume. In general, the higher the priority

and the higher the traffic volume, the more stringent the acceptable threshold will be. For example, the acceptable threshold for a high-priority/high-volume suburban movement might be "D", while LOS "F" on a low-priority/low-volume urban movement might be appropriate. For side-street stop-controlled intersections, a key measure of operational effectiveness is the side-street LOS. Long delays and poor LOS can sometimes result on the side street, even if the overall intersection is functioning well, making it a valuable design criterion.

A final fundamental component of operational analyses is a study of vehicular queuing, or the lineup of vehicles waiting to pass through an intersection. An intersection can operate with an acceptable level of service, but if queues from the intersection extend back to block entrances to turn lanes or accesses to adjacent land uses, unsafe operating conditions could result. The 95th percentile queue, or the length of queue with a 5% chance of occurring during the peak hour, is considered the standard for design purposes.

C. Results of Analysis; 2023 No-Build Scenario

The existing roadway infrastructure, in terms of roadway cross sections and intersection control, has the capacity to support the area through the 2023 design year, although the intersection of University Avenue W and Lexington Parkway N is operating near capacity. It is noted, the Green Line LRT impacts the flow of traffic on Lexington Parkway N, as during the peak times the trains travel on University Avenue with six minute headways extending the University Avenue W green time by as much as 30 seconds during these cycles. While this interruption was not accounted for in the Synchro/Simtraffic modeling, it will benefit the side street operations along Lexington Parkway W by creating longer gaps in traffic for left turning movements thus the results of the analysis reported in Tables A and B, which summarize the 2023 No-Build operational analysis, are more conservative than what is currently occurring. The results in the Tables include the overall LOS for each study area intersection, and the LOS for the worst movement at the intersections. It is noted that the original signal timings were incorporated into the No-Build analysis. The complete operational analysis output is available upon request.

Table A
2023 AM No-Build Operations Table

Intersection	Level of Service[1.]	Notes/95th Percentile Queues[2]
University Ave/Lexington Pkwy N	C (24.9 sec)/D (46.1 sec) EBL	SBT queue is forecast at 402 feet
Lexington Pkwy N/Site Access	a (2.2 sec)/f (50.6 sec) ebl	NBL queue is forecast at 64 feet
Lexington Pkwy N/Fuller Ave	a (0.6 sec)/f (60.0 sec) wbl	WB queue is forecast at 30 feet
Lexington Pkwy N/Central Ave W	a (2.5 sec)/f (69.9 sec) ebl	NBL queue is forecast at 88 feet
Lexington Pkwy N/St Anthony Ave	B (13.4 sec)/C (31.2 sec) WBL	WBLT queue is forecast at 262 feet
Lexington Pkwy N/Concordia Ave	B (17.1 sec)/D (42.7 sec) EBL	EBLT queue is forecast at 281 feet
University Ave/N Dunlap St	a (0.2 sec)/a (2.8 sec) nbr	NB queue is forecast at 31 feet
University Ave/Aldi's Access	a (1.0 sec)/a (3.0 sec) nbr	NB queue is forecast at 33 feet
N Dunlap St/Site Access	a (0.8 sec)/a (4.4 sec) wbl	WB queue is forecast at 40 feet
N Dunlap St/Central Ave W	a (1.0 sec)/a (6.0 sec) wbl	WB queue is forecast at 65 feet

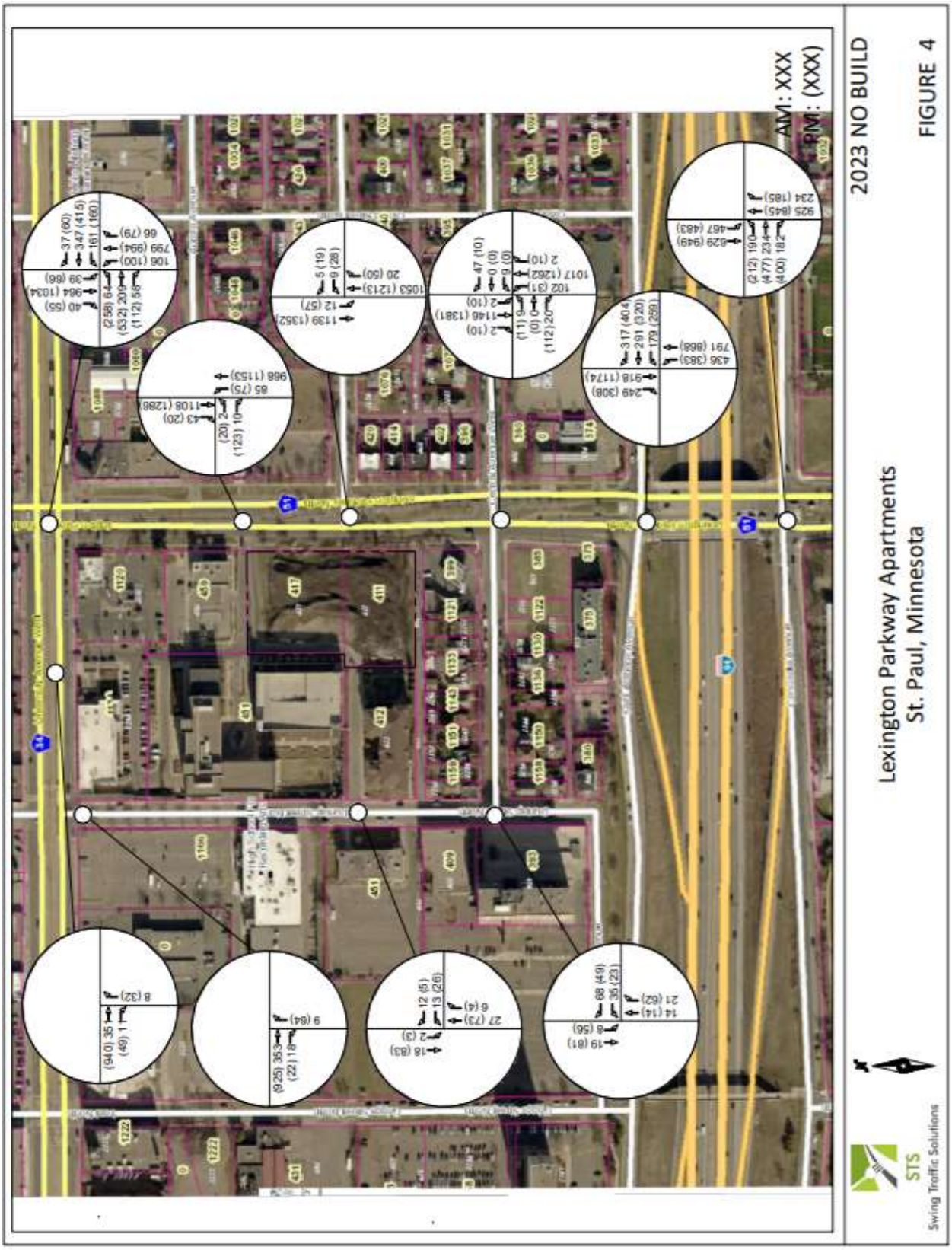
1. Overall LOS reported from SimTraffic delay calculations. First letter represents intersection LOS, while second letter represents worst LOS of individual approach. Upper case letters indicate signalized intersections, and lower case letters indicate unsignalized intersections.
2. 95th percentile queues are a result from an average of 10 SimTraffic simulations.

Table B
2023 PM No-Build Operations Table

Intersection	Level of Service[1.]	Notes/95th Percentile Queues[2]
University Ave/Lexington Pkwy N	E (65.1 sec)/F (199.0 sec) SBR	SBT queue is forecast at 1108 feet
Lexington Pkwy N/Site Access	a (3.2 sec)/f (98.7 sec) ebl	EBL queue is forecast at 79 feet
Lexington Pkwy N/Fuller Ave	a (4.4 sec)/f (279.0 sec) wbl	WB queue is forecast at 171 feet
Lexington Pkwy N/Central Ave W	a (1.6 sec)/e (36.9 sec) ebl	EB queue is forecast at 75 feet
Lexington Pkwy N/St Anthony Ave	B (16.7 sec)/C (27.8 sec) NBL	WBLT queue is forecast at 254 feet
Lexington Pkwy N/Concordia Ave	B (19.3 sec)/C (31.9 sec) EBL	EBLT queue is forecast at 298 feet
University Ave/N Dunlap St	a (0.6 sec)/a (5.4 sec) nbr	NB queue is forecast at 51 feet
University Ave/Aldi's Access	a (2.1 sec)/b (10.8 sec) nbr	NB queue is forecast at 63 feet
N Dunlap St/Site Access	a (0.9 sec)/a (4.7 sec) wbl	WB queue is forecast at 44 feet
N Dunlap St/Central Ave W	a (1.7 sec)/a (5.1 sec) wbl	WB queue is forecast at 40 feet

1. Overall LOS reported from SimTraffic delay calculations. First letter represents intersection LOS, while second letter represents worst LOS of individual approach. Upper case letters indicate signalized intersections, and lower case letters indicate unsignalized intersections.
2. 95th percentile queues are a result from an average of 10 SimTraffic simulations.

Results of the analysis contained in Tables A and B indicate that all study area intersections are projected to operate at an acceptable overall LOS for 2023 No-Build conditions. However, the intersection of University Avenue W and Lexington Parkway N is operating at capacity during the PM Peak time with long vehicle queues in the southbound direction. Also, the side street operations of the Lexington Parkway N intersections with Site Access, Fuller Avenue and Central Avenue W are shown to have long delays during both the AM and PM peak times. Field observation of existing conditions reveal these delays are over estimated as the LRT operation is creating gaps for these movements.


AM: XXX
PM: (XXX)
2023 NO BUILD
FIGURE 4
Lexington Parkway Apartments
St. Paul, Minnesota
STS
Swing Traffic Solutions

A-3. BUILD ALTERNATIVE

A. Site-Generated Traffic

The urban area where this Transit Oriented Development is proposed is characterized by the Institute of Transportation Engineers as Dense Mixed-Use Urban:

> **Dense Multi-Use Urban**—a fully developed area (or nearly so), with diverse and interacting complementary land uses, good pedestrian connectivity, and convenient and frequent transit. This area type can be a well-developed urban area outside a major metropolitan downtown or a moderate size urban area downtown. The land use mix typically includes office, retail, residential, and often entertainment, hotel, and other commercial uses. The residential uses are typically multifamily or single-family on lots no larger than one-fourth acre. The commercial uses often have little or no setback from the sidewalk. Because the motor vehicle still represents the primary mode of travel to and from the area, there typically is on-street parking and often off-street public parking. The complementary land uses provide the opportunity for short trips within the Dense Multi-Use Urban area, made convenient by walking, biking, or transit. The area is served by significant transit (either rail or bus) that enables a high level of transit usage to and from area development.

The area characteristics and alternative transportation opportunities impact the trip generation tendencies for proposed land developments. In this case ITE provides vehicle trip generation data and person trip generation data as current research suggest residents within Transit Oriented Development do not drive as much as in more suburban or rural area. Table C summarizes the vehicle trip generation estimate calculated for the proposed Lexington Parkway Apartments using the Institute of Transportation Engineers' (ITE's) Trip Generation Manual, 10th Edition. While the 3,000 square foot commercial space is expected to serve the residents and pedestrian traffic and is not expected to generate vehicular traffic, for the purposes of this study it is assumed the space will be occupied by a restaurant/bar use. The numbers shown reflect the statistics associated with Dense Mixed Use Urban type of development.

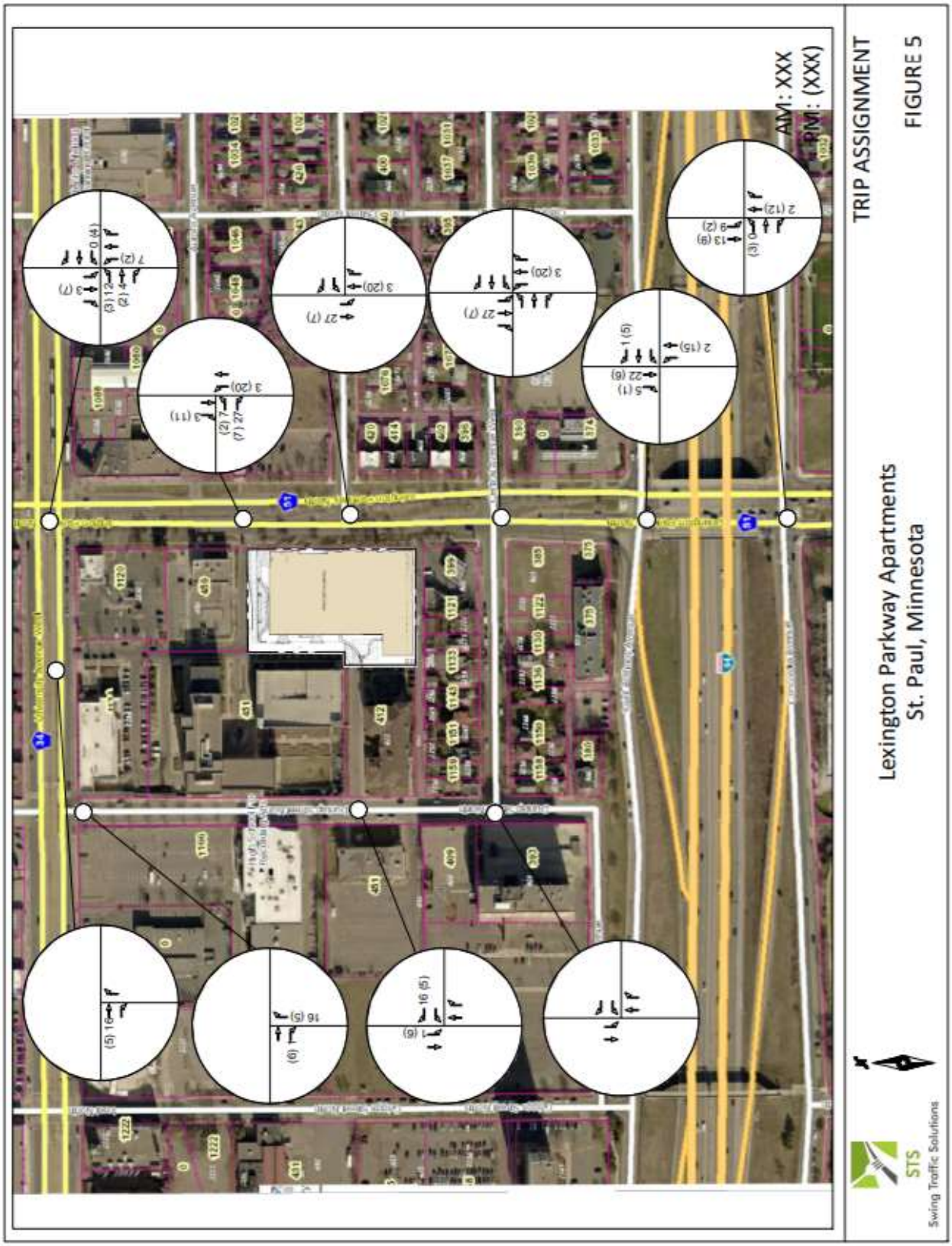
Table C
Trip Generation Estimates – Proposed Land Use

