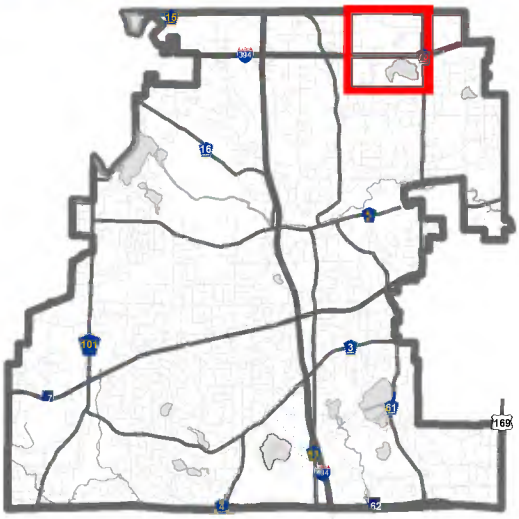
Location Map

Project: Marsh Run II Redevelopment
Address:11816 Wayzata Blvd

CITY OF MINNETONKA



DORAN
DEVELOPMENT

February 24, 2023

Loren Gordon
Senior Planner
City of Minnetonka
14600 Minnetonka Boulevard
Minnetonka, MN 55345

Re: Marsh Run II Redevelopment

Dear Mr. Gordon,

Doran is proposing a new, high-quality, Class A luxury apartment project that will be complimentary to the Birke, in the 394 Corridor regional area. This project follows the City's 2040 Comprehensive Plan for the 394 Corridor regional area. This project will add life and vitality to the north side of 394, enhancing walkability, providing an additional housing option for existing residents, attracting the next generation of residents to the city, and supporting the nearby commercial uses that exist in the neighborhood today. The project will contain an affordable housing component mixed with market-rate apartments to contribute to the City's need for attainable and affordable housing. The project will provide ample and convenient visitor parking, including 40 dedicated short term and visitor stalls located in a surface lot directly in front of the building's main entrance along Wayzata Boulevard. In addition, this project will add to the City's parks and trail system, with a pedestrian bridge and walking trail loop that preserves a majority of the site's significant trees and landscape features. This is a unique opportunity to redevelop a 4.33 acre blighted and underutilized site to create an exceptional project that will contribute to the City's goals for affordable housing, tree preservation, and the connection of parks and trails.

The project is in a recommended redevelopment TIF District by the EDAC. The Plans will include razing an existing office building on the site and constructing a 197-unit apartment project, with 10% of the units affordable to households earning 60% of the area median income, and 10% of the units affordable to households 80% of the area median income. The building will contain a mix of alcove, 1 bed, 2 bed, and 3 bed apartments with active gathering spaces for residents and guest located on the first and second levels of the building. 304 parking stalls will be constructed to support the housing project with 266 of those stalls to be internal parking and 40 as surface parking. The internal parking stalls will be contained in a two-level parking garage with one of the levels being below grade.

For the building's exterior architecture, the project is thoughtfully designed around neighborhood characteristics and concept plan feedback. From the community and City feedback during the open house and sketch review process, the exterior design seeks to be contextual, timeless, and a unique contribution to the City of Minnetonka's architecture. To lower the visual scale of the building and relate to the more traditional architecture to the North, the overall building is broken up and articulated into 5 distinct pieces with a base, middle, and top to the building form. Historical inspiration is made modern with traditional cornice, frames, and book ends translated into clean black lines, panelized forms, and black accents. To add to the existing sense of place, the material palate will complement the existing retail center and the Birke apartment building with a mountain shadow velour brick base, white and earth tone lap siding, and black

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cementitious panels and windows. To clearly call out the building entrances, black brick is used at the vehicle and pedestrian entrances; and a copper canopy on the center black brick form clearly identifies the main visitor and pedestrian entrance to the building. The building lighting will be further developed if the plans are formally approved. The project will have up/down sconces at select locations of the south elevations, along with lighting on the building canopy. Site lighting along sidewalks throughout the development will be further developed to meet code requirements.

On the north portion of the property features an existing wetland pond and walking trail loop. The development proposes a better pedestrian connection to the trail and wetland by extending a sidewalk along the eastern side of the proposed building to connect with Wayzata Blvd. The project also proposes a pedestrian bridge that will span the wetland east of the property and create a connection to Fairfield Road. Both connections will enhance the existing walking options in the neighborhood, especially for those with dogs.

The building south elevation has a height of 68' from grade which is the same height as the Birke Apartments just east of the proposed project. The proposed project is surrounded by wetland, and vacant land to the west, north and east. The eastern wetland on the property runs into the office building along Fairfield Road (11800 Wayzata Blvd). The developer will also purchase this property, with no immediate plans for redevelopment.

The developer is aware of parking concerns that exist in the neighborhood and has strategically planned for parking in this redevelopment that will accommodate the resident needs from the project, along with alleviate existing concerns in the neighborhood. The two-story podium will feature 266 parking stalls for residents. The 40 surface parking stalls will provide convenient options for short term resident and guest parking. With the Birke Apartments, the developer learned that even with plenty of excess guest stalls, when the stalls are interior to the building – they will be underutilized because they are not convenient. In addition to more surface parking, the proposed project will have a higher parking ratio than the Birke Apartments with 1.55 total parking/stalls per unit vs. the Birke's 1.40 parking stalls/unit at the Birke. To alleviate the need for additional surface parking to serve the Birke Apartments, the developer will be recording a parking easement on the 11800 Wayzata Blvd office property it plans to purchase with the acquisition of 11816 Wayzata Blvd. Peak parking demands for the office tenants on the 11800 Wayzata Blvd property are between the hours of 8:00 AM – 5:00 PM. Peak parking demands for the Birke apartments are in the hours that office tenants do not require parking, and weekends (especially in the summer months).

The site will have two points of ingress/egress – with a similar alignment of the existing property access points onto Wayzata Blvd. The western access point provides access to surface parking, the building main entrance and to the podium parking garage with internal ramping to level one. The eastern access to the parking podium will provide a connection to the lower level of the parking podium, with a move-in/delivery staging area. The access to the parking podium and move in door will wrap around a fully planted island as detailed in the Landscape Plans. The civil plans further show the option for a three-point turn around for residents to back out of the move in area or parking entrance internally before exiting onto Wayzata Blvd. The building entrance facing Wayzata Blvd is framed with a copper color sign canopy that becomes a focal point for the project.

The developer is proposing a unit of Alcove, 1-bedroom, 2-bedroom and 3-bedroom units. All units will feature direct access balconies or patios and luxury finishes. The project will feature a strategically placed entertainment suite available to all residents on level 6 at the northeast corner of the building. This location facing north, will allow residents to take in one of the best natural viewsheds of the property facing the wetland and large trees. The entertainment suite will have a connected balcony, naturally allowing the building to step down which is also the only portion of the building

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in any shadow proximity of neighboring housing. The property will have an amenity deck on level two, facing west/southwest to allow for the best sunlight. The amenity deck will feature a pool, spa, multipurpose green space, firepits and grilling stations. Additional amenities throughout the project include:

- A business center;
- Flex work space;
- Clubroom;
- Entertainment Suite;
- Exercise facility;
- Dog park;
- Golf simulator;
- Site trail

The amenity deck pool will close at dusk when seasonally open during the year. Other amenities on the amenity deck would close by 10 p.m. as consistent with the City of Minnetonka noise ordinance. The property would also have security cameras to monitor this area and the rest of the property.

The Missing Middle & Affordable Units

The proposed project will incorporate 20% of the units affordable to households earning 60% and 80% AMI, what is referred to the "missing middle." The missing middle is defined as middle income households that continue to face a growing shortage of affordable housing supply, while incomes of these middle-income workers have not paced with the rising housing costs. According to a recent Urban Land Institute Study in Minnesota (ULI) affordable housing production has disproportionately targeted developing units at our below 60% AMI due to Low Income Tax Credit requirements. Multifamily projects at a state and local level that qualify under a Housing TIF District require units with deeper affordability levels. Low Income Tax Credit programs across the state of Minnesota require projects to have units affordable to households at or below 60% AMI, with most projects at even deeper affordability levels (30 & 50% AMI) to remain competitive. There is a real need for units affordable to households at 80% AMI, with only 97 of the 8,627 rental units affordable to this income. With a growing gap of units developed in the missing middle, the developer looks forward to being part of the local solution of the missing middle by adding a proposed 40 affordable units in the project.

Office Tenants & Relocation

With the acquisition of the office building, the developer plans to assist any businesses with active leases. The developer will have vacant space available in the adjacent 11800 Wayzata Blvd property it is also purchasing, along with office space in another property acquisition within 5 minutes of the property.

Evolution of the Project Design

On November 29, 2022, we hosted a neighborhood meeting at the Birke Community/Entertainment Room. The plans were further developed by our architecture team to show more site plan details, and unit mix/floor plans. The architecture team also prepared three building elevations in hopes to gain feedback from attendees on which elevation was the most reflective of the neighborhood. There was consensus that building elevation "3" was the best fit for their neighborhood and to complement existing developments. The initial Neighbor feedback on building scale, shadows concerns, protection of the site's environmental features and wildlife, dog walking and parking. Parking concerns for the

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proposed project were discussed with more concerns over the existing parking issues along Fairfield Road and a request of the developer to find a solution.

Following this meeting, we presented the concept to the Planning Commission on January 16, 2023 & City Council on January 30th. This was the same concept plan shared with neighbors in November, but with one chosen elevation, shadow and height exhibits also prepared by our architecture team. During the Planning Commission meeting, three neighbors voiced the same concerns that heard at the November neighborhood meeting. The main three concerns discussed in detail were dog walking/waste, building scale and parking/Birke parking issues. The Planning Commissioners requested the developer find permanent solutions to the apparent parking overflow of Birke residents onto Fairfield Road. We discussed how the Marsh Run II proposed project would have a higher parking stall/unit ratio than the Birke. Most importantly, the proposed project would have an immense amount of surface and guest parking as it compares to the Birke. The City Council had similar feedback as it relates to concerns over the Birke parking. The Council requested further analysis on the exterior elevations to differentiate the project from other projects in Minnetonka. The Council also requested to understand uses of the TIF request beyond the affordable units.

The Economic Development Advisory Commission (EDAC) reviewed the TIF request in the amount of $4.6 million on January 26th. The 11800 & 11816 Wayzata Blvd. parcels were both classified as functionally obsolete and blighted to further classified as a Redevelopment TIF District. With a Redevelopment TIF district, there is more flexibility on determining the mix of affordable units in the project. The selected mix of units affordable to households earning 60% and 80% of the area median income (AMI) was agreed upon by City staff and the developer. City staff reviewed their recently completed housing market report, and real time housing dashboard. Staffed reported there are many units in this area serving households earning at or below 50% AMI. This area is in specific need of more units affordable to households earning 60% and 80% AMI. As outlined above, there are many reasons there is low production of units for the "missing middle" – units affordable to households earning between 60-80% AMI.

Feedback Through Concept Review

Below are the concerns raised from the neighborhood, Planning Commission and City Council and how every item has been addressed to alleviate or compromise on all the concerns.

- This project will add stress to the existing parking concerns along Fairfield Road
    - The project will provide many more convenient surface stalls (40) for guest and short-term parking. We are advocating for the city to install additional no parking signs along Fairfield Road. Our Birke property management team is happy to be part of the ongoing solution and communication to its residents to correct the parking along this road. The commitment to a permanent parking easement at 11800 Wayzata Blvd. will provide another option for Birke residents and guest looking for a convenient location to park. The rest of the guest parking at the Birke can be accessed through the parking garage which is only entered off Wayzata Boulevard. There are plenty of vacant stalls currently available within the building.
- The amount of additional traffic along Wayzata Blvd.
    - As part of the application process the city will order a traffic study (paid for by Doran Companies) to look at the impacts that the development could have on the intersections at the development and secondary intersections that could see potential impacts. If there are impacts, the traffic engineer will provide suggestions to improve the level of service of the direct or indirect intersections.
- The building will cast a shadow to northern townhomes along Fairfield Court

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- After the architecture team completed a shadow study of the project, the building was stepped down the at the northeast corner by moving the entertainment suite and balcony to the only portion of the building with any shadow impacts to neighbors. The closest distance to the NE building corner to the SE corner of the neighboring townhomes is 226', which significantly exceeds existing PID zoning setback requirements.
- With the rework of the building in the northeast corner of the project, during the lowest sunlight season evening hours, the projects shadow does not directly impact the neighbors.

- Loss of privacy with the trees surrounding the property
  - A majority of the trees on the property are within the delineated wetland boundaries and will remain. The proposed project also follows a very similar footprint to the existing office complex, allowing us to retain as many trees as possible. The developer will be required to submit and comply to a tree preservation plan with the city.
- The additional people and dogs in the neighborhood using the local trails and sidewalks, affecting the other homeowner association's fees and changing the quiet neighborhood.
  - There is an existing passive walking trail around the wetland pond to the north portion of the property. The development proposes a better pedestrian connection to the trail and wetland by extending a sidewalk along the eastern side of the proposed building to connect with Wayzata Blvd. The project also proposes a pedestrian bridge that will span the wetland east of the property and create a connection to Fairfield Road. Both connections will enhance the existing walking options in the neighborhood, especially for those with dogs.
- Birke residents are leaving dog waste throughout sidewalks and HOAs nearby.

  Anyone who lives at the Birke or the proposed project with a dog will be required to have the dog take a DNA test to track their dogs if any issues arise on the property. This will help in reminding the residents to clean up after their dogs wherever they go. We are happy to be part of a community solution around the dog waste issue in the neighborhood.
- The impact to the environment and wetlands by the project
  - As part of any project, we have completed environmental studies to determine the wetland boundaries and associated protections of those wetlands. The proposed project meets all required setbacks from the site wetlands. Both our contractor and the city have requirements or guidelines that are to be followed during construction to ensure that the project does not affect the environment of the site. One of these items is a SWPPP or Storm Water Pollution Prevention Plan that would help guide the site, so no sediment is let off the site and would affect the storm water that may run into other local bodies of water.
  - The proposed wetland bridge plans to span the wetland to the east of the site. If the plans progress, the bridge design and construction will need to be further studied. The developer will work closely with the City and Bassett Creek Watershed district on a bridge design that minimizes or has no impact to the wetland.
- The overall design, height, scale and density of the project
  - The proposed project is further away from any residential neighbors than the Birke project is, surrounded by natural features that will remain on the site to the west, north and east & Interstate 394/Wayzata Blvd directly facing south. The building height is similar to the Birke and Bayhill Condominiums to the north (68' and 52' high buildings respectively). With the project sitting at a height that would create a consistent visual transition along the 394 corridor, the project is less dense than the Birke: 68 units/acre verses 48 units/acre.

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- The amenity deck and pool area location – why is this building amenity not on the north side of the building?
    - The amenity deck's location facing south-west will optimize the highest amount of daylight hours – allowing for a more desirable building amenity.

Governmental Approvals

Below are the applications that are submitted as part of this entitlement package. We request that each individual application be taken action on individually in the order established below.

Rezoning to a Planned Unit Development (PUD)

The proposed project site is currently guided mixed use in the City's comprehensive plan allowing for high-density residential. The city 2040 comprehensive plan also encourages redevelopment of housing near area services and retail, while providing access to transit & create more pedestrian friendly neighborhoods. We believe the project will meet a public benefit and comprehensive plan goals as an outcome of the rezoning request. The rezoning request is to change the zoning from a PID (Planned I-394 District) to a PUD (Planned Unit Development). The City is looking to add diverse housing and affordable housing units. As further described below, the mix of units affordable to households earning 60% and 80% AMI was strategically selected based on the City's housing dashboard. This mix of affordable units will bring much-needed units to the "missing middle" – units affordable to households earning 60-80% AMI. These households are a key part of our community workforce. The project will also add additional high-quality housing stock near retail services, and public transportation. The project site is within two blocks of a retail center along Wayzata Blvd, along with a ¼ mile from Ridgedale Center. The proposed project brings housing to a site with two high-frequency bus stops outside of the property. Lastly, the project will greatly increase pedestrian connections with a neighborhood trail connection made to Wayzata Blvd and Fairfield Road.

Site and Building Plan Review

As required with the Minnetonka zoning code, we have prepared a site and building plan review application. This application will provide architectural plans and renderings to show the project. The application also includes civil plans, landscape plans, wetland delineation, tree plans and other items to help the City staff, Planning Commission and City Council to review and approve. Attached with the Site and Building Plan Review application are the following: legal description, survey, architectural site plan, grading and drainage plan, street and utility plan, tree plans, wetland delineation, landscape plan, floor plans and this as the written statement/project narrative.

Master Development Plan

A master development plan is submitted. This application has all the same information that the site and building plan review application has. The information will provide a larger understanding of the project and help City staff determine if there are any issues with the overall development of the site. The approval of the master development plan application will be the legal control governing the development of the property within the PUD. Attached with the Master Development Plan application are the following: legal description, survey, architectural site plan, grading and drainage plan, street and utility plan, tree plans, wetland delineation, landscape plan, building renderings, floor plans and this as the written statement/project narrative.

Conclusion

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This project will significantly contribute to the City's goals and neighborhood's needs with high quality & affordable housing; a meaningful contribution to the City's parks and trails system; preserved significant trees; ample & convenient visitor parking; and a contextual & timeless architecture that's unique to the City of Minnetonka. Enclosed are the land use applications & supplementary plans/documents for review. Please feel free to reach out with any questions.

Sincerely,

Tony Kuechle
Doran RE Partners, LLC

7803 Glenroy Road, Suite 200 | Bloomington, MN 55439 | **952.288.2000** | Fax: 952.288.2001 | www.DoranCompanies.com

Exhibit A – Legal Description

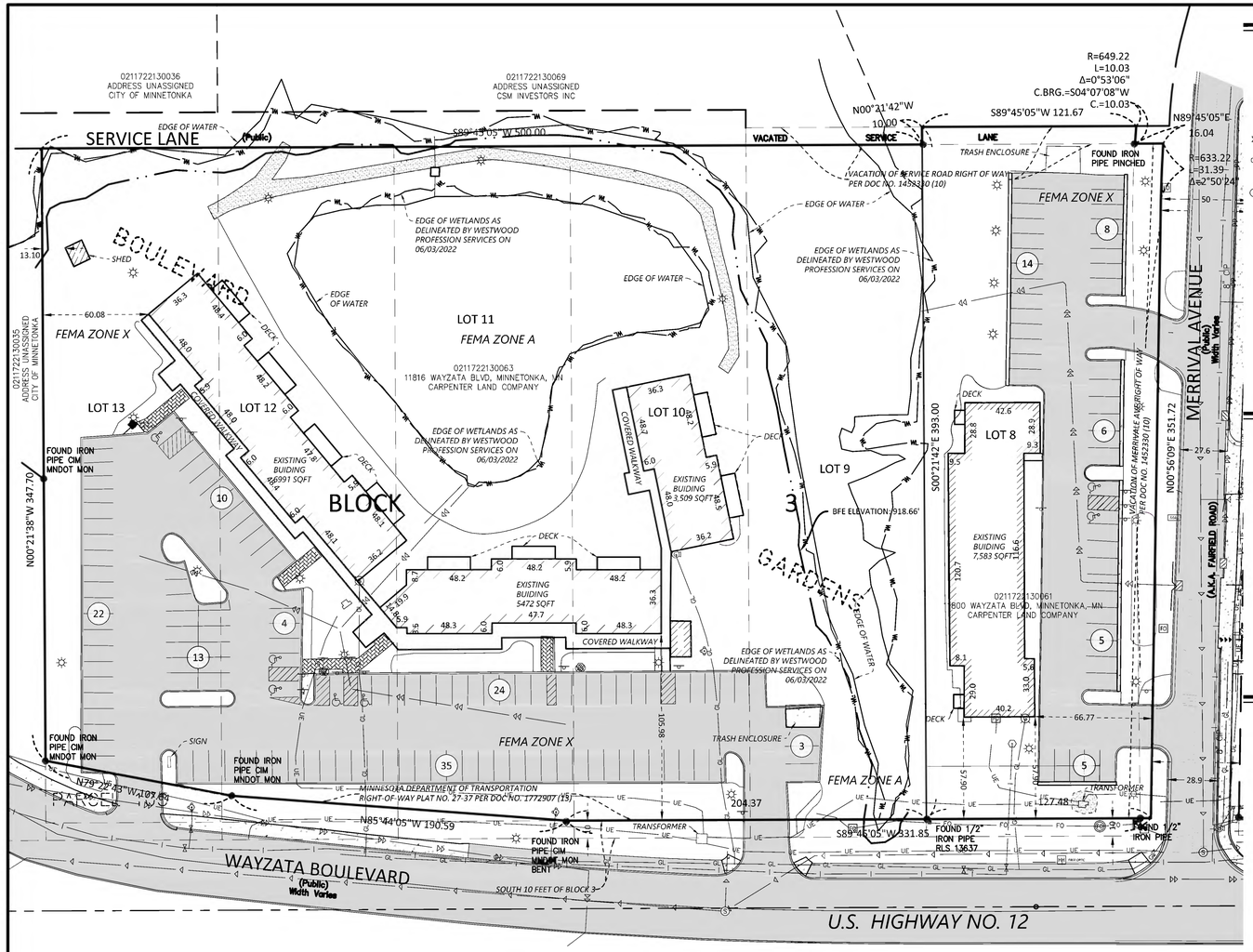
Par 1: Lot 8, Block 3, except the South 10 feet taken for widening Superior Boulevard; and That part of vacated Marrivale Ave. described as follows: beginning at a point on the East line of Lot 8, Block 3, in said plat distant 10.00 feet North of the Southeast corner of said Lot 8; thence; East, parallel with the South line of said Lot 8, a distance of 6.00 feet; thence Northerly to the point of intersection with a line which runs parallel with and 50.00 feet Westerly from the Easterly line of said Avenue, said point of intersection being 31.52 feet Southerly of the Easterly extension of the North line of said Lot 8, as measured along the last said parallel line; thence Northerly along said parallel line, a distance of 31.52 feet ot said Easterly extension of the North line of Lot 8; thence West along said Easterly extension, to the Northeast corner of said Lot 8; thence Southerly, along said East line of Lot 8, to said point of beginning; That part of Service Lane lying South of the center line thereof and between the Westerly right-of-way line of Merrivale Ave. and a Northerly extension of the Westerly line of Lot 8, Block 3, "Boulevard Gardens, Hennepin Co. Minn."

Par 2: Lots 9, 10, 11, 12 and 13, Block 3, "Boulevard Gardens, Hennepin Co. Minn.", except the South 10 feet of said Lots 9, 10, 11, 12 and 13 and except that part of said Lots 11, 12 and 13 that is designated and delineated as Parcel 10C on the Minnesota Department of Transportation Right-of-Way plat No 27-37.

Subject to a perpetual easement in favor of the City of Minnetonka, its successors and/or assigns for public purposes over, under and across Merrivale Avenue as shown in Document No 1452330; (as to Par 1)

Subject to a reservation by the State of Minnesota of minerals and mineral rights; (as to Lot 9 in Par 2)

PID 02-117-22-13-0063



LEGEND

- FOUND MONUMENT
- FOUND CAST IRON MONUMENT
- FOUND RIGHT-OF-WAY MONUMENT
- SET MONUMENT MARKED LS
- GATE VALVE / HYDRANT
- SANITARY MANHOLE
- CLEAN OUT
- STORM MANHOLE
- STORM CATCH BASIN
- FLARED END SECTION
- TRANSFORMER
- LIGHT
- GUY ANCHOR
- UTILITY POLE
- GUARD POST
- SIGN
- GAS METER
- GAS MANHOLE
- ELECTRIC MANHOLE
- ELECTRIC METER
- TELEPHONE PEDESTAL
- CABLE TV BOX
- COMMUNICATIONS MANHOLE
- BOUNDARY LINE
- RIGHT-OF-WAY LINE
- UNDERLYING / ADJACENT LOT
- TIE LINE
- SECTION LINE
- (100.00) DEED DISTANCE
- WATERMAIN
- SANITARY SEWER
- STORM SEWER
- UNDERGROUND ELECTRIC
- UNDERGROUND TELEPHONE
- UNDERGROUND GAS
- OVERHEAD ELECTRICAL WIRE
- CHAIN LINK FENCE
- WOOD FENCE
- WIRE FENCE
- WET LAND
- RETAINING WALL
- BLOCK RETAINING WALL
- STONE RETAINING WALL
- POND / WATER LINE
- FEMA FLOOD ZONE LINE
- EASEMENT LINE
- SETBACK LINE
- RESTRICTED ACCESS
- TREE LINE
- CONCRETE CURB
- BUILDING LINE
- BUILDING CANOPY
- BITUMINOUS SURFACE
- CONCRETE SURFACE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SPOT ELEVATION
- CONTOUR
- SOIL BORING
- REGULAR PARKING STALL COUNT
- TRAFFIC MARKERS

SURVEY NOTES

1. This survey was prepared utilizing Title Commitment No. NCS-1148042-MPLS by First American Title Insurance Company , bearing an effective date of 09/02/2022.
2. The bearing system is based on the Hennipin County coordinate system, NAD83 (1986 Adjust), with an assumed bearing of north 89 degrees 45 minutes five seconds east for the South line of the Northeast quarter , Section 2 , Township 117 , Range 22.
3. Improvements depicted on this survey are a combination of data collected by Sambatek and by others.