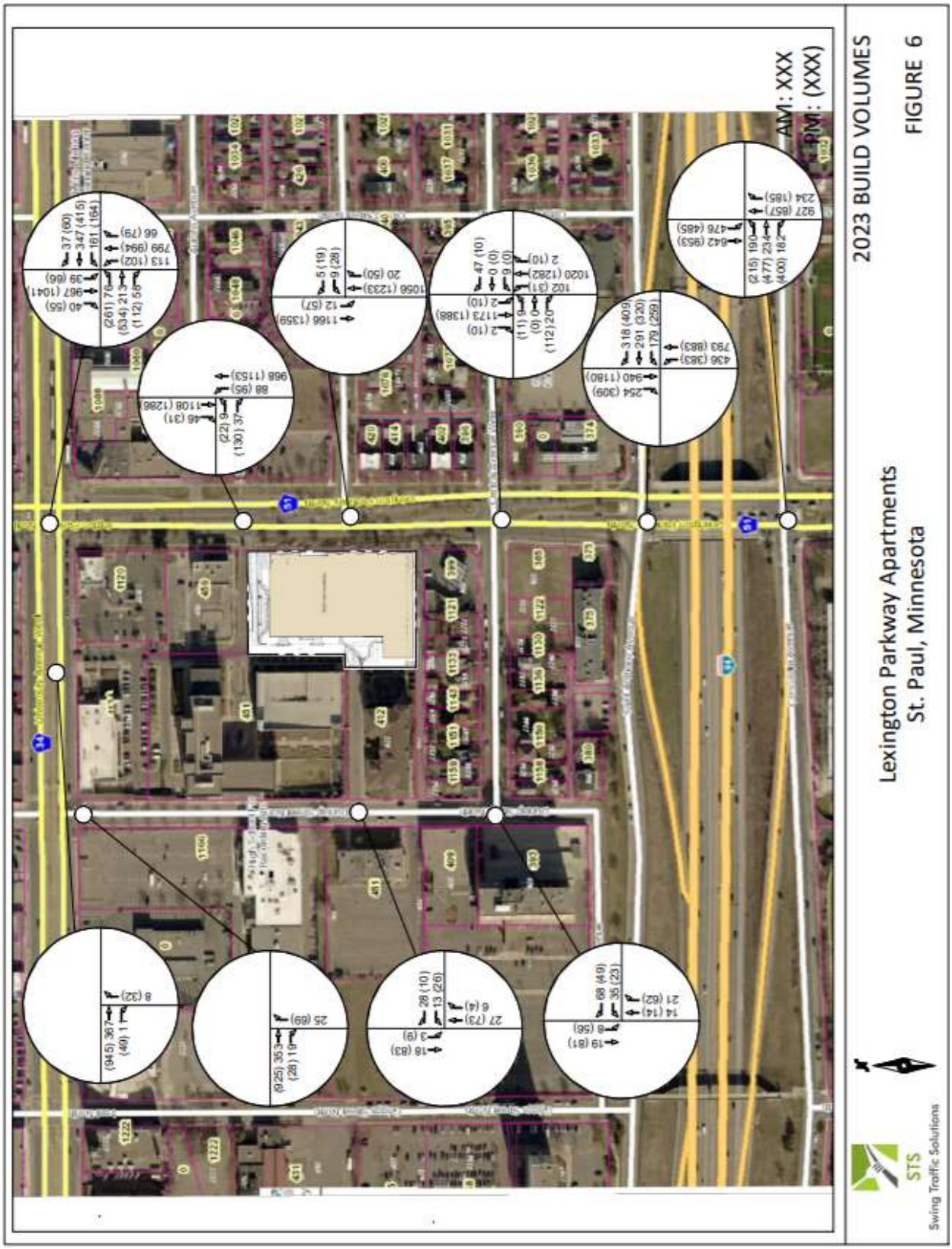
Land Use	ITE Code	Size	AM Peak Hour		PM Peak Hour	
			Enter	Exit	Enter	Exit
Apartment	221	285 Units	7	50	37	14
Restaurant/Bar	931	3,000 sq.ft	1	1	16	7
Gross Total Trips			8	51	53	21
Shared Trips			-1	-1	-11	-5
Net New Trips			**7**	**50**	**42**	**16**

The ITE Trip Generation Handbook, 3rd Edition, outlines a procedure to account for shared trips and pass-by trips. Shared trips are trips that visit more than one use within a multi-use development. For example, a resident of an apartment may also be a patron of a coffee shop within a development and would not generate a new trip to visit the coffee shop. Also, since the proposed development is within a shopping district in an urban environment, visitors to the area may eat at the restaurant within this development and may go to shop at the Aldi's all in one "shared" trip. Pass-by trips are those trips already using the adjacent roadway and enter the site as an intermediate stop on their way to another destination. The estimated trip generation is not adjusted for pass-by trips in this analysis. The proposed redevelopment is expected to generate 57 AM Peak hour vehicle trips, and 58 PM Peak hour vehicle trips.

B. Trip Distribution and Assignment

The distribution of site-generated traffic to the study area from and to the adjacent street system is based on existing distribution patterns within the area. Figure 5 the assigned site generated traffic destined to the proposed Lexington Parkway Apartments site. These trips were combined with the 2023 No-Build peak hour volumes to represent the 2023 Build volumes. Figures 6 illustrates the 2023 Build AM and PM Peak hour volumes through the study area.


AM: XXX
PM: (XXX)
TRIP ASSIGNMENT
FIGURE 5
Lexington Parkway Apartments
St. Paul, Minnesota
STS
Swing Traffic Solutions


AM: XXX
PM: (XXX)
2023 BUILD VOLUMES
FIGURE 6
Lexington Parkway Apartments
St. Paul, Minnesota
STS
Swing Traffic Solutions

C. Results of Analysis: Build Scenario

This section contains the results of the 2023 Build intersection operational analyses and provides recommendations for mitigating project-related traffic impacts, as necessary. It is noted that the existing signal timing plans were initially utilized in the Build analysis. A summary of the results from the analysis representing the 2023 Build conditions are presented in Tables D for the AM Peak hour and E for the PM Peak hour.

Table D
2023 AM Build Operations Table

Intersection	Level of Service[1.]	Notes/95th Percentile Queues[2]
University Ave/Lexington Pkwy N	C (28.2 sec)/D (49.0 sec) EBL	SBT queue is forecast at 411 feet
Lexington Pkwy N/Site Access	a (2.6 sec)/e (48.3 sec) ebl	NBL queue is forecast at 63 feet
Lexington Pkwy N/Fuller Ave	a (0.9 sec)/f (84.7 sec) wbl	WB queue is forecast at 48 feet
Lexington Pkwy N/Central Ave W	a (2.1 sec)/f (61.3 sec) ebl	NBL queue is forecast at 71 feet
Lexington Pkwy N/St Anthony Ave	B (13.4 sec)/C (28.7 sec) WBL	WBLT queue is forecast at 272 feet
Lexington Pkwy N/Concordia Ave	B (17.6 sec)/D (42.3 sec) EBL	EBLT queue is forecast at 246 feet
University Ave/N Dunlap St	a (0.3 sec)/a (2.8 sec) nbr	NB queue is forecast at 47 feet
University Ave/Aldi's Access	a (1.0 sec)/a (2.9 sec) nbr	NB queue is forecast at 26 feet
N Dunlap St/Site Access	a (0.9 sec)/a (4.1 sec) wbl	WB queue is forecast at 49 feet
N Dunlap St/Central Ave W	a (2.7 sec)/a (5.3 sec) wbl	WB queue is forecast at 52 feet

1. Overall LOS reported from SimTraffic delay calculations. First letter represents intersection LOS, while second letter represents worst LOS of individual approach. Upper case letters indicate signalized intersections, and lower case letters indicate unsignalized intersections.
2. 95th percentile queues are a result from an average of 10 SimTraffic simulations.

Table E
2023 AM Build Operations Table

Intersection	Level of Service[1.]	Notes/95th Percentile Queues[2]
University Ave/Lexington Pkwy N	E (67.8 sec)/F (207.2 sec) SBR	SBT queue is forecast at 1001 feet
Lexington Pkwy N/Site Access	a (3.4 sec)/f (63.7 sec) ebl	EBR queue is forecast at 86 feet
Lexington Pkwy N/Fuller Ave	a (9.5 sec)/f (409.3 sec) wbl	WB queue is forecast at 323 feet
Lexington Pkwy N/Central Ave W	a (2.2 sec)/f (64.7 sec) ebl	EB queue is forecast at 102 feet
Lexington Pkwy N/St Anthony Ave	B (16.8 sec)/C (26.8 sec) WBL	WBLT queue is forecast at 276 feet
Lexington Pkwy N/Concordia Ave	C (22.0 sec)/C (32.7 sec) EBL	EBLT queue is forecast at 329 feet
University Ave/N Dunlap St	a (0.6 sec)/a (5.1 sec) nbr	NB queue is forecast at 51 feet
University Ave/Aldi's Access	a (1.8 sec)/a (7.1 sec) nbr	NB queue is forecast at 91 feet
N Dunlap St/Site Access	a (0.8 sec)/a (4.2 sec) wbl	WB queue is forecast at 47 feet
N Dunlap St/Central Ave W	a (1.6 sec)/a (5.6 sec) wbl	WB queue is forecast at 46 feet

1. Overall LOS reported from SimTraffic delay calculations. First letter represents intersection LOS, while second letter represents worst LOS of individual approach. Upper case letters indicate signalized intersections, and lower case letters indicate unsignalized intersections.
2. 95th percentile queues are a result from an average of 10 SimTraffic simulations.

The results reported in Tables D and E of the 2023 Build conditions for the proposed plan indicate that all study area intersections are projected to operate at the same overall levels of service with essentially no change in delay or vehicle queuing with the addition of site-generated vehicle traffic.

A-4. CONCLUSIONS

The preceding analysis has evaluated the potential traffic impacts of the proposed Lexington Parkway Apartments development with a 285 unit apartment building and 3,000 square feet of commercial space on the operations of the study area intersections surrounding the site in St. Paul.

Two scenarios, 2023 No-Build and Build, were analyzed and compared to assess the development's impact to vehicular traffic on the roadway system. The design year of 2023 was chosen, corresponding to the year after build-out of the site.

The Proposed Plan consists of a 285-unit apartment building including a 3,000 square foot commercial space (assumed to be a restaurant/bar for this analysis) located west of Lexington Parkway N, south of University Avenue W, east of N Dunlap Street, and north of Central Avenue W. The building will also include a parking garage with 134 vehicle parking spaces and 285 bicycle parking spaces to serve the residents and guests.

Development of the Proposed Plan is expected to generate 57 new AM Peak hour trips and 58 new PM Peak hour trips on the study area roadways. Traffic along Lexington Parkway N has declined over the last twenty year, however, to account for potential increases in traffic due to redevelopment in the area, growth in background traffic at an annual rate of 0.5% was accounted for in the analysis.

Results of the operational analyses indicate that under the 2023 and 2023 Build scenarios, all study area intersection will operate acceptably with essentially no change in vehicle delay or vehicle queueing. It is noted, the Lexington Parkway N north approach to the University Avenue W intersection has and will continue to have long vehicle queues associated with longer cycle lengths during LRT transit operation.

The Lexington Parkway Apartments development is a Transit Oriented Development consistent with the City's long range goals to provide a more walkable and connected community. It will have a negligible impact to the vehicle traffic operations of the surrounding roadway network. Further, with all the bicycle, pedestrian and transit opportunities present in and around the site, vehicular trip generation will remain low.

City of Saint Paul – Department of Safety and Inspections
Site Plan Review – Preliminary Staff Report
Date of Report: Dec 7, 2020
Address Location: 411 – 417 Lexington Pkwy N (current addresses)
Project: Lexington Station Apartments

SAINT PAUL
MINNESOTA

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Alatus Development LLC
IDS Center, 80 S 8th St,
Suite 4155
Minneapolis, MN 55402

Michael Kuntz
DJR Architecture
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Minneapolis, MN 55401

PJ Disch
Loucks
7200 Hemlock Lane,
Suite 300
Maple Grove, MN 55396

On December 1, 2020, you met with City staff to discuss the site plan for the Lexington Station Apartments project including a 6-story, mixed-use development with 285 residential units, 3,300 square foot commercial tenant space, 139 at-grade structured parking spaces, stormwater management, and landscaping. The comments from that meeting are summarized below.

1. **Site Plan Approval Process**
   a) Provide a pdf version of the updated Site Plan package based on the comments summarized in this letter for review by the Site Plan Review Committee.
   b) Site Plan Review is a function delegated by the St Paul Planning Commission to City staff, however, a Site Plan may be referred to Planning Commission for public hearing. The Planning Commission voted at its Dec 4, 2020, meeting to bring this Site Plan application forward for a public hearing at a Zoning Committee meeting and determination by the Planning Commission.
   c) For this project the overall Site Plan will receive a public hearing at the Zoning Committee of the Planning Commission. The public hearing date is to be determined based on formal Application date and completeness of the site plan package. The Planning Commission shall determine whether the submitted site plan is approved or denied per the findings in Leg. Code Sec. 61.402. - Site plan review by the planning commission (c) site plan review and approval.
   d) Planning Commission approval of the Site Plan must be obtained before staff can sign-off on the Site Plan.
   e) A Final Site Plan decision by the Planning Commission may be appealed within ten days after the date of the decision per Leg. Code Sec. 61.702 – Appeals to city council.
   f) Per Minnesota State Statute 326, the final plans submitted shall be signed by the appropriate licensed Professional, i.e. PE, LA, RLS, etc., responsible for plan development.
   g) Building permits will not be issued until the Site Plan has final approval.

2. **Zoning**
   Reviewer: Ashley Skarda/651-266-9013 ashley.skarda@ci.stpaul.mn.us
   Reviewer: Tia Anderson/651-266-9086 tia.anderson@ci.stpaul.mn.us
   Comments:
   a) The proposed use of the property as a Mixed-Use development is permitted at this location in a T4 Traditional Neighborhood Zoning District.
   b) Provide proof of receipt from Ramsey County of filing the parcel combination for 411 and 417 Lexington Pkwy N. See attached Request for Combination of Contiguous Properties form.
   c) *Update the Site Plan with dimensions of proposed setbacks for all sides and Floor Area Ratio*. In T4 Zoning District, the density and dimensional standards for a Mixed-Use building are:
      - For a parcel in a Light-Rail Station Area greater than 25,000 square feet, the FAR is a minimum 1.0. There is no maximum FAR.
      - 75' maximum height; the proposed building is within the height limit measured from average existing grade to the top of the roof deck for flat roofs. Structures may exceed this 75' height limit if stepped back from side and rear property lines a distance equal to the additional height or with a Conditional Use Permit. Structures shall be stepped back one foot from all setback lines for every 2½ feet of height over 75 feet.

- 0' minimum – 10' maximum front setback. Setbacks are measured from the property line to the outermost portion of the building façade, including balconies.
- 6' minimum side and rear setback if walls of structures facing interior lot lines contain windows or other openings or when a nonresidential use adjoins a side yard of a residential property.
- The setback shall be a minimum of 13 feet from the centerline of an adjoining alley.

d) The *Lexington Station Area Plan* calls for enhanced pedestrian zone; based on discussions with Parks, Public Works, Planning, and Ramsey Co, a 12' concrete sidewalk (10' walk surface plus 2' clear zone) and the wide boulevard was determined to meet the pedestrian area requirement.

e) In a Traditional Neighborhood Zoning District, when more than 50% of both the building and the parcel are within one-quarter mile of University Avenue, then no off-street parking is required. The proposed 139 structured parking spaces, well below the maximum for the use in this location.

f) A Travel Demand Management Plan is required for any development or redevelopment, including phased construction, providing 100 or more accessory off-street parking spaces.
   - The TDMP is intended to implement comprehensive plan policies calling for balance and choice in transportation options in order to reduce motor vehicle travel and thus traffic congestion in the city, enhance the efficiency of transportation facilities and infrastructure, improve air quality, conserve energy and enhance productivity.
   - The TDMP is under review by Move MN, the City's designated Transportation Management Organization.

g) *Update the Site Plan to indicate typical parking space dimensions and maneuvering lane widths* per Leg. Code Sec. 63.305. – Minimum layout dimensions and Sec. 63.308. – Maneuvering lanes.

h) *Update the Site Plan with a sign detail for the ADA spaces.* Parking spaces and passenger loading zones for persons with disabilities shall be designed in accordance with the provisions of the Accessibility Guidelines for Buildings and Facilities of the Americans with Disabilities Act (ADA).

i) *Update the Site Plan to indicate any compact parking spaces and if so, include a sign detail for compact parking spaces.* Accessory parking facilities may designate up to 50% of the spaces for compact cars only, in which case, the minimum layout dimensions may be reduced to 8' in width and 16' in length. Compact spaces shall be designated by signs with a minimum of one sign per every four compact spaces.

j) *Update the site plan to indicate location of any exterior bicycle parking and provide a bike rack detail.* Bicycle parking for 285 bikes is proposed. Bicycle parking shall be provided in a convenient, safe, and secure location according to the following:
   - For dwelling units, a minimum of one secure bicycle parking space shall be provided for every 14 dwelling units.
   - For commercial uses, a minimum of one secure bicycle parking space shall be provided for every 20 vehicle parking spaces.

k) *Provide a narrative of the proposed trash and recycling location and operation*. At the December 1, 2020, Site Plan Review Committee preliminary meeting, the project team indicated that trash and recycling would be stored internally and picked-up outside the building, and further detail on the operations is forthcoming. If housed externally, garbage dumpsters and trash containers shall be located to the rear of the principal building and enclosed by a visual screen.

l) *Update the narrative* to include details on the use of the existing Wilder Center parking ramp and the added pedestrian connection between the Wilder ramp and the Lexington Station Apartments.

3. **Building Design Standards**

a) The project shall comply with building design standards per Leg. Code Sec. 63.110:
   - A primary entrance of principal structures shall be located within the front third of the structure; be delineated with elements such as roof overhangs, recessed entries, landscaping, or similar design features; and have a direct pedestrian connection to the street.
   - Building materials and architectural treatments used on sides of buildings facing an abutting public street should be similar to those used on principal facades.
   - For principal buildings, above grade window and door openings shall comprise at least 15% of the total area of exterior walls facing a public street or sidewalk.
   - The visual impact of rooftop equipment shall be reduced through such means as location, screening, or integration into the roof design. Screening shall be of durable, permanent

materials that are compatible with the primary building materials. Exterior mechanical equipment such as ductwork shall not be located on primary building facades.

b) Developments within traditional neighborhood districts shall be consistent with the applicable design standards unless the applicant can demonstrate that there are circumstances unique to the property that make compliance impractical or unreasonable. The project shall comply with Traditional Neighborhood design standards per Leg. Code Sec. 66.343. including:
   - Transitions to lower-density neighborhoods. Transitions in density or intensity shall be managed through careful attention to building height, scale, massing and solar exposure.
   - Building facade articulation. The bottom 25' of buildings shall include elements that relate to the human scale. These should include doors and windows, texture, projections, awnings and canopies, ornament, etc.
   - *Update the site plan to include primary entrance for the commercial tenant on Lexington Pkwy.* Entrance location. There shall be a primary pedestrian building entrance on all arterial or collector streets. In multi-tenant buildings, any ground floor use with street frontage shall have an entrance facing the street.
   - *Provide the percentage of window and door openings on the ground floor on the east architectural elevation (Lexington Pkwy).* Door and window openings – minimum and character. For new commercial buildings, windows and doors or openings shall comprise at least 50% of the length and at least 30% of the area of the ground floor along arterial and collector street facades.
     - Windows shall be designed with punched and recessed openings, in order to create a strong rhythm of light and shadow.
     - Glass on windows and doors shall be clear or slightly tinted, and allow views into and out of the interior.
     - Window shape, size and patterns shall emphasize the intended organization of the facade and the definition of the building.
   - Materials and detailing – All building facades visible from a public street or walkway shall employ materials and design features similar to those of the front facade.
   - Parking location and design. Off-street parking shall be provided within a principal structure, underground, or to the rear of buildings to the greatest extent possible. Vehicular entrances to structured parking shall be minimized so that they do not dominate the street frontage of the building.
   - Lighting shall be pedestrian-scale. Light standards shall be no more than 16' in height along interior sidewalks and walkways, and have a downcast glow.

4. **Lighting and Landscaping for the Site**
   a) Exterior lighting shall meet Zoning Code Sec. 63.116. - Exterior lighting.
      - All outdoor lighting shall be shielded to reduce glare and shall be so arranged as to reflect lights away from all adjacent residential districts or adjacent residences in such a way as not to exceed three (3) footcandles measured at the residence district boundary.
      - All lighting in all districts used for the external illumination of buildings shall be placed and shielded so as not to interfere with the vision of persons on adjacent highways or adjacent property.
   b) All required yards and any underdeveloped space shall be landscaped using materials such as trees, shrubs, sod, groundcover plants, or stormwater landscaping.

5. **Signs**
   Reviewer: David Eide/651-266-9013 david.eide@ci.stpaul.mn.us
   Comments:
   a) Multi-use developments require a Master Sign Plan as a means to ensure adequate signage for tenants.
   b) Business signs require a separate review and Sign Permit from the Department of Safety and Inspections. Site plan approval does not constitute approval of signs shown on the site plan.

6. **Planning**
   Reviewer: Kady Dadlez/651-266-6619 kady.dadlez@ci.stpaul.mn.us
   Comments:
   a) The proposed mixed-use project is consistent with the 2040 Saint Paul Comprehensive Plan (2020), the Lexington Station Area Plan (2008), and Union Park Community Plan (2016). (see attached analysis)
   b) Generally, the comprehensive plan encourages transit supportive density and supports growth and development of new housing, particularly in areas identified as Mixed Use, Urban Neighborhoods and/or in areas with the highest existing or planned transit capacity, to meet market demand for living in walkable, transit-accessible, urban neighborhoods. The plan also supports increases in density on valuable urban land and calls for high-quality urban design that supports pedestrian friendliness and a healthy environment, and enhances the public realm.

7. **Parkland Dedication**
   As a part of this project, the City requires payment of a Parkland Dedication fee (in lieu of the property owner needing to dedicate a portion of the property as park land). The fee collected is used by the City for acquiring park land or other park capital improvements in the area.

   Staff estimates a dedication fee of $89,472 plus an $102 administrative fee. The fee is calculated based on the number of residential units and commercial area, previous land use, and capped at 4.5% of the county assessor's estimated market value of the land. Payment is included with building and inspection fees when the building permit is issued.

8. **Public Works Records and Mapping**
   Contact Number: 651-266-6150
   Comments:
   a) Continue to use the 411 Lexington Parkway North address for the Apartments.
   b) We suggest the address to use for the Commercial tenant space is 435 Lexington Avenue North. Please contact the 'Maps and Records' office regarding the Primary Active address that is to be issued and assigned to the Commercial tenant space.
   c) Contact the 'Maps and Records' office with the Secondary Addresses to use for the apartment living units to be attached with the 411 Lexington Parkway North Primary Active Address (i.e. Apt 101, Apt 202, Unit 303, Unit 404, etc.).

9. **Public Works Transportation Planning**
   Reviewer: Colleen Paavola/651-266-6104 colleen.paavola@ci.stpaul.mn.us
   Comments:
   a) Please be advised that a Temporary Pedestrian Access Route (TPAR) and/or a Temporary Traffic Control (TTC) plan may be required as part of the Right-of-Way (ROW) permitting process. Said TTC or TPAR plans must be approved by the City prior to the ROW Permitting office issuing a permit(s).
   b) Per Minnesota State Statute 326, the final plans submitted must be signed by the appropriate licensed Professional, i.e. PE, LA, PLS, etc., responsible for plan development.
   c) Please change the treatment for the reconstruction of the alley from concrete to bituminous on all applicable plan sheets; this would be consistent with other City alleys for maintenance purposes.
   d) Please update note #2 and note #9 under CITY OF ST. PAUL NOTES on sheet C0-1 with the following contact: Traffic Signal/Street Lighting Supervisor Mike Lusian 651-266-9780 mike.lusian@ci.stpaul.mn.us.
   e) Please update note #6 under CITY OF ST. PAUL NOTES on sheet C0-1 with the following Inspector name and number: Jennifer Ziemer, 651-485-4263
   f) Please REPLACE note #8 under CITY OF ST. PAUL NOTES on sheet C0-1 with the following: NO PRIVATE FACILITIES IN THE RIGHT OF WAY: The developer is strictly prohibited from installing private electrical wiring, conduit, receptacles and/or lighting in the City's Right of Way. This includes stubbing conduit or cable into the public right of way to accommodate utility feeds to the site. Coordinate with each utility prior to construction to determine feed points into the property. Utilities are

responsible for securing excavation permits to run their service into a site, and (where required) submitting plans for review by the Public Works Utility Review Committee.
The Contractor shall contact Mike Lusian, General Foreman, Lighting - Signal Maintenance, (651-266-9780), if removal or relocation of existing facilities is required or in the event of damage to the lighting or signal utilities. The Contractor shall assume responsibility (and related costs) for any damage or relocations.

10. **Ramsey County**
Reviewer: Brad Estochen/651-266-7114 bradley.estochen@co.ramsey.mn.us
Comments:
A copy of the Site Plan was provided to Ramsey County for review. Staff reserves the right to make additional comments and conditions based on their feedback.

11. **Metro Transit**
Reviewer: Berry Farrington berry.farrington@metrotransit.org
Comments:
Contact Greg Tuveson (612-349-5407 / greg.tuveson@metrotransit.org), Metro Transit Street Operations, if construction of your project requires temporary lane or street closures.

12. **Move Minnesota**
Reviewer: Thresa Nelson/651-789-1402 theresan@movemn.org
Reviewer: Erik Thompson/651-789-1419 erikt@movemn.org
Comments:
a) A Travel Demand Management Plan is required for any development or redevelopment, including phased construction, providing 100 or more accessory off-street parking spaces. The TDMP is reviewed by Move MN on behalf of the City.
b) Move Minnesota is excited to work with the property management team on achieving the mode split goals of 40/40/20 for this development. Please consider providing Metro Transit passes in all welcome packets for new residents and promote the various transportation options in marketing materials.
c) Providing a bike room with amble racks and a bike fix-it station will create a bicycle friendly living option for residents. Please clarify how the bike racks in the bike room will be accounted for in the budget.
d) It's unclear where the bike route is located on the development site and how it will connect with the existing bike lane on Griggs Street, please clarify.
e) Please indicate the number of exterior bike racks and location, as mentioned during the preliminary site plan review meeting, and add cost for exterior bike racks to line-item budget.

13. **Public Works Traffic Engineering**
Reviewer: Elizabeth Stiffler/651-266-6210 elizabeth.stiffler@ci.stpaul.mn.us
Reviewer: Mike Klobucar/651-266-6208 mike.klobucar@ci.stpaul.mn.us
Comments:
a) Please indicate the sign type on existing signs and light poles. Indicate impacts, if any.
b) The north site access from Lexington should be treated as a drive way. Modify the plan to remove the ADA ramp and carry the 12' path straight through the driveway.
c) Update the plan to include ADA ramps on the west side of the intersection of Lexington/Fuller on both the north and south sides (it is understood that there are currently no ramps on the east side). Both north and south outwalks between the mainline sidewalk and ped ramp shall be typical 6' width.
d) We have concerns about how traffic will access the building. Indicate on plans how all types of vehicles that will access the site with turning movements.
e) An explanation of how moving trucks and garbage trucks access the site should be provided.
f) The driveway/access at the SE corner of the building needs to be redesigned so that vehicles don't need to use the alley, adjacent property or public path to maneuver. Show turning movements for largest vehicles to show vehicles stay within property limits.
g) Traffic study has been provided and is currently under review. Study should include analysis at each access to property, adjacent intersections and may need an increase in scope. Study should

include queuing analysis of main entrance/drop off area. Study should include all modes. Revisions should be emailed directly to both Mike and Elizabeth to ensure receipt for quickest review and turnaround.

h) Pedestrian access improvements such as median islands/extensions or other pedestrian treatments may be required depending on increased level of proposed activity at the intersection at Lexington/Fuller.
i) We have concerns about possible congestion/back-ups on southbound Lexington from pick up/drop off. How will these be discouraged? Update the Narrative accordingly.

14. **Public Works Sidewalks and Construction**
Reviewer: Ryan Lowry/651-266-6147 ryan.lowry@ci.stpaul.mn.us
Comments:

a) Contractor is responsible for damage to the mainline sidewalk, curb, drive access and boulevard landscaping cause during the construction. Contractor advised to document pre-existing condition of the right of way prior to commencement of the construction.
b) No ped ramp installation for driveway crossings. Driveway at NE corner to install full width crossing at 12' sidewalk width. Curb on north side of drive removed and replaced as a driveway crossing. Concrete installed up to the East/West sidewalk on the north side of the driveway across from Dairy Queen. Remove jog in the sidewalk to accommodate the existing sidewalk crossing in the driveway.
c) Add pedestrian crossings at Fuller Ave. Per Traffic Engineering recommendations.
d) Alley construction to be bituminous section and center draining, city standards.
e) Replace MnDOT Pedestrian Curb Ramp Details with the 2017 version, rather than 2014.
f) Match existing roadway sections for restoration. Minimum 2' cut into asphalt for curb removals or utility cuts.
g) Lexington curb style is Modified B-612, city standard plate 3106A.
h) Driveways installed per city standard plate 1206D.
i) Standard B-612 detail acceptable in place of city standard plate 3100C where applicable. Match existing roadway curb styles using standard plate 3100C when Modified B612 is not the existing style.
j) Sidewalk permit construction is installed as follows:
    - Mainline sidewalk or catwalks/outwalks installed at 4" concrete thickness with 6" agg. base
    - Ped. Ramps, curb ramps, sidewalk abutting back of curb, and residential driveways installed at 6" concrete thickness with 6" agg. base.
    - Commercial driveways, alley driveways, and sidewalk expecting traffic per turning movements or traffic studies are to be installed at 8" thickness with 6" agg. base.
    - Alley bituminous installed at 3" thickness with 6" agg. base. Alleys are typically center draining through the apron unless circumstances do not allow.
    - Curb work and cuts into alleys require a minimum of 2' saw cut into the asphalt to ensure proper installation of abutting construction and proper compaction of asphalt road/alley section.

15. **Public Works Sewers**
Reviewer: Anca Sima/651-266-6237 anca.sima@ci.stpaul.mn.us
Comments:

a) proposed rate should be less or equal with as-built. 24" storm pipe at the main? now it is only 12", so leave it 12" and the gate (see permit a111687), in this way the rate will not increase.
b) Specify the EOF should be at least 1 ft. lower than FFE. The surface of pond: 2 feet.
c) If the existing manhole for the proposed service connection is a brick construction, reconstruction of the manhole access may be required, please add the attached detail (2322b) for manhole reconstruction.
d) If the storm pipe is less of 5" of building foundation, than is under the pluming jurisdiction. You have to provide 5 pound air test.
e) Provide SAC determination in order to verify the sewer capacity for the development..
f) 411& 417 Lexington Pkwy N parcels shall be combined.
g) show the existing underground storage on demo, grading & utility.
h) same swm, so provide agreement between all parties and private drainage easements.

i) Update the Site Plan with the following notes:
   - If the construction will require temporary installation of bollards (standpipes) in the ROW, apply for a ROW encroachment.
   - SEWER REPAIR PERMIT: Plumbing Contractor to obtain "Repair Permits" from Public Works for proposed modification to the existing storm sewer connections. Call St Paul PW permit desk (651-266-6234) for information on obtaining this permit.
   - SEWER REMOVAL/ABANDONMENT PERMIT for a82791, a82790,a95706. Plumbing Contractor to obtain "Removal Permits" from Public Works to cut off existing sewer connections services to the property. Call St Paul PW permit desk (651-266-6234) for information on obtaining this permit.
   - SEWER CONNECTION PERMIT: License house drain contractor to obtain (Sewer Connection Permit) to construct new sanitary and storm connection in street from main to the property. Call St Paul PW permit desk (651-266-6234) for information on obtaining this permit.

16. **Water Quality/Erosion Control**
    Reviewer: Wes Saunders-Pearce/651-266-9112 wes.saunders-pearce@ci.stpaul.mn.us
    Reviewer: Jacqueline Cassman/651-266-9083 jacqueline.cassman@ci.stpaul.mn.us
    Comments:
    No comments. Erosion control plan is satisfactory as shown.

17. **Water Utility**
18. Reviewer: Amanda Leier/651-266-6276 amanda.leier@ci.stpaul.mn.us
    Reviewer: Jeff Murphy/ 651-266-6213 jeffrey.murphy@ci.stpaul.mn.us
    Comments:
    a) The two (2) services being proposed will need to be tapped off of the 16" CI watermain in Lexington Pkwy N, please update plans accordingly.
    b) To note: The service being proposed being tapped off of is a 1.5" CP service, not a 15" service.
    c) Please contact Graeme Chapel at 651-266-6882, at your earliest convenience regarding undermining of existing utilities and what SPRWS will require as done on a case-by-case basis.
    d) Show existing water services on Plan Sheet C1-1 to be cut off at the water main.
       - 413 N Lexington Pkwy – 1.5" CP – 33 N S FULLER-28 E W LINE WALK
    e) Provide profile view of all proposed utility crossings.
    f) The following work shall be performed by SPRWS on an actual cost basis. An estimate will be provided and payment in the amount of the estimate must be received before the work can be scheduled. Work of this type is currently being scheduled 4 to 6 weeks after payment and required signatures have been received:
       - Pipework within right of way for 8" DI.
       - Pipework within right of way for 6" AF.
       - Cut off of existing unused water services at the main.
       - Inspection of water facility work performed by owner's contractor.
    g) Plumbing permit applications to be made with SPRWS at 1900 Rice Street, Saint Paul, MN.
    h) Before construction of a new water service can be scheduled, SPRWS must receive a Water Service Contract signed by the owner and all required payments.
    i) Provide completed project data sheets to determine service & meter sizing.
    j) Furnish one set of interior fire suppression mechanical plans for review and approval by SPRWS plumbing inspection unit.
    k) Furnish one set of revised site plans for review. Following approval by SPRWS, furnish one set of approved plans.
    l) Provide the following on PLAN SHEET C4-1 under NOTES:
       - Water services to be installed according to SPRWS "Standards for the Installation of Water Mains.
       - A four-sided trench box is required on all excavations deeper than 5 feet where underground work or inspection is to be performed by SPRWS. For all wet taps to be performed by SPRWS, a minimum trench box size of 8 feet high x 8 feet wide x 10 feet long is required. Ladders are

required and must extend 3 feet above the surface of the trench. Sidewalks, pavements, ducts and appurtenant structures shall not be undermined unless a support system or another method of protection is provided. Trenches in excess of 20 feet in depth must be signed off by a registered professional engineer. Excavated material must be kept a minimum of 2 feet from the edge of the trench.