SUBJECT PROPERTY

Description from title commitment:

Parcel 1: Lot 8, Block 3, except the South 10 feet taken for widening Superior Boulevard; and That part of vacated Marrivale Avenue described as follows:

Beginning at a point on the East line of Lot 8, Block 3, in said plat distant 10.00 feet North of the Southeast corner of said Lot 8; thence; East, parallel with the South line of said Lot 8, a distance of 6.00 feet; thence Northerly to the point of intersection with a line which runs parallel with and 50.00 feet Westerly from the Easterly line of said Avenue, said point of intersection being 31.52 feet Southerly of the Easterly extension of the North line of said Lot 8, as measured along the last said parallel line; thence Northerly along said parallel line, a distance of 31.52 feet of said Easterly extension of the North line of Lot 8; thence West along said Easterly extension, to the Northeast corner of said Lot 8; thence Southerly, along said East line of Lot 8, to said point of beginning; That part of Service Lane lying South of the center line thereof and between the Westerly right-of-way line of Merrivale Avenue and a Northerly extension of the Westerly line of Lot 8, Block 3, "Boulevard Gardens, Hennepin County Minnesota."

Parcel 2: Lots 9, 10, 11, 12 and 13, Block 3, "Boulevard Gardens, Hennepin County Minnesota.", except the South 10 feet of said Lots 9, 10, 11, 12 and 13 and except that part of said Lots 11, 12 and 13 that is designated and delineated as Parcel 10C on the Minnesota Department of Transportation Right-of-Way plat No 27-37.

The following notes correspond to the reference numbers listed in Schedule B, Section 2 of the title commitment.

10. Subject to a perpetual easement in favor of the City of Minnetonka, its successors and/or assigns for public purposes over, under and across Merrivale Avenue as shown in Document No 1452330; (as to Par 1) shown as a recital on the Certificate of Title. **According to the description in said document, the Right-of-Way lies within the surveyed property as shown hereon.**
11. Subject to a reservation by the State of Minnesota of minerals and mineral rights; (as to Lot 9 in Par 2), shown as a recital on the Certificate of Title. **The document is blanket in nature and are not graphically depicted**
12. Easement for highway purposes (Trunk Highway No. 12) acquired by State of Minnesota over Southerly 10 feet together with the right of construct and maintain temporary snow fences on lands adjacent thereto, as evidenced by Final Certificate, recorded January 14, 1938, as Document No. 139851 (Not reflected on the Certificate of Title). **According to the description in said document, the Right-of-Way lies adjacent to the surveyed property as shown hereon.**
13. State Right-of-Way Plat, recorded November 6, 1986, as Document No. 1772907.**According to the description in said document, the Right-of-Way is the southern boundary of the surveyed property as shown hereon.**
14. No right of access exists from premises to Interstate Highway No. 394. Right of access was acquired by the State of Minnesota as evidenced by Final Certificate, recorded September 12, 1990 as Document No. 2123328. (Not reflected on the Certificate of Title) **According to the description in said document, the Right of Access adjoins the surveyed property as shown hereon. Based on the description in said document, the right of access to Parcel 10-C was not specifically taken by said document. The Surveyor is not depicting any access restrictions on the survey. Direct access to Interstate 394 is obstructed by a chainlink fence on the south side of Wayzata Boulevard frontage road.**
15. Terms and conditions as contained in Planning Commission Resolution No. 2019-06, recorded March 21, 2019, as Document No. T05601870. **According to the description in said document, the resolution does not lie within or benefit the surveyed property and is not graphically depicted hereon.**

"TABLE A" NOTES

1. The survey shows property corner monuments or witness to the corner that were found during the field work, as well as property corner monuments or witness to the corner set by the surveyor at locations where there did not appear to be any evidence of an existing monument.
2. The address of the surveyed property is shown on the graphical portion of the survey.
3. The surveyed property lies within Flood Plain Zone X – 'Areas determined to be outside the 0.2% annual chance flood plain' and Zone A, as depicted by scaled map location and graphic plotting according to FEMA, FIRM Map No. 27053C0331F dated 11/04/2016.
4. The gross land area of the surveyed property is 5.260 Acres or 229,125 Square Feet.

7a. The buildings and exterior dimensions of the outside wall at ground level are shown on the survey, which may or may not be the foundation wall.

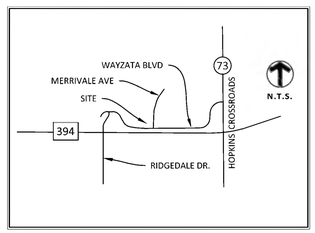
7b1. The square footage of the buildings is are shown on the survey square feet, measured at ground level.

8. Visible substantial features observed in the process of conducting the fieldwork are shown hereon.
9. The parking areas and striping on the surveyed property are shown. There are 7 striped handicap parking stalls, and there are 149 striped regular parking stalls for a total of 146 striped parking stalls.

11. Evidence of underground utilities existing on or serving the surveyed property is shown per the following:
a) Plans and/or reports were provided by the client.

13. The names of adjoining land owners according to the current county tax records as of 01/16/2023 are shown on the survey.
16. There is no evidence of recent earth moving work, building construction or building additions observed in the process of conducting the fieldwork for this survey.
17. No changes in street right of ways are proposed per CITY OF MINNETONKA website. There is no observable evidence of recent street or sidewalk construction or repair.
18. Plottable off site easements and servitudes disclosed in the provided title documents and/or observed during the field work that appear to benefit and/or affect the subject property are shown hereon.
19. Evidence of professional liability insurance obtained by the surveyor will be furnished upon request.

VICINITY MAP



CERTIFICATION

To Doran RE Partners, LLC, a Minnesota limited liability company and First American 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 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 2, 3, 4, 7(a), 7(b)(1), 8, 9, 11(a), 13, 16, 17, 18, and 19 of Table A thereof. The field work was completed on 01/09/2023.

Dated this 20th day of January, 2023.

Sambatek, Inc.

Mark R. Salo
Minnesota License No. 43933
msalo@sambatek.com

NORTH

0 40 80
SCALE IN FEET

NO	DATE	BY	CKD	APPR	COMMENT

DRAWN BY: CDJ
DESIGNED BY:
CHECKED BY: JN
PROJECT NO.

Sambatek
www.sambatek.com
Engineering | Surveying | Planning | Environmental

ALTA/NSPS Land Title Survey

DORAN RE PARNERS, LLC
MARSH RUN II
11900 WAYZATA BLVD
MINNETONKA, MN

SHEET 1 OF 1
REV. A

22.0S (LMS TECH) | MARK SALO, LS (MN, OK, WI) | 1/20/2023 12:40:28 PM
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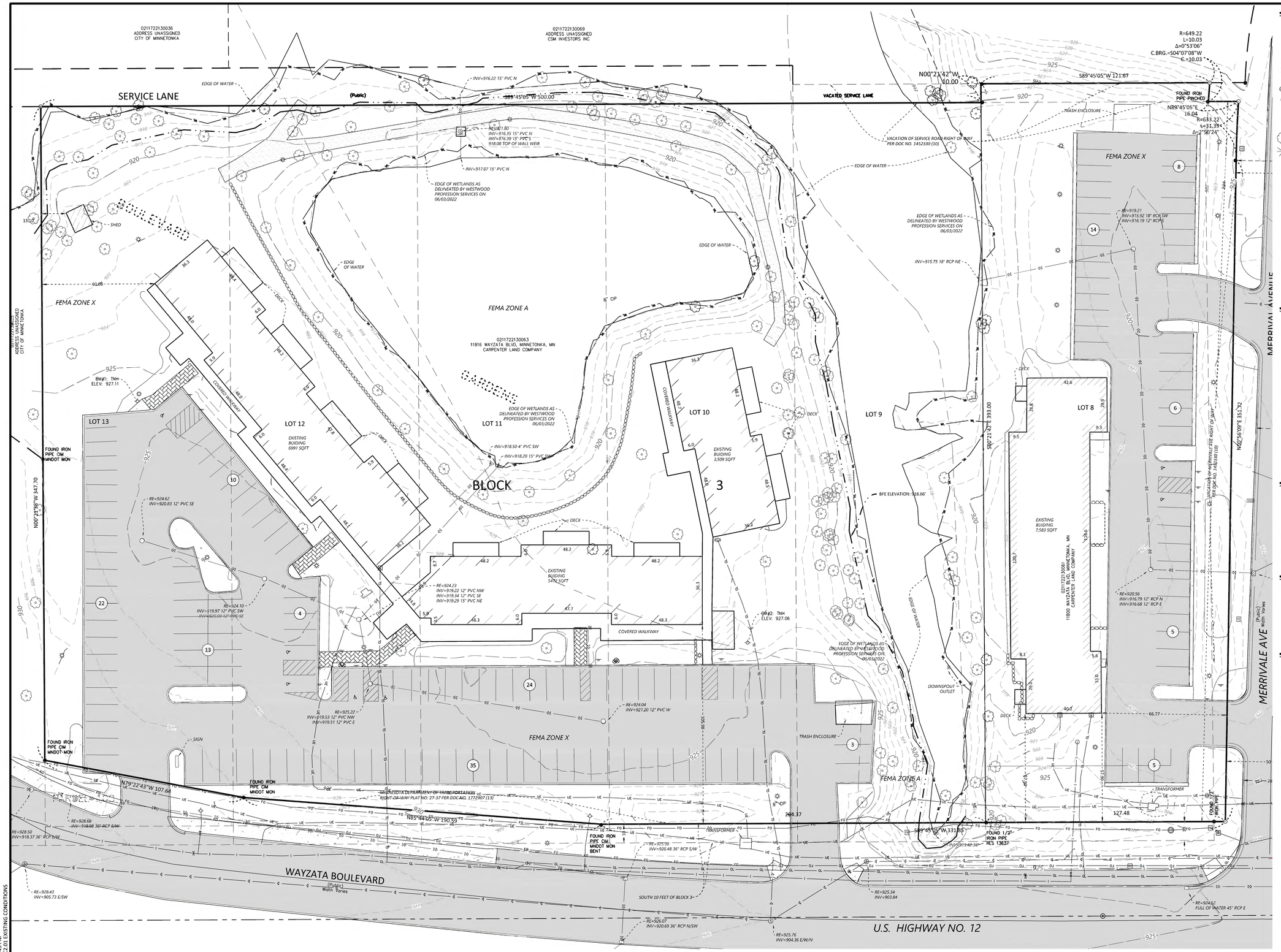

LEGEND

- FOUND MONUMENT
- SET MONUMENT MARKED 43933
- ELECTRIC METER
- LIGHT
- AIR CONDITIONER
- GUY ANCHOR
- HANDICAP STALL
- UTILITY POLE
- POST
- SIGN
- DECIDUOUS TREE
- CONIFEROUS TREE
- WATERMAIN
- SANITARY SEWER
- FORCEMAIN (SAN.)
- STORM SEWER
- FLARED END SECTION
- ELECTRIC TRANSFORMER
- TELEPHONE PEDESTAL
- GAS METER
- OVERHEAD WIRE
- CHAIN LINK FENCE
- IRON FENCE
- WIRE FENCE
- WOOD FENCE
- EASEMENT LINE
- SETBACK LINE
- RESTRICTED ACCESS
- CONCRETE CURB
- BUILDING LINE
- BUILDING CANOPY
- BITUMINOUS SURFACE
- CONCRETE SURFACE
- LANDSCAPE SURFACE

DESCRIPTION

PARCEL 1:
LOT 8, BLOCK 3, EXCEPT THE SOUTH 10 FEET TAKEN FOR WIDENING SUPERIOR BOULEVARD; AND THAT PART OF VACATED MARRIVALE AVENUE DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE EAST LINE OF LOT 8, BLOCK 3, IN SAID PLAT DISTANT 10.00 FEET NORTH OF THE SOUTHEAST CORNER OF SAID LOT 8; THENCE; EAST, PARALLEL WITH THE SOUTH LINE OF SAID LOT 8, A DISTANCE OF 6.00 FEET; THENCE NORTHERLY TO THE POINT OF INTERSECTION WITH A LINE WHICH RUNS PARALLEL WITH AND 50.00 FEET WESTERLY FROM THE EASTERLY LINE OF SAID AVENUE, SAID POINT OF INTERSECTION BEING 31.52 FEET SOUTHERLY OF THE EASTERLY EXTENSION OF THE NORTH LINE OF SAID LOT 8, AS MEASURED ALONG THE LAST SAID PARALLEL LINE; THENCE NORTHERLY ALONG SAID PARALLEL LINE, A DISTANCE OF 31.52 FEET OF SAID EASTERLY EXTENSION OF THE NORTH LINE OF LOT 8; THENCE WEST ALONG SAID EASTERLY EXTENSION, TO THE NORTHEAST CORNER OF SAID LOT 8; THENCE SOUTHERLY, ALONG SAID EAST LINE OF LOT 8, TO SAID POINT OF BEGINNING; THAT PART OF SERVICE LANE LYING SOUTH OF THE CENTER LINE THEREOF AND BETWEEN THE WESTERLY RIGHT-OF-WAY LINE OF MERRIVALE AVENUE AND A NORTHERLY EXTENSION OF THE WESTERLY LINE OF LOT 8, BLOCK 3, "BOULEVARD GARDENS, HENNEPIN COUNTY MINNESOTA."

PARCEL 2:
LOTS 9, 10, 11, 12 AND 13, BLOCK 3, "BOULEVARD GARDENS, HENNEPIN COUNTY MINNESOTA.", EXCEPT THE SOUTH 10 FEET OF SAID LOTS 9, 10, 11, 12 AND 13 AND EXCEPT THAT PART OF SAID LOTS 11, 12 AND 13 THAT IS DESIGNATED AND DELINEATED AS PARCEL 10C ON THE MINNESOTA DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAY PLAT NO 27-37.

PROPERTY SUMMARY

1. SUBJECT PROPERTIES ADDRESS IS 11816 WAYZATA BLVD, ITS PROPERTY IDENTIFICATION NUMBER IS 02-117-22-13-0063.
2. THE GROSS AREA OF THE SUBJECT PROPERTY IS 5.490 ACRES OR 239,125 SQUARE FEET.
3. THE SUBJECT PROPERTY IS ZONED PID, PER ZONING APPLICATION FOUND ON THE CITY OF MINNETONKA WEBSITE.
4. THE BUILDING(S) AND EXTERIOR DIMENSIONS OF THE OUTSIDE WALL AT GROUND LEVEL ARE SHOWN ON THE SURVEY. IT MAY NOT BE THE FOUNDATION WALL.

BENCHMARKS

1. THE VERTICAL DATUM IS BASED ON NAVD88. THE ORIGINATING BENCH MARKS ARE 2789 BJ AND 2789 BK, BOTH REFERENCED FROM THE MNDOT GEODETIC DATABASE

BENCHMARK #1
TNH ELEV.=927.11
BENCHMARK #2
TNH ELEV.=927.06

SURVEY NOTES

1. THE BEARING SYSTEM IS BASED ON THE HENNEPIN COUNTY COORDINATE SYSTEM, NAD83 (1986 ADJUST). WITH AN ASSUMED BEARING OF NORTH 89 DEGREES 45 MINUTES 5 SECONDS EAST FOR THE SOUTH LINE OF THE NORTHEAST QUARTER, SECTION 2, TOWNSHIP 117, RANGE 22.
2. FIELD WORK WAS COMPLETED ON 01/26/2023.
3. IMPROVEMENTS DEPICTED ON THIS SURVEY ARE A COMBINATION OF DATA COLLECTED BY SAMBATEK AND BY OTHERS.

NORTH
0 20 40
SCALE IN FEET

NO	DATE	BY	CKD	APPR	COMMENT
	02/23/2023	JMW	EJC	JB	Preliminary Site Plans

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

Print Name: MARK SALO

Date 02/24/2023 License # 43933

PRELIMINARY 02/24/2023	DRAWN BY DT
DESIGN REVIEW	DESIGNED BY DT
PERMIT SUBMITTAL	CHECKED BY MRS
CONSTRUCTION DOCUMENTS	PROJECT NO. 51414

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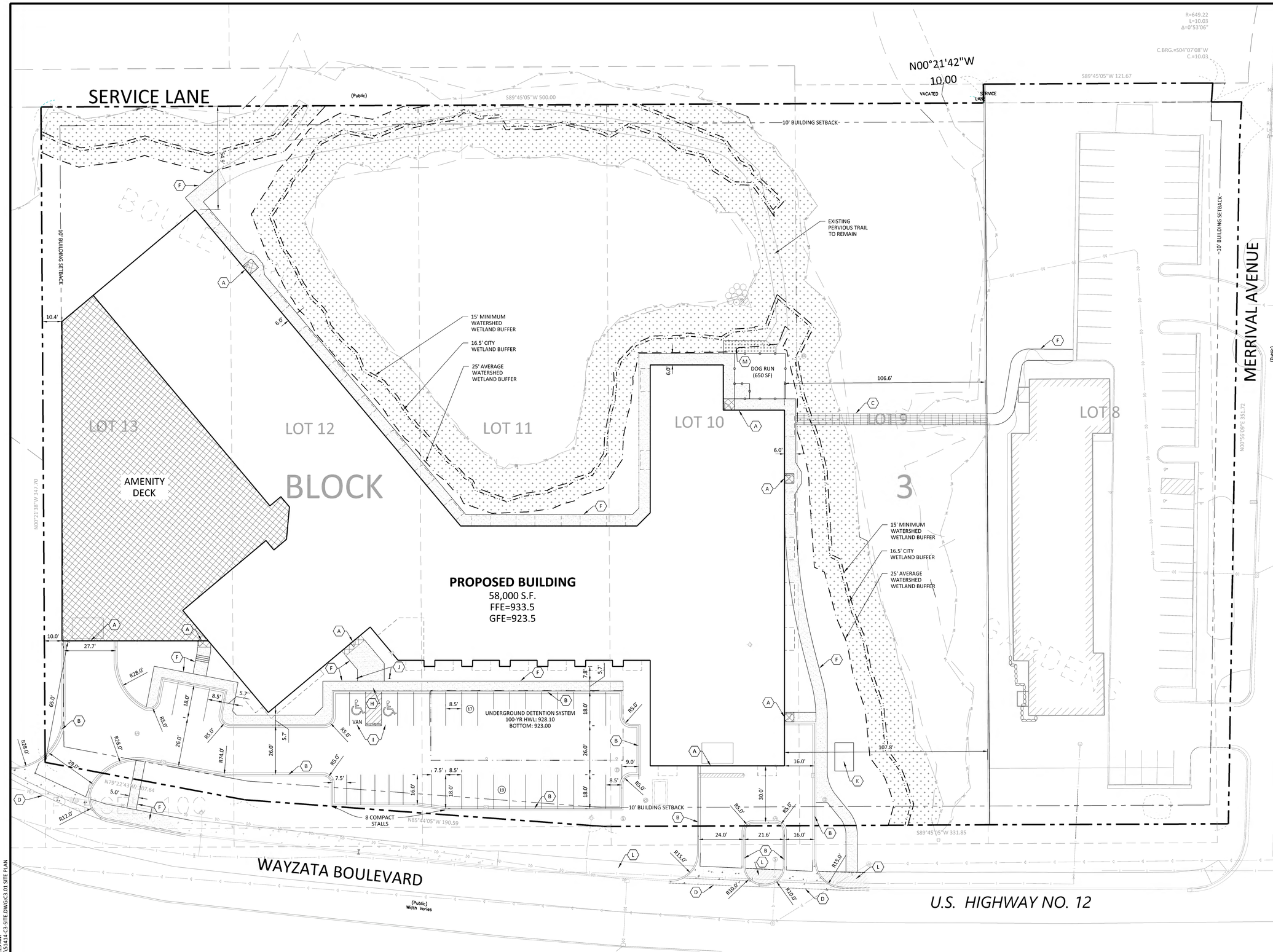
EXISTING CONDITIONS

DORAN COMPANIES
MARSH RUN II REDEVELOPMENT
PRELIMINARY SITE DEVELOPMENT PLANS
MINNEOTNKA, MN

SHEET C2.01 REV.

24 15 LMS TECH | JOSEPH BAILEY | 2/22/2023 6:47:45 PM
L:\PROJECTS\1414\CAD\SHEETS\1414-C2.02EXCND.DWG C2.01 EXISTING CONDITIONS



LEGEND

PROPOSED / EXISTING

- BOUNDARY LINE
- CONCRETE CURB
- EASEMENT LINE
- BUILDING LINE
- RETAINING WALL
- WETLAND
- TREE LINE
- SAW CUT LINE
- SIGN
- BOLLARD
- PARKING STALL COUNT
- KEY NOTE
- LIGHT POLE (BY OTHERS)
- STANDARD DUTY ASPHALT PAVING
- HEAVY DUTY ASPHALT PAVING
- CONCRETE PAVING
- CONCRETE SIDEWALK
- PAVEMENT BY OTHERS (SEE ARCHITECTURAL PLANS)
- GRAVEL TRAIL
- 25' AVERAGE WETLAND BUFFER AREA / 16.5' MIN
- 25' AVERAGE WETLAND BUFFER AREA

DEVELOPMENT SUMMARY

AREA	
SITE AREA	239,125 SF 5.49 AC
PARKING SUMMARY	
SURFACE STANDARD	30 STALLS
SURFACE COMPACT	8 STALLS
SURFACE ADA	2 STALLS
GARAGE STANDARD	240 STALLS
GARAGE COMPACT	18 STALLS
GARAGE ADA	6 STALLS
TOTAL	304 STALLS
SETBACKS	
PROPOSED BUILDING	10 FT
ZONING	
EXISTING ZONING	PID
PROPOSED ZONING	PID
GREEN SPACE	
PROPOSED PERVIOUS	128,280 SF
PROPOSED IMPERVIOUS	110,845 SF

DEVELOPMENT NOTES

1. ALL DIMENSIONS ARE ROUNDED TO THE NEAREST TENTH FOOT.
2. ALL DIMENSIONS SHOWN ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL REVIEW PAVEMENT GRADIENT AND CONSTRUCT "GUTTER OUT" WHERE WATER DRAINS AWAY FROM CURB. ALL OTHER AREAS SHALL BE CONSTRUCTED AS "GUTTER IN" CURB. COORDINATE WITH GRADING CONTRACTOR.
4. ALL AREAS ARE ROUNDED TO THE NEAREST SQUARE FOOT.
5. ALL PARKING STALLS TO BE 9' IN WIDTH AND 18' IN LENGTH UNLESS OTHERWISE INDICATED.
6. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF EXIT PORCHES, RAMPS, PRECISE BUILDING DIMENSIONS AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS.
7. REFER TO FINAL PLAT FOR LOT BOUNDARIES, LOT NUMBERS, LOT AREAS, AND LOT DIMENSIONS.
8. ALL GRADIENTS ON SIDEWALKS ALONG THE ADA ROUTE HAVE BEEN DESIGNED WITH A MAXIMUM LONGITUDINAL SLOPE OF 4.5%, AND A MAXIMUM CROSS SLOPE OF 1.5%. THIS IS LESS THAN THE ADA CODE MAXIMUM LONGITUDINAL SLOPE OF 5% (1:20), EXCEPT AT CURB RAMPS (1:12), AND A MAXIMUM CROSS SLOPE OF 2.00% (1:50). THE MAXIMUM DESIGN SLOPE IN ANY DIRECTION ON AN ADA PARKING STALL OR ACCESS AISLE IS 1.5%, LESS THAN THE ADA CODE MAXIMUM SLOPE IN ANY DIRECTION ON AN ADA PARKING STALL OR ACCESS AISLE OF 2.00% (1:50). THE CONTRACTOR SHALL REVIEW AND VERIFY THE GRADIENT IN THE FIELD ALONG THE ADA ROUTES PRIOR TO PLACING CONCRETE OR BITUMINOUS PAVEMENT. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IF THERE IS A DISCREPANCY BETWEEN THE GRADIENT IN THE FIELD VERSUS THE DESIGN GRADIENT AND COORDINATE WITH GRADING CONTRACTOR.
9. "NO PARKING" SIGNS SHALL BE PLACED ALONG ALL DRIVEWAYS AS REQUIRED BY CITY.
10. STREET NAMES ARE SUBJECT TO APPROVAL BY THE CITY.
11. BUILDING ADDITION HAS BEEN LOCATED BASED ON ORIGINAL GRIDLINE DESIGN AND/OR EXISTING BUILDING EXTERIOR CORNER SURVEY LOCATIONS. EXTERIOR CORNERS DO NOT REPRESENT EXISTING BUILDING GRIDLINES. CONTRACTOR SHALL LOCATE EXISTING GRIDLINES IN THE FIELD FOLLOWING DEMOLITION AND COORDINATE REQUIRED MODIFICATIONS, IF ANY, TO EXPANSION PLACEMENT WITH CIVIL AND ARHCITECT ACCORDINGLY.