- Service connections shall be installed with 8 feet of cover as per established grade from the main to the property line or, if applicable, to the utility easement line. When solid rock conditions are encountered water services may be installed with 6.5 feet of cover. At this depth, the need for insulation will be determined by SPRWS Inspectors.
- All pipe 2" and smaller must be Type K copper. All pipe 4" and larger must be ductile iron.
- Pipe material for 8" Ductile Iron Pipe must be Class 52, Pipe material for 6" and 4" Ductile Iron Pipe must be Class 53. The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The interior cement mortar lining shall be applied without asphalt seal coat.
- Pipe must be wrapped in V-Bio Polywrap encasement.
- Maintain 3 feet vertical separation between water and sewer pipes or a 12 inch separation with 4 inch high density insulation per SPRWS Standard Plate D-10 for typical water main offsets.
- Refer to SPRWS "Standards for the Installation of Water Mains" Standard Plate D-11 for restrained pipe requirement.
- All water service valve boxes within construction area must be exposed and brought to grade upon completion of construction.
- All pipe work inside of property to be performed by a plumber licensed by the State of Minnesota and Certified by the City of Saint Paul. SPRWS requires separate outside and inside plumbing permits for each new water service.
- All unused existing water services to be cut off by SPRWS. Excavation and restoration by owner's contractor. New water services will not be turned on until required cutoffs have been performed.
- Water facility pipework within right of way to be installed by SPRWS. Excavation and restoration by owner's contractor.
- The contractor providing excavation is responsible for obtaining all excavation and obstruction permits required by any governing authority.

19. **Fire**

Reviewer: Ann Blaser/651-266-9140 ann.blaser@ci.stpaul.mn.us

Comments:

a) Visibility of the Fire Department connection must be maintained on the address side of the building in a visible, accessible location at all times without obstruction by fences, bushes, trees, walls, or other objects for a minimum of 3 feet to the front and each side. This requirement is applicable for the duration of the construction time as well.

b) A metal sign or collar with raised letters at least 1 inch in size must be mounted on all Fire Department connections serving fire sprinklers, standpipes, or fire pump connections. Such signs shall read AUTOMATIC SPRINKLERS or STANDPIPES or TEST CONNECTION or a combination thereof as applicable.

c) Automatic Fire Sprinkler System Required. Plans and permits required by licensed contractor. Flow test is required to determine adequacy of water service for proposed fire suppression system. The fire prevention section of the Dept. of Safety and Inspections reviews sprinkler plans, issues permits and does the necessary inspections of the installation. Contact Jeff Hemenway 651-266-8952 with questions on obtaining this permit and the procedure for arranging a time to perform this test.

d) Once construction passes 40 vertical feet, a standpipe (temporary or permanent) is required to be in place.

e) The size of the fire water line is not reviewed with site plan. It will be reviewed with the fire sprinkler permit submittal.

f) Update the Utility Plan with the following notes:

- Contractor to maintain access to the fire department connection for fire department personnel at all times during the construction period.

20. **City Forestry**
Reviewer: Zach Jorgensen/651-632-2437 zach.jorgensen@ci.stpaul.mn.us
Comments:
a) Sheet C1-1:
   - The existing street trees on Lexington Parkway are not shown. Please update the plan to show the location of the existing trees and indicate their removal.
   - Please provide a copy of the survey indicating the location and size of the existing trees.
b) Sheet L1-1:
   - Standard tree spacing in the right of way is 35'-40' oc. Please reduce tree spacing and add two additional street trees on Lexington Parkway.
   - Trees should be centered in the boulevard area or set slightly back from center. Please provide a minimum of five feet between the street trees and the bike/walkway.
   - Please change the tree type for the proposed street trees on Lexington to one or more of the following: Bicolor oak, hackberry, 'Espresso' Kentucky coffeetree, New Harmony or Triumph elm.

21. **Parks and Recreation**
Reviewer: Paul Sawyer/651-266-6417 paul.sawyer@ci.stpaul.mn.us
Comments:
a) Sidewalk width and placement are good.
b) Provide ADA-compliant pedestrian ramps at quadrants of intersection with Fuller Ave per PW Traffic Engineering specifications.
c) Do not pave Lexington Ave right of way except for pedestrian facilities.
d) Ensure no encroachments in Lexington Ave right of way above, below, and at grade, including no doors swinging into right of way.
e) Update landscape plan to remove shrubs and ornamental grasses from Lexington Ave right of way. Boulevard should contain only sod and overstory trees.

22. **MPCA Permit**
This project will be affecting more than one acre. A General Storm Water Permit for Construction Activity from the Minnesota Pollution Control Agency is required. No land disturbance activity for the project is allowed, until this permit is obtained and is in addition to any City or watershed district permits required. Call the Brian Green MPCA Statewide Compliance Coordinator for the Storm water Program MPCA at 507-206-2610 if you have questions about the process for obtaining this permit.

23. **Capitol Region Watershed District**
Reviewer: Forrest Kelley/651-644-8888 forrest@capitolregionwd.org
Comments:
a) The project area is an acre or more in size and will require a permit from the Capitol Region Watershed District. A copy of the watershed permit or other written authorization from the district must be provided before the site plan will be approved or any permits are issued, allowing construction to proceed.
b) CRWD permit application #20-036 has been received as of 11/23/2020 and is currently under review. Comments will follow separately.

24. **Plumbing**
Reviewer: Rick Jacobs/651-266-9051 rick.jacobs@ci.stpaul.mn.us
Comments:
a) Contact Saint Paul Regional Water Services (SPRWS) for questions, permits, fees, inspections, specifications, plans, or information that may be required for the water service and/or the water meter.

b) Sanitary and/or storm sewer service passing within 10 feet of the building are governed by the MN Plumbing Code. Specification for pipe material selection and notes for required air test of the piping, compliant with MN State Plumbing Code 4714 Section 1109.0, must be shown on the plan. This system must be reviewed and approved by Rick Jacobs, Senior Plumbing Inspector (651-266-9051) to ensure that it meets Plumbing Code standards.
c) Contact the City of Saint Paul Department of Public Works Sewer Division for questions, permits, fees, inspections, specifications, plans, or information that may be required for sewer and storm piping work performed outside the building, including retention systems located outside the building.

d) Update the Site Plan with the following:
   - Show the location of the oil & flammable waste interceptor and all underground tanks.
   - Indicate provisions to prevent piping from freezing.
   - Provide a roof plan showing the total square footage of all roof areas and the square footage each roof drain will serve including the 6th floor terrasse's and 2nd floor "courtyard" areas.
   - It is suggested a floor drain be installed in the "Bike Space" and "Dog Wash" areas.
   - All primary roof drains shall be connected to the storm sewer. MPC 4714.1101.1.
   - Secondary Roof Drainage shall drain to an approved place of disposal in the form of Secondary Roof Drains installed per MPC 4714.1101 & 1102, and Minnesota State Building Code 1503.4 1-5. Secondary roof drainage must discharge onto permeable soils and cannot drain onto the sidewalk. MPC 4714.1101.1. Both primary and secondary roof drainage systems must meet this requirement. Minnesota has specific requirements to address seasonal conditions of freeze and thaw when the discharge from roof drains could create unsafe, icy conditions on sidewalks. It is suggested that a proper point of discharge that can be approved by the Authority Having Jurisdiction for secondary roof drainage is in the form of secondary roof drains piped internally, down to within 18 inches of grade, through the outside wall, onto a splash block installed per MPC 1101.5.3, and laid over permeable soils of an adequate amount where saturation of the soil will not occur, and they will not cause a hazard or nuisance.

25. **Building Code Requirements**
Reviewer: James Williamette/651-266-9077 james.williamette@ci.stpaul.mn.us
Comments:
a) Contact Jim Williamette to schedule a preliminary building plan review and energy code discussion prior to submitting a building permit application.
b) This proposal will require a building permit to proceed. The building permit is issued only after all necessary city staff have approved and signed off on the proposed design. In addition to the building permit, separate permits are required for any plumbing, electrical and mechanical work, elevator installation and any fire sprinkler modifications. These permits must be obtained and the work performed by city licensed contractors in each of the respective trades.
c) One PDF and two sets of complete construction documents stamped by public works must be submitted with the building permit application to the DSI Main Office/ Permit Desk.
   - The construction documents shall include architectural, structural, mechanical, electrical and plumbing plans signed and stamped by design professionals registered in the State of Minnesota, The architect shall provide a complete code analysis and a color-coded exit plan showing all fire rated walls and shafts and include exit access and travel distances. The plans shall have the energy code noted on the plans along with the compliance path chosen. The submittal should include compliance documents detailing how the energy code requirements are met.
   - Plans must be dimensioned, drawn to scale and sufficiently detailed to denote the scope of work to be performed and the method of construction.
   - Mechanical ventilation plans will need to be prepared by a mechanical engineer, registered with the State of Minnesota. In some cases, a "Master in the Trade" may prepare plans. The ventilation contractor should contact our senior warm air inspector Gary Reinsberg (651-266-9064) or by e-mail at Gary.reinsberg@ci.stpaul.mn.us The Energy code and path must be noted on these plans also.

- The plumbing and electrical contractors for this project should contact our office if they have questions about whether engineered plans need to be submitted with their permit request. The senior plumbing inspector is Rick Jacobs at 651-266-9051 Rick.jacobs@ci.stpaul.mn.us and the senior electrical inspector is Dan Moynihan at 651-266-9036 Dan.monihan@ci.stpaul.mn.us

Note: **The building permit will not be issued until all signoffs are received** from Zoning, HVAC, Public Works, or other departments that are assigned to the project.

26. **Service Availability Charge (SAC)**
The proposed project will need a SAC determination before a building permit can be issued. You must submit a copy of the plans to the Metropolitan Council Environmental Services (MCES) for a SAC determination. Please see their website at https://metrocouncil.org for additional information. If MCES determines that a SAC fee is due, the City will collect that payment with the building permit fee.
SAC Questions and Determination Review Submittal Information email:
SACprogram@metc.state.mn.us or call 651-602-1770 to speak to a SAC representative.

Report Prepared By:

Tia Anderson
Principal City Planner

cc: File, Site Plan Review Staff, CRWD, MoveMN, Metro Transit, Ramsey Co

Lexington Station Site Plan Review - Comprehensive Plan Summary
December 29, 2020

The proposed mixed-use project is consistent with the 2040 Saint Paul Comprehensive Plan (2020), the Lexington Station Area Plan (2008), and Union Park Community Plan (2016). Generally, the comprehensive plan encourages transit supportive density and supports growth and development of new housing, particularly in areas identified as Mixed Use, Urban Neighborhoods and/or in areas with the highest existing or planned transit capacity, to meet market demand for living in walkable, transit-accessible, urban neighborhoods. The plan also supports increases in density on valuable urban land and calls for high-quality urban design that supports pedestrian friendliness and a healthy environment, and enhances the public realm.

2040 COMPREHENSIVE PLAN
The proposed mixed-use development is consistent with the 2040 Saint Paul Comprehensive Plan, including the Lexington Station Area Plan and the Union Park Community Plan. The 2040 Saint Paul Comprehensive Plan (2020) identifies the project site along the west side of Lexington Parkway as being in a mixed-use area and a neighborhood node. Mixed-use areas are primarily along thoroughfares well-served by transit. The main distinguishing characteristic is a balance of jobs and housing within walking distance of one another. Neighborhood nodes are compact, mixed-use areas that provide shops, services, neighborhood-scale civic and institutional uses, recreational facilities and employment close to residences. They may be neighborhood centers, transit station areas or urban villages, and have often developed adjacent to major intersections or at former street car stops. Neighborhood nodes serve a neighborhood's daily needs. Neighborhood Nodes are denser concentrations of development relative to the adjacent future land use categories. Land use goals in the 2040 plan include: economic and population growth focused around transit; neighborhood nodes that support daily needs within walking distance; equitably-distributed community amenities, access to employment and housing choice; and people-centered urban design.

Land use policies in the plan include:

City Wide
Policy LU-1. Encourage transit-supportive density and direct the majority of growth to areas with the highest existing or planned transit capacity. *The project site is in the Lexington Station Area where higher density is encouraged.*
Policy LU-9. Promote high-quality urban design that supports pedestrian friendliness and a healthy environment, and enhances the public realm. *The developer sited the building to hold the corners along Lexington Parkway and proposes an articulated building façade above the first floor to help break up its massing. Windows and door openings along Lexington Parkway enhance street level activation. Twelve-foot wide sidewalks along Lexington Parkway and the 15-foot wide landscaped boulevard between the sidewalk and roadway enhance pedestrian safety, friendliness, walkability.*
Policy LU-13. Support strategies, as context and technology allow, to improve off-street parking efficiency, such as shared parking agreements, district ramps, car sharing, electric vehicle charging and reduced parking overall. *The project plans to share parking with the Wilder Foundation in the ramp located just west of the development site to limit the amount of new parking that needs to be built.*
Policy LU-14. Reduce the amount of land devoted to off-street parking in order to use land more efficiently, accommodate increases in density on valuable urban land, and promote the use of transit and other non-car mobility modes. *The project increases density on the site, promotes use of transit, walking, and biking, and incorporates a reduced number of structured off-street parking spaces.*

Policy LU-18. Support facilities outside public rights-of-way to support pedestrian and bicycling activity, such as sidewalk access to building entrances, adequate lighting, trails and bicycle parking/storage. *The project plans to incorporate an enhanced bike-pedestrian path into the site design at the north end of the property and connectivity opportunities to Fuller Avenue and the surrounding neighborhood. To enhance safe crossing of the private road west of the site, an accessible pedestrian ramp is planned. This will be useful to residents of the project who park in the Wilder ramp, those accessing nearby businesses and transit to the north, and those accessing Midway Peace Park to the west.*

Mixed-Use

Policy LU-28. Support pedestrian-friendly streetscapes and visual interest through commercial building design. *The project sites the building to hold the corners along Lexington Parkway and proposes an articulated building façade to help break up its massing. Windows and door openings enhance street level activation. A primary pedestrian building entrance on Lexington Parkway is needed for the commercial space to meet traditional neighborhood design standard Sec. 66.343(b)(12). Twelve-foot wide sidewalks enhance pedestrian friendliness and walkability along Lexington Parkway and the 15-foot wide landscaped boulevard between the sidewalk and roadway enhance pedestrian safety, friendliness, walkability.*

Policy LU-29. Ensure that building massing, height, scale and design transition to those permitted in adjoining districts. *The alley along the southern border of the site allows for a transition in density between the development site and the single-family homes in a T3 zoning district. Lexington Parkway serves as a transition to the T2 multi-family uses on the east side of the street.*

Neighborhood Nodes

Policy LU-30. Focus growth at Neighborhood Nodes using the following principles: 1. Increase density toward the center of the node and transition in scale to surrounding land uses. 2. Prioritize pedestrian-friendly urban design and infrastructure that emphasizes pedestrian safety. 3. Cluster neighborhood amenities to create a vibrant critical mass. 4. Improve access to jobs by prioritizing development with high job density. *The increased density is located within the neighborhood node. The building's design takes into consideration the need for pedestrian friendly urban design and new sidewalks will enhance pedestrian comfort and safety. The site includes space for a commercial tenant and is within walking distance of amenities to satisfy many daily needs.*

Policy LU-31. Invest in Neighborhood Nodes to achieve development that enables people to meet their daily needs within walking distance and improves equitable access to amenities, retail and services. *The site includes space for a commercial tenant and is within walking distance of amenities to satisfy many daily needs.*

Housing policies include:

Policy H-16. Increase housing choice across the city to support economically diverse neighborhoods by pursuing policies and practices that maximize housing and locational choices for residents of all income levels. *The market-rate project offers a range of housing options. The developer notes that the project supports the desire of area stakeholders to see a wider range of rents within new, privately financed developments, including more units at deeper levels of affordability. This stretch of University Avenue has not seen the development of much market-rate housing, unlike sites west of Snelling Avenue. A mix of market-rate and subsidized housing is key to addressing Saint Paul's housing needs.*

Policy H-46. Support the development of new housing, particularly in areas identified as Mixed Use, Urban Neighborhoods, and/or in areas with the highest existing or planned transit service, to meet market demand for living in walkable, transit-accessible, urban neighborhoods. *The project site is in the Lexington Station Area, a Neighborhood Node, where higher density is encouraged.*

Transportation policies include:
Policy T-12. Minimize and consolidate driveway curb cuts as redevelopment opportunities arise for redevelopment sites that have sufficient existing access or can reasonably be accessed via side streets, alleys or shared driveways, especially in areas with anticipated high pedestrian activity or with adjacent planned bikeways. *Curb cuts are minimized with the project. No curb cuts along Lexington Parkway are planned. The development will have two curb cuts on the private road on the west side of the building, one for the commercial space and one for the apartments. A drop off/loading area is planned along the private road at the north end of the building. A garage entrance for move-ins and move-outs is planned for the southeast corner of the building, with access from the alley.*

LEXINGTON STATION AREA PLAN
The mixed-use development is consistent with the Lexington Station Area Plan (2008). The station area plan identifies a portion of the project site as being in an area identified as The Lexington Hub and an area identified as sensitive neighborhood infill. The Hub is an area where future redevelopment will strengthen the edges of the block and better define entrance to points for pedestrian and vehicles. The infill area calls for development to be sensitively designed to preserve light, views, and privacy in single family neighborhoods. The project site abuts commercial and institutional uses to the north, medium density residential uses to the west, a commercial use and single-family homes to the south, and commercial and medium density residential uses on the east side of Lexington Parkway. The project site is in the Union Park neighborhood and near the boundary with three other neighborhoods: Summit-University to the east; Frogtown to the northeast; and Hamline-Midway the northwest.

In terms of public realm, the station area plan calls for 14-foot sidewalks to be established within the mobility enhancement area, policies 3.1 and 5.2. The Mobility Enhancement Area is where a higher level of pedestrian activity is anticipated, and a high-quality pedestrian environment is key. *The proposed plans for the project include a 12-foot wide sidewalk along Lexington Parkway and a 7-foot wide sidewalk on private property along the private drive on the north side of the site. A 15-foot wide landscaped boulevard between the sidewalk and Lexington Parkway is planned, making for a very walkable and pedestrian friendly environment. Lexington Parkway is identified as a future trail by the Department of Parks and Recreation. There is adequate right of way to develop the trail adjacent to the site.*

In terms of built form, the station area plan states that all new development should promote transparency and activity at street level, policy 4.2.1. *Plans for the proposed project call for active amenity and commercial uses along Lexington Parkway with entrances along the parkway and along the private drive at the north end of the building. A continuous building façade is planned along Lexington Parkway. The S-shaped building above the first floor will help to break up massing of the structure along the frontage and provide for light and air to residential units. Balconies will help break up the massing as well.*

In terms of land use and development program, the station area plan calls for development of a true mixed-used corridor, noting that all transit-supportive uses should be permitted here, including medium to high density family residential, and commercial and retail uses, policy 4.2.2. *Plans for the proposed project include a six-story mixed-use building with 288 residential units, about 3,000 square feet of commercial space, and 1,500 square feet of rentable work suite space for tenants of the building.*

In terms of circulation, parking, and access, the station area plan calls for the urban grid pattern to be reestablished including an extension of Fuller Avenue west of Lexington Parkway, for large single parcels to be subdivided to create a more walkable environment of smaller-scaled streets and blocks, and for formalizing existing access routes to create a new pattern of streets and blocks, policy 4.1.3. In terms of movement and connections, the station area plan calls for strengthening Charles and Fuller as East-West bike routes and extending Fuller Avenue to the west, policy 5.1. *Plans for the proposed project do not include reestablishing the street grid, extending Fuller Avenue, subdividing* parcels, or formalizing existing access routes. *Nor do the proposed plans include extending Fuller to the west or a bike route. The City has not taken steps to preserve the right of way needed for a Fuller Avenue extension since the station area plan was adopted in 2008. Until the City secures the necessary resources for desired public infrastructure, the private property may be used for any legal use permitted under the current zoning classification, provided that the proposed use meets all applicable conditions and/or standards.*

The project site's location within the station area and the mobility enhancement area makes walkability in and around the site a high priority. Creation of a more cohesive and walkable neighborhood is key, which is why the plan calls for wide sidewalks. *Twelve-foot wide sidewalks along Lexington Parkway and the 15-foot wide landscaped boulevard between the sidewalk and roadway enhance pedestrian safety, friendliness, walkability. The project plans to incorporate an enhanced bike-pedestrian path into the site design at the north end of the property and connectivity opportunities to Fuller Avenue and the surrounding neighborhood. To enhance safe crossing of the private road west side of the site, an accessible pedestrian ramp is planned. This will be useful to residents of the project who park in the Wilder ramp, those accessing nearby businesses and transit to the north, and those accessing Midway Peace Park, about two blocks to the west. Midway Peace Park, a new City park, is the only neighborhood park that will be accessible to residents of the project without the need to cross a major thoroughfare.*

UNION PARK COMMUNITY PLAN

The proposed mixed-use development is consistent with the Union Park Community Plan (2016), which states the neighborhood's goals as the preservation of desirable assets and neighborhood character as well as development to meet present and future needs.

Land Use and Housing Strategies include:

LU1. Support land uses that preserve Union Park as a connected, walkable, mixed-use, sustainable neighborhood with a pedestrian-oriented, human-scale streetscape.

LU2.3. Ensure that new development fits within the character and scale of adjacent neighborhoods.

LU3.2. Explore opportunities to increase density levels and promote new development along key corridors that support transit-oriented development.

H1.1. Support multi-unit mixed-use development in mixed- use corridors that can accommodate higher density levels, while minimizing impacts on adjacent lower density areas, and discourage multi-unit housing and retail uses that are incompatible with single-family residential areas.

H1.2. Support efforts to develop a wide range of housing affordability levels, promoting more affordable housing along major transit routes including Snelling Bus Rapid Transit and the Green Line Light Rail line.

H1.3. Support housing development designed to promote pedestrian, bicycle, and public transit activity.

City of Saint Paul – Department of Safety and Inspections
Site Plan Review – Preliminary Staff Report
Date of Report: Dec 7, 2020
Address Location: 411 – 417 Lexington Pkwy N (current addresses)
Project: Lexington Station Apartments

SAINT PAUL
MINNESOTA

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Alatus Development LLC
IDS Center, 80 S 8th St,
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Minneapolis, MN 55402

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DJR Architecture
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Minneapolis, MN 55401

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Loucks
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Maple Grove, MN 55396

On December 1, 2020, you met with City staff to discuss the site plan for the Lexington Station Apartments project including a 6-story, mixed-use development with 285 residential units, 3,300 square foot commercial tenant space, 139 at-grade structured parking spaces, stormwater management, and landscaping. The comments from that meeting are summarized below.

1. **Site Plan Approval Process**
   a) Provide a pdf version of the updated Site Plan package based on the comments summarized in this letter for review by the Site Plan Review Committee. Response: Noted
   b) Site Plan Review is a function delegated by the St Paul Planning Commission to City staff, however, a Site Plan may be referred to Planning Commission for public hearing. The Planning Commission voted at its Dec 4, 2020, meeting to bring this Site Plan application forward for a public hearing at a Zoning Committee meeting and determination by the Planning Commission. Response: Noted
   c) For this project the overall Site Plan will receive a public hearing at the Zoning Committee of the Planning Commission. The public hearing date is to be determined based on formal Application date and completeness of the site plan package. The Planning Commission shall determine whether the submitted site plan is approved or denied per the findings in Leg. Code Sec. 61.402. - Site plan review by the planning commission (c) site plan review and approval. Response: Noted
   d) Planning Commission approval of the Site Plan must be obtained before staff can sign-off on the Site Plan. Response: Noted
   e) A Final Site Plan decision by the Planning Commission may be appealed within ten days after the date of the decision per Leg. Code Sec. 61.702 – Appeals to city council. Response: Noted
   f) Per Minnesota State Statute 326, the final plans submitted shall be signed by the appropriate licensed Professional, i.e. PE, LA, RLS, etc., responsible for plan development. Response: Noted
   g) Building permits will not be issued until the Site Plan has final approval. Response: Noted

2. **Zoning**
   Reviewer: Ashley Skarda/651-266-9013 ashley.skarda@ci.stpaul.mn.us
   Reviewer: Tia Anderson/651-266-9086 tia.anderson@ci.stpaul.mn.us
   Comments:
   a) The proposed use of the property as a Mixed-Use development is permitted at this location in a T4 Traditional Neighborhood Zoning District. Response: Noted
   b) Provide proof of receipt from Ramsey County of filing the parcel combination for 411 and 417 Lexington Pkwy N. See attached Request for Combination of Contiguous Properties form. Response: Will provide proof upon receipt
   c) *Update the Site Plan with dimensions of proposed setbacks for all sides and Floor Area Ratio*. In T4 Zoning District, the density and dimensional standards for a Mixed-Use building are:
      - For a parcel in a Light-Rail Station Area greater than 25,000 square feet, the FAR is a minimum 1.0. There is no maximum FAR. Response: Refer to Building Information Sheet for FAR info.
      - 0' minimum – 10' maximum front setback. Setbacks are measured from the property line to the outermost portion of the building façade, including balconies. Response: Noted, see revised C2-1
      - 6' minimum side and rear setback if walls of structures facing interior lot lines contain windows or

other openings or when a nonresidential use adjoins a side yard of a residential property. Response: Noted, see revised C2-1 Refer to Site Plan for setback dimensions.

- The setback shall be a minimum of 13 feet from the centerline of an adjoining alley. Response: Noted, see revised C2-1

d) The *Lexington Station Area Plan* calls for enhanced pedestrian zone; based on discussions with Parks, Public Works, Planning, and Ramsey Co, a 12' concrete sidewalk (10' walk surface plus 2' clear zone) and the wide boulevard was determined to meet the pedestrian area requirement. Response: Noted

e) In a Traditional Neighborhood Zoning District, when more than 50% of both the building and the parcel are within one-quarter mile of University Avenue, then no off-street parking is required. The proposed 139 structured parking spaces, well below the maximum for the use in this location. Response: Noted

f) A Travel Demand Management Plan is required for any development or redevelopment, including phased construction, providing 100 or more accessory off-street parking spaces.

- The TDMP is intended to implement comprehensive plan policies calling for balance and choice in transportation options in order to reduce motor vehicle travel and thus traffic congestion in the city, enhance the efficiency of transportation facilities and infrastructure, improve air quality, conserve energy and enhance productivity. Response: Noted
- The TDMP is under review by Move MN, the City's designated Transportation Management Organization. Response: Noted

g) *Update the Site Plan to indicate typical parking space dimensions and maneuvering lane widths* per Leg. Code Sec. 63.305. – Minimum layout dimensions and Sec. 63.308. – Maneuvering lanes. Response: Refer to Level 1 Plan for updated information.

h) *Update the Site Plan with a sign detail for the ADA spaces.* Parking spaces and passenger loading zones for persons with disabilities shall be designed in accordance with the provisions of the Accessibility Guidelines for Buildings and Facilities of the Americans with Disabilities Act (ADA). Response: Signs will be provided at all ADA spaces in the project that comply with ICC A117.1, Section 502.7.

i) *Update the Site Plan to indicate any compact parking spaces and if so, include a sign detail for compact parking spaces.* Accessory parking facilities may designate up to 50% of the spaces for compact cars only, in which case, the minimum layout dimensions may be reduced to 8' in width and 16' in length. Compact spaces shall be designated by signs with a minimum of one sign per every four compact spaces. Response: Refer to Level P1 & Level 1 Plans for updated parking information.

j) *Update the site plan to indicate location of any exterior bicycle parking and provide a bike rack detail.* Bicycle parking for 285 bikes is proposed. Bicycle parking shall be provided in a convenient, safe, and secure location according to the following:

- For dwelling units, a minimum of one secure bicycle parking space shall be provided for every 14 dwelling units. Response: 288 secure bicycle parking spaces are provided for residential use.
- For commercial uses, a minimum of one secure bicycle parking space shall be provided for every 20 vehicle parking spaces. Response: 8 external secure bicycle parking spaces are provided at NE Corner.

k) *Provide a narrative of the proposed trash and recycling location and operation*. At the December 1, 2020, Site Plan Review Committee preliminary meeting, the project team indicated that trash and recycling would be stored internally and picked-up outside the building, and further detail on the operations is forthcoming. If housed externally, garbage dumpsters and trash containers shall be located to the rear of the principal building and enclosed by a visual screen. Response: Trash narrative is described on Project Narrative.

l) *Update the narrative* to include details on the use of the existing Wilder Center parking ramp and the added pedestrian connection between the Wilder ramp and the Lexington Station Apartments. Response: Project Narrative has been updated to include details of project related parking.

3. **Building Design Standards**

a) The project shall comply with building design standards per Leg. Code Sec. 63.110:

- A primary entrance of principal structures shall be located within the front third of the structure; be delineated with elements such as roof overhangs, recessed entries, landscaping, or similar design features; and have a direct pedestrian connection to the street. Response: Noted. Refer to Elevation and Perspective Sheets.
- Building materials and architectural treatments used on sides of buildings facing an abutting public street should be similar to those used on principal facades. Response: Noted
- For principal buildings, above grade window and door openings shall comprise at least 15% of the total area of exterior walls facing a public street or sidewalk. Response: Noted
- The visual impact of rooftop equipment shall be reduced through such means as location, screening, or integration into the roof design. Screening shall be of durable, permanent materials that are compatible with the primary building materials. Exterior mechanical equipment such as ductwork shall not be located on primary building facades. Response: Noted

b) Developments within traditional neighborhood districts shall be consistent with the applicable design standards unless the applicant can demonstrate that there are circumstances unique to the property that make compliance impractical or unreasonable. The project shall comply with Traditional Neighborhood design standards per Leg. Code Sec. 66.343. including:
   - Transitions to lower-density neighborhoods. Transitions in density or intensity shall be managed through careful attention to building height, scale, massing and solar exposure. Response: Noted
   - Building facade articulation. The bottom 25' of buildings shall include elements that relate to the human scale. These should include doors and windows, texture, projections, awnings and canopies, ornament, etc. Response: Noted
   - *Update the site plan to include primary entrance for the commercial tenant on Lexington Pkwy.* Entrance location. There shall be a primary pedestrian building entrance on all arterial or collector streets. In multi-tenant buildings, any ground floor use with street frontage shall have an entrance facing the street. Response: See revised C2-1 and architectural site plan
   - *Provide the percentage of window and door openings on the ground floor on the east architectural elevation (Lexington Pkwy).* Door and window openings – minimum and character. For new commercial buildings, windows and doors or openings shall comprise at least 50% of the length and at least 30% of the area of the ground floor along arterial and collector street facades. Response Refer to Elevation Sheets.
     - Windows shall be designed with punched and recessed openings, in order to create a strong rhythm of light and shadow. Response: Refer to Elevation and Perspective Sheets.
     - Glass on windows and doors shall be clear or slightly tinted, and allow views into and out of the interior. Response: We plan on using clear glass throughout the project.
     - Window shape, size and patterns shall emphasize the intended organization of the facade and the definition of the building. Response: Refer to Elevation and Perspective Sheets.
   - Materials and detailing – All building facades visible from a public street or walkway shall employ materials and design features similar to those of the front facade. Response: Refer to Elevation and Perspective Sheets.
   - Parking location and design. Off-street parking shall be provided within a principal structure, underground, or to the rear of buildings to the greatest extent possible. Vehicular entrances to structured parking shall be minimized so that they do not dominate the street frontage of the building. Response: Parking entries are located at the west side of the building away from the highly visible building facades at the east and north. Refer to the Plan, Elevation and Perspective Sheets.
   - Lighting shall be pedestrian-scale. Light standards shall be no more than 16' in height along interior sidewalks and walkways, and have a downcast glow. Response: Noted.

4. **Lighting and Landscaping for the Site**

a) Exterior lighting shall meet Zoning Code Sec. 63.116. - Exterior lighting.
   - All outdoor lighting shall be shielded to reduce glare and shall be so arranged as to reflect lights away from all adjacent residential districts or adjacent residences in such a way as not to exceed three (3) footcandles measured at the residence district boundary. Response: Noted.
   - All lighting in all districts used for the external illumination of buildings shall be placed and

shielded so as not to interfere with the vision of persons on adjacent highways or adjacent property. Response: Noted

b) All required yards and any underdeveloped space shall be landscaped using materials such as trees, shrubs, sod, groundcover plants, or stormwater landscaping. Response: See L1-1

5. **Signs**
Reviewer: David Eide/651-266-9013 david.eide@ci.stpaul.mn.us
Comments:
a) Multi-use developments require a Master Sign Plan as a means to ensure adequate signage for tenants. Response: Noted
b) Business signs require a separate review and Sign Permit from the Department of Safety and Inspections. Site plan approval does not constitute approval of signs shown on the site plan. Response: Noted

6. **Planning**
Reviewer: Kady Dadlez/651-266-6619 kady.dadlez@ci.stpaul.mn.us
Comments:
a) The proposed mixed-use project is consistent with the 2040 Saint Paul Comprehensive Plan (2020), the Lexington Station Area Plan (2008), and Union Park Community Plan (2016). (see attached analysis) Response: Noted
b) Generally, the comprehensive plan encourages transit supportive density and supports growth and development of new housing, particularly in areas identified as Mixed Use, Urban Neighborhoods and/or in areas with the highest existing or planned transit capacity, to meet market demand for living in walkable, transit-accessible, urban neighborhoods. The plan also supports increases in density on valuable urban land and calls for high-quality urban design that supports pedestrian friendliness and a healthy environment, and enhances the public realm. Response: Noted

7. **Parkland Dedication**
As a part of this project, the City requires payment of a Parkland Dedication fee (in lieu of the property owner needing to dedicate a portion of the property as park land). The fee collected is used by the City for acquiring park land or other park capital improvements in the area. Response: Noted

Staff estimates a dedication fee of $89,472 plus an $102 administrative fee. The fee is calculated based on the number of residential units and commercial area, previous land use, and capped at 4.5% of the county assessor's estimated market value of the land. Payment is included with building and inspection fees when the building permit is issued. Response: Noted

8. **Public Works Records and Mapping**
Contact Number: 651-266-6150
Comments:
a) Continue to use the 411 Lexington Parkway North address for the Apartments. Response: Noted
b) We suggest the address to use for the Commercial tenant space is 435 Lexington Avenue North. Please contact the 'Maps and Records' office regarding the Primary Active address that is to be issued and assigned to the Commercial tenant space. Response: Noted
c) Contact the 'Maps and Records' office with the Secondary Addresses to use for the apartment living units to be attached with the 411 Lexington Parkway North Primary Active Address (i.e. Apt 101, Apt 202, Unit 303, Unit 404, etc.). Response: Noted