CIVIL 3D MODEL LIMITATIONS

SAMBATEK'S DELIVERABLE AND GOVERNING DOCUMENTS FOR CONSTRUCTION SHALL BE A HARD COPY AND/OR PDF PLAN SHEETS. IF A CIVIL 3D MODEL IS GENERATED IN THE PROCESS OF PREPARING THE PLAN SHEETS, IT IS AS A DESIGN TOOL ONLY AND NOT AS A SEPARATE DELIVERABLE. AT THE OWNER'S REQUEST, WE WILL RELEASE OUR CIVIL 3D MODEL FOR THE CONTRACTOR'S USE. HOWEVER, ITS USE IS AT THE CONTRACTOR'S RISK AND SHALL NOT BE USED FOR STAKING OF CURB, SIDEWALK, OR OTHER HARD SURFACE IMPROVEMENTS. IF A CIVIL 3D MODEL FOR STAKING HARD SURFACE IMPROVEMENTS IS REQUIRED, WE CAN PROVIDE A SUPPLEMENTAL AGREEMENT FOR REFINEMENT AND PREPARATION OF THE CIVIL 3D MODEL.

KEY NOTES

A. BUILDING, STOOPS, STAIRS (SEE ARCHITECTURAL PLANS)
B. B-612 CONCRETE CURB AND GUTTER
C. PEDESTRIAN WETLAND CROSSING
D. CONCRETE APRON
E. NOT USED
F. CONCRETE SIDEWALK
G. RETAINING WALL
H. ACCESSIBLE RAMP
I. ACCESSIBLE STALL STRIPING
J. ACCESSIBLE PARKING SIGN
K. TRANSFORMER
L. BITUMINOUS TRAIL
M. GRAVEL TRAIL

WETLAND SUMMARY

ONSITE WETLAND - MANAGE 2	
AVERAGE BUFFER REQUIRED (25')	18,870 SF
AVERAGE BUFFER PROVIDED	18,870 SF
OFFSITE WETLAND - MANAGE 2	
AVERAGE BUFFER REQUIRED (25')	14,832 SF
AVERAGE BUFFER PROVIDED	14,877 SF

NORTH
0 20 40
SCALE IN FEET

THE SUBSURFACE UTILITY INFORMATION SHOWN ON THESE PLANS IS A UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF ASCE/CI 38-02, TITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA." THE CONTRACTOR AND/OR SUBCONTRACTORS SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, BY CONTACTING THE NOTIFICATION CENTER (GOPHER STATE ONE FOR MINNESOTA). THE CONTRACTOR AND/OR SUBCONTRACTOR AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES, WHICH MIGHT BE OCCASIONED BY HIS OR HER FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES (UNDERGROUND AND OVERHEAD).

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

NO	DATE	BY	CKD	APPR	COMMENT
	02/23/2023	JMW	EJC	JB	Preliminary Site Plans

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.

Print Name: JOSEPH BAILEY

Date 02/24/2023 License # 58645

PRELIMINARY 02/24/2023	
DESIGN REVIEW	
PERMIT SUBMITTAL	
CONSTRUCTION DOCUMENTS	

DRAWN BY	JMW
DESIGNED BY	EJC
CHECKED BY	JB
PROJECT NO.	51414

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SITE PLAN

DORAN COMPANIES
MARSH RUN II REDEVELOPMENT
PRELIMINARY SITE DEVELOPMENT PLANS
MINNEOTNKA, MN

SHEET C3.01 REV.

24-15 LLMS TECH | JOSEPH BAILEY | 2/27/2023 11:08:25 AM
\\SAMBATEK-FS1\PROJECTS\PROJECTS 51414\CAD\SHEETS\51414 C3-SITE.DWG\C3.01 SITE PLAN

SERVICE LANE (Public)

VACATED SERVICE LANE

14

LOT 13

LOT 12

LOT 11

LOT 10

LOT 9

LOT 8

BLOCK 3

AMENITY DECK

PROPOSED BUILDING
58,000 S.F.
FFE=933.5
GFE=923.5

28.0'

R28.0'

VAN

15.6'

277.4'

26.0'

26.4'

Minnetonka Fire Truck

16.0'

R28.0'

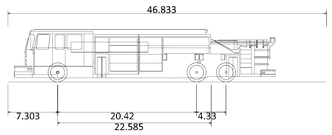
R28.0'

R12.0'

MERRIVAL AVENUE

WAYZATA BOULEVARD (Public) Width Varies

U.S. HIGHWAY NO. 12



Minnetonka Fire Truck	
Overall Length	46.833ft
Overall Width	8.250ft
Overall Body Height	7.715ft
Min Body Ground Clearance	0.627ft
Track Width	8.000ft
Lock-to-lock time	5.00s
Max Wheel Angle	45.00°

NORTH

0 20 40
SCALE IN FEET

NO	DATE	BY	CKD	APPR	COMMENT
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PERMIT SUBMITTAL	CHECKED BY JB
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FIRE TRUCK TURNING MOVEMENT

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PRELIMINARY SITE DEVELOPMENT PLANS
MINNEOTNKA, MN

SHEET C3.02 REV.

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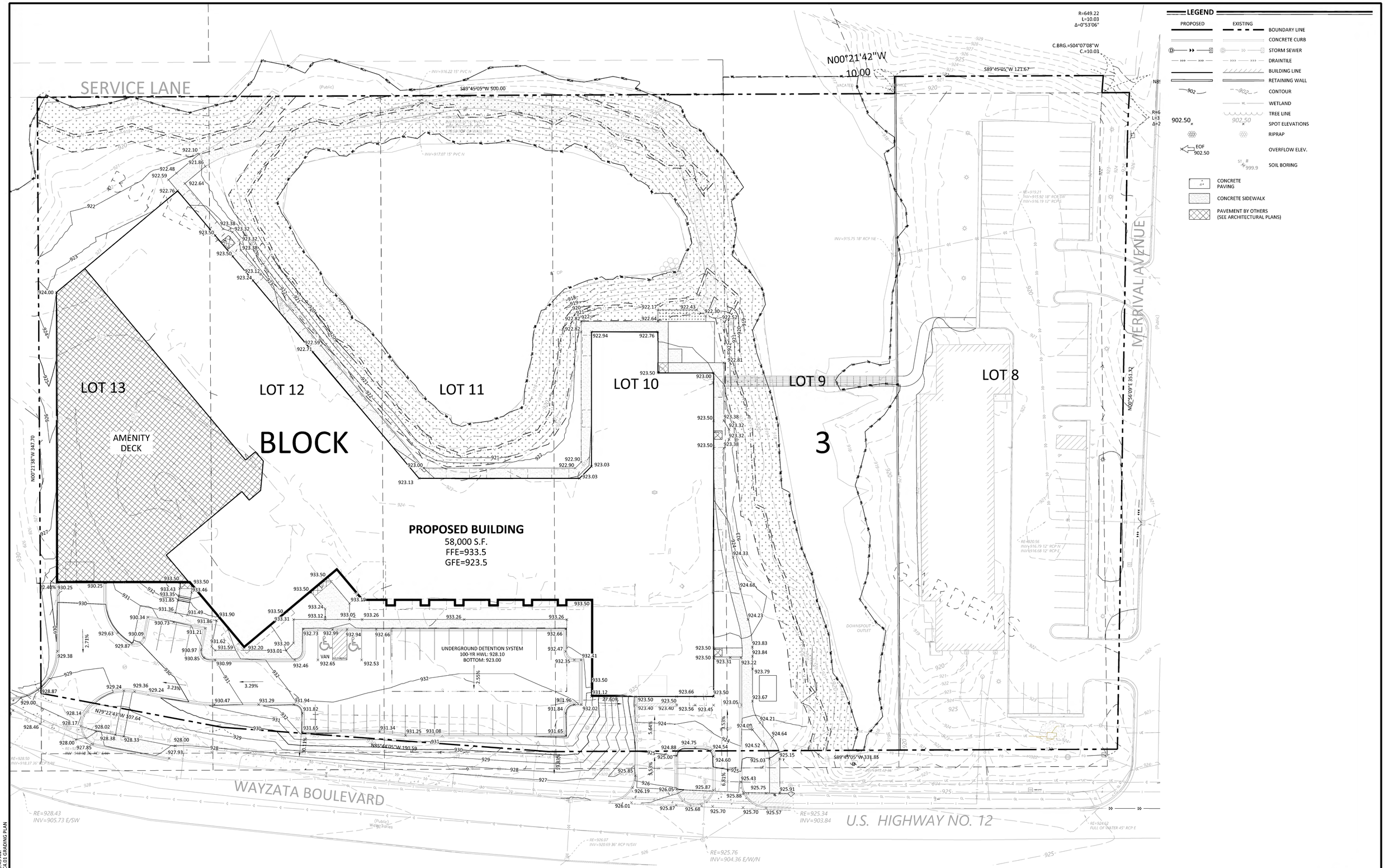

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IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

NORTH
SCALE 0 20 40 IN FEET

NO	DATE	BY	CKD	APPR	COMMENT
	02/23/2023	JMW	EJC	JB	Preliminary Site Plans

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.

Print Name: JOSEPH BAILEY
Date 02/24/2023 License # 58645

PRELIMINARY 02/24/2023	DRAWN BY JMW
DESIGN REVIEW	DESIGNED BY EJC
PERMIT SUBMITTAL	CHECKED BY JB
CONSTRUCTION DOCUMENTS	PROJECT NO. 51414

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GRADING PLAN

DORAN COMPANIES
MARSH RUN II REDEVELOPMENT
PRELIMINARY SITE DEVELOPMENT PLANS
MINNEOTNKA, MN

SHEET C4.01 REV.

24.15 (LMS TECH) | JOSEPH BAILEY | 2/27/2023 10:23:43 AM
I:\PROJECTS\51414\CAD\SHEETS\51414-C4.01GRADE.DWG C4.01 GRADING PLAN

GRADING NOTES

1. PROPOSED CONTOURS ARE TO FINISHED SURFACE ELEVATION. SPOT ELEVATIONS ALONG PROPOSED CURB DENOTE GUTTER GRADE.
2. CONTRACTOR SHALL REVIEW PAVEMENT GRADIENT AND CONSTRUCT "GUTTER OUT" WHERE WATER DRAINS AWAY FROM CURB. ALL OTHER AREAS SHALL BE CONSTRUCTED AS "GUTTER IN" CURB.
3. ALL GRADIENT ON SIDEWALKS ALONG THE ADA ROUTE SHALL HAVE A MAXIMUM LONGITUDINAL SLOPE OF 5% (1:20), EXCEPT AT CURB RAMPS (1:12), AND A MAXIMUM CROSS SLOPE OF 2.00% (1:50). MAXIMUM SLOPE IN ANY DIRECTION ON AN ADA PARKING STALL OR ACCESS AISLE SHALL BE IN 2.00% (1:50). CONTRACTOR SHALL REVIEW AND VERIFY THE GRADIENT IN THE FIELD ALONG THE ADA ROUTES PRIOR TO PLACING CONCRETE OR BITUMINOUS. CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IF THERE IS A DISCREPANCY BETWEEN THE GRADIENT IN THE FIELD VERSUS THE DESIGN GRADIENT. COORDINATE ALL WORK WITH PAVING CONTRACTOR.
4. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID PROPERTY DAMAGE TO ADJACENT PROPERTIES DURING THE CONSTRUCTION PHASES OF THIS PROJECT. CONTRACTOR WILL BE HELD SOLELY RESPONSIBLE FOR ANY DAMAGES TO THE ADJACENT PROPERTIES OCCURRING DURING THE CONSTRUCTION PHASES OF THIS PROJECT.
5. SAFETY NOTICE TO CONTRACTORS: IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS ON THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE DUTY OF THE ENGINEER OR THE DEVELOPER TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON OR NEAR THE CONSTRUCTION SITE.
6. CONTRACTOR SHALL COMPLETE THE SITE GRADING CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE OWNER'S SOILS ENGINEER. ALL SOIL TESTING SHALL BE COMPLETED BY THE OWNER'S SOILS ENGINEER. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIRED SOIL TESTS AND INSPECTIONS WITH THE SOILS ENGINEER.
   A GEOTECHNICAL ENGINEERING SOILS REPORT HAS BEEN COMPLETED BY:

   COMPANY: BRAUN INTERTEC

   ADDRESS: 1101 HAMPSHIRE AVE S, MINNEAPOLIS, MN 55438

   PHONE: 952-995-2238

   DATE: 02/23/2023

   CONTRACTOR SHALL OBTAIN A COPY OF THE SOILS REPORT.
7. CONTRACTOR SHALL COMPLETE DEWATERING AS REQUIRED TO COMPLETE THE SITE GRADING CONSTRUCTION.
8. PRIOR TO PLACEMENT OF THE AGGREGATE BASE, A TEST ROLL SHALL BE PERFORMED ON THE STREET AND PARKING AREA SUBGRADE. CONTRACTOR SHALL PROVIDE A LOADED TANDEM AXLE TRUCK WITH A GROSS WEIGHT OF 25 TONS. THE TEST ROLLING SHALL BE AT THE DIRECTION OF THE SOILS ENGINEER AND SHALL BE COMPLETED IN AREAS AS DIRECTED BY THE SOILS ENGINEER. CORRECTION OF THE SUBGRADE SOILS SHALL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF THE SOILS ENGINEER.
9. REPLACE ALL SUBGRADE SOIL DISTURBED DURING THE CONSTRUCTION THAT HAVE BECOME UNSUITABLE AND WILL NOT PASS A TEST ROLL. REMOVE UNSUITABLE SOIL FROM THE SITE AND IMPORT SUITABLE SOIL AT NO ADDITIONAL COST TO THE OWNER.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING VEHICULAR AND PEDESTRIAN TRAFFIC CONTROL DEVICES SUCH AS BARRICADES, WARNING SIGNS, DIRECTIONAL SIGNS, FLAGMEN AND LIGHTS TO CONTROL THE MOVEMENT OF TRAFFIC WHERE NECESSARY. TRAFFIC CONTROL DEVICES SHALL CONFORM TO APPROPRIATE MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARDS.
11. EXISTING TREES AND OTHER NATURAL VEGETATION WITHIN THE PROJECT AND/OR ADJACENT TO THE PROJECT ARE OF PRIME CONCERN TO THE CONTRACTOR'S OPERATIONS AND SHALL BE A RESTRICTED AREA. CONTRACTOR SHALL PROTECT TREES TO REMAIN AT ALL TIMES. EQUIPMENT SHALL NOT NEEDLESSLY BE OPERATED UNDER NEARBY TREES AND EXTREME CAUTION SHALL BE EXERCISED WHEN WORKING ADJACENT TO TREES. SHOULD ANY PORTION OF THE TREE BRANCHES REQUIRE REMOVAL TO PERMIT OPERATION OF THE CONTRACTOR'S EQUIPMENT, CONTRACTOR SHALL OBTAIN THE SERVICES OF A PROFESSIONAL TREE TRIMMING SERVICE TO TRIM THE TREES PRIOR TO THE BEGINNING OF OPERATION. SHOULD CONTRACTOR'S OPERATIONS RESULT IN THE BREAKING OF ANY LIMBS, THE BROKEN LIMBS SHOULD BE REMOVED IMMEDIATELY AND CUTS SHALL BE PROPERLY PROTECTED TO MINIMIZE ANY LASTING DAMAGE TO THE TREE. NO TREES SHALL BE REMOVED WITHOUT AUTHORIZATION BY THE ENGINEER. COSTS FOR TRIMMING SERVICES SHALL BE CONSIDERED INCIDENTAL TO THE GRADING CONSTRUCTION AND NO SPECIAL PAYMENT WILL BE MADE.
    a. RESTRICTED AREAS SHALL INCLUDE ALL DESIGNATED TREED AREAS OUTSIDE OF THE DESIGNATED CONSTRUCTION ZONE. ALL VEGETATION WITHIN THE RESTRICTED AREAS SHALL REMAIN.

    b. CONTRACTOR SHALL RESTRICT ALL GRADING AND CONSTRUCTION ACTIVITIES TO AREAS DESIGNATED ON THE PLANS. ACTIVITIES WITHIN THE CONSTRUCTION MAY BE RESTRICTED TO A NARROWER WIDTH IN THE FIELD TO SAVE ADDITIONAL TREES AS DIRECTED BY THE OWNER.

    c. ACTIVITIES PROHIBITED OUTSIDE OF THE CONSTRUCTION BOUNDARIES WOULD INCLUDE, BUT NOT BE LIMITED TO: SOIL AND OTHER MATERIAL STOCKPILING, EQUIPMENT OR MACHINERY STORAGE, DRIVING OF ANY VEHICLE, LEAKAGE OR SPILLAGE OF ANY "WASHOUT" OR OTHER TOXIC MATERIAL. THE COLLECTION OF OTHER DEBRIS AND SOIL STOCKPILING WILL BE IN AN AREA DETERMINED ON-SITE BY THE ENGINEER.

    d. ALL RESTRICTED AREAS SHALL BE FENCED OFF WITH BRIGHT ORANGE POLYETHYLENE SAFETY NETTING AND STEEL STAKES AS SHOWN ON THE TREE PROTECTION DETAIL. AT NO TIME SHALL THIS FENCING BE REMOVED OR ACTIVITY OF ANY KIND TAKE PLACE WITHIN IT. FINAL PLACEMENT OF ALL PROTECTIVE FENCING SHALL BE COMPLETE BEFORE ANY WORK COMMENCES ON-SITE.

    e. BEFORE COMMENCING WITH ANY EXCAVATION CONTRACTOR SHALL COMPLETE ALL PREPARATORY WORK REGARDING TREE REMOVAL, ROOT PRUNING, TREE PRUNING AND STUMP REMOVAL TO THE SATISFACTION OF THE OWNER.

    f. PREPARATORY WORK SHALL INCLUDE THE FOLLOWING AND SHALL BE COMPLETED UNDER THE DIRECT SUPERVISION OF THE OWNER'S REPRESENTATIVE:

    i. TREE REMOVAL: CONTRACTOR SHALL FELL THE TREES. AT NO TIME SHALL TREES BE BULLDOZED OUT, BUT SHALL BE CUT DOWN AND STUMPS REMOVED SEPARATELY. PRIOR TO THE FELLING OF ALL TREES, PROPER REMOVAL OF A PORTION OR ALL OF THE CANOPY SHALL BE COMPLETED SO THAT TREES IN THE RESTRICTED AREAS SHALL NOT BE INJURED IN THE PROCESS.

    ii. ROOT PRUNING: BEFORE ANY STUMPS ARE TO BE REMOVED, ALL ROOTS SHALL BE SEVERED FROM ROOTS IN THE RESTRICTED AREAS BY SAW CUTTING WITH A VERMEER DESIGNED FOR ROOT PRUNING, BY HAND, OR WITH A CHAINSAW. TREE ROOTS PROJECTING INTO THE CONSTRUCTION ZONE SHALL BE EXPOSED PRIOR TO ROOT PRUNING WITH SMALL MACHINERY, I.E..., BOBCAT.

    iii. STUMP REMOVAL: AT SUCH TIME THAT ROOTS HAVE BEEN PROPERLY SEVERED, STUMPS MAY BE REMOVED. WHERE REMOVAL OF CERTAIN STUMPS COULD CAUSE DAMAGE TO EXISTING PROTECTED TREES, TREE STUMPS SHALL BE GROUND OUT. ALL STUMP REMOVAL SHALL BE UNDER THE DIRECT SUPERVISION OF THE OWNER'S REPRESENTATIVE.

    iv. TREE PRUNING: PROPER PRUNING OF TREES IN THE RESTRICTED ZONE SHALL BE DIRECTED BY AND SUPERVISION AT ALL TIMES BY THE OWNER'S REPRESENTATIVE.

    g. AN OWNER'S REPRESENTATIVE WILL BE AVAILABLE AT ALL TIMES DURING THE PREPARATORY AND CONSTRUCTION PERIOD.

    h. MULCH RATHER THAN SEED OR SOD WILL BE USED AT THE BASE OF QUALITY TREES TO A PERIMETER DETERMINED BY THE OWNER'S REPRESENTATIVE. AREAS TO BE SEEDED FOR EROSION CONTROL PURPOSES WITHIN THE CONSTRUCTION ZONE ARE TO BE DETERMINED BY THE OWNER'S REPRESENTATIVE. NATURAL GROUND COVER WILL BE MAINTAINED WHEREVER POSSIBLE.

    i. THE USE OF RETAINING WALLS NEAR TREES, IN ADDITION TO THOSE REQUIRED ON THE PLANS SHALL BE DETERMINED IN THE FIELD, BASED ON TREE LOCATIONS AND TOPOGRAPHY.
12. EXCAVATE TOPSOIL FROM AREAS TO BE FURTHER EXCAVATED OR REGRADED AND STOCKPILE IN AREAS DESIGNATED ON THE SITE. CONTRACTOR SHALL SALVAGE ENOUGH TOPSOIL FOR RESPREADING ON THE SITE AS SPECIFIED. EXCESS TOPSOIL SHALL BE PLACED IN EMBANKMENT AREAS, OUTSIDE OF BUILDING PADS, ROADWAYS AND PARKING AREAS. CONTRACTOR SHALL SUBCUT CUT AREAS, WHERE TURF IS TO BE ESTABLISHED, TO A DEPTH OF 6 INCHES. RESPREAD TOPSOIL IN AREAS WHERE TURF IS TO BE ESTABLISHED TO A MINIMUM DEPTH OF 6 INCHES.
13. TRENCH BORROW CONSTRUCTION: IF ALLOWED BY THE OWNER, CONTRACTOR SHALL COMPLETE "TRENCH BORROW" EXCAVATION IN AREAS DIRECTED BY THE ENGINEER IN ORDER TO OBTAIN STRUCTURAL MATERIAL. TREES SHALL NOT BE REMOVED OR DAMAGED AS A RESULT OF THE EXCAVATION, UNLESS APPROVED BY THE ENGINEER. THE EXCAVATION SHALL COMMENCE A MINIMUM OF 10 FEET FROM THE LIMIT OF THE BUILDING PAD. THE EXCAVATION FROM THIS LIMIT SHALL EXTEND AT A MINIMUM SLOPE OF 1 FOOT HORIZONTAL TO 1 FOOT VERTICAL (1:1) DOWNWARD AND OUTWARD FROM THE FINISHED SURFACE GRADE ELEVATION. THE TRENCH BORROW EXCAVATION SHALL BE BACKFILLED TO THE PROPOSED FINISHED GRADE ELEVATION, AND SHALL BE COMPACTED IN ACCORDANCE WITH REQUIREMENTS OF THE QUALITY COMPACTION METHOD AS OUTLINED IN MN/DOT SPECIFICATION 2105.3F2. SNOW FENCE SHALL BE FURNISHED AND PLACED ALONG THE PERIMETER OF THE TRENCH BORROW AREA WHERE THE SLOPES EXCEED 2 FOOT HORIZONTAL TO 1 FOOT VERTICAL (2:1).
14. FINISHED GRADING SHALL BE COMPLETED, CONTRACTOR SHALL UNIFORMLY GRADE AREAS WITHIN LIMITS OF GRADING, INCLUDING ADJACENT TRANSITION AREAS. PROVIDE A SMOOTH FINISHED SURFACE WITHIN SPECIFIED TOLERANCES, WITH UNIFORM LEVELS OR SLOPES BETWEEN POINTS WHERE ELEVATIONS ARE SHOWN, OR BETWEEN SUCH POINTS AND EXISTING GRADES. AREAS THAT HAVE BEEN FINISHED GRADED SHALL BE PROTECTED FROM SUBSEQUENT CONSTRUCTION OPERATIONS, TRAFFIC AND EROSION. REPAIR ALL AREAS THAT HAVE BECOME RUTTED, ERODED OR HAS SETTLED BELOW THE CORRECT GRADE. ALL AREAS DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO EQUAL OR BETTER THAN ORIGINAL CONDITION OR TO THE REQUIREMENTS OF THE NEW WORK.
15. TOLERANCES
    a. THE RESIDENTIAL BUILDING SUBGRADE FINISHED SURFACE ELEVATION SHALL NOT VARY BY MORE THAN 0.30 FOOT ABOVE, OR 0.30 FOOT BELOW, THE PRESCRIBED ELEVATION AT ANY POINT WHERE MEASUREMENT IS MADE.

    b. THE COMMERCIAL BUILDING SUBGRADE FINISHED SURFACE ELEVATION SHALL NOT VARY BY MORE THAN 0.10 FOOT ABOVE, OR 0.10 FOOT BELOW, THE PRESCRIBED ELEVATION AT ANY POINT WHERE MEASUREMENT IS MADE.

    c. THE STREET OR PARKING AREA SUBGRADE FINISHED SURFACE ELEVATION SHALL NOT VARY BY MORE THAN 0.05 FOOT ABOVE, OR 0.10 FOOT BELOW, THE PRESCRIBED ELEVATION OF ANY POINT WHERE MEASUREMENT IS MADE.

    d. AREAS WHICH ARE TO RECEIVE TOPSOIL SHALL BE GRADED TO WITHIN 0.30 FOOT ABOVE OR BELOW THE REQUIRED ELEVATION, UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

    e. TOPSOIL SHALL BE GRADED TO PLUS OR MINUS 1/2 INCH OF THE SPECIFIED THICKNESS.
16. AFTER THE SITE GRADING IS COMPLETED, IF EXCESS OR SHORTAGE OF SOIL MATERIAL EXISTS, CONTRACTOR SHALL TRANSPORT ALL EXCESS SOIL MATERIAL OFF THE SITE TO AN AREA SELECTED BY THE CONTRACTOR, OR IMPORT SUITABLE MATERIAL TO THE SITE.
17. CONTRACTOR SHALL DETERMINE THE LOCATION OF ANY HAUL ROADS THAT MAY BE REQUIRED TO COMPLETE THE SITE GRADING CONSTRUCTION AND SHALL INDICATE HAUL ROADS ON EROSION AND SEDIMENT CONTROL "SITE MAP". CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE GOVERNING AUTHORITY OF EACH ROADWAY. CONTRACTOR SHALL POST WHATEVER SECURITY AND COMPLY WITH ALL CONDITIONS WHICH ARE REQUIRED BY EACH GOVERNING AUTHORITY OF EACH ROADWAY.
18. DISTURBED AREAS WITHIN WETLAND MITIGATION SITE AND ANY DISTURBED AREAS WITHIN THE WETLAND SHALL BE RESTORED WITH 6 TO 12 INCHES OF ORGANIC SOILS, PREFERABLY SOILS THAT WERE PREVIOUSLY REMOVED FROM WETLAND AREAS. SEEDING IN THE WETLAND MITIGATION AREAS ABOVE THE NORMAL WATER LEVEL SHALL BE MN STATE SEED MIX 34-271, WET MEADOW SOUTH AND WEST, OR APPROVED EQUAL. FOR STATE SEED MIXES, OATS AND WINTER WHEAT SHOULD BE SELECTED BASED ON THE TIME OF YEAR THAT THE MIX IS BEING USED. OATS SHOULD BE INCLUDED IN MIXES IF BEING USED BETWEEN OCTOBER 15TH AND AUGUST 1ST. WINTER WHEAT SHOULD BE USED BETWEEN AUGUST 1ST AND OCTOBER 15TH. THE SEEDING RATE IS THE SAME FOR OATS AND WINTER WHEAT. MIX 34-271 SHOULD BE APPLIED AT 12 POUNDS PER ACRE. SEED SHALL BE WATERED UNTIL A HEALTHY STAND OF VEGETATION IS OBTAINED.
19. FILL PLACED WITHIN THE BUILDING PAD AREAS SHALL BE IN CONFORMANCE WITH HUD/FHA PROCEDURES AND DATA SHEET 79G.

CIVIL 3D MODEL LIMITATIONS

SAMBATEK'S DELIVERABLE AND GOVERNING DOCUMENTS FOR CONSTRUCTION SHALL BE A HARD COPY AND/OR PDF PLAN SHEETS. IF A CIVIL 3D MODEL IS GENERATED IN THE PROCESS OF PREPARING THE PLAN SHEETS, IT IS AS A DESIGN TOOL ONLY AND NOT AS A SEPARATE DELIVERABLE. AT THE OWNER'S REQUEST, WE WILL RELEASE OUR CIVIL 3D MODEL FOR THE CONTRACTOR'S USE. HOWEVER, ITS USE IS AT THE CONTRACTOR'S RISK AND SHALL NOT BE USED FOR STAKING OF CURB, SIDEWALK, OR OTHER HARD SURFACE IMPROVEMENTS. IF A CIVIL 3D MODEL FOR STAKING HARD SURFACE IMPROVEMENTS IS REQUIRED, WE CAN PROVIDE A SUPPLEMENTAL AGREEMENT FOR REFINEMENT AND PREPARATION OF THE CIVIL 3D MODEL.

REV. DATE

NO	DATE	BY	CKD	APPR	COMMENT
	02/23/2023	JMW	EJC	JB	Preliminary Site Plans

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.

Print Name: JOSEPH BAILEY

Date 02/24/2023 License # 58645

PRELIMINARY 02/24/2023 | DESIGN REVIEW | PERMIT SUBMITTAL | CONSTRUCTION DOCUMENTS

DRAWN BY JMW | DESIGNED BY EJC | CHECKED BY JB | PROJECT NO. 51414

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GRADING NOTES

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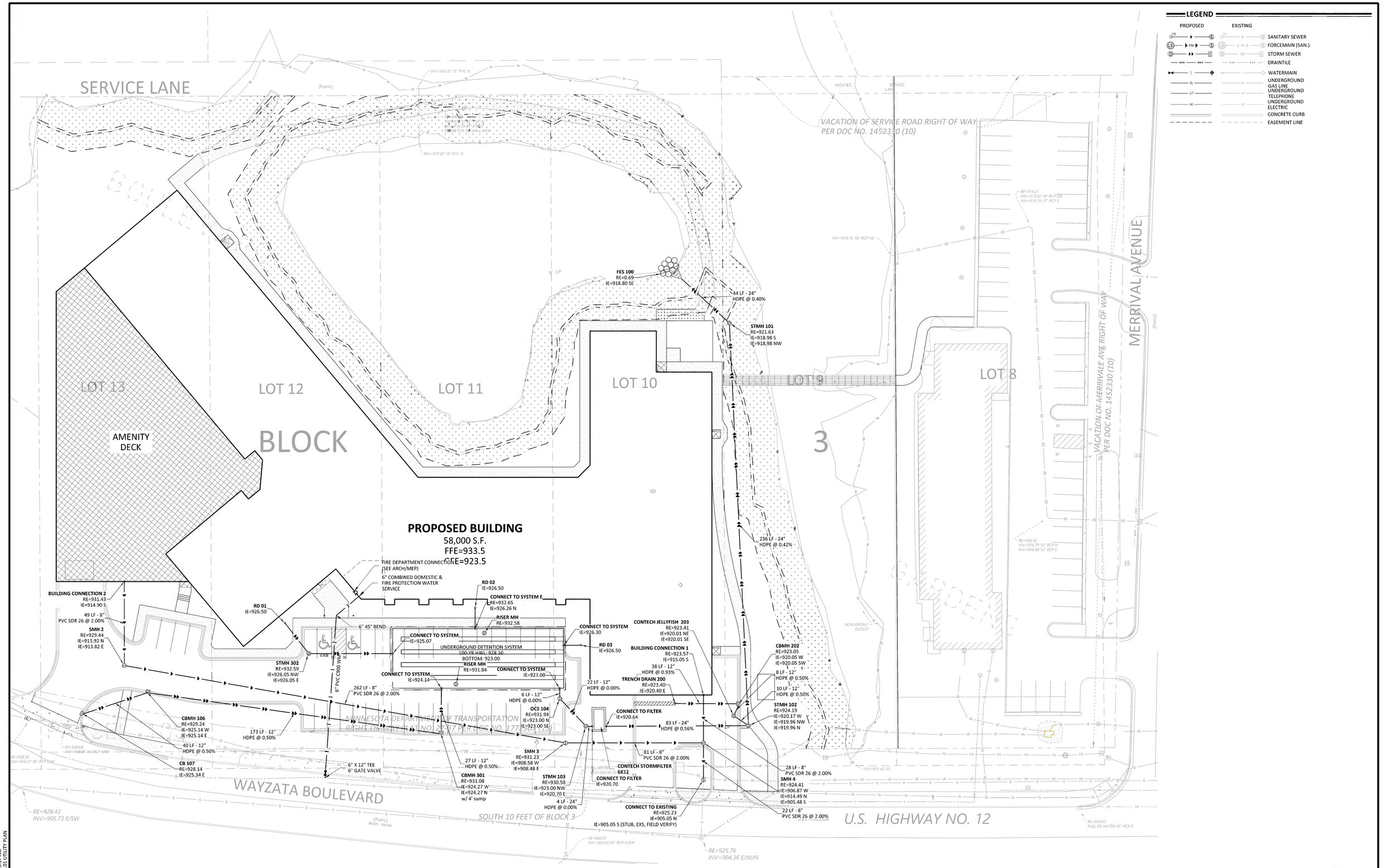
SHEET C4.02 REV.

24.15 (LMS TECH) | JOSEPH BAILEY | 2/27/2023 10:23:43 AM
L:\PROJECTS\51414\CAD\SHEETS\51414-C4.02-GRADE DWG C4.02 GRADING NOTES



THE SUBSURFACE UTILITY INFORMATION SHOWN ON THESE PLANS IS A UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF ASCE/CI 38-02, TITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA." THE CONTRACTOR AND/OR SUBCONTRACTORS SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, BY CONTACTING THE NOTIFICATION CENTER (GOPHER STATE ONE FOR MINNESOTA). THE CONTRACTOR AND/OR SUBCONTRACTOR AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES, WHICH MIGHT BE OCCASIONED BY HIS OR HER FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES (UNDERGROUND AND OVERHEAD).

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

NO	DATE	BY	CKD	APPR	COMMENT
	02/23/2023	JMW	EJC	JB	Preliminary Site Plans

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CONSTRUCTION DOCUMENTS	PROJECT NO. 51414

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UTILITY PLAN

DORAN COMPANIES
MARSH RUN II REDEVELOPMENT
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MINNEOTNKA, MN

SHEET C6.01 REV.

24.5 (LMS TECH) | JOSEPH BAILEY | 2/27/2023 10:25:17 AM
L:\PROJECTS\51414\CAD\SHEETS\51414-C6-UTILITY.DWG,C6.01 UTILITY PLAN

UTILITY CONSTRUCTION NOTES

1. THE UTILITY IMPROVEMENTS FOR THIS PROJECT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE "STANDARD UTILITIES SPECIFICATIONS" AS PUBLISHED BY THE CITY ENGINEERS ASSOCIATION OF MINNESOTA (CEAM), EXCEPT AS MODIFIED HEREIN. CONTRACTOR SHALL OBTAIN A COPY OF THESE SPECIFICATIONS.
   a. ALL UTILITIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REQUIRMENTS, INCLUDING BUT NOT LIMITED TO CITY, DEPARTMENT OF LABOR AND INDUSTRY AND MINNESOTA DEPARTMENT OF HEALTH REQUIREMENTS.
   b. CONTRACTOR SHALL NOT OPEN, TURN OFF, INTERFERE WITH, OR ATTACH ANY PIPE OR HOSE TO OR TAP WATERMAIN BELONGING TO THE CITY UNLESS DULY AUTHORIZED TO DO SO BY THE CITY. ANY ADVERSE CONSEQUENCES OF ANY SCHEDULED OR UNSCHEDULED DISRUPTIONS OF SERVICE TO THE PUBLIC ARE THE LIABILITY OF CONTRACTOR.
   c. A MINIMUM VERTICAL SEPARATION OF 18 INCHES, AND HORIZONTAL SEPARATION OF 10-FEET, BETWEEN OUTSIDE PIPE AND/OR STRUCTURE WALLS, IS REQUIRED AT ALL WATERMAIN AND SEWER MAIN (BUILDING, STORM AND SANITARY) CROSSINGS.
2. ALL MATERIALS SHALL BE AS SPECIFIED IN CEAM SPECIFICATIONS EXCEPT AS MODIFIED HEREIN.
   a. ALL MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE CITY.
   b. ALL SANITARY SEWER TO BE PVC SDR-35, UNLESS NOTED OTHERWISE.
      i. ALL SANITARY SEWER SERVICES TO BUILDING SHALL BE PVC SCH 40 CONFORMING TO ASTM D2665.
   c. ALL WATERMAIN TO BE DUCTILE IRON - CLASS 52, or PVC C-900, UNLESS NOTED OTHERWISE.
      i. ALL WATERMAIN TO HAVE 7.5-FEET OF COVER OVER TOP OF WATERMAIN.
      ii. PROVIDE THRUST BLOCKING AND MECHANICAL JOINT RESTRAINTS ON ALL WATERMAIN JOINTS PER CITY STANDARDS.
      iii. WHERE A SEWER LINE CROSSES A WATER SERVICE, THE WATER SERVICE SHALL NOT CONTAIN ANY JOINTS OR CONNECTIONS WITHIN 10 FEET OF THE CROSSING.
   d. ALL STORM SEWER PIPE TO BE SMOOTH INTERIOR DUAL WALL HDPE PIPE WITH WATERTIGHT GASKETS, UNLESS NOTED OTHERWISE.
      i. ALL STORM SEWER PIPE FOR ROOF DRAIN SERVICES TO BUILDING SHALL BE PVC SCH 40 CONFORMING TO ASTM D2665.
   e. RIP RAP SHALL BE Mn/DOT CLASS
3. COORDINATE ALL BUILDING SERVICE CONNECTION LOCATIONS AND INVERT ELEVATIONS WITH MECHANICAL CONTRACTOR PRIOR TO CONSTRUCTION.
4. ALL BUILDING SERVICE CONNECTIONS (STORM, SANITARY, WATER) WITH FIVE FEET OR LESS COVER ARE TO BE INSULATED FROM BUILDING TO POINT WHERE 5-FEET OF COVER IS ACHIEVED.
5. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID PROPERTY DAMAGE TO ADJACENT PROPERTIES DURING THE CONSTRUCTION PHASES OF THIS PROJECT. CONTRACTOR WILL BE HELD SOLELY RESPONSIBLE FOR ANY DAMAGES TO THE ADJACENT PROPERTIES OCCURRING DURING THE CONSTRUCTION PHASES OF THIS PROJECT.
6. SAFETY NOTICE TO CONTRACTORS: IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS ON THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE DUTY OF THE ENGINEER OR THE DEVELOPER TO CONDUCT CONSTRUCTION REVIEW OF CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF CONTRACTOR'S SAFETY MEASURES IN, ON OR NEAR THE CONSTRUCTION SITE.
7. ALL AREAS OUTSIDE THE PROPERTY BOUNDARIES THAT ARE DISTURBED BY UTILITY CONSTRUCTION SHALL BE RESTORED IN KIND. SODDED AREAS SHALL BE RESTORED WITH 6 INCHES OF TOPSOIL PLACED BENEATH THE SOD.
8. CONTRACTOR SHALL 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. TRAFFIC CONTROL DEVICES SHALL CONFORM TO APPROPRIATE MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARDS.
9. ALL SOILS TESTING SHALL BE COMPLETED BY AN INDEPENDENT SOILS ENGINEER. EXCAVATION FOR THE PURPOSE OF REMOVING UNSTABLE OR UNSUITABLE SOILS SHALL BE COMPLETED AS REQUIRED BY THE SOILS ENGINEER. THE UTILITY BACKFILL CONSTRUCTION SHALL COMPLY WITH THE REQUIREMENTS OF THE SOILS ENGINEER. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIRED SOILS TESTS AND SOIL INSPECTIONS WITH THE SOILS ENGINEER. A GEOTECHNICAL ENGINEERING REPORT HAS BEEN COMPLETED BY:
   COMPANY: BRAUN INTERTEC

   ADDRESS: 11001 HAMPSHIRE AVE S, MINNEAPOLIS, MN 55438

   PHONE: 952-995-2238

   DATED: 02/23/2023

   CONTRACTOR SHALL OBTAIN A COPY OF THIS SOILS REPORT.
10. CONTRACTOR SHALL SUBMIT 2 COPIES OF SHOP DRAWINGS FOR MANHOLE AND CATCH BASIN STRUCTURES TO _____. CONTRACTOR SHALL ALLOW 5 WORKING DAYS FOR SHOP DRAWING REVIEW.
11. CONTRACTOR AND MATERIAL SUPPLIER SHALL DETERMINE THE MINIMUM DIAMETER REQUIRED FOR EACH STORM SEWER STRUCTURE.
    THE UNDERGROUND STORMWATER SYSTEM SHOWN ON THE UTILITY PLAN AND THE DETAIL SHEETS IS FOR INFORMATIONAL PURPOSES ONLY AND DEPICTS THE MINIMUM STORAGE REQUIREMENTS AND THE SYSTEM ELEVATIONS. THE CONTRACTOR (WITH THEIR SUPPLIER OR DESIGNER) SHALL SUBMIT DESIGN DRAWINGS TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. THE DESIGN DRAWINGS SHALL DEPICT THE FINAL LAYOUT AND DETAILS FOR CONSTRUCTION. THE DRAWINGS SHALL BE CERTIFIED BY A LICENSED ENGINEER FOR THE STATE IN WHICH THE PROJECT IS CONSTRUCTED. THE SUBMITTAL SHALL INCLUDE ALL NECESSARY PRODUCT INFORMATION, DESIGN CALCULATIONS AND BEDDING REQUIREMENTS FOR THE PROPOSED STORMWATER SYSTEM. FOLLOWING CONSTRUCTION, THE CERTIFYING ENGINEER SHALL SUBMIT A LETTER TO THE OWNER AND ENGINEER INDICATING THEY OBSERVED THE INSTALLATION AND THE INSTALLATION OF THE STORMWATER SYSTEM WAS IN CONFORMANCE WITH THE CERTIFIED DRAWINGS.

NO	DATE	BY	CKD	APPR	COMMENT
	02/23/2023	JMW	EJC	JB	Preliminary Site Plans

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.

Print Name: JOSEPH BAILEY

Date 02/24/2023 License # 58645

PRELIMINARY 02/24/2023	DRAWN BY JMW
DESIGN REVIEW	DESIGNED BY EJC
PERMIT SUBMITTAL	CHECKED BY JB
CONSTRUCTION DOCUMENTS	PROJECT NO. 51414

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UTILITY NOTES

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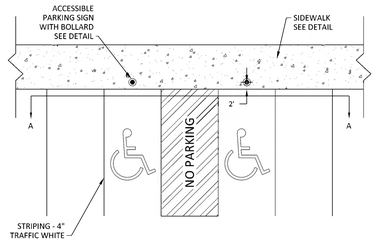
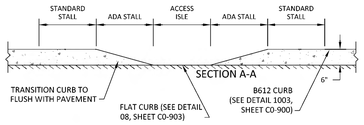
MINNEOTNKA, MN

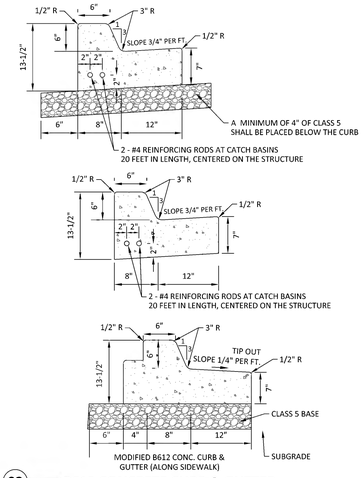
SHEET C6.02 REV.



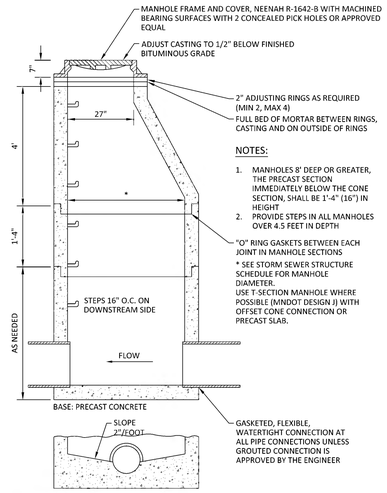
PLAN VIEW OF ADA PARKING



01 ADA PARKING N.T.S.



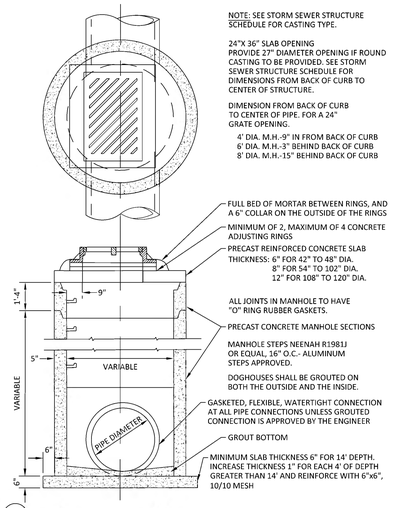
02 B612 CONCRETE CURB & GUTTER N.T.S.



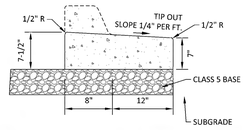
NOTES:

1. MANHOLES 8' DEEP OR GREATER, THE PRECAST SECTION IMMEDIATELY BELOW THE CONE SECTION, SHALL BE 1'-4" (16") IN HEIGHT
2. PROVIDE STEPS IN ALL MANHOLES OVER 4.5 FEET IN DEPTH

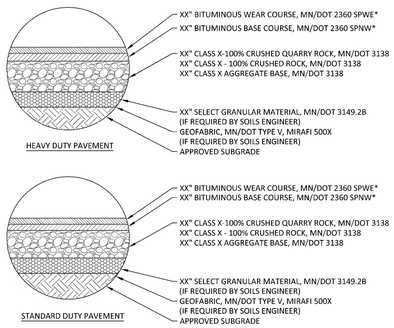
03 STORM SEWER MANHOLE N.T.S.



04 CATCH BASIN MANHOLE N.T.S.



05 FLAT CURB SECTION N.T.S.

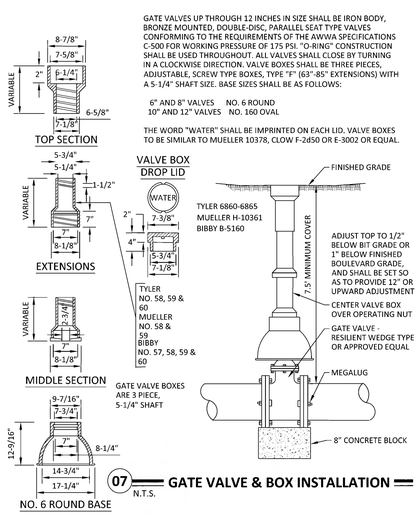


NOTES:

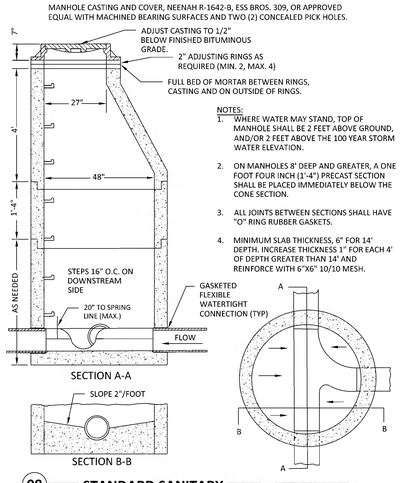
1. THE PAVEMENT SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH MNDOT "STANDARD SPECIFICATION FOR CONSTRUCTION", AND ALSO THE REQUIREMENTS OF THE OWNER'S GEOTECHNICAL CONSULTANT.
2. ALL THICKNESSES, AS SPECIFIED, ARE TO BE CONSIDERED MINIMUM DEPTHS, AFTER COMPACTION.
3. MN/DOT SPEC. 2357 BITUMINOUS TACK COAT SHALL BE PLACED BETWEEN SUCCESSIVE BITUMINOUS LIFTS AND AGAINST ABUTTING CONCRETE CURB EDGES.

* REFER TO BITUMINOUS MIX DESIGN REQUIREMENT PROVIDED BY THE GEOTECHNICAL CONSULTANT

06 PAVEMENT SECTIONS N.T.S.



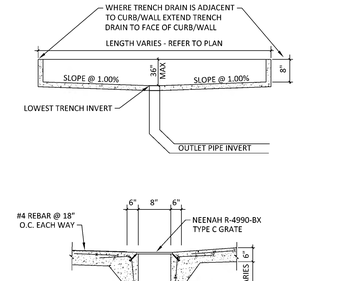
07 GATE VALVE & BOX INSTALLATION N.T.S.



NOTES:

1. WHERE WATER MAY STAND, TOP OF MANHOLE SHALL BE 2 FEET ABOVE GROUND, AND/OR 2 FEET ABOVE THE 100 YEAR STORM WATER ELEVATION.
2. ON MANHOLES 8' DEEP AND GREATER, A ONE FOOT FOUR INCH (1'-4") PRECAST SECTION SHALL BE PLACED IMMEDIATELY BELOW THE CONE SECTION.
3. ALL JOINTS BETWEEN SECTIONS SHALL HAVE "O" RING RUBBER GASKETS.
4. MINIMUM SLAB THICKNESS, 6" FOR 14' DEPTH. INCREASE THICKNESS 1" FOR EACH 4' OF DEPTH GREATER THAN 14' AND REINFORCE WITH 6"X6" 10/10 MESH.

08 STANDARD SANITARY SEWER MANHOLE N.T.S.



09 TRENCH DRAIN DETAIL N.T.S.

NO	DATE	BY	CKD	APPR	COMMENT
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Print Name: JOSEPH BAILEY

Date 02/24/2023 License # 58645

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DETAILS

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SHEET C9.01 REV.