9. **Public Works Transportation Planning**
Reviewer: Colleen Paavola/651-266-6104 colleen.paavola@ci.stpaul.mn.us
Comments:
a) Please be advised that a Temporary Pedestrian Access Route (TPAR) and/or a Temporary Traffic Control (TTC) plan may be required as part of the Right-of-Way (ROW) permitting process. Said

TTC or TPAR plans must be approved by the City prior to the ROW Permitting office issuing a permit(s). Response: Noted, will provide as needed.

b)

c) Per Minnesota State Statute 326, the final plans submitted must be signed by the appropriate licensed Professional, i.e. PE, LA, PLS, etc., responsible for plan development. Response: Noted

d) Please change the treatment for the reconstruction of the alley from concrete to bituminous on all applicable plan sheets; this would be consistent with other City alleys for maintenance purposes. Response: Noted, see C2-1

e) Please update note #2 and note #9 under CITY OF ST. PAUL NOTES on sheet C0-1 with the following contact: Traffic Signal/Street Lighting Supervisor Mike Lusian 651-266-9780 mike.lusian@ci.stpaul.mn.us. Response: Note updated

f) Please update note #6 under CITY OF ST. PAUL NOTES on sheet C0-1 with the following Inspector name and number: Jennifer Ziemer, 651-485-4263 Response: Note updated

g) Please REPLACE note #8 under CITY OF ST. PAUL NOTES on sheet C0-1 with the following:
NO PRIVATE FACILITIES IN THE RIGHT OF WAY: The developer is strictly prohibited from installing private electrical wiring, conduit, receptacles and/or lighting in the City's Right of Way. This includes stubbing conduit or cable into the public right of way to accommodate utility feeds to the site. Coordinate with each utility prior to construction to determine feed points into the property. Utilities are responsible for securing excavation permits to run their service into a site, and (where required) submitting plans for review by the Public Works Utility Review Committee.
The Contractor shall contact Mike Lusian, General Foreman, Lighting - Signal Maintenance, (651-266-9780), if removal or relocation of existing facilities is required or in the event of damage to the lighting or signal utilities. The Contractor shall assume responsibility (and related costs) for any damage or relocations. Response: Note updated

10. **Ramsey County**
Reviewer: Brad Estochen/651-266-7114 bradley.estochen@co.ramsey.mn.us
Comments:
A copy of the Site Plan was provided to Ramsey County for review. Staff reserves the right to make additional comments and conditions based on their feedback. Response: Noted

11. **Metro Transit**
Reviewer: Berry Farrington berry.farrington@metrotransit.org
Comments:
Contact Greg Tuveson (612-349-5407 / greg.tuveson@metrotransit.org), Metro Transit Street Operations, if construction of your project requires temporary lane or street closures. Response: Noted

12. **Move Minnesota**
Reviewer: Thresa Nelson/651-789-1402 theresan@movemn.org
Reviewer: Erik Thompson/651-789-1419 erikt@movemn.org
Comments:

a) A Travel Demand Management Plan is required for any development or redevelopment, including phased construction, providing 100 or more accessory off-street parking spaces. The TDMP is reviewed by Move MN on behalf of the City. Response: Noted

b) Move Minnesota is excited to work with the property management team on achieving the mode split goals of 40/40/20 for this development. Please consider providing Metro Transit passes in all welcome packets for new residents and promote the various transportation options in marketing materials. Response: Noted

c) Providing a bike room with amble racks and a bike fix-it station will create a bicycle friendly living option for residents. Please clarify how the bike racks in the bike room will be accounted for in the budget. Response: Noted

d) It's unclear where the bike route is located on the development site and how it will connect with the existing bike lane on Griggs Street, please clarify. Response: Working with the City of St. Paul, the Design Team have gone through multiple iterations of bike paths and ultimately landed on a bike route

within the development that runs (North/South) along the East (Lexington) side of the site and (East/West) along the North side of the site. Refer to the Site Plan for locations.

e) Please indicate the number of exterior bike racks and location, as mentioned during the preliminary site plan review meeting, and add cost for exterior bike racks to line-item budget. Response: Exterior parking spaces for 8 bikes are provided at NE corner of site. Refer to Site Plan.

13. **Public Works Traffic Engineering**

Reviewer: Elizabeth Stiffler/651-266-6210 elizabeth.stiffler@ci.stpaul.mn.us
Reviewer: Mike Klobucar/651-266-6208 mike.klobucar@ci.stpaul.mn.us

Comments:

a) Please indicate the sign type on existing signs and light poles. Indicate impacts, if any. Response: Noted see updated C1-1
b) The north site access from Lexington should be treated as a drive way. Modify the plan to remove the ADA ramp and carry the 12' path straight through the driveway. Response: Noted, see C2-1
c) Update the plan to include ADA ramps on the west side of the intersection of Lexington/Fuller on both the north and south sides (it is understood that there are currently no ramps on the east side). Both north and south outwalks between the mainline sidewalk and ped ramp shall be typical 6' width. Response: Refer to Site Plan.
d) We have concerns about how traffic will access the building. Indicate on plans how all types of vehicles that will access the site with turning movements. Response: See EX-1 for Truck Movement Exhibit at SE corner for moving trucks.
e) An explanation of how moving trucks and garbage trucks access the site should be provided. Response: See EX-1 for Truck Movement Exhibit at SE corner for moving trucks. Refer to Project Narrative for trash information.
f) The driveway/access at the SE corner of the building needs to be redesigned so that vehicles don't need to use the alley, adjacent property or public path to maneuver. Show turning movements for largest vehicles to show vehicles stay within property limits. Response: Noted see turning exhibit
g) Traffic study has been provided and is currently under review. Study should include analysis at each access to property, adjacent intersections and may need an increase in scope. Study should include queuing analysis of main entrance/drop off area. Study should include all modes. Revisions should be emailed directly to both Mike and Elizabeth to ensure receipt for quickest review and turnaround. Response: Noted
h) Pedestrian access improvements such as median islands/extensions or other pedestrian treatments may be required depending on increased level of proposed activity at the intersection at Lexington/Fuller. Response: Noted
i) We have concerns about possible congestion/back-ups on southbound Lexington from pick up/drop off. How will these be discouraged? Update the Narrative accordingly. Response: Refer to TDMP

14. **Public Works Sidewalks and Construction**

Reviewer: Ryan Lowry/651-266-6147 ryan.lowry@ci.stpaul.mn.us

Comments:

a) Contractor is responsible for damage to the mainline sidewalk, curb, drive access and boulevard landscaping cause during the construction. Contractor advised to document pre-existing condition of the right of way prior to commencement of the construction. Response: Note is under demo notes #5 on C0-1
b) No ped ramp installation for driveway crossings. Driveway at NE corner to install full width crossing at 12' sidewalk width. Curb on north side of drive removed and replaced as a driveway crossing. Concrete installed up to the East/West sidewalk on the north side of the driveway across from Dairy Queen. Remove jog in the sidewalk to accommodate the existing sidewalk crossing in the driveway. Response: See revised C2-1
c) Add pedestrian crossings at Fuller Ave. Per Traffic Engineering recommendations. Response: See revised plans.
d) Alley construction to be bituminous section and center draining, city standards. Response: See revised plans and detail on C8-1

e) Replace MnDOT Pedestrian Curb Ramp Details with the 2017 version, rather than 2014. Response: See revised details
f) Match existing roadway sections for restoration. Minimum 2' cut into asphalt for curb removals or utility cuts. Response: See revised plans
g) Lexington curb style is Modified B-612, city standard plate 3106A. Response: See revised plans and detail on C8-1
h) Driveways installed per city standard plate 1206D. Response: See revised plans and detail on C8-1
i) Standard B-612 detail acceptable in place of city standard plate 3100C where applicable. Match existing roadway curb styles using standard plate 3100C when Modified B612 is not the existing style. Response: See revised plans and details
j) Sidewalk permit construction is installed as follows:
   - Mainline sidewalk or catwalks/outwalks installed at 4" concrete thickness with 6" agg. Base Response: See revised plans and detail on C8-1
   - Ped. Ramps, curb ramps, sidewalk abutting back of curb, and residential driveways installed at 6" concrete thickness with 6" agg. base. Response: See revised plans and details
   - Commercial driveways, alley driveways, and sidewalk expecting traffic per turning movements or traffic studies are to be installed at 8" thickness with 6" agg. base. Response: See revised plans and details
   - Alley bituminous installed at 3" thickness with 6" agg. base. Alleys are typically center draining through the apron unless circumstances do not allow. Response: See revised plans and detail on C8-1
   - Curb work and cuts into alleys require a minimum of 2' saw cut into the asphalt to ensure proper installation of abutting construction and proper compaction of asphalt road/alley section. Response: See revised plans

15. **Public Works Sewers**
Reviewer: Anca Sima/651-266-6237 anca.sima@ci.stpaul.mn.us
Comments:
a) proposed rate should be less or equal with as-built. 24" storm pipe at the main? now it is only 12", so leave it 12" and the gate (see permit a111687), in this way the rate will not increase. Response: C4-1 and storm report has been adjusted
b) Specify the EOF should be at least 1 ft. lower than FFE. The surface of pond: 2 feet. Response: See revised C3-1 for EOF.
c) If the existing manhole for the proposed service connection is a brick construction, reconstruction of the manhole access may be required, please add the attached detail (2322b) for manhole reconstruction. Response: Note has been added to C0-1
d) If the storm pipe is less of 5" of building foundation, than is under the pluming jurisdiction. You have to provide 5 pound air test. Response: Note has been added to C0-1
e) Provide SAC determination in order to verify the sewer capacity for the development. Response: The design team's preliminary estimate for SAC fees is $782,700. Ownership and design team will work with MCES for a final SAC determination.
f) 411& 417 Lexington Pkwy N parcels shall be combined. Response: Receipt will be provided once completed
g) show the existing underground storage on demo, grading & utility. Response: See revised plans
h) same swm, so provide agreement between all parties and private drainage easements. Response: Noted

i) Update the Site Plan with the following notes: Response: Following notes are on C0-1
   - If the construction will require temporary installation of bollards (standpipes) in the ROW, apply for a ROW encroachment.
   - SEWER REPAIR PERMIT: Plumbing Contractor to obtain "Repair Permits" from Public Works for proposed modification to the existing storm sewer connections. Call St Paul PW permit desk (651-266-6234) for information on obtaining this permit.
   - SEWER REMOVAL/ABANDONMENT PERMIT for a82791, a82790,a95706. Plumbing Contractor to obtain "Removal Permits" from Public Works to cut off existing sewer connections

services to the property. Call St Paul PW permit desk (651-266-6234) for information on obtaining this permit.

- SEWER CONNECTION PERMIT: License house drain contractor to obtain (Sewer Connection Permit) to construct new sanitary and storm connection in street from main to the property. Call St Paul PW permit desk (651-266-6234) for information on obtaining this permit.

16. **Water Quality/Erosion Control**
Reviewer: Wes Saunders-Pearce/651-266-9112 wes.saunders-pearce@ci.stpaul.mn.us
Reviewer: Jacqueline Cassman/651-266-9083 jacqueline.cassman@ci.stpaul.mn.us
Comments:
No comments. Erosion control plan is satisfactory as shown. Response: Noted

17. **Water Utility**
18. Reviewer: Amanda Leier/651-266-6276 amanda.leier@ci.stpaul.mn.us
Reviewer: Jeff Murphy/ 651-266-6213 jeffrey.murphy@ci.stpaul.mn.us
Comments:
a) The two (2) services being proposed will need to be tapped off of the 16" CI watermain in Lexington Pkwy N, please update plans accordingly. Response: See revised utility plan
b) To note: The service being proposed being tapped off of is a 1.5" CP service, not a 15" service. Response: See revised C1-1 & C4-1
c) Please contact Graeme Chapel at 651-266-6882, at your earliest convenience regarding undermining of existing utilities and what SPRWS will require as done on a case-by-case basis. Response: Noted
d) Show existing water services on Plan Sheet C1-1 to be cut off at the water main.
   - 413 N Lexington Pkwy – 1.5" CP – 33 N S FULLER-28 E W LINE WALK Response: See revised demo plan. Service is being cut off at main per city standards
e) Provide profile view of all proposed utility crossings. Response: Tops and bottoms of pipes has been added to sheet C4-1
f) The following work shall be performed by SPRWS on an actual cost basis. An estimate will be provided and payment in the amount of the estimate must be received before the work can be scheduled. Work of this type is currently being scheduled 4 to 6 weeks after payment and required signatures have been received: Response: Noted
   - Pipework within right of way for 8" DI.
   - Pipework within right of way for 6" AF.
   - Cut off of existing unused water services at the main.
   - Inspection of water facility work performed by owner's contractor.
g) Plumbing permit applications to be made with SPRWS at 1900 Rice Street, Saint Paul, MN. Response: Noted
h) Before construction of a new water service can be scheduled, SPRWS must receive a Water Service Contract signed by the owner and all required payments. Response: Noted
i) Provide completed project data sheets to determine service & meter sizing. Response: See Project Information Sheet
j) Furnish one set of interior fire suppression mechanical plans for review and approval by SPRWS plumbing inspection unit. Response: Noted
k) Furnish one set of revised site plans for review. Following approval by SPRWS, furnish one set of approved plans. Response: Noted
l) Provide the following on PLAN SHEET C4-1 under NOTES: Response: ALL NOTES ARE ON C0-1
   - Water services to be installed according to SPRWS "Standards for the Installation of Water Mains.
   - A four-sided trench box is required on all excavations deeper than 5 feet where underground work or inspection is to be performed by SPRWS. For all wet taps to be performed by SPRWS, a minimum trench box size of 8 feet high x 8 feet wide x 10 feet long is required. Ladders are required and must extend 3 feet above the surface of the trench. Sidewalks, pavements, ducts and appurtenant structures shall not be undermined unless a support system or another method of protection is provided. Trenches in excess of 20 feet in depth must be signed off by a

registered professional engineer. Excavated material must be kept a minimum of 2 feet from the edge of the trench.

- Service connections shall be installed with 8 feet of cover as per established grade from the main to the property line or, if applicable, to the utility easement line. When solid rock conditions are encountered water services may be installed with 6.5 feet of cover. At this depth, the need for insulation will be determined by SPRWS Inspectors.
- All pipe 2" and smaller must be Type K copper. All pipe 4" and larger must be ductile iron.
- Pipe material for 8" Ductile Iron Pipe must be Class 52, Pipe material for 6" and 4" Ductile Iron Pipe must be Class 53. The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The interior cement mortar lining shall be applied without asphalt seal coat.
- Pipe must be wrapped in V-Bio Polywrap encasement.
- Maintain 3 feet vertical separation between water and sewer pipes or a 12 inch separation with 4 inch high density insulation per SPRWS Standard Plate D-10 for typical water main offsets.
- Refer to SPRWS "Standards for the Installation of Water Mains" Standard Plate D-11 for restrained pipe requirement.
- All water service valve boxes within construction area must be exposed and brought to grade upon completion of construction.
- All pipe work inside of property to be performed by a plumber licensed by the State of Minnesota and Certified by the City of Saint Paul. SPRWS requires separate outside and inside plumbing permits for each new water service.
- All unused existing water services to be cut off by SPRWS. Excavation and restoration by owner's contractor. New water services will not be turned on until required cutoffs have been performed.
- Water facility pipework within right of way to be installed by SPRWS. Excavation and restoration by owner's contractor.
- The contractor providing excavation is responsible for obtaining all excavation and obstruction permits required by any governing authority.