24-15 (LMS TECH) | JOSEPH BAILEY | 2/27/2023 10:26:45 AM
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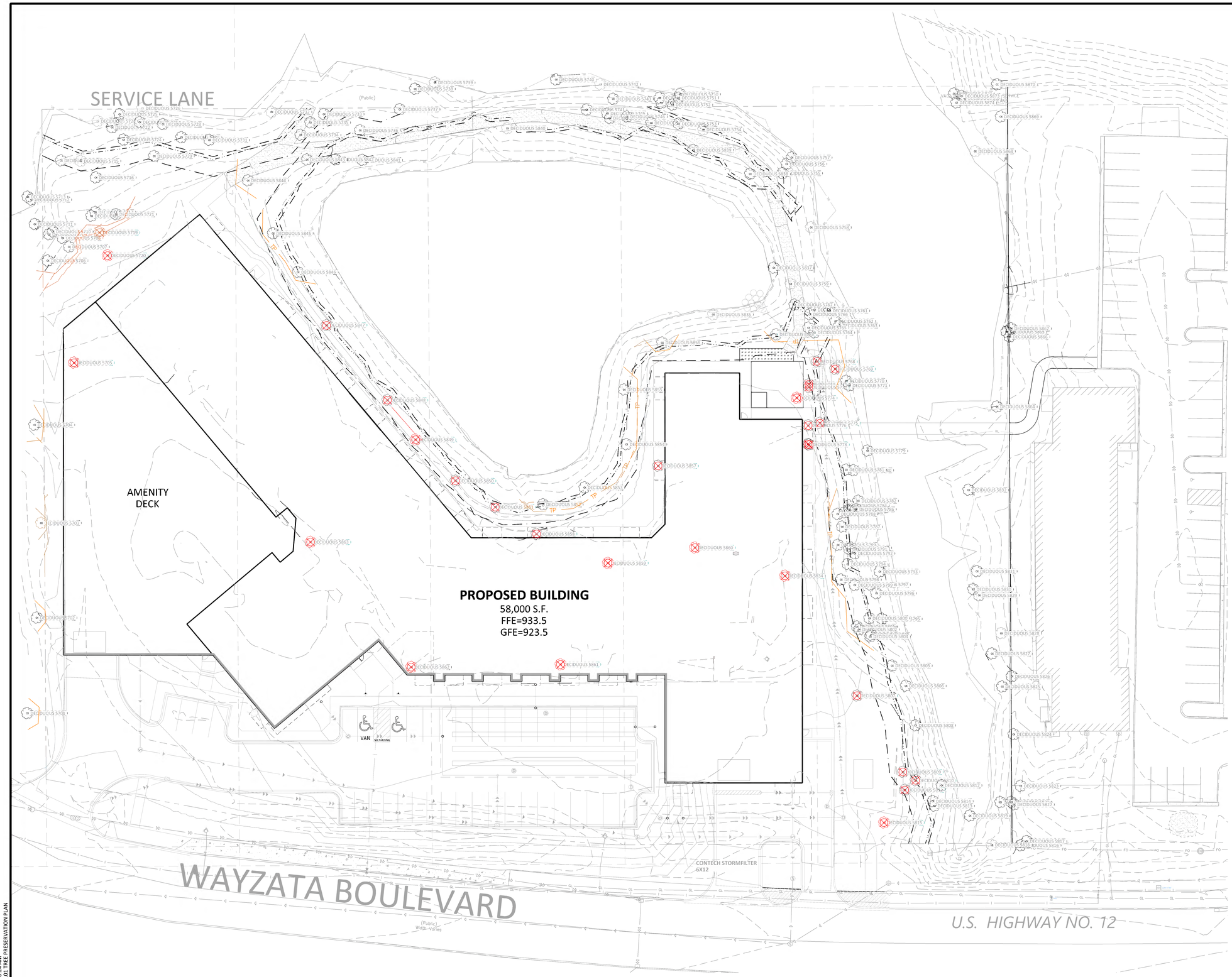

LEGEND

	PROPOSED	EXISTING
PROPERTY LIMIT		
CURB & GUTTER		
EASEMENT		
BUILDING		
RETAINING WALL		
WETLAND LIMITS		
TREELINE		
LANDSCAPE EDING		
STORM SEWER	D	
SANITARY SEWER	S	
FORCEMAIN (SAN.)	LS FM	
WATERMAIN		
YARDDRAIN		
LIMITS OF DISTURBANCE		
TREE PROTECTION FENCE	TP	
TREE TO BE REMOVED		
SIGN		
PIPE BOLLARD		
RIPRAP		

STANDARD DUTY ASPHALT PAVING	
CONCRETE PAVING	
CONCRETE SIDEWALK	ML

MINNETONKA LANDSCAPE CODE

SIGNIFICANT TREE REMOVAL:

ALLOWED REMOVAL: 50% of trees on site

Two inches dsh replanted per tree removed.

REMOVED: 16% OF SIGNIFICANT TREES ON SITE

HIGH PRIORITY TREE REMOVAL:

ALLOWED REMOVAL: 35% of trees on site

One inch for each inch in diameter of a deciduous tree removed and one foot for each foot in height of a coniferous tree removed.

REMOVED: 28% OF SIGNIFICANT TREES ON SITE

NORTH

SCALE 0 20 40 IN FEET

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	02/23/2023	JMW	EJC	JB	Preliminary Site Plans

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Print Name: JOHN R. WORKMAN

Date 02/24/2023 License # 59119

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DRAWN BY	ML
DESIGNED BY	JRW
CHECKED BY	JRW
PROJECT NO.	51414

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TREE PRESERVATION PLAN

DORAN COMPANIES
MARSH RUN II REDEVELOPMENT
PRELIMINARY SITE DEVELOPMENT PLANS
MINNEOTNKA, MN

SHEET L0.01 REV.

24.5 (LMS TECH) | JOSEPH BAILEY | 2/23/2023 11:10:24 AM
L:\PROJECTS\51414\CAD\SHEETS\51414-L0.TREE PRES.DWG L0.01 TREE PRESERVATION PLAN

A-Tag	DBH	B-Species	Status
5701	12	Green Ash (Fraxinus pennsylvaica)	Preserve
5702	16	Green Ash (Fraxinus pennsylvaica)	Preserve
5703	16	Green Ash (Fraxinus pennsylvaica)	Preserve
5704	20	Green Ash (Fraxinus pennsylvaica)	Preserve
5705	23	Green Ash (Fraxinus pennsylvaica)	Remove
5706	7	Box Elder (Acer negundo)	Preserve
5707	29	Eastern Cottonwood (Populus deltoides)	Preserve
5708	13	Eastern Cottonwood (Populus deltoides)	Preserve
5709	4	Box Elder (Acer negundo)	Preserve
5710	4	Box Elder (Acer negundo)	Preserve
5711	8	Box Elder (Acer negundo)	Preserve
5712	44	Black Willow (Salix nigra)	Preserve
5713	5	Box Elder (Acer negundo)	Preserve
5714	9	Box Elder (Acer negundo)	Preserve
5715	11	Box Elder (Acer negundo)	Preserve
5716	23	Eastern Cottonwood (Populus deltoides)	Preserve
5717	17	Eastern Cottonwood (Populus deltoides)	Preserve
5718	13	Eastern Cottonwood (Populus deltoides)	Preserve
5719	31	Eastern Cottonwood (Populus deltoides)	Remove
5720	4	Eastern Cottonwood (Populus deltoides)	Remove
5721	4	Box Elder (Acer negundo)	Preserve
5722	5	Box Elder (Acer negundo)	Preserve
5723	9	Box Elder (Acer negundo)	Preserve
5724	8	Box Elder (Acer negundo)	Preserve
5725	14	Black Willow (Salix nigra)	Preserve
5726	9	Box Elder (Acer negundo)	Preserve
5727	10	Box Elder (Acer negundo)	Preserve
5728	10	Box Elder (Acer negundo)	Preserve
5729	6	Box Elder (Acer negundo)	Preserve
5730	15	Box Elder (Acer negundo)	Preserve
5731	9	Box Elder (Acer negundo)	Preserve
5732	4	Box Elder (Acer negundo)	Preserve
5733	34	Eastern Cottonwood (Populus deltoides)	Preserve
5734	21	Eastern Cottonwood (Populus deltoides)	Preserve
5735	16	Eastern Cottonwood (Populus deltoides)	Preserve
5736	15	Black Willow (Salix nigra)	Preserve
5737	42	Eastern Cottonwood (Populus deltoides)	Preserve
5738	24	Black Willow (Salix nigra)	Preserve
5739	23	Black Willow (Salix nigra)	Preserve
5740	26	Eastern Cottonwood (Populus deltoides)	Preserve
5741	19	Eastern Cottonwood (Populus deltoides)	Preserve
5742	13	Eastern Cottonwood (Populus deltoides)	Preserve
5743	14	Black Willow (Salix nigra)	Preserve
5744	13	Eastern Cottonwood (Populus deltoides)	Preserve
5745	11	Eastern Cottonwood (Populus deltoides)	Preserve
5746	15	Eastern Cottonwood (Populus deltoides)	Preserve
5747	17	Eastern Cottonwood (Populus deltoides)	Preserve
5748	12	Eastern Cottonwood (Populus deltoides)	Preserve
5749	7	Eastern Cottonwood (Populus deltoides)	Preserve
5750	5	Eastern Cottonwood (Populus deltoides)	Preserve
5751	15	Eastern Cottonwood (Populus deltoides)	Preserve
5752	14	Eastern Cottonwood (Populus deltoides)	Preserve
5753	15	Black Willow (Salix nigra)	Preserve
5754	19	Eastern Cottonwood (Populus deltoides)	Preserve
5755	27	Eastern Cottonwood (Populus deltoides)	Preserve
5756	6	American Elm (Ulmus americana)	Preserve
5757	5	American Elm (Ulmus americana)	Preserve
5758	16	Eastern Cottonwood (Populus deltoides)	Preserve
5759	26	Quaking Aspen (Populus tremuloides)	Preserve
5760	25	Eastern Cottonwood (Populus deltoides)	Preserve
5761	11	Box Elder (Acer negundo)	Preserve
5762	8	Box Elder (Acer negundo)	Preserve
5763	9	Box Elder (Acer negundo)	Preserve
5764	12	Eastern Cottonwood (Populus deltoides)	Preserve
5765	15	Quaking Aspen (Populus tremuloides)	Preserve
5766	8	Quaking Aspen (Populus tremuloides)	Preserve
5767	5	Quaking Aspen (Populus tremuloides)	Preserve
5768	23	Quaking Aspen (Populus tremuloides)	Remove
5769	12	Quaking Aspen (Populus tremuloides)	Remove
5770	13	Quaking Aspen (Populus tremuloides)	Preserve
5771	5	Quaking Aspen (Populus tremuloides)	Preserve
5772	4	Box Elder (Acer negundo)	Remove
5773	9	Box Elder (Acer negundo)	Remove
5774	12	Box Elder (Acer negundo)	Remove
5775	8	Green Ash (Fraxinus pennsylvaica)	Remove
5776	9	Box Elder (Acer negundo)	Remove
5777	8	Box Elder (Acer negundo)	Remove
5778	7	Box Elder (Acer negundo)	Remove
5779	8	Box Elder (Acer negundo)	Preserve
5780	33	Eastern Cottonwood (Populus deltoides)	Preserve
5781	5	Box Elder (Acer negundo)	Preserve
5782	5	Box Elder (Acer negundo)	Preserve
5783	6	Box Elder (Acer negundo)	Preserve
5784	10	Black Willow (Salix nigra)	Preserve
5785	4	Box Elder (Acer negundo)	Preserve
5786	26	Eastern Cottonwood (Populus deltoides)	Preserve
5787	8	Box Elder (Acer negundo)	Preserve
5788	25	Eastern Cottonwood (Populus deltoides)	Preserve
5789	15	Eastern Cottonwood (Populus deltoides)	Preserve
5790	15	Eastern Cottonwood (Populus deltoides)	Preserve
5791	9	Box Elder (Acer negundo)	Preserve
5792	23	Eastern Cottonwood (Populus deltoides)	Preserve
5793	4	Box Elder (Acer negundo)	Preserve
5794	28	Eastern Cottonwood (Populus deltoides)	Preserve
5795	5	Box Elder (Acer negundo)	Preserve
5796	5	Box Elder (Acer negundo)	Preserve
5797	41	Eastern Cottonwood (Populus deltoides)	Preserve
5798	6	Siberian Elm (Ulmus pumila)	Preserve
5799	20	Eastern Cottonwood (Populus deltoides)	Preserve
5800	5	Box Elder (Acer negundo)	Preserve
5801	6	Box Elder (Acer negundo)	Preserve
5802	5	Box Elder (Acer negundo)	Preserve
5803	8	Box Elder (Acer negundo)	Preserve
5804	6	Box Elder (Acer negundo)	Preserve
5805	11	Box Elder (Acer negundo)	Preserve
5806	5	Box Elder (Acer negundo)	Preserve
5807	19	Green Ash (Fraxinus pennsylvaica)	Remove
5808	22	Box Elder (Acer negundo)	Preserve
5809	8	Green Ash (Fraxinus pennsylvaica)	Remove
5810	4	Box Elder (Acer negundo)	Remove
5811	9	Siberian Elm (Ulmus pumila)	Remove
5812	34	Eastern Cottonwood (Populus deltoides)	Preserve
5813	4	Green Ash (Fraxinus pennsylvaica)	Preserve
5814	10	Box Elder (Acer negundo)	Preserve
5815	5	Box Elder (Acer negundo)	Remove
5816	6	Green Ash (Fraxinus pennsylvaica)	Preserve
5817	5	Green Ash (Fraxinus pennsylvaica)	Preserve
5818	5	Green Ash (Fraxinus pennsylvaica)	Preserve
5819	4	Box Elder (Acer negundo)	Preserve
5820	6	Green Ash (Fraxinus pennsylvaica)	Preserve
5821	8	Siberian Elm (Ulmus pumila)	Preserve
5822	22	Eastern Cottonwood (Populus deltoides)	Preserve
5823	32	Eastern Cottonwood (Populus deltoides)	Preserve
5824	14	Box Elder (Acer negundo)	Preserve
5825	8	Green Ash (Fraxinus pennsylvaica)	Preserve
5826	9	Green Ash (Fraxinus pennsylvaica)	Preserve
5827	8	Green Ash (Fraxinus pennsylvaica)	Preserve
5828	7	Box Elder (Acer negundo)	Preserve
5829	9	Green Ash (Fraxinus pennsylvaica)	Preserve
5830	5	Green Ash (Fraxinus pennsylvaica)	Preserve
5831	14	Green Ash (Fraxinus pennsylvaica)	Preserve
5832	13	Green Ash (Fraxinus pennsylvaica)	Preserve
5833	9	Green Ash (Fraxinus pennsylvaica)	Preserve
5834	12	River Birch (Betula nigra)	Remove
5835	5	Black Walnut (Juglans nigra)	Preserve
5836	8	Box Elder (Acer negundo)	Remove
5837	6	Green Ash (Fraxinus pennsylvaica)	Preserve
5838	13	Quaking Aspen (Populus tremuloides)	Preserve
5839	4	Box Elder (Acer negundo)	Preserve
5840	14	Box Elder (Acer negundo)	Preserve
5841	4	Box Elder (Acer negundo)	Preserve
5842	5	Box Elder (Acer negundo)	Preserve
5843	7	Green Ash (Fraxinus pennsylvaica)	Preserve
5844	21	Honey Locust (Gladitsia triacanthos)	Preserve
5845	22	Honey Locust (Gladitsia triacanthos)	Preserve
5846	22	Honey Locust (Gladitsia triacanthos)	Preserve
5847	26	Honey Locust (Gladitsia triacanthos)	Remove
5848	28	Honey Locust (Gladitsia triacanthos)	Remove
5849	27	Honey Locust (Gladitsia triacanthos)	Remove
5850	23	Honey Locust (Gladitsia triacanthos)	Remove
5851	24	Honey Locust (Gladitsia triacanthos)	Remove
5852	16	Honey Locust (Gladitsia triacanthos)	Preserve
5853	23	Honey Locust (Gladitsia triacanthos)	Preserve
5854	21	Honey Locust (Gladitsia triacanthos)	Preserve
5855	19	Honey Locust (Gladitsia triacanthos)	Preserve
5856	25	Honey Locust (Gladitsia triacanthos)	Preserve
5857	10	Paper Birch (Betula papyrifera)	Remove
5858	16	River Birch (Betula nigra)	Remove
5859	8	Paper Birch (Betula papyrifera)	Remove
5860	11	Paper Birch (Betula papyrifera)	Remove
5861	12	River Birch (Betula nigra)	Remove
5862	28	Green Ash (Fraxinus pennsylvaica)	Remove
5863	22	River Birch (Betula nigra)	Remove
5864	7	Box Elder (Acer negundo)	Preserve
5865	36	Eastern Cottonwood (Populus deltoides)	Preserve
5866	8	American Elm (Ulmus americana)	Preserve
5867	6	Box Elder (Acer negundo)	Preserve
5868	7	Green Ash (Fraxinus pennsylvaica)	Preserve
5869	10	Box Elder (Acer negundo)	Preserve
5870	18	Box Elder (Acer negundo)	Preserve
5871	14	Box Elder (Acer negundo)	Preserve
5872	6	Green Ash (Fraxinus pennsylvaica)	Preserve
5873	7	Green Ash (Fraxinus pennsylvaica)	Preserve
5874	5	Green Ash (Fraxinus pennsylvaica)	Preserve

24.15 | LMS TECH1 | JOSEPH BAILEY | 2/23/2023 11:10:24 AM
J:\PROJECTS\51414\CAD\SHEETS\51414-L0-TREE INVENTORY.DWG | L0.02 TREE INVENTORY

NO	DATE	BY	CKD	APPR	COMMENT
	02/23/2023	JMW	EJC	JB	Preliminary Site Plans

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.

Print Name: JOHN R. WORKMAN

Date 02/24/2023 License # 59119

PRELIMINARY 02/24/2023
DESIGN REVIEW
PERMIT SUBMITTAL
CONSTRUCTION DOCUMENTS

DRAWN BY ML
DESIGNED BY JRW
CHECKED BY JRW
PROJECT NO. 51414

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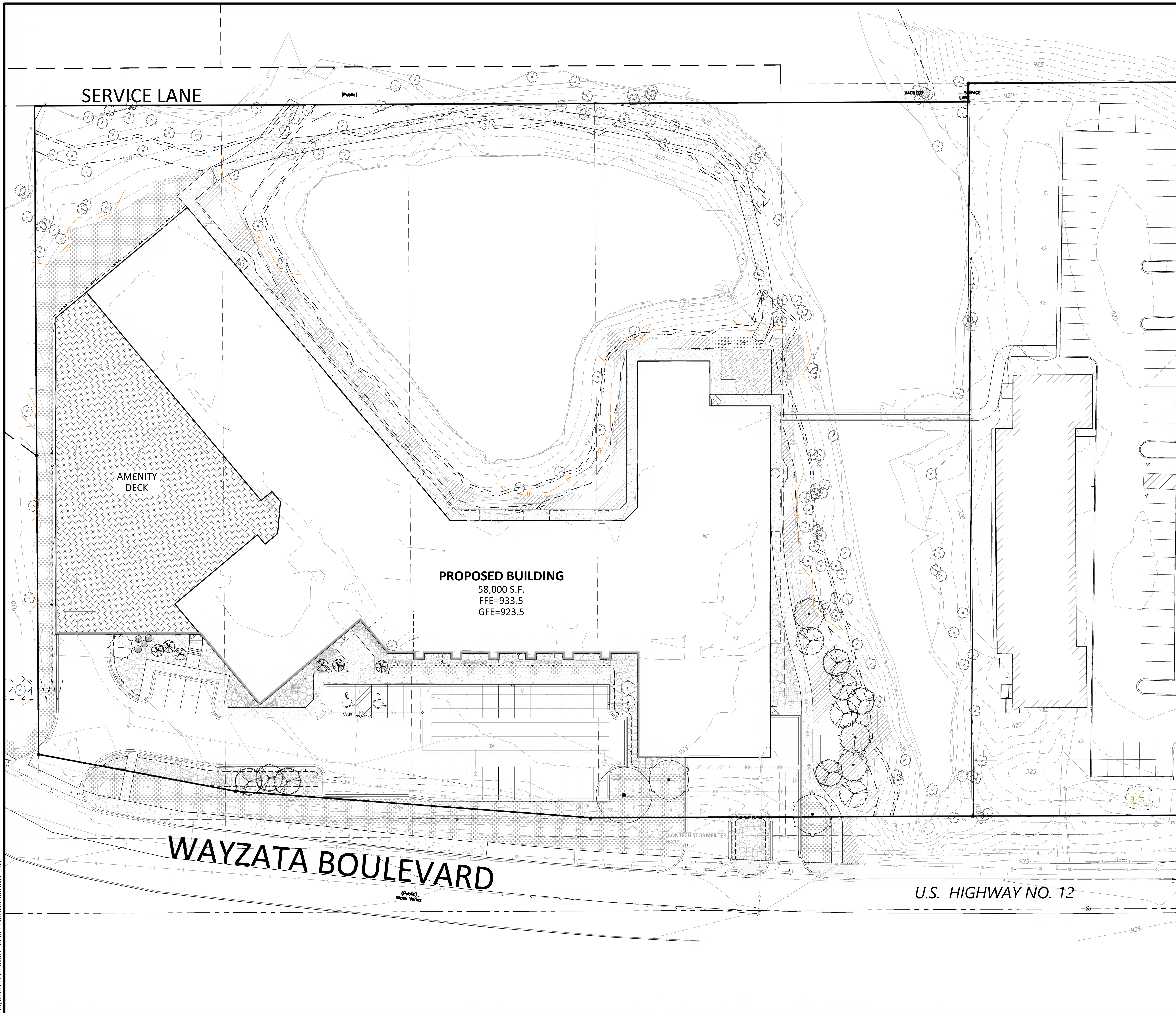
TREE INVENTORY

DORAN COMPANIES
MARSH RUN II REDEVELOPMENT
PRELIMINARY SITE DEVELOPMENT PLANS
MINNEOTNKA, MN

SHEET L0.02 REV.



LEGEND

	PROPOSED	EXISTING
PROPERTY LIMIT		
CURB & GUTTER		
EASEMENT		
BUILDING		
RETAINING WALL		
WETLAND LIMITS		WL
TREELINE		
LANDSCAPE EDING		
STORM SEWER		
SANITARY SEWER		
FORCEMAIN (SAN.)	FM	
WATERMAIN		
YARDDRAIN		
LIMITS OF DISTURBANCE		
TREE PROTECTION FENCE	TP	
TREE TO BE REMOVED		
SIGN		
PIPE BOLLARD		
RIPRAP		

STANDARD DUTY ASPHALT PAVING

CONCRETE PAVING

CONCRETE SIDEWALK

MINNETONKA LANDSCAPE CODE

LANDSCAPING REQUIREMENTS:
PROJECT VALUE, INCLUDING BUILDING CONSTRUCTION, SITE PREPARATION AND SITE IMPROVEMENTS
IF OVER 4,000,000 = 1% LANDSCAPE VALUE
ESTIMATED CONSTRUCTION COST MINIMUM VALUE.

LANDSCAPE ITEM	ESTIMATED VALUE
TOTAL ESTIMATED VALUE	*TO BE DETERMINED

*CONSTRUCTION VALUES WILL BE PROVIDED BY DORAN CONSTRUCTION.

PLANT SCHEDULE

PLANT SCHEDULE

TREES	CODE	BOTANICAL / COMMON NAME	CONT	CAL	SIZE	QTY
	SG	Acer freemanii `Sienna Glen` / Sienna Glen Maple	B & B	2.5"Cal		1
	DP	Betula platyphylla `Fargo` TM / Dakota Pinnacle Birch	B & B	2"Cal		6
	IH	Gleditsia triacanthos `Imperial` / Imperial Honeylocust	B & B	2.5"Cal		2
	RP	Quercus robur x warei`Long` / Regal Prince Oak	B & B	2.5"Cal		2
CONIFERS	CODE	BOTANICAL / COMMON NAME	CONT	CAL	SIZE	QTY
	BF	Abies balsamea / Balsam Fir	B & B		6`	1
	NS	Picea abies / Norway Spruce	B & B		6`	3
	TT	Thuja occidentalis `Techny` / Techny Arborvitae	B & B		8`	4
ORN. TREES	CODE	BOTANICAL / COMMON NAME	CONT	CAL	SIZE	QTY
	CC	Malus x `Coaralburst` / Coralburst Crabapple	B & B	2"Cal		6
	IL	Syringa reticulata `Ivory Silk` / Ivory Silk Japanese Tree Lilac	B & B	2"Cal		4
GROUND COVERS	CODE	BOTANICAL / COMMON NAME	CONT			
	ART TUR	Artificail Turf / X-Grass Pet Turf	Seed			
	34-262	MNDOT Seed Mix 34-262 / Wet Prairie	Seed			
	TUR HIG	Turf Sod Highland Sod / Sod	Sod			

NORTH

0 20 40
SCALE IN FEET

24.1S (LMS TECH) | JOSEPH BAILEY | 2/24/2023 12:59:51 PM
L:\PROJECTS\51414\CAD\SHEETS\51414-L1-LSCP.DWG-L1.01 TREE AND GROUNDCOVER PLAN

NO	DATE	BY	CKD	APPR	COMMENT
	02/23/2023	JMW	EJC	JB	Preliminary Site Plans

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.

Print Name: JOHN R. WORKMAN

Date 02/24/2023 License # 59119

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PERMIT SUBMITTAL
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DRAWN BY ML
DESIGNED BY JRW
CHECKED BY JRW
PROJECT NO. 51414

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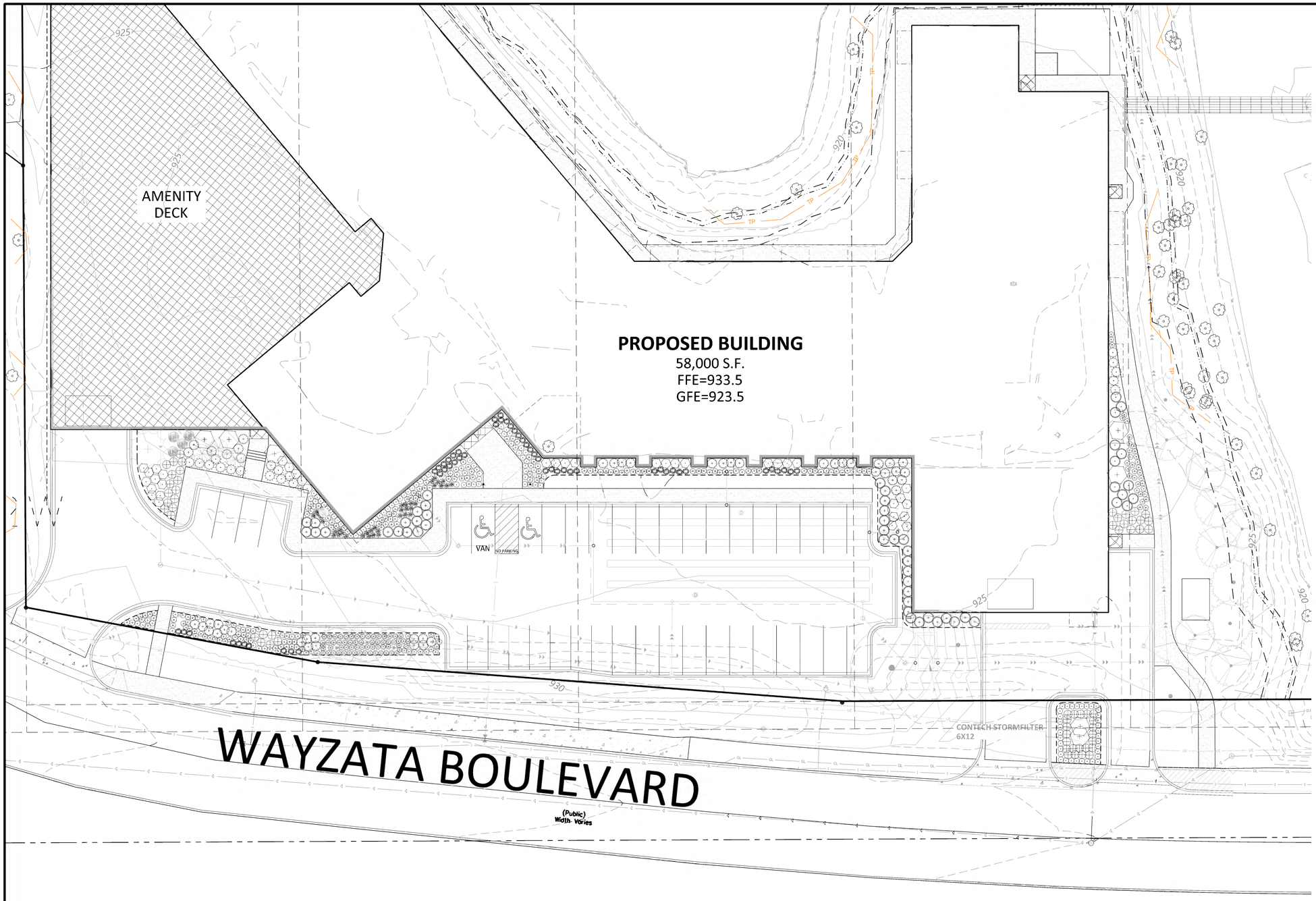
TREE AND GROUNDCOVER PLAN

DORAN COMPANIES
MARSH RUN II REDEVELOPMENT
PRELIMINARY SITE DEVELOPMENT PLANS
MINNEOTNKA, MN

SHEET L1.01

REV.



LEGEND

	PROPOSED	EXISTING
PROPERTY LIMIT		
CURB & GUTTER		
EASEMENT		
BUILDING		
RETAINING WALL		
WETLAND LIMITS		ML
TREELINE		
LANDSCAPE EDING		
STORM SEWER	D	
SANITARY SEWER	S	S
FORCEMAIN (SAN.)	LS	FM S
WATERMAIN		
YARDDRAIN		
LIMITS OF DISTURBANCE		
TREE PROTECTION FENCE	TP	
TREE TO BE REMOVED		
SIGN		
PIPE BOLLARD		
RIPRAP		

STANDARD DUTY ASPHALT PAVING
CONCRETE PAVING
CONCRETE SIDEWALK

MINNETONKA LANDSCAPE CODE

LANDSCAPING REQUIREMENTS:
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ESTIMATED CONSTRUCTION COST MINIMUM VALUE.
LANDSCAPE ITEM ESTIMATED VALUE

TOTAL ESTIMATED VALUE xxxxxxxx

*CONSTRUCTION VALUES WILL BE PROVIDED BY DORAN CONSTRUCTION.

PLANT SCHEDULE

PLANT SCHEDULE

SHRUBS	CODE	BOTANICAL / COMMON NAME	CONT	QTY
	BH	Diervilla lonicera / Dwarf Bush Honeysuckle	5 gal	57
	AH	Hydrangea arborescens `Annabelle` / Annabelle Smooth Hydrangea	5 gal	36
	LL	Hydrangea paniculata `Limelight` TM / Limelight Hydrangea	5 gal	7
	MJ	Juniperus chinensis `Mint Julep` / Mint Julep Juniper	5 gal	17
	CJ	Juniperus sabina `Monna` / Calgary Carpet Juniper	5 gal	40
	FS	Sorbaria sorbifolia `Sem` / Sem Ash Leaf Spirea	5 gal	48
	HA	Thuja occidentalis `Holmstrup` / Holmstrup Cedar	10 gal	12
GRASSES	CODE	BOTANICAL / COMMON NAME	CONT	QTY
	PDS	Sporobolus heterolepis / Prairie Dropseed	1 gal	53
PERENNIALS	CODE	BOTANICAL / COMMON NAME	CONT	QTY
	SBA	Allium x `Summer Beauty` / Summer Beauty Allium	1 gal	98
	PCF	Echinacea purpurea `Rubinstern` / Purple Coneflower	1 gal	63
	BDL	Hemerocallis x `Baja` / Baja Daylily	1 gal	39
	RSH	Hosta x `Regal Splendor` / Plantain Lily	1 gal	62
	WLC	Nepeta x faassenii `Walkers Low` / Walkers Low Catmint	1 gal	117
	BES	Rudbeckia fulgida `Goldstrum` / Black Eyed Susan	1 gal	38

NORTH

0 15 30
SCALE IN FEET

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J:\PROJECTS\51414\CADD\SHEETS\51414 L1 LSCP DWG L1.02 SHRUB PLAN

NO	DATE	BY	CKD	APPR	COMMENT
	02/23/2023	JMW	EJC	JB	Preliminary Site Plans

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.

Print Name: JOHN R. WORKMAN

Date 02/24/2023 License # 59119

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DESIGNED BY JRW
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SHRUB PLAN

DORAN COMPANIES
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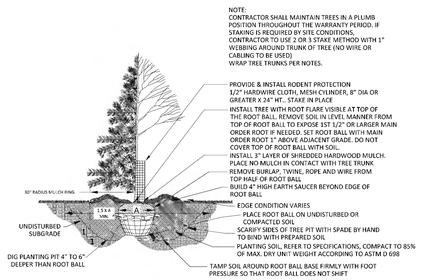
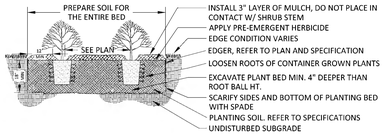
PRELIMINARY SITE DEVELOPMENT PLANS
MINNEOTNKA, MN

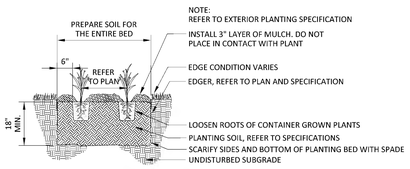
SHEET L1.02 REV.



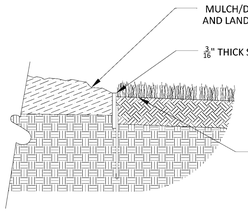
1 L1.02 TREE PLANTING DETAIL
1/4" = 1'-0" P-01



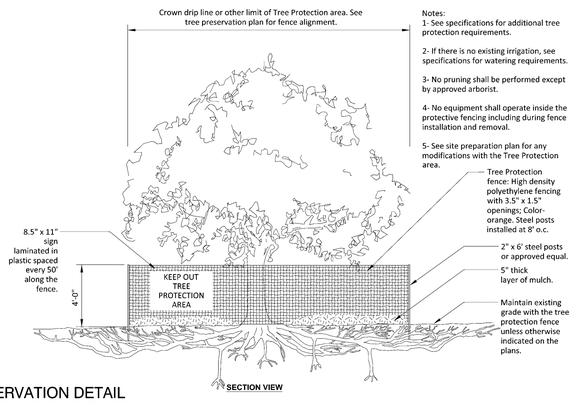
2 L1.02 SHRUB PLANTING DETAIL
3/8" = 1'-0" P-02



3 L1.02 PERENNIAL PLANTING DETAIL
1/2" = 1'-0" P-03



4 L1.02 STEEL EDGER
1 1/2" = 1'-0" P-06



5 L1.02 TREE PRESERVATION DETAIL
1/4" = 1'-0" P-04

NOTES

GENERAL NOTES:

1. THE CONTRACTOR SHALL INSPECT THE SITE AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS RELATING TO THE NATURE AND SCOPE OF THE WORK.
2. THE CONTRACTOR SHALL VERIFY PLAN LAYOUT AND BRING TO THE ATTENTION OF THE LANDSCAPE ARCHITECT DISCREPANCIES WHICH MAY COMPROMISE THE DESIGN OR INTENT OF THE LAYOUT.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE CODES, REGULATIONS, AND PERMITS GOVERNING THE WORK.
4. THE CONTRACTOR SHALL PROTECT EXISTING ROADS, CURBS/GUTTERS, TRAILS, TREES, LAWNS AND SITE ELEMENTS DURING CONSTRUCTION. DAMAGE TO SAME SHALL BE REPAIRED AND/OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.
5. LOCATE AND VERIFY ALL UTILITIES, INCLUDING IRRIGATION LINES, WITH THE OWNER FOR PROPRIETARY UTILITIES AND GOPHER STATE ONE CALL 48 HOURS BEFORE DIGGING. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND REPAIR OF ANY DAMAGES TO SAME. NOTIFY THE LANDSCAPE ARCHITECT OF ANY CONFLICTS TO FACILITATE PLANT RELOCATION.
6. **THE LANDSCAPE CONTRACTOR SHALL COORDINATE THE PHASES OF CONSTRUCTION AND PLANTING INSTALLATION WITH OTHER CONTRACTORS WORKING ON SITE.**
7. THE CONTRACTOR SHALL REVIEW THE SITE FOR DEFICIENCIES IN SITE CONDITIONS WHICH MIGHT NEGATIVELY AFFECT PLANT ESTABLISHMENT, SURVIVAL OR WARRANTY. UNDESIRABLE SITE CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT PRIOR TO BEGINNING OF WORK.
8. THE PLAN TAKES PRECEDENCE OVER THE LANDSCAPE LEGEND IF DISCREPANCIES EXIST. QUANTITIES SHOWN IN THE PLANTING SCHEDULE ARE FOR THE CONTRACTOR'S CONVENIENCE. CONTRACTOR TO VERIFY QUANTITIES SHOWN ON THE PLAN.
9. THE SPECIFICATIONS TAKE PRECEDENCE OVER THE PLANTING NOTES AND GENERAL NOTES.
10. EXISTING TREES AND SHRUBS TO REMAIN SHALL BE PROTECTED TO THE DRIP LINE FROM ALL CONSTRUCTION TRAFFIC, STORAGE OF MATERIALS ETC. WITH 4' HT. ORANGE PLASTIC SAFETY FENCING ADEQUATELY SUPPORTED BY STEEL FENCE POSTS 6' O.C. MAXIMUM SPACING.
11. LONG-TERM STORAGE OF MATERIALS OR SUPPLIES ON-SITE WILL NOT BE ALLOWED.
12. CONTRACTOR SHALL REQUEST IN WRITING, A FINAL ACCEPTANCE INSPECTION.

PLANTING NOTES:

1. NO PLANTS SHALL BE INSTALLED UNTIL FINAL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.
2. A GRANULAR PRE-EMERGENT HERBICIDE SHALL BE APPLIED TO ALL PLANT BEDS AT THE MANUFACTURERS RECOMMENDED RATE PRIOR TO PLANT INSTALLATION.
3. ALL PLANTING STOCK SHALL CONFORM TO THE "AMERICAN STANDARD FOR NURSERY STOCK," ANSI-Z60, LATEST EDITION, OF THE AMERICAN ASSOCIATION OF NURSERYMEN, INC. AND SHALL CONSTITUTE MINIMUM QUALITY REQUIREMENTS FOR PLANT MATERIALS.
4. OVERSTORY TREES SHALL BEGIN BRANCHING NO LOWER THAN 6' ABOVE PAVED SURFACES.
5. ALL PLANTS MUST BE HEALTHY, VIGOROUS MATERIAL, FREE OF PESTS AND DISEASE AND BE CONTAINER GROWN OR BALLED AND BURLAPPED AS INDICATED IN THE LANDSCAPE LEGEND.
6. PLANT MATERIALS TO BE INSTALLED PER PLANTING DETAILS.
7. ALL TREES MUST BE STRAIGHT TRUNKED AND FULL HEADED AND MEET ALL REQUIREMENTS SPECIFIED.
8. THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO REJECT ANY PLANTS WHICH ARE DEEMED UNSATISFACTORY BEFORE, DURING, OR AFTER INSTALLATION.
9. NO SUBSTITUTIONS OF PLANT MATERIAL SHALL BE ACCEPTED UNLESS APPROVED IN WRITING BY THE LANDSCAPE ARCHITECT.
10. ALL PLANT MATERIAL QUANTITIES, SHAPES OF BEDS AND LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETE COVERAGE OF ALL PLANTING BEDS AT SPACING SHOWN AND ADJUSTED TO CONFORM TO THE EXACT CONDITIONS OF THE SITE. THE LANDSCAPE ARCHITECT SHALL APPROVE THE STAKING LOCATION OF ALL PLANT MATERIALS PRIOR TO INSTALLATION.
11. ALL PLANTING AREAS MUST BE COMPLETELY MULCHED AS SPECIFIED.
12. MULCH: DOUBLE SHREDDED HARDWOOD MULCH, CLEAN AND FREE OF NOXIOUS WEEDS OR OTHER DELETERIOUS MATERIAL, IN ALL MASS PLANTING BEDS AND FOR TREES, UNLESS INDICATED AS ROCK MULCH ON DRAWINGS. SUBMIT SAMPLE TO LANDSCAPE ARCHITECT PRIOR TO DELIVERY ON-SITE FOR APPROVAL. DELIVER MULCH ON DAY OF INSTALLATION. USE 3" FOR SHRUB BEDS, TREE RINGS, AND 3" FOR PERENNIAL/GROUND COVER BEDS, UNLESS OTHERWISE DIRECTED.
13. BUILDING MAINTENANCE STRIP: WHERE NO LANDSCAPE PLANTING BEDS EXIST ADJACENT TO A BUILDING FOUNDATION, CONTRACTOR SHALL INSTALL A DECORATIVE ROCK MAINTENANCE STRIP PER PLAN. DECORATIVE ROCK SHALL BE 1"-3" DRESSER TRAP ROCK, GREY IN COLOR.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MULCHES AND PLANTING SOIL QUANTITIES TO COMPLETE THE WORK SHOWN ON THE PLAN.
15. USE ANTI-DESICCANT (WILTPRUF OR APPROVED EQUAL) ON DECIDUOUS PLANTS MOVED IN LEAF AND FOR EVERGREENS MOVED ANYTIME. APPLY AS PER MANUFACTURER'S INSTRUCTION. ALL EVERGREENS SHALL BE SPRAYED IN THE LATE FALL FOR WINTER PROTECTION DURING WARRANTY PERIOD.
16. WRAP ALL SMOOTH-BARKED DECIDUOUS TREES PLANTED IN THE FALL PRIOR TO DECEMBER 1 AND REMOVE WRAPPING AFTER MAY 1. TREE WRAPPING MATERIAL SHALL BE WHITE TWO-WALLED PLASTIC SHEETING APPLIED FROM TRUNK FLARE TO THE FIRST BRANCH.
17. ALL DECIDUOUS, PINE, AND LARCH PLANTINGS SHALL RECEIVE RODENT PROTECTION PER MNDOT 2571.31.2
18. PLANTING SOIL FOR TREES, SHRUBS AND GROUND COVERS: FERTILE FRIABLE LOAM CONTAINING A LIBERAL AMOUNT (4% MIN.) OF HUMUS AND CAPABLE OF SUSTAINING VIGOROUS PLANT GROWTH. IT SHALL COMPLY WITH MNDOT SPECIFICATION 3877 TYPE B SELECT TOPSOIL. MIXTURE SHALL BE FREE FROM HARDPACK SUBSOIL, STONES, CHEMICALS, NOXIOUS WEEDS, ETC. SOIL MIXTURE SHALL HAVE A PH BETWEEN 6.1 AND 7.5 AND 10-0-10 FERTILIZER AT THE RATE OF 3 POUNDS PER CUBIC YARD. IN PLANTING BEDS INCORPORATE THIS MIXTURE THROUGHOUT THE ENTIRE BED IN A 6" LAYER AND ROTO-TILLING IT INTO THE TOP 12" OF SOIL AT A 1:1 RATIO.ANY PLANT STOCK NOT PLANTED ON DAY OF DELIVERY SHALL BE HEELED IN AND WATERED UNTIL INSTALLATION. PLANTS NOT MAINTAINED IN THIS MANNER WILL BE REJECTED.
19. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY THAT EACH EXCAVATED TREE AND SHRUB PIT WILL PERCOLATE PRIOR TO INSTALLING PLANTING MEDIUM AND PLANTS. THE CONTRACTOR SHALL FILL THE BOTTOM OF SELECTED HOLES WITH SIX INCHES OF WATER AND CONFIRM THAT THIS WATER WILL PERCOLATE WITHIN A 24-HOUR PERIOD. IF THE SOIL AT A GIVEN AREA DOES NOT DRAIN PROPERLY, A PVC DRAIN OR GRAVEL SUMP SHALL BE INSTALLED OR THE PLANTING SHALL BE RELOCATED IF DIRECTED BY THE LANDSCAPE ARCHITECT.
20. ALL PLANTS SHALL BE GUARANTEED FOR TWO COMPLETE GROWING SEASONS (APRIL 1 - NOVEMBER 1), UNLESS OTHERWISE SPECIFIED. THE GUARANTEE SHALL COVER THE FULL COST OF REPLACEMENT INCLUDING LABOR AND PLANTS.
21. CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT AT LEAST 3 DAYS PRIOR TO PLANNED DELIVERY. THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT AT LEAST 24 HOURS IN ADVANCE OF BEGINNING PLANT INSTALLATION.
22. SEASONS/TIME OF PLANTING AND SEEDING: NOTE: THE CONTRACTOR MAY ELECT TO PLANT IN OFF-SEASONS ENTIRELY AT HIS/HER RISK.

22.1.	POTTED PLANTS:	4/1 - 6/1; 9/21 - 11/1
22.2.	DECIDUOUS /B&B:	4/1 - 6/1; 9/21 - 11/1
22.3.	EVERGREEN POTTED PLANTS:	4/1 - 6/1; 9/21-11/1
22.4.	EVERGREEN B&B:	4/1 - 5/1; 9/21 - 11/1
22.5.	TURF/LAWN SEEDING:	4/1 - 6/1; 7/20 - 9/20
22.6.	NATIVE MIX SEEDING:	4/15 - 7/20; 9/20-10/20

23. MAINTENANCE SHALL BEGIN IMMEDIATELY AFTER EACH PORTION OF THE WORK IS IN PLACE. PLANT MATERIAL SHALL BE PROTECTED AND MAINTAINED UNTIL THE INSTALLATION OF THE PLANTS IS COMPLETE, INSPECTION HAS BEEN MADE, AND PLANTINGS ARE ACCEPTED EXCLUSIVE OF THE GUARANTEE. MAINTENANCE SHALL INCLUDE WATERING, CULTIVATING, MULCHING, REMOVAL OF DEAD MATERIALS, RE-SETTING PLANTS TO PROPER GRADE AND KEEPING PLANTS IN A PLUMB POSITION. AFTER ACCEPTANCE, THE OWNER SHALL ASSUME MAINTENANCE RESPONSIBILITIES. HOWEVER, THE CONTRACTOR SHALL CONTINUE TO BE RESPONSIBLE FOR KEEPING THE TREES PLUMB THROUGHOUT THE GUARANTEE PERIOD.
24. ANY PLANT MATERIAL WHICH DIES, TURNS BROWN, OR DEFOLIATES (PRIOR TO TOTAL ACCEPTANCE OF THE WORK) SHALL BE PROMPTLY REMOVED FROM THE SITE AND REPLACED WITH MATERIAL OF THE SAME SPECIES, QUANTITY, AND SIZE AND MEETING ALL LANDSCAPE LEGEND SPECIFICATIONS.
25. WATERING: MAINTAIN A WATERING SCHEDULE WHICH WILL THOROUGHLY WATER ALL PLANTS ONCE A WEEK. IN EXTREMELY HOT, DRY WEATHER, WATER MORE OFTEN AS REQUIRED BY INDICATIONS OF HEAT STRESS SUCH AS WILTING LEAVES. CHECK MOISTURE UNDER MULCH PRIOR TO WATERING TO DETERMINE NEED. CONTRACTOR SHALL MAKE THE NECESSARY ARRANGEMENTS FOR WATER.

TURF NOTES:

TURF ESTABLISHMENT SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE PROVISIONS OF THE MN/DOT 2105 AND 2575 EXCEPT AS MODIFIED BELOW:

1. ALL AREAS TO RECEIVE SOD SHALL ALSO RECEIVE 6" OF TOPSOIL PRIOR TO INSTALLING SOD. TOPSOIL SHALL BE FREE OF TREE ROOTS, STUMPS, BUILDING MATERIAL, AND TRASH, AND SHALL BE FREE OF STONES LARGER THAN 1 ½" INCHES IN ANY DIMENSION.
2. WHERE SOD ABUTS PAVED SURFACES, FINISHED GRADE OF SOD/SEED SHALL BE HELD 1" BELOW SURFACE ELEVATION OF TRAIL, SLAB, CURB, ETC.
3. SOD SHALL BE LAID PARALLEL TO THE CONTOURS AND SHALL HAVE STAGGERED JOINTS. ON SLOPES STEEPER THAN 3:1 OR IN DRAINAGE SWALES, SOD SHALL BE STAKED SECURELY.
4. TURF ON ALL OTHER AREAS DISTURBED BY CONSTRUCTION SHALL BE RESTORED BY SEEDING, MULCHING AND FERTILIZING. SEED MIXTURE NO.25-121 WILL BE PLACED AT THE RATE OF 65 POUNDS PER ACRE.
5. ALL DISTURBED AREAS TO BE TURF SEEDED, ARE TO RECEIVE 6" TOP SOIL, SEED, MULCH, AND WATER UNTIL A HEALTHY STAND OF GRASS IS OBTAINED. FOR SLOPES STEEPER THAN 3:1 OR IN DRAINAGE SWALES INSTALL EROSION CONTROL BLANKET.
6. ALL DISTURBED AREAS TO RECEIVE NATIVE SEED, ARE TO RECEIVE PLANTING SOIL, SEED, MULCH, AND WATER UNTIL A HEALTHY STAND OF GRASS IS OBTAINED. FOR SLOPES STEEPER THAN 3:1 OR IN DRAINAGE SWALES INSTALL EROSION CONTROL BLANKET.