19. **Fire**

Reviewer: Ann Blaser/651-266-9140 ann.blaser@ci.stpaul.mn.us

Comments:

a) Visibility of the Fire Department connection must be maintained on the address side of the building in a visible, accessible location at all times without obstruction by fences, bushes, trees, walls, or other objects for a minimum of 3 feet to the front and each side. This requirement is applicable for the duration of the construction time as well. Response: Noted see FDC on C4-1

b) A metal sign or collar with raised letters at least 1 inch in size must be mounted on all Fire Department connections serving fire sprinklers, standpipes, or fire pump connections. Such signs shall read AUTOMATIC SPRINKLERS or STANDPIPES or TEST CONNECTION or a combination thereof as applicable. Response: Noted

c) Automatic Fire Sprinkler System Required. Plans and permits required by licensed contractor. Flow test is required to determine adequacy of water service for proposed fire suppression system. The fire prevention section of the Dept. of Safety and Inspections reviews sprinkler plans, issues permits and does the necessary inspections of the installation. Contact Jeff Hemenway 651-266-8952 with questions on obtaining this permit and the procedure for arranging a time to perform this test. Response: Noted

d) Once construction passes 40 vertical feet, a standpipe (temporary or permanent) is required to be in place. Response: Noted

e) The size of the fire water line is not reviewed with site plan. It will be reviewed with the fire sprinkler permit submittal. Response: Noted

f) Update the Utility Plan with the following notes:
   - Contractor to maintain access to the fire department connection for fire department personnel at all times during the construction period. Response: Note is already on C0-1 Site Notes, and will be added to Utility notes on C0-1 as well

20. **City Forestry**
Reviewer: Zach Jorgensen/651-632-2437 zach.jorgensen@ci.stpaul.mn.us
Comments:
a) Sheet C1-1:
   - The existing street trees on Lexington Parkway are not shown. Please update the plan to show the location of the existing trees and indicate their removal. Response: See revised C1-1
   - Please provide a copy of the survey indicating the location and size of the existing trees. Response: Survey will be updated before permit
b) Sheet L1-1:
   - Standard tree spacing in the right of way is 35'-40' oc. Please reduce tree spacing and add two additional street trees on Lexington Parkway. Response: See revised L1-1
   - Trees should be centered in the boulevard area or set slightly back from center. Please provide a minimum of five feet between the street trees and the bike/walkway. Response: See revised L1-1
   - Please change the tree type for the proposed street trees on Lexington to one or more of the following: Bicolor oak, hackberry, 'Espresso' Kentucky coffeetree, New Harmony or Triumph elm. Response: See revised L1-1

21. **Parks and Recreation**
Reviewer: Paul Sawyer/651-266-6417 paul.sawyer@ci.stpaul.mn.us
Comments:
a) Sidewalk width and placement are good. Response: Noted
b) Provide ADA-compliant pedestrian ramps at quadrants of intersection with Fuller Ave per PW Traffic Engineering specifications. Response: Noted see revised plans
c) Do not pave Lexington Ave right of way except for pedestrian facilities. Response: Noted
d) Ensure no encroachments in Lexington Ave right of way above, below, and at grade, including no doors swinging into right of way. Response: Noted
e) Update landscape plan to remove shrubs and ornamental grasses from Lexington Ave right of way. Boulevard should contain only sod and overstory trees. Response: Noted, see revised L1-1

22. **MPCA Permit**
This project will be affecting more than one acre. A General Storm Water Permit for Construction Activity from the Minnesota Pollution Control Agency is required. No land disturbance activity for the project is allowed, until this permit is obtained and is in addition to any City or watershed district permits required. Call the Brian Green MPCA Statewide Compliance Coordinator for the Storm water Program MPCA at 507-206-2610 if you have questions about the process for obtaining this permit. Response: Noted: Contractor will provide once obtained.

23. **Capitol Region Watershed District**
Reviewer: Forrest Kelley/651-644-8888 forrest@capitolregionwd.org
Comments:
a) The project area is an acre or more in size and will require a permit from the Capitol Region Watershed District. A copy of the watershed permit or other written authorization from the district must be provided before the site plan will be approved or any permits are issued, allowing construction to proceed. Response: Plans have been submitted to the watershed district
b) CRWD permit application #20-036 has been received as of 11/23/2020 and is currently under review. Comments will follow separately. Response: Noted

24. **Plumbing**
Reviewer: Rick Jacobs/651-266-9051 rick.jacobs@ci.stpaul.mn.us
Comments:

a) Contact Saint Paul Regional Water Services (SPRWS) for questions, permits, fees, inspections, specifications, plans, or information that may be required for the water service and/or the water meter. Response: Noted
b) Sanitary and/or storm sewer service passing within 10 feet of the building are governed by the MN Plumbing Code. Specification for pipe material selection and notes for required air test of the piping, compliant with MN State Plumbing Code 4714 Section 1109.0, must be shown on the plan. This system must be reviewed and approved by Rick Jacobs, Senior Plumbing Inspector (651-266-9051) to ensure that it meets Plumbing Code standards. Response: Note is already on plan C1-0 Utility Plan Notes #12
c) Contact the City of Saint Paul Department of Public Works Sewer Division for questions, permits, fees, inspections, specifications, plans, or information that may be required for sewer and storm piping work performed outside the building, including retention systems located outside the building. Response: Note is already on plan C1-0 Utility Plan Notes #13

d) Update the Site Plan with the following:
   - Show the location of the oil & flammable waste interceptor and all underground tanks. Response: Refer to Level P1 Plan
   - Indicate provisions to prevent piping from freezing. Response: Noted
   - Provide a roof plan showing the total square footage of all roof areas and the square footage each roof drain will serve including the 6th floor terrasse's and 2nd floor "courtyard" areas. Response:Noted. Refer to Roof Plan.
   - It is suggested a floor drain be installed in the "Bike Space" and "Dog Wash" areas. Response: Noted. Refer to Level 1 Plan.
   - All primary roof drains shall be connected to the storm sewer. MPC 4714.1101.1. Response: Note is already on plan C1-0 Utility Plan Notes #14
   - Secondary Roof Drainage shall drain to an approved place of disposal in the form of Secondary Roof Drains installed per MPC 4714.1101 & 1102, and Minnesota State Building Code 1503.4 1-5. Secondary roof drainage must discharge onto permeable soils and cannot drain onto the sidewalk. MPC 4714.1101.1. Both primary and secondary roof drainage systems must meet this requirement. Minnesota has specific requirements to address seasonal conditions of freeze and thaw when the discharge from roof drains could create unsafe, icy conditions on sidewalks. It is suggested that a proper point of discharge that can be approved by the Authority Having Jurisdiction for secondary roof drainage is in the form of secondary roof drains piped internally, down to within 18 inches of grade, through the outside wall, onto a splash block installed per MPC 1101.5.3, and laid over permeable soils of an adequate amount where saturation of the soil will not occur, and they will not cause a hazard or nuisance. Response: Note is already on plan C1-0 Utility Plan Notes #15

25. **Building Code Requirements**
Reviewer: James Williamette/651-266-9077 james.williamette@ci.stpaul.mn.us
Comments:
a) Contact Jim Williamette to schedule a preliminary building plan review and energy code discussion prior to submitting a building permit application. Response: Noted
b) This proposal will require a building permit to proceed. The building permit is issued only after all necessary city staff have approved and signed off on the proposed design. In addition to the building permit, separate permits are required for any plumbing, electrical and mechanical work, elevator installation and any fire sprinkler modifications. These permits must be obtained and the work performed by city licensed contractors in each of the respective trades. Response: Noted
c) One PDF and two sets of complete construction documents stamped by public works must be submitted with the building permit application to the DSI Main Office/ Permit Desk. Response: Noted
   - The construction documents shall include architectural, structural, mechanical, electrical and plumbing plans signed and stamped by design professionals registered in the State of Minnesota, The architect shall provide a complete code analysis and a color-coded exit plan showing all fire rated walls and shafts and include exit access and travel distances. The plans

shall have the energy code noted on the plans along with the compliance path chosen. The submittal should include compliance documents detailing how the energy code requirements are met. Response: Noted

- Plans must be dimensioned, drawn to scale and sufficiently detailed to denote the scope of work to be performed and the method of construction. Response: Noted
- Mechanical ventilation plans will need to be prepared by a mechanical engineer, registered with the State of Minnesota. In some cases, a "Master in the Trade" may prepare plans. The ventilation contractor should contact our senior warm air inspector Gary Reinsberg (651-266-9064) or by e-mail at Gary.reinsberg@ci.stpaul.mn.us The Energy code and path must be noted on these plans also. Response: Noted
- The plumbing and electrical contractors for this project should contact our office if they have questions about whether engineered plans need to be submitted with their permit request. The senior plumbing inspector is Rick Jacobs at 651-266-9051 Rick.jacobs@ci.stpaul.mn.us and the senior electrical inspector is Dan Moynihan at 651-266-9036 Dan.monihan@ci.stpaul.mn.us Response: Noted

Note: **The building permit will not be issued until all signoffs are received** from Zoning, HVAC, Public Works, or other departments that are assigned to the project. Response: Noted

26. **Service Availability Charge (SAC)**
The proposed project will need a SAC determination before a building permit can be issued. You must submit a copy of the plans to the Metropolitan Council Environmental Services (MCES) for a SAC determination. Please see their website at https://metrocouncil.org for additional information. If MCES determines that a SAC fee is due, the City will collect that payment with the building permit fee.
SAC Questions and Determination Review Submittal Information email:
SACprogram@metc.state.mn.us or call 651-602-1770 to speak to a SAC representative. Response: The design team's preliminary estimate for SAC fees is $782,700. Ownership and design team will work with MCES for a final SAC determination.

Report Prepared By:

Tia Anderson
Principal City Planner

cc: File, Site Plan Review Staff, CRWD, MoveMN, Metro Transit, Ramsey Co

City of Saint Paul – Department of Safety and Inspections
Site Plan Review – Preliminary Staff Report
Date of Report: Dec 7, 2020
Address Location: 411 – 417 Lexington Pkwy N (current addresses)
Project: Lexington Station Apartments

SAINT PAUL
MINNESOTA

Chris Osmundson
Alatus Development LLC
IDS Center, 80 S 8th St,
Suite 4155
Minneapolis, MN 55402

Michael Kuntz
DJR Architecture
333 N Washington Ave,
Suite 210
Minneapolis, MN 55401

PJ Disch
Loucks
7200 Hemlock Lane,
Suite 300
Maple Grove, MN 55396

Lexington Station Project Team,

The reviewers have completed their first review cycle in the electronic system and we have returned the file to you.

- To provide project updates in response to staff comments in this document, upload an updated Site Plan package to the City of St. Paul's Electronic Plan Review System (planreview.stpaul.gov/ProjectDox) for review by the Site Plan Review Committee.
- Utilize the "Group Management Task" in the ProjectDox task list to add or remove project members collaborating on the Site Plan Review. The project team, not City staff, is responsible for sharing information and coordinating updates among project professionals including the status of the site plan review, building plan review, and permits.
- Site Plan Review decisions may be appealed within ten days after the date of the decision (which is the date of this letter) per Leg. Code Sec. 61.701 – Administrative Appeals, to the Planning Commission. An Appeal of a Site Plan decision shall be filed with the Zoning Administrator.
- The Site Plan Review Approval process only encompasses design approval. Construction and Utility Permits required for your project will result in additional reviews and requirements. Please plan your project accordingly.
- Building permits will not be issued until the Site Plan receives Final Approval.
- Final Site Plan Review Approval will be issued after City Staff sign-off on the updated Site Plan. A Final Site Plan Approval decision may be appealed within ten days after the date of the decision per Leg. Code Sec. 61.701 – Administrative Appeals, to the Planning Commission.

The following comments and revision requests are available in the system:

Group	Reviewer	Reviewer Comment	Status of Comments	Comment Reference
CRWD	Elizabeth Hosch, EHosch@capitolregionwd.org, 812-345-5838	CRWD permit application #20-036 has been received and has been tabled with 10 conditions. Resubmittal not yet received, and Board meeting approval date not yet set, as of 12/28/2020.		
DSI - Building Plan Review		a) Contact Jim Williamette to schedule a preliminary building plan review and energy code discussion prior to submitting a building permit application. b) This proposal will require a building		

		permit to proceed. The building permit is issued only after all necessary city staff have approved and signed off on the proposed design. In addition to the building permit, separate permits are required for any plumbing, electrical and mechanical work, elevator installation and any fire sprinkler modifications. These permits must be obtained, and the work performed by city licensed contractors in each of the respective trades. c) One PDF and two sets of complete construction documents stamped by public works must be submitted with the building permit application to the DSI Main Office/ Permit Desk. •?The construction documents shall include architectural, structural, mechanical, electrical and plumbing plans signed and stamped by design professionals registered in the State of Minnesota, The architect shall provide a complete code analysis and a color-coded exit plan showing all fire rated walls and shafts and include exit access and travel distances. The plans shall have the energy code noted on the plans along with the compliance path chosen. The submittal should include compliance documents detailing how the energy code requirements are met. •?Plans must be dimensioned, drawn to scale and sufficiently detailed to denote the scope of work to be performed and the method of construction. •?Mechanical ventilation plans will need to be prepared by a mechanical engineer, registered with the State of Minnesota. In some cases, a “Master in the Trade” may prepare plans. The ventilation contractor should contact our senior warm air inspector Gary Reinsberg (651-266- 9064) or by e-mail at Gary.reinsberg@ci.stpaul.mn.us The Energy code and path must be noted on these plans also. •?The plumbing and electrical contractors for this project should contact our office if they have questions about whether engineered plans need to be submitted with their permit request. The senior plumbing inspector is Rick Jacobs		

		at 651-266-9051 Rick.jacobs@ci.stpaul.mn.us and the senior electrical inspector is Dan Moynihan at 651-266-9036 Dan.monihan@ci.stpaul.mn.us		
DSI - Fire Safety	Ann Blaser	Ensure FDC is clear for 3 feet on all sides and is visible from the street.	Note	General
	Ann Blaser	Automatic fire suppression is required for this building. For permitting go to: https://www.stpaul.gov/departments/safety-inspections/fire-inspections/special-services	Note	General
	Ann Blaser	A full fire alarm system is required. For permitting go to: https://www.stpaul.gov/departments/safety-inspections/fire-inspections/special-services	Note	General
	Ann Blaser	Size of water service supply for the sprinkler system is dependent on the demand of the automatic fire suppression system. Sizing requirements may change based on system design.	Note	General
	Ann Blaser	A standpipe (temporary or permanent) is required during construction once the project has exceeded 40 feet above fire department vehicle access.	Note	General
DSI - Plumbing				
DSI - Site Plan Review	Ashley Skarda	As a part of this project, the City requires payment of a Parkland Dedication fee (in lieu of the property owner needing to dedicate a portion of the property as park land). The fee collected is used by the City for acquiring park land or other park capital improvements in the area. Response: Noted Staff estimates a dedication fee of $89,472 plus an $102 administrative fee. The fee is calculated based on the number of residential units and commercial area, previous land use, and capped at 4.5% of the county assessor's estimated market value of the land. Payment is included with building and inspection fees when the building permit is issued.	Note	Final Checklist

DSI - Water Resource		The following was noted in the preliminary review by Jacqueline Cassman: No comments. Erosion control plan is satisfactory as shown. Note - Required Capitol Region Watershed permits will need to be issued before DSI Staff can sign off on related building permits. Please work with your contractor and the CRWD to avoid any confusion. Note - This project will be affecting more than one acre. A General Storm Water Permit for Construction Activity from the Minnesota Pollution Control Agency is required. No land disturbance activity for the project is allowed, until this permit is obtained and is in addition to any City or watershed district permits required. Call the Brian Green MPCA Statewide Compliance Coordinator for the Storm water Program MPCA at 507-206-2610 if you have questions about the process for obtaining this permit. Please turn a copy in to ashley.skarda@ci.stpaul.mn.us when received. This MPCA permit is required before any of your building permits can be issued.		
DSI - Zoning	Ashley Skarda	Provide proof of receipt from Ramsey County of filing the parcel combination for 411 and 417 Lexington Pkwy N. See attached Request for Combination of Contiguous Properties form.	Not Met	Density & Dimensional Standards
	Ashley Skarda	Thank you for addressing our preliminary feedback and revision requests in your revisions.	Note	Density & Dimensional Standards
	Ashley Skarda	Please show 7 ADA parking spaces.	Not Met	Parking
	Ashley Skarda	Please ensure consistency between the plan sheets on the total number of parking spaces.	Not Met	Parking
	Ashley Skarda	The building meets dimensional standards including density, % of window and door openings, and a maximum height of 75' as measured from average grade to roof deck.	Note	Density & Dimensional Standards

Metro Transit		Please contact Greg Tuveson (612-349-5407 / greg.tuveson@metrotransit.org), Metro Transit Street Operations, if construction of your project requires temporary lane or street closures.		
Parks and Recreation		All comments addressed		
Parks Forestry	Zach Jorgensen	Forestry notes 3-5 covering tree protection are not needed as the existing street trees on Lexington Parkway will be removed.	Unresolved	31 - C0-1 Civl Notes.pdf
	Zach Jorgensen	Forestry notes 12-14 also need to be included on the landscape plan.	Unresolved	31 - C0-1 Civl Notes.pdf
	Zach Jorgensen	Please update the plant schedule to include the Kentucky coffeetree to be planted on the Lexington Parkway boulevard. Tree to be one of the named cultivars 'Espresso' or 'True North'	Unresolved	40 - L1-1 Landscape Plan.pdf
	Zach Jorgensen	The following note has been included on sheet C0-1 but is to be included with the tree planting detail as well: Remove burlap and ropes from top 1/3rd of rootball, cut wire basket down to second horizontal wire from the bottom, and dispose of off-site.	Unresolved	41 - L1-2 Landscape Details.pdf
		See markups		
PED - Planning				
PW - Mapping and Records	Ashley Skarda	Continue to use the 411 Lexington Parkway North address for the Apartments.	Note	General
	Ashley Skarda	We suggest the address to use for the Commercial tenant space is 435 Lexington Avenue North.Please contact the Maps and Records office regarding the Primary Active address that is to beissued and assigned to the Commercial tenant space.	Note	General
	Ashley Skarda	Contact the Maps and Records office with the Secondary Addresses to use for the apartment living units to be attached with the 411 Lexington Parkway North Primary Active Address (i.e. Apt 101,Apt 202, Unit 303, Unit 404, etc.).	Note	General
		Notes copied from Public Works Records and Mapping Staff's Dec 7th Comments. Contact Public Works Mapping and Records at: 651-266-6150 with any		