GENERAL TREE SPECIFICATIONS:

1. ALL STREET AND PARKING LOT TREES SHALL BE LIMBED UP TO THE FOLLOWING HEIGHTS:
   - 1.1. 2" CAL. TREES: LOWEST BRANCH 6' HT.
   - 1.2. 3" CAL.+ TREES: LOWEST BRANCH 7' HT.
2. TREE CANOPY WIDTH SHALL BE RELATIVE TO HEIGHT/CALIPER OF TREE AND TYPE OF TREE.
   - 2.1. 1" CALIPER/6-8' HT: 3-4' WIDTH MIN.
   - 2.2. 2" CALIPER/12-14' HT: 4-5' WIDTH MIN.
   - 2.3. 3" CALIPER/14-16' HT: 6-7' WIDTH MIN.
3. CANOPY TREES SHALL NOT HAVE CO-DOMINATE LEADERS IN LOWER HALF OF TREE CROWN.
4. ALL TREES SHALL HAVE SYMMETRICAL OR BALANCED BRANCHING ON ALL SIDES OF THE TREE.
5. TREES SHALL NOT BE TIPPED PRUNED.
6. TREES SHALL BE FREE OF PHYSICAL DAMAGE FROM SHIPPING AND HANDLING. DAMAGED TREES SHALL BE REJECTED.
7. SUMMER DUG TREES SHALL HAVE ROOTBALL SIZE INCREASED BY 20%
8. TREES WHICH EXCEED RECOMMENDED CALIPER TO HEIGHT RELATIONSHIP SHALL BE REJECTED.

IRRIGATION NOTES:

1. IRRIGATION SYSTEM TO BE DESIGN/BUILD. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR APPROVAL OF SYSTEM LAYOUT PRIOR TO INSTALLATION.
2. ALL SOD TO RECEIVE SPRAY OR ROTOR IRRIGATION HEADS WITH MINIMUM DESIGN OF 1" IRRIGATION PER WEEK.
3. ALL PLANT BEDS TO RECEIVE DRIP LINE IRRIGATION , WITH A MINIMUM DESIGN OF .25" IRRIGATION PER WEEK.
4. CONTRACTOR TO INSTALL A TOTAL OF 4 QUICK COUPLERS AT THE CORNERS OF THE PROPERTY. A 2.5" TYPE K SOURCE PIPE IS PROVIDED BY MECHANICAL.

LOW MAINTENANCE FESCUE NOTES:

1. DURING GROWING SEASON NEVER MOW SHORTER THAN 3.5 INCHES, PREFERRED MAINTENANCE IS MOW ONCE PER MONTH AT 5" HEIGHT
2. DO NOT USE HIGH NITROGEN FERTILIZER ON FESCUE LAWN
3. OVERSEED THIN,BARE SPOTS IN FALL
4. ALWAYS USE SHARP BLADE WHEN MOWING TO AVOID TEARING LEAF BLADE
5. SET MOWER TO 3" FOR BAGGING AND MOWING IN LATE FALL AFTER GROWING SEASON

NATIVE SEED MIX NOTES:

1. ESTABLISHMENT AND YEAR ONE: MOW THREE(3) TIMES FIRST YEAR ON 30-DAY INTERVALS TO A HEIGHT BETWEEN FIVE AND EIGHT INCHES. DO NOT USE FERTILIZERS. SPOT TREAT INVASIVE WOODY PLANTS OR HAND WEED INDIVIDUAL NOXIOUS WEEDS.
2. YEAR TWO: PERFORM ONE MOWING BETWEEN MID-JUNE AND MID-AUGUST. SPOT SPRAY WEEDS AS NEEDED WHERE THEY ARE ESPECIALLY DOMINATE.
3. YEAR THREE (AND BEYOND): CUT ONE TIME PER YEAR AS A CLEAN UP PROCEDURE (EITHER IN EARLY MAY OR LATE NOVEMBER). PRESCRIBED BURNS MAY BE USED AS WELL IN PLACE OF MOWING. CHECK LOCAL REGULATIONS AND PERMIT PROCEDURES.

NORTH

0 ## ## SCALE IN FEET

NO	DATE	BY	CKD	APPR	COMMENT
	02/23/2023	JMW	EJC	JB	Preliminary Site Plans

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.

Print Name: JOHN R. WORKMAN

Date 02/24/2023 License # 59119

PRELIMINARY 02/24/2023	DRAWN BY ML
DESIGN REVIEW	DESIGNED BY JRW
PERMIT SUBMITTAL	CHECKED BY JRW
CONSTRUCTION DOCUMENTS	PROJECT NO. 51414

Sambatek www.sambatek.com
Engineering | Surveying | Planning | Environmental

LANDSCAPE DETAILS AND NOTES

DORAN COMPANIES
MARSH RUN II REDEVELOPMENT
PRELIMINARY SITE DEVELOPMENT PLANS
MINNEOTNKA, MN

SHEET L1.03 REV.

24.15 (LMS TECH) | JOSEPH BAILEY | 2/24/2023 12:59:51 PM
U:\PROJECTS\51414-CAD\SHEETS\51414-L1.LSC-DWG L1.03 LANDSCAPE DETAILS AND NOTES

MARSH RUN II REDEVELOPMENT

SITE & BUILDING PLANS: FEBRUARY 24, 2023

Project Description

Doran is proposing a new, high-quality, Class A luxury apartment project that will be complimentary to the Birke, in the 394 Corridor regional area. This project is precisely what the City of Minnetonka is seeking the 2040 Comprehensive Plan for the 394 Corridor regional area. This project will add life and vitality to the north side of 394, enhancing walkability, providing an additional housing option for existing residents, attracting the next generation of residents to the City, and supporting the nearby commercial uses that exist in the neighborhood today. The project will contain an affordable housing component mixed with market-rate apartments to contribute to the City's need for attainable and affordable housing. The project will provide ample and convenient visitor parking, including 40 dedicated short term and visitor stalls located in a surface lot directly in front of the building's main entrance along Wayzata Boulevard. In addition, this project will add to the City's parks and trail system, with a pedestrian bridge and walking trail loop that preserve most of the site's significant trees and landscape features. This is a unique opportunity to redevelop a 4.33 acre blighted and underutilized site to create an exceptional project that will contribute to the City's goals for affordable housing, tree preservation, and the connection of parks and trails.

The redevelopment will include razing an existing office building on the site and constructing a 197-unit apartment project, with 10% of the units affordable to households earning 60% of the area median income levels, and 10% of the units affordable to households earning 80% of the area median income levels. The building will contain a mix of alcove, 1 bed, 2 bed, and 3 bed apartments with active gathering spaces for residents and guest located on the first and second levels of the building. The project will consist of a concrete podium parking garage with approximately 304 parking stalls on two levels—one level at grade along Wayzata Boulevard and a basement level that walks out to the North side of the site. The parking garage will contain all of the resident parking for the project, with an additional 40 surface parking spaces along Wayzata Boulevard near the main entrance for short-term guest and delivery parking. Above level one the building will be wood framed construction for the apartments and an open, elevated amenity deck will have several outdoor amenities. Amenities throughout the project will include: Business center; Flex work space; Clubroom and game room; entertainment suite with rooftop patio; Game simulator; Exercise facility; Group exercise room; Outdoor pool; Outdoor spa; Grilling stations; Outdoor fire pits; Pet spa; Heated underground parking; Bocce ball, and outdoor seating. The natural site features contribute to the City and the overall amenities, with a walking trail loop along the North wetlands, a sidewalk to Wayzata Boulevard, and a pedestrian bridge trail connection to the existing park trail to the Landings and retail center to the East.

This project has significant wetlands on the North and East Sides of the property that will remain to visually buffer the existing residential area to the North and East sides of the site. The proposed project "fits", both visually and in terms of use, massing and density, and it properly addresses the goals and concerns identified by the City and residential neighbors. For the building's exterior architecture, the project is thoughtfully designed around neighborhood characteristics and concept plan feedback. From the community and City feedback during the open house and sketch review process, the exterior design seeks to be contextual, timeless, and a unique contribution to the City of Minnetonka's architecture. To lower the visual scale of the building and relate to the more traditional architecture to the North, the overall mass is broken up and articulated into 5 distinct pieces with a base, middle, and top to the building form. Historical inspiration is made modern with traditional cornice, frames, and book ends translated into clean black lines, panelized forms, and black accents. To add to the existing sense of place, the material palate will compliment the existing retail center and the Birke apartment building with a mountain shadow velour brick base, white and earth tone lap siding, and black cementitious panels and windows. To clearly call out the building entrances, black brick is used at the vehicle and pedestrian entrances; and a copper canopy on the center black brick form clearly identifies the main visitor and pedestrian entrance to the building.

In summary, this project will significantly contribute to the City's goals and neighborhood's needs with: high quality & affordable housing; a meaningful contribution to the City's parks and trails system; preserved significant trees; ample & convenient visitor parking; and a contextual & timeless architecture that's unique to the City of Minnetonka.

Site Map

Project Team

Owner/Developer:
Doran RE Partners, LLC
7803 Glenroy Road
Bloomington, MN 55439
Ph: 952-288-2000

Contractor:
Doran Construction Company, LLC
7803 Glenroy Road
Bloomington, MN 55439
Ph: 952-288-2000

Architect:
Doran Architects, LLC
7803 Glenroy Road
Bloomington, MN 55439
Ph: 952-288-2000

Attorney:
Doran Companies
Attn: Legal Department
7803 Glenroy Road
Bloomington, MN 55439
Ph: 952-288-2000

Civil:
Sambatek
12800 Whitewater Drive Suite 300
Minneapolis, MN 55430
PH: 763-843-0420

Surveyor:
Sambatek
12800 Whitewater Drive Suite 300
Minneapolis, MN 55430
PH: 763-843-0420

Landscape:
Sambatek
12800 Whitewater Drive Suite 300
Minneapolis, MN 55430
PH: 763-843-0420

Unit, Bed, and Parking Count

UNITS

1 BED	113
2 BED	44
3 BED	9
ALCOVE	31
STUDIO	0
TOTAL	**197 UNITS**

BEDS

1 BED	113
2 BED	88
3 BED	27
ALCOVE	31
STUDIO	0
TOTAL	**259 BEDS**

PARKING

SURFACE STANDARD	30
SURFACE COMPACT	8
SURFACE ADA	2
SURFACE TOTAL	40
LEVEL P1 STANDARD	133
LEVEL P1 COMPACT	9
LEVEL P1 ADA	3
LEVEL P1 TOTAL	145
LEVEL 1 STANDARD	107
LEVEL 1 COMPACT	9
LEVEL 1 ADA	3
LEVEL 1 TOTAL	119
TOTAL	**304 PARKING SPACES**

Total SF Per Floor:

P1 LEVEL	54,360 SF
L1 LEVEL	57,950 SF
L2 LEVEL	43,070 SF
L3 LEVEL	43,070 SF
L4 LEVEL	43,070 SF
L5 LEVEL	43,070 SF
L6 LEVEL	42,450 SF
GRAND TOTAL:	**327,040 SF**

Building Information:

Construction Type: 1A Podium
IIIA Above Podium
(w/ Automatic SprinklerSystem
Per 2018 MNSBC Chapter 9)

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STREET VIEW FROM SE CORNER

VIEW FROM NE CORNER

VIEW FROM NW CORNER

STREET VIEW FROM SW CORNER

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

EXISTING SITE PHOTOS

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

CONTEXT SITE PLAN

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DORAN
ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

EXISTING SITE PLAN

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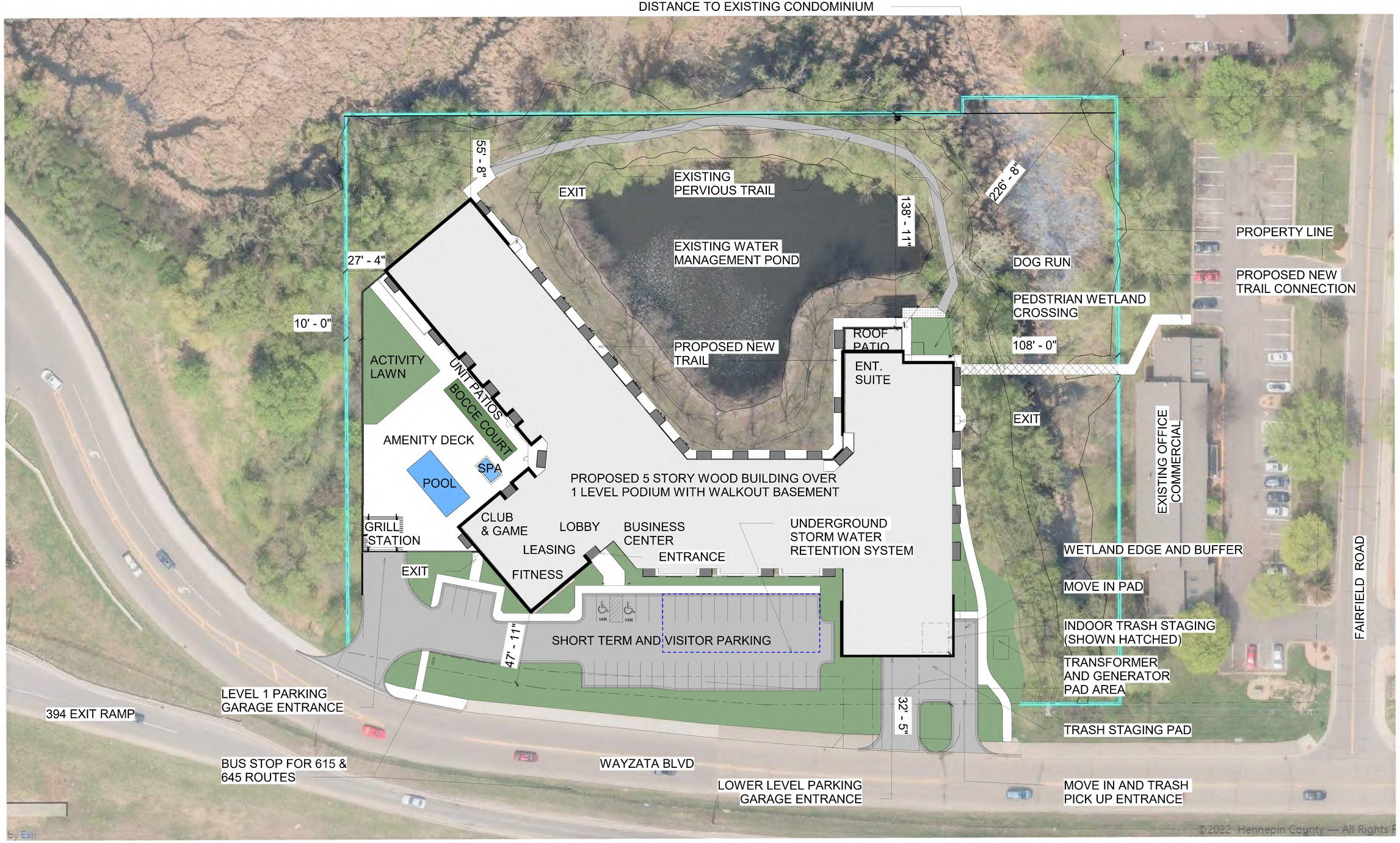

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DORAN
ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

PROPOSED SITE PLAN

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

LOWER LEVEL FLOOR PLAN

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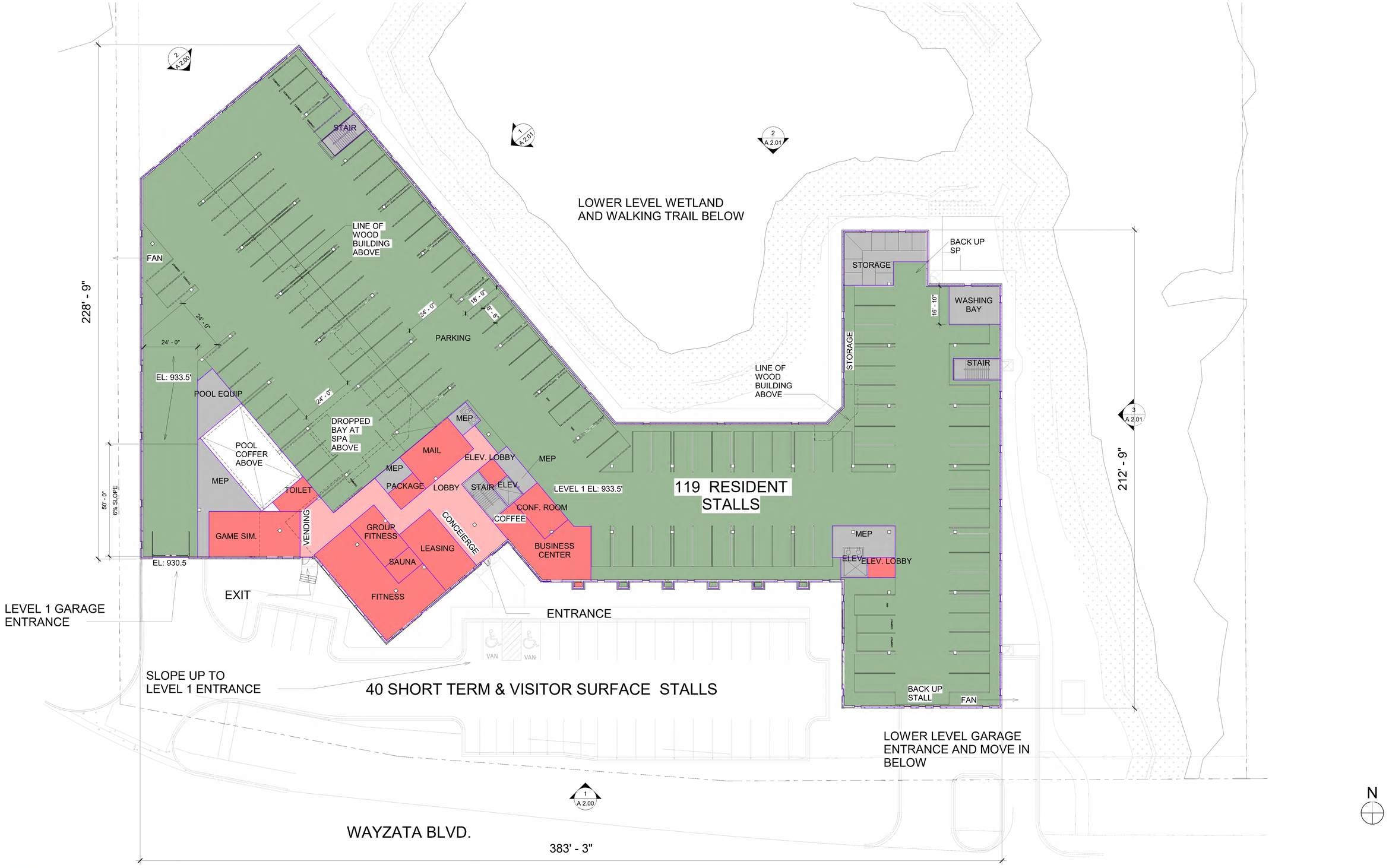

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

LEVEL 1 FLOOR PLAN

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

LEVEL 2 FLOOR PLAN

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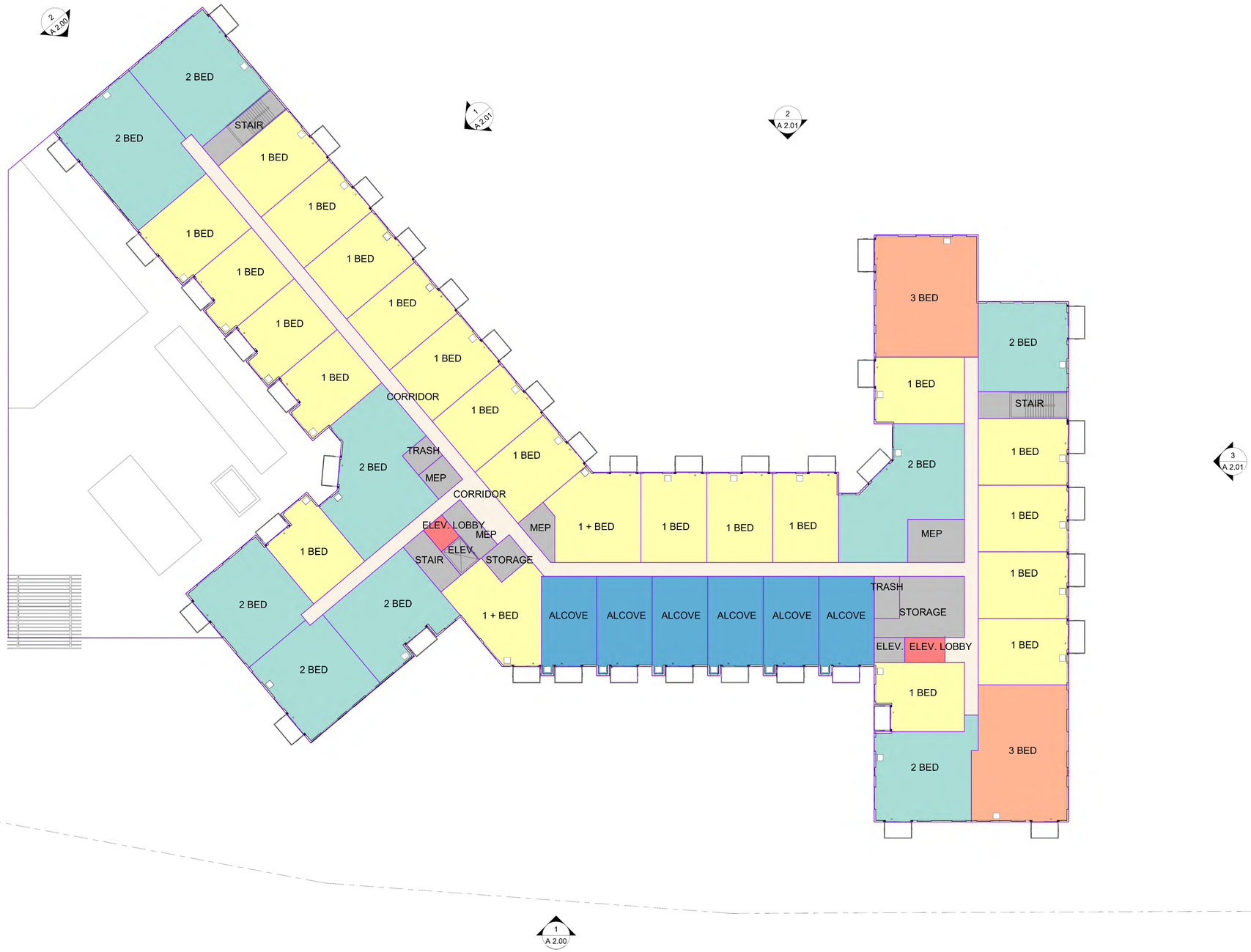

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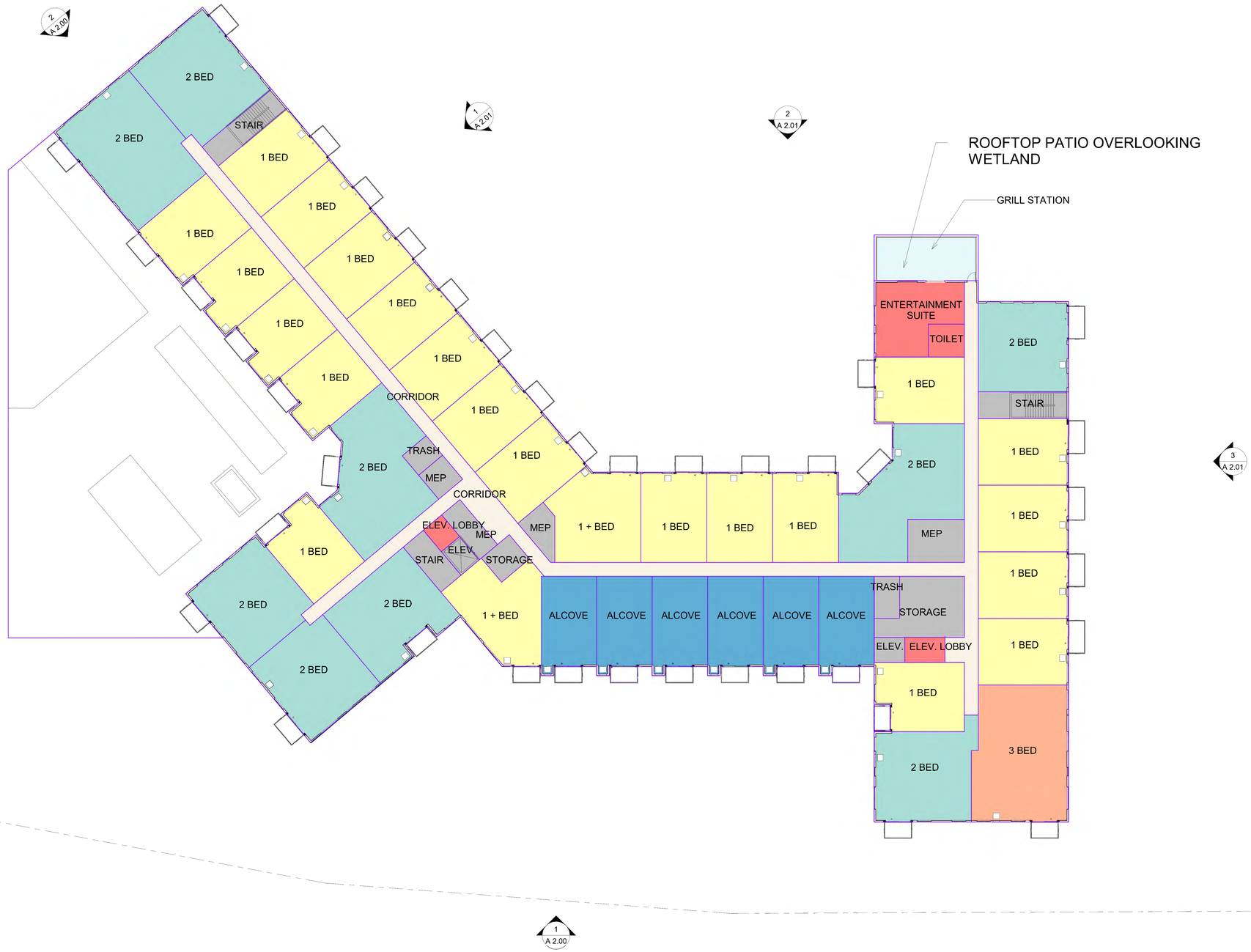
DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