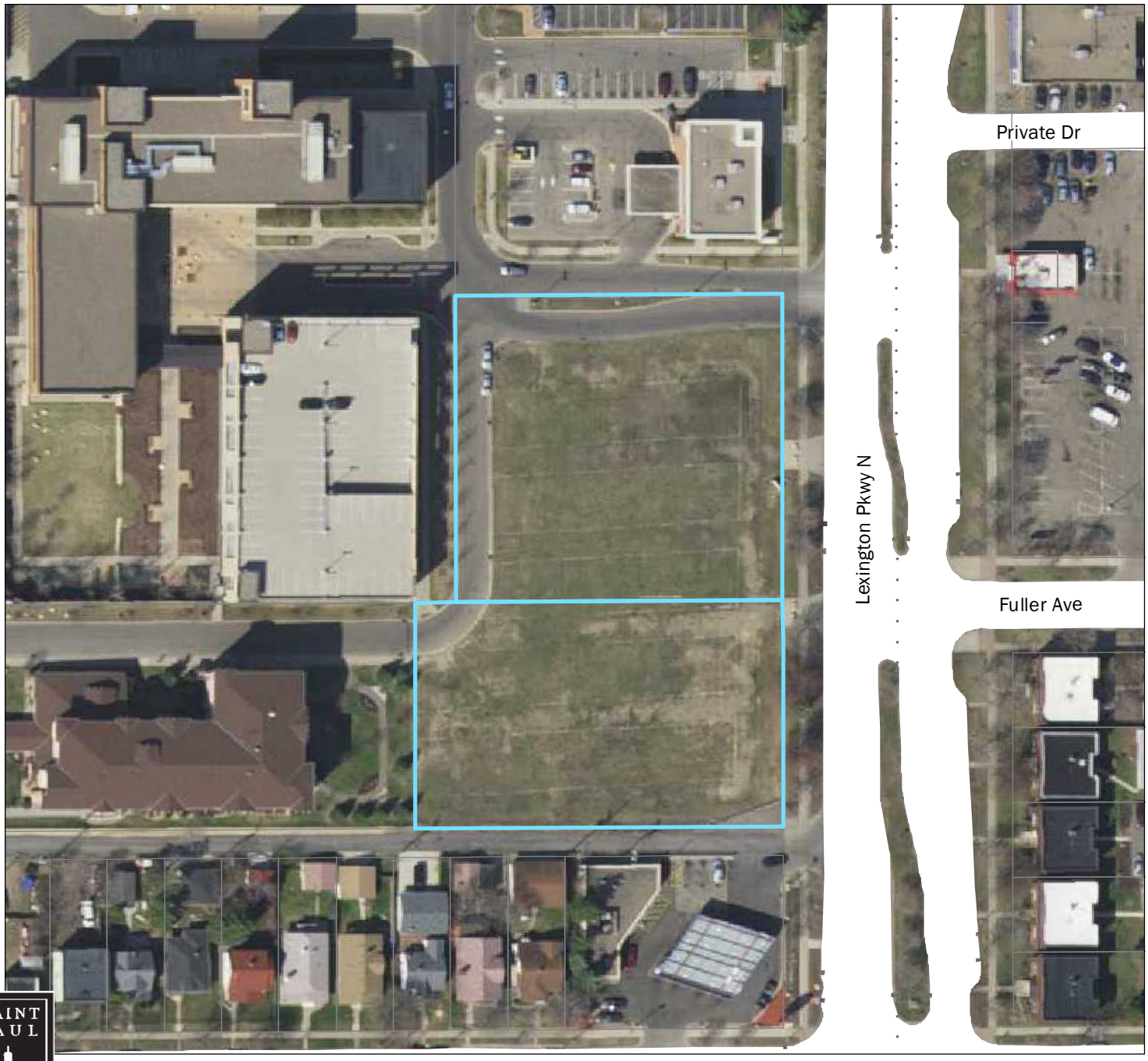
		questions.		
PW - Sewers	Anca Sima	Provide the SAC for the development to verify if it is enough capacity in the main.	Not Met	General
	Anca Sima	same swm for the block, so provide agreement between all parties and private drainage easements	Not Met	General
PW - Street Design and Construction	Ryan Lowry	Match existing roadway sections for restoration.	Unresolved	33 - C2-1 Site Plan.pdf
	Ryan Lowry	Match existing curb style (MB612, city standard plate 3106A) and cut a minimum of 2' into the roadway for restoration to ensure adequate compaction.	Unresolved	33 - C2-1 Site Plan.pdf
	Ryan Lowry	Boulevard curb tapers not necessary when built per standard plate 1206D.	Unresolved	33 - C2-1 Site Plan.pdf
		See comments		
PW - Traffic Engineering Primary Review	Elizabeth Stiffler	Turning movement exhibits used are car with trailer and panel van. What about SU-40 moving van? Show turning template of largest vehicle to be used. In addition, a letter from the owner should be provided indicating they understand and acknowledge the limitations of the loading dock area and they agree not to utilize vehicles that will encroach on the sidewalk area.	Not Met	General
	Elizabeth Stiffler	Comments for first draft of the traffic study were provided via 12/29/20 email to the traffic engineer. They will be added to Change marks section.	Not Met	General
Ramsey County	Scott Mareck	The proposed use is generally consistent with the land use element of the Ramsey County 2040 Comprehensive Plan which encourages greater intensity of use, infill and development through partnerships with cities.	Note	General
	Scott Mareck	There is a City of St. Paul planned bike trail along Fuller Avenue that approaches the development from the east. A sidewalk stub from the development is planned to align with this trail along the west side of Lexington Parkway (CSAH 51). A controlled pedestrian crossing determined by Ramsey County will need to	Note	General

		be installed across Lexington Parkway (CSAH 51) connecting the future bike trail along Fuller Avenue to the proposed development site sidewalk. Costs for this crossing will be the responsibility of the developer. The schedule for installing this crossing will need to be coordinated with the City and City plans to construct the Fuller Avenue trail.		
SPRWS	Amanda Leier	Existing 1.5" CP water service to be cut off at main.	Unresolved	32 - C1-1 Demo Plan.pdf
	Amanda Leier	Please refer to the Reviewer Attachments folder. Provide completed project data sheets. SPRWS will verify domestic service size and determine meter sizing. Fire suppression sizing must be verified by DSI Fire.	Not Met	General
	Amanda Leier	Please refer to the Reviewer Attachments folder for SPRWS Review Notes Document.	Not Met	General
	Amanda Leier, Amanda.Leier@ci.stpaul.mn.us, 651-266-6276			

Report Prepared By:

Ashley Skarda
Site Plan Review Coordinator

cc: File, Site Plan Review Staff, CRWD, MoveMN, Metro Transit, Ramsey Co



FILE #20-102-273 Aerial Map

Application of Lexington Station

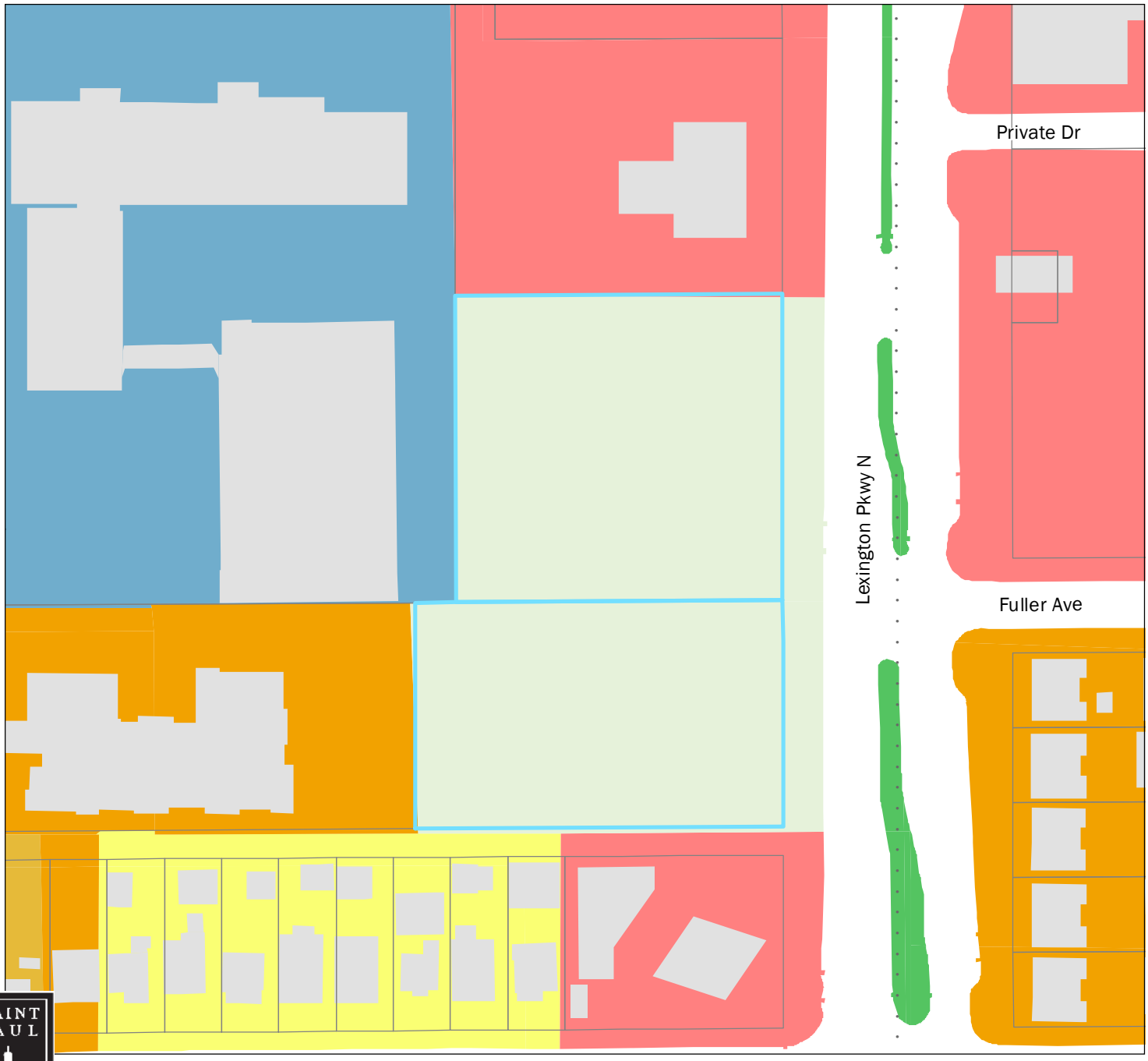
Application Type: Site Plan Review
Application Date: December 29, 2020
Planning District: 13

0 25 50 100 150 200 Feet

This document was prepared by the Saint Paul Planning and Economic Development Department and is intended to be used for reference and illustrative purposes only. This drawing is not a legally recorded plan, survey, official tax map or engineering schematic and is not intended to be used as such. Data sources: City of Saint Paul, Ramsey County, Metropolitan Council, State of Minnesota.

Subject Parcel(s) Outlined in Blue

ParcelPoly on



FILE #20-102-273 Existing Land Use

Application of Lexington Station

Application Type: Site Plan Review
Application Date: December 29, 2020
Planning District: 13

0 25 50 100 150 200 Feet

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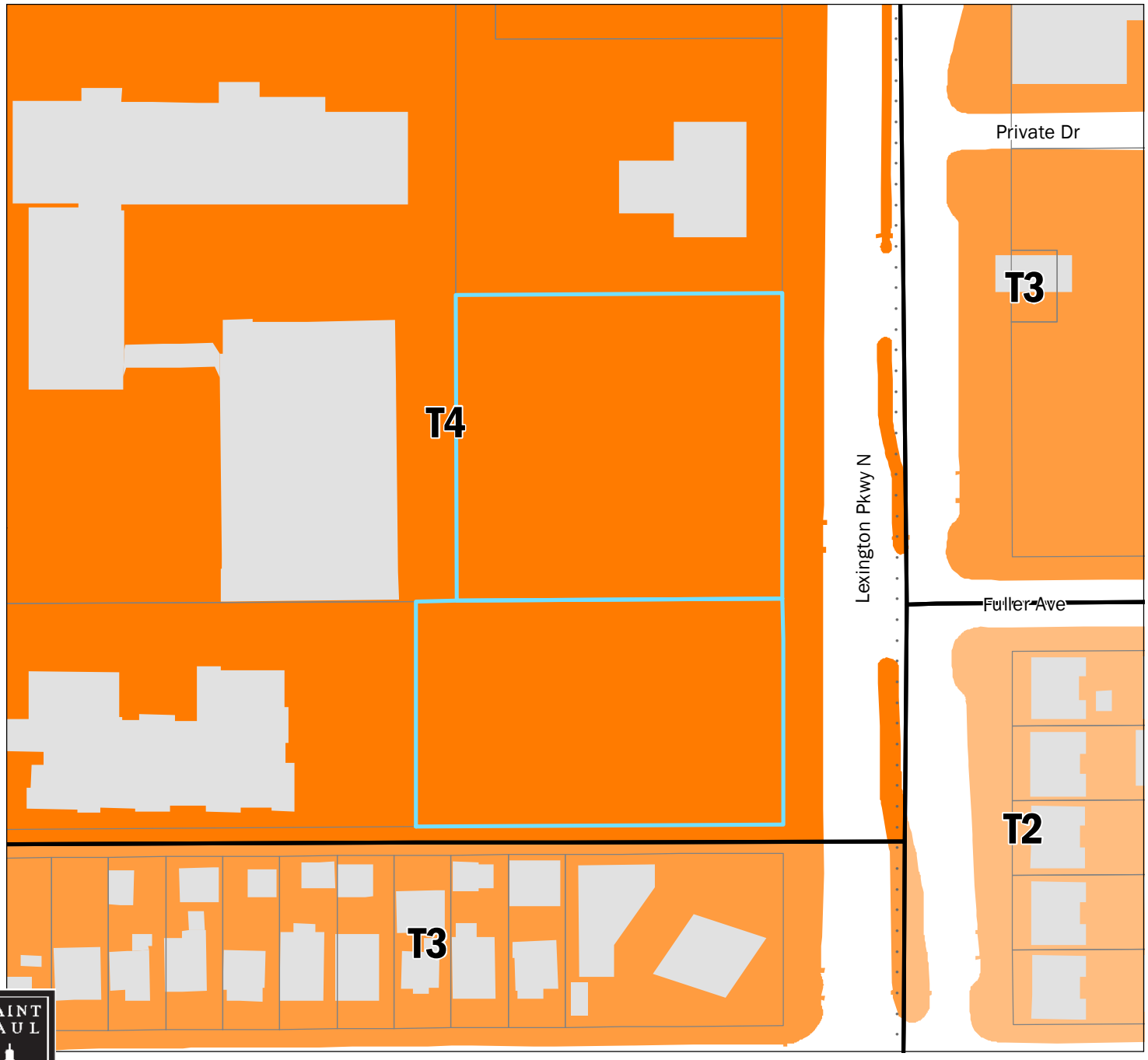
Subject Parcel(s) Outlined in Blue

- ParcelPoly on
- Farmstead
- Seasonal/Vacation
- Single Family Detached
- Manufactured Housing Park
- Single Family Attached
- Multifamily
- Office
- Retail and Other Commercial
- Mixed Use Residential
- Mixed Use Industrial
- Mixed Use Commercial and Other
- Industrial and Utility
- Extractive
- Institutional
- Park, Recreational or Preserve
- Golf Course
- Major Highway
- Railway
- Airport
- Agricultural
- Undeveloped
- Water



FILE #20-102-273 Zoning Map

Application of Lexington Station

Application Type: Site Plan Review
Application Date: December 29, 2020
Planning District: 13

0 25 50 100 150 200 Feet

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Subject Parcel(s) Outlined in Blue

- ParcelPoly on
- RL One-Family Large Lot
- R1 One-Family
- R2 One-Family
- R3 One-Family
- R4 One-Family
- RT1 Two-Family
- RT2 Townhouse
- RM1 Multiple-Family
- RM2 Multiple-Family
- RM3 Multiple-Family
- T1 Traditional Neighborhood
- T2 Traditional Neighborhood
- T3 Traditional Neighborhood
- T3M T3 with Master Plan
- T4 Traditional Neighborhood
- T4M T4 with Master Plan
- OS Office-Service
- B1 Local Business
- BC Community Business (converted)
- B2 Community Business
- B3 General Business
- B4 Central Business
- B5 Central Business Service
- IT Transitional Industrial
- ITM IT with Master Plan
- I1 Light Industrial
- I2 General Industrial
- I3 Restricted Industrial
- F1 River Residential
- F2 Residential Low
- F3 Residential Mid
- F4 Residential High
- F5 Business
- F6 Gateway
- VP Vehicular Parking
- PD Planned Development
- CA Capitol Area Jurisdiction