LEVELS 3, 4, & 5 FLOOR PLAN

A 1.03



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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

LEVEL 6 FLOOR PLAN

A 1.04

2 WEST ELEVATION
1/16" = 1'-0"

EXTERIOR ELEVATION KEYNOTES

- 1A STONE VENEER
- 2A PRECAST CONCRETE, INLAYED THIN BRICK - BLACK
- 2B PRECAST CONCRETE, EXPOSED PRECAST FINISH - BLACK - 25% SANDBLASTED
- 2C PRECAST CONCRETE, EXPOSED PRECAST FINISH - BLACK - 75% SANDBLASTED
- 2D PRECAST CONCRETE, INLAYED THIN BRICK - BROWN
- 3A METAL PANEL - COPPER COLOR
- 3B METAL PANEL - CORNICE - BLACK
- 4A CEMINTITIOUS LAP SIDING - WHITE
- 4B CEMINTITIOUS LAP SIDING - BLACK
- 4C CEMINTITIOUS LAP SIDING - BROWN
- 4D CEMINTITIOUS PANELS - WHITE
- 4E CEMINTITIOUS PANELS - BLACK
- 5A MTL. DOOR, PAINT TO MATCH ADJACENT FINISH
- 5B PREFINISHED METAL COPING - COLOR BLACK
- 5C PREFINISHED METAL COPING - COLOR WHITE
- 6A PREFINISHED ALUMINUM BALCONY - PICKET RAILINGS - BLACK
- 6B PREFINISHED RAILING - PICKET RAILINGS - BLACK
- 7 MECHANICAL LOUVER, MATCH COLOR TO ADJACENT MATERIAL
- 8 PREFINISHED METAL INSULATED OVERHEAD SECTIONAL DOOR
- 12 SLIDING PATIO DOOR - BLACK FRAME
- 13 FIBERGLASS EXTERIOR WINDOW - BLACK FRAME
- 14 HOLLOW METAL DOOR AND GLAZING - BLACK FRAME
- 15 BUILDING SIGNAGE
- 16 TRELLIS - BLACK

1 SOUTH ELEVATION
1/16" = 1'-0"

1/16" = 1'-0"
0' 8' - 0" 16' - 0" 32' - 0" 64' - 0"

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

OVERALL BUILDING ELEVATIONS

A 2.00

* REFER TO SHEET A 3.00 FOR EXTERIOR ELEVATION KEY NOTES

3 EAST ELEVATION
1/16" = 1'-0"

2 NORTH ELEVATION
1/16" = 1'-0"

1 NORTH ELEVATION - ANGLED
1/16" = 1'-0"

1/16" = 1'-0"
0' 8' - 0" 16' - 0" 32' - 0" 64' - 0"

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

OVERALL BUILDING ELEVATIONS

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

EXTERIOR RENDERING

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

EXTERIOR RENDERING

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

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EXTERIOR RENDERING

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

EXTERIOR RENDERING

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

EXTERIOR RENDERING

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MAR / SEPT 21ST

JUNE 21ST

DEC 21ST

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DORAN ARCHITECTURE

MARSH RUN II REDEVELOPMENT

11816 Wayzata Blvd, Minnetonka

SHADOW STUDIES

A 4.00

PRELIMINARY STORMWATER MANAGEMENT PLAN

Marsh Run II
11900 Wayzata Blvd
Minnetonka, MN

Prepared By:
Sambatek
February 24, 2023

Sambatek

Contents

Project Introduction

The Marsh Run II project is proposed by Doran Development, LLC and includes redevelopment of the existing Marsh Run Offices. The project site is located at 11900 Wayzata Boulevard in Minnetonka, Minnesota and is within the jurisdiction of the Bassett Creek Watershed Management Commission (BCWMC). The proposed redevelopment will result in the construction of one multifamily apartment complex with associated parking lots, sidewalks, and utility improvements. The Marsh Run II redevelopment will meet the stormwater design requirements of the City of Minnetonka, BCWMC, and MPCA through construction of a treatment train involving one underground detention facility and Manufactured Treatment Devices. The design requirements for the site are as follows:

- Rate control requirement: proposed nonlinear projects creating one of more acres of new and/or fully reconstructed impervious surfaces much manage stormwater runoff such that the peak flow rates leaving the site are equal to or less than the existing rate leaving the site for the 1-, 2-, 10-, and 100-year events based on Atlas 14 precipitation (City, Watershed)
- Volume control requirement: proposed nonlinear development/redevelopment projects which create one of more acres of new and/or fully reconstructed impervious surfaces shall capture and retain onsite 1.1 inches of runoff from new and/or fully reconstructed impervious surfaces (City, Watershed).
    - If the performance goal is not feasible and/or is not allowed, project proposer must implement flexible treatment options from the BCWMC Design Sequence Flow Chart and City's Stormwater Management Design Guidelines.
- Water quality requirements: for sites where the volume reduction goal is unfeasible, project proposers must utilize the Design Sequence Flow Chart to review Flexible Treatment Options (FTO) to satisfy water quality control (City, Watershed).
    - The site conditions for the proposed location result in FTO #2 applying to the site.
    - FTO #2 includes providing volume abstraction to the maximum extent practicable and providing 60% annual phosphorous removal from site runoff.
- Provide maintenance of wetland hydrology in accordance with wetland Manage 2 classification requirements.

Soil Classification

Boring logs were completed by Braun Intertec on October 17, 2022. These logs showed existing soils onsite consist of fill (SM, SC, CL) from elevations 0-11' below ground surface and lean clay (CL) from 7-54' below ground surface. These soils are hydrologic soil group (HSG) D and unsuitable for infiltration. Water was observed at elevations of 12-40' below ground surface. Please see the complete borings logs included in the appendices. A complete geotechnical evaluation will be completed along with the final plans.

Existing Conditions

The existing project area consists of three buildings, parking lots, and one existing wetland. Existing impervious onsite includes office buildings along with parking lots and sidewalks for a total of 1.54 acres of impervious surfaces. Ground cover consists of trees and grass surrounding the wetland. There are no existing stormwater management facilities onsite. There is one existing outlet control structure which conveys flow from the onsite wetland offsite to the north.

In existing conditions, the majority of site runoff flows into onsite storm sewers(1E) and directly into the existing wetland (2E). A portion of pervious runoff from the perimeter of the site flows offsite to a larger existing wetland (3E) located north of the site, and the remainder of the site discharges south to Wayzata Boulevard (4E).

A summary of the existing areas and curve numbers is outlined below. Please see the appendices for existing drainage maps and models.

EXISTING AREAS & CURVE NUMBERS

Subcatchment	Area (acres)	Pervious CN
1E	1.86	80
2E	1.19	79
3E	0.65	79
4E	0.20	80

Proposed Conditions

The proposed redevelopment project will disturb approximately 2.65 acres of the site and result in 0.43 acres of net new impervious surface. Stormwater management facilities proposed for the site include a treatment train with underground detention to provide rate control and a manufactured water quality treatment device to provide water quality treatment for the required abstraction volume. A second proprietary device will provide water quality treatment for one area of impervious runoff which bypasses the detention pipes. There is no volume abstraction proposed onsite due to site constraints such as HSG D soils and proximity to existing wetlands. The proposed treatment train will provide water quality treatment to an equivalent volume which would be abstracted given more favorable existing site conditions.

Runoff from the proposed building and the majority of the parking lot will be routed to the treatment train before ultimately discharging to the existing wetland onsite (1S). One garage ramp will route through a second proprietary device before discharging to the existing wetland (5S). The wetland will also receive a portion of direct runoff from the site area surrounding it (2S). The perimeter of the site will continue to discharge north (3S) to another wetland offsite in maintenance of existing drainage patterns. A portion of the front of the site will continue to discharge directly onto Wayzata Boulevard (4S) as in existing conditions.

A summary of the proposed areas and curve numbers is outlined below. Please see the appendices for existing drainage maps and models.

PROPOSED AREAS & CURVE NUMBERS

Subcatchment	Area	Pervious CN
1S	1.83	80

2S	1.09	80
3S	0.59	79
4S	0.25	80
5S	0.15	80

Rate Control

BCWMC requires proposed nonlinear projects creating one of more acres of fully reconstructed impervious surfaces much manage stormwater runoff such that the peak flow rates leaving the site are equal to or less than the existing rate leaving the site for the 2-, 10-, and 100-year events. The City of Minnetonka requires submittals show the existing and proposed 1-, 2-, 10-, and 100-year stormwater runoff volume and rate analysis. Runoff calculations were performed in HydroCAD using the Dynamic Storage Indicator method and MSE-3 distribution with Atlas 14 rainfall data for Hennepin County. Sub catchments with time of concentration greater than 7 minutes were calculated using sheet flow and shallow concentrated flow. Stormwater discharges from the proposed site to the north to an offsite wetland and south to Wayzata Boulevard. The results of runoff rate comparison and summarized in the tables below and detailed calculations can be found in the appendices.

DESIGN RAINFALL EVENTS

Storm Event	(in)
1-Year	2.48
2-Year	2.86
10-Year	4.26
100-Year	7.32

EXISTING MAXIMUM RATE OF RUNOFF (CFS)

Storm Event	To Wayzata Blvd (node 4E)	To Onsite Wetland (node Wtld EXS inflow)	To Offsite Wetland (reach 1R)	Total Existing (reach 2R)
1-Year	0.46	7.36	0.72	**1.07**
2-Year	0.57	8.97	0.97	**1.40**
10-Year	0.99	15.06	1.96	**2.73**
100-Year	1.91	28.61	4.33	**5.82**

PROPOSED MAXIMUM RATE OF RUNOFF (CFS)

Storm Event	To Wayzata Blvd (node 4S)	To Onsite Wetland (node Wtld Prd inflow)	To Offsite Wetland (reach 3R)	Total Existing (reach 4R)
1-Year	0.45	2.64	0.59	**0.84**
2-Year	0.58	3.26	0.79	**1.11**
10-Year	1.09	11.92	1.58	**2.19**
100-Year	2.22	30.24	3.45	**4.74**

Water Quality

Due to the presence of HSG D soils onsite and volume abstraction being infeasible, the Marsh Run II project utilizes alternate compliance to satisfy water quality requirements. The City of Minnetonka's Volume Retention Compliance Sequencing Approach requires new development and redevelopment projects provide for 60% Total Phosphorus (TP) removal and 90% Total Suspended Solids (TSS) removal. BCWMC utilizes a Flexible Treatment Option flowchart to determine the water quality requirements. The Marsh Run II site is restricted due to the presence of HSG D soils and proximity to the existing wetland which results in the classification of Flexible Treatment Option #2. FTO#2 requires providing 60% annual phosphorous removal from site runoff. Manufactured Treatment Devices (MTD) were selected to provide water quality control for the site given limited surface area and depth for media filtration or wet sedimentation. An MPCA-approved StormFilter was selected to provide 60% TP removal along with 85% TSS removal as stated in the Minnesota Stormwater Manual and will treat discharge from the detention pipes. An MPCA-approved Jellyfish was selected to provide 56% TP removal and 80% TSS removal as stated in the Minnesota Stormwater Manual and will treat runoff from the garage entrance.
The MIDS Calculator was used to model the nutrient loads of the proposed site and the results of the model are summarized in the table below. Please see the appendices for the full MIDS printout.

NUTRIENT ANALYSIS

BMP	TSS Load (lb)	TP Load (lb)
Proposed Load Generated	798.8	4.397
Load Removed by BMPs	716.2	2.780
% Removed	90	63

Pretreatment

Pretreatment prior to the subsurface detention pipes and StormFilter will be provided in the form of sump manholes. SHSAM was used to determine the required sump size given removal requirements and incorporated in the MIDS model.

Pretreatment	Standard Sumps	Area	1.83 ac
Precipitation	Golden Valley ('95-'07)	**Hydraulic Length**	76 ft
PSD	OK110-PSD	**Average Slope**	3.0%
Temperature	St. Paul	**Pervious CN**	80
Influent Conc. (mg/L)	200	**Impervious %**	95%

Name	Model	Total Load (lbs)	Total Load Remo...	Removal Efficien...	Model Height (ft)	Model Diameter (ft)	Pipe Diameter (in...
StandardSumps	42	22790	753	3.3	2.0	4.0	12
StandardSumps	44	22790	2186	9.6	4.0	4.0	15
StandardSumps	55	22790	4413	19.4	5.0	5.0	18

Volume Reduction

Due to the presence of HSG D soils onsite and volume abstraction being infeasible, the Marsh Run II project utilizes alternate compliance to satisfy volume reduction requirements. The City of Minnetonka's Volume Retention Compliance Sequencing Approach requires new development and redevelopment projects retain runoff to the maximum extent practicable. BCWMC's FTO#2 also requires providing volume abstraction to the maximum extent practicable.

Given limited surface area and proximity to an existing wetland, the chosen solution for the Marsh Run II project includes filtrating 1.1" of runoff over the project's new and disturbed impervious surfaces through an MPCA-approved Manufactured Treatment Device. Discharge from the MTD will flow into the existing wetland located north of the proposed building. Detailed calculations outlining the volume reduction requirements are outlined below. Further information may be found in the appendices.

$$Required\ Treatment\ Volume(ft^3) = V_{inf} = 1.1(in) * \frac{1\ ft}{12\ in} * New\ Impervious\ Area\ (ft^2)$$

$$V_{inf}(ft^3) = 1.1(in) * \frac{1\ ft}{12\ in} * 86{,}261(\ ft^2) = 7{,}907\ ft^3$$

VOLUME CONTROL ANALYSIS

New Impervious Surface	86,261	sf
Design Treatment Rainfall Event	1.1	in
Required Treatment Volume	**7,907**	**cf**
Required Drawdown Time	48	hrs
Provided Volume Below Outlet	**7,920**	**cf**

Wetlands

The existing wetland located onsite is classified as Manage 2 per communication with the City of Minnetonka. Marsh Run II will provide the required limited impacts to wetland hydrology. The results of wetland hydrologic impacts are summarized below. Detailed calculations may be found in the HydroCad analysis of the appendices.

WETLAND BOUNCE ANALYSIS (FT)

STORM	EXISTING	PROPOSED	CHANGE
1-YEAR	916.71	916.81	0.10
2-YEAR	916.87	916.97	0.10
10-YEAR	917.44	917.55	0.11
100-YEAR	918.22	918.21	0.01

WETLAND INFLOW ANALYSIS (AC-FT)

STORM	EXISTING	PROPOSED	CHANGE
1-YEAR	0.369	0.421	14%
2-YEAR	0.451	0.508	13%
10-YEAR	0.771	0.839	9%
100-YEAR	1.509	1.592	6%

Wetland buffers are provided in accordance with BCWMC and the City of Minnetonka standards. BCWMC requires Manage 2 wetlands have an average buffer width of 25' and minimum width of 15', while the City of Minnetonka requires a 16.5' buffer. A summary of the buffer analysis is provided below. Please see the civil sheets for buffer delineation.

WETLAND BUFFER ANALYSIS

WETLAND	REQUIRED (25' AVERAGE) (SF)	PROVIDED (SF)
ONSITE	18,870	18,870
OFFSITE	14,832	14,877

Emergency Overflow

The grading design will convey overflow runoff through the site should a catch basin or pipe become plugged or if a rainfall event occurs that exceeds the design capacity of the storm sewer system. Overflow runoff will be routed offsite without impacting any neighboring structures. The high-water level of the underground detention system is 928.10 which provides greater than one foot of elevation separation between the HWL and the FFE of the proposed building.

Stormwater System Operations & Maintenance

An operations & maintenance agreement will be prepared for the project if required by the LGU.

Erosion & Sediment Control

A comprehensive Stormwater Pollution Prevention Plan (SWPPP) meeting the requirements of the MPCA NPDES permit will be developed as a part of the proposed plans.

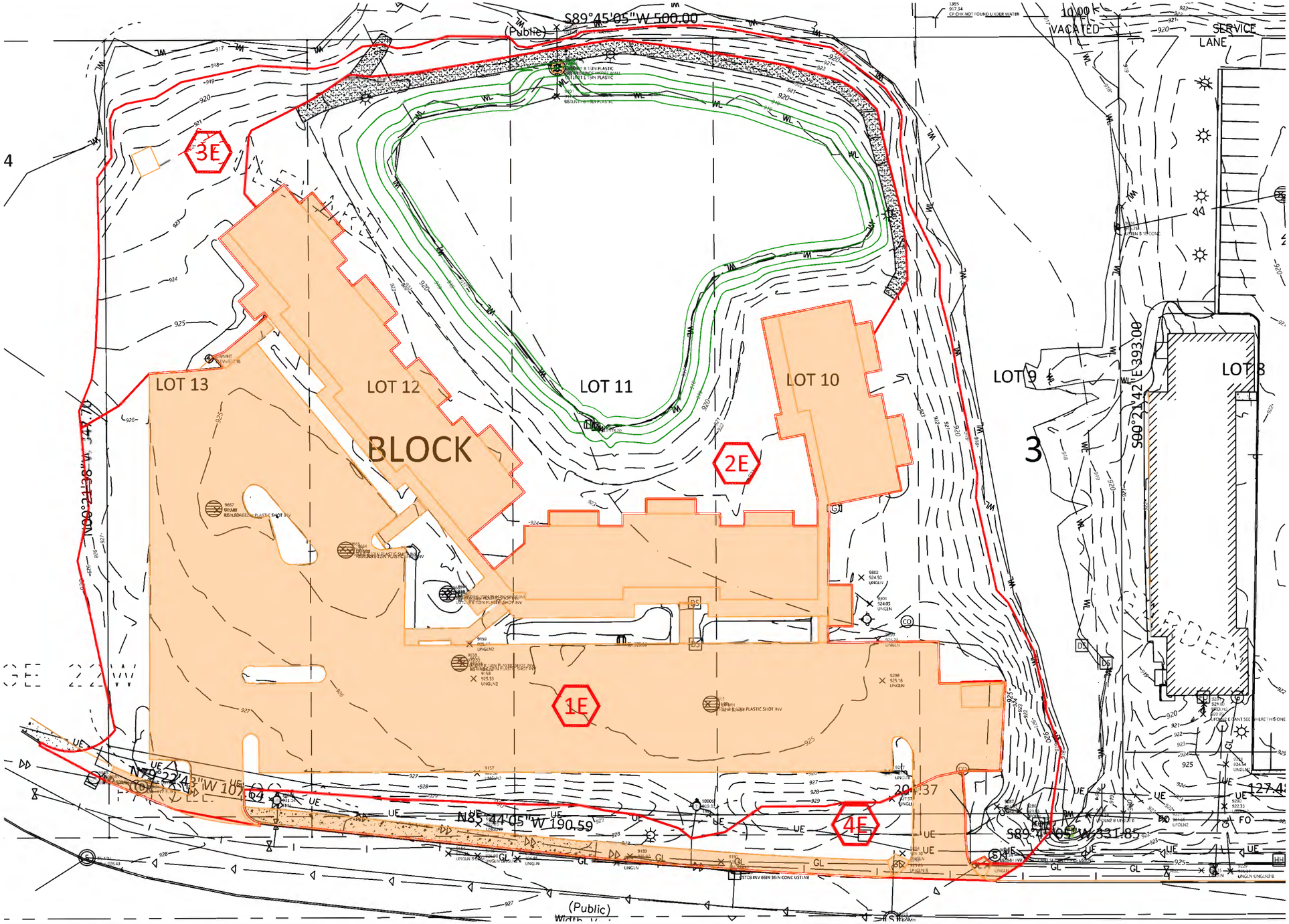
Summary

The proposed Marsh Run II project will meet the requirements of the City of Minnetonka, BCWMC, and MPCA through construction of underground detention and filtration through one MTD. These BMPs will provide the required rate control, water quality, and volume reduction improvements prior to discharging stormwater runoff from the site to downstream receiving waters.

If you have any questions, comments, or additional information regarding this report, please contact me at JBailey@sambatek.com or 763.746.1606

Enclosures
Appendix A – Drainage Maps
Appendix B - Hydrocad Report
Appendix C – MIDS Model
Appendix D – Boring Logs

APPENDIX A – DRAINAGE MAPS



LEGEND

- XX — LINK
- XX — POND
- XX — REACH
- XX — SUB-CATCHMENT

NORTH

0 50

SCALE IN FEET

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DRAWN BY:	DRWN
DESIGNED BY:	DSGN
CHECKED BY:	CHCK
ISSUED:	00/00/00
REVISION:	REF
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EXISTING DRAINAGE MAP

MARSH RUN
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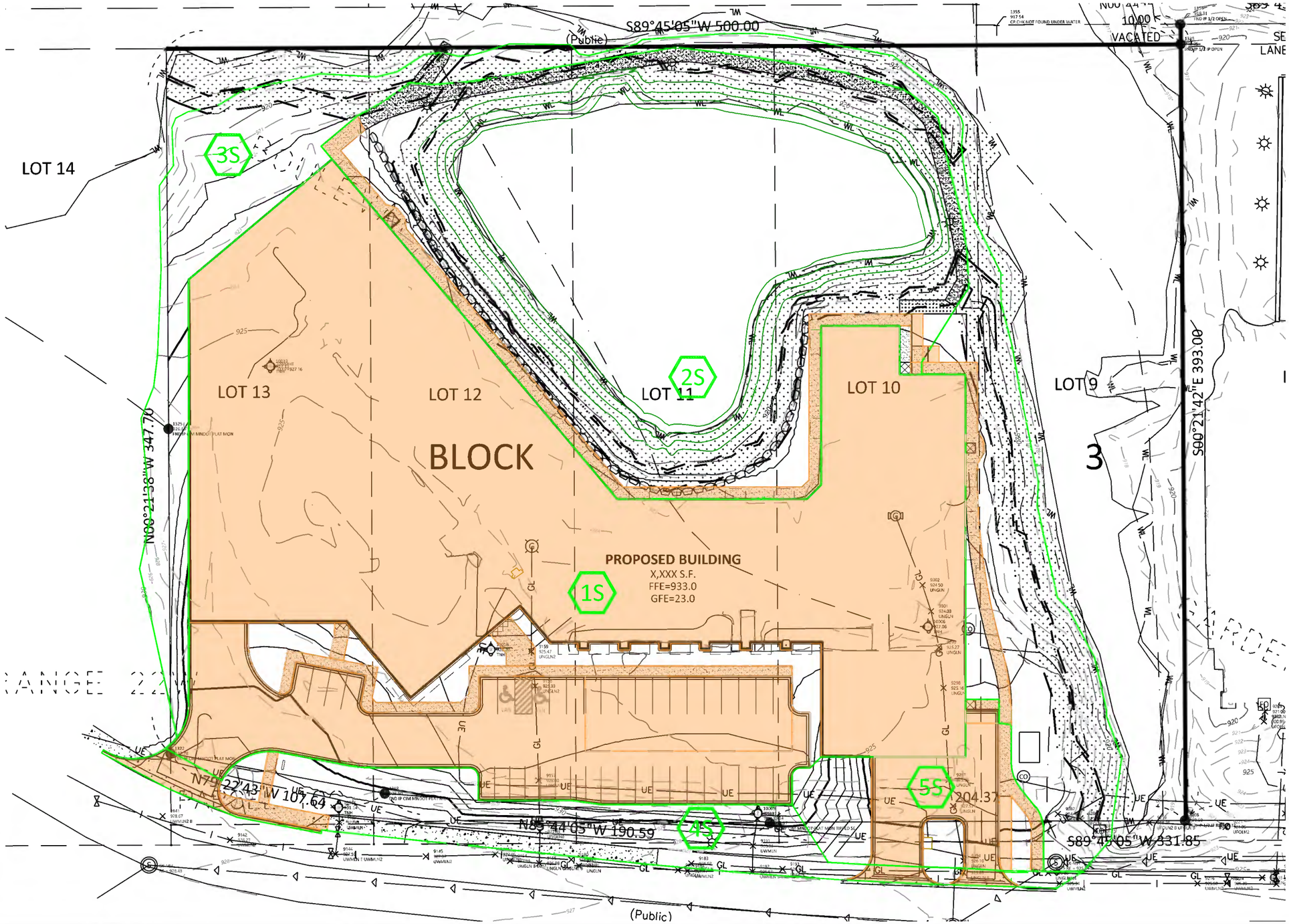

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ISSUED:	00/00/00
REVISION:	REF
REV DATE:	DATE

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PROPOSED DRAINAGE MAP

MARSH RUN
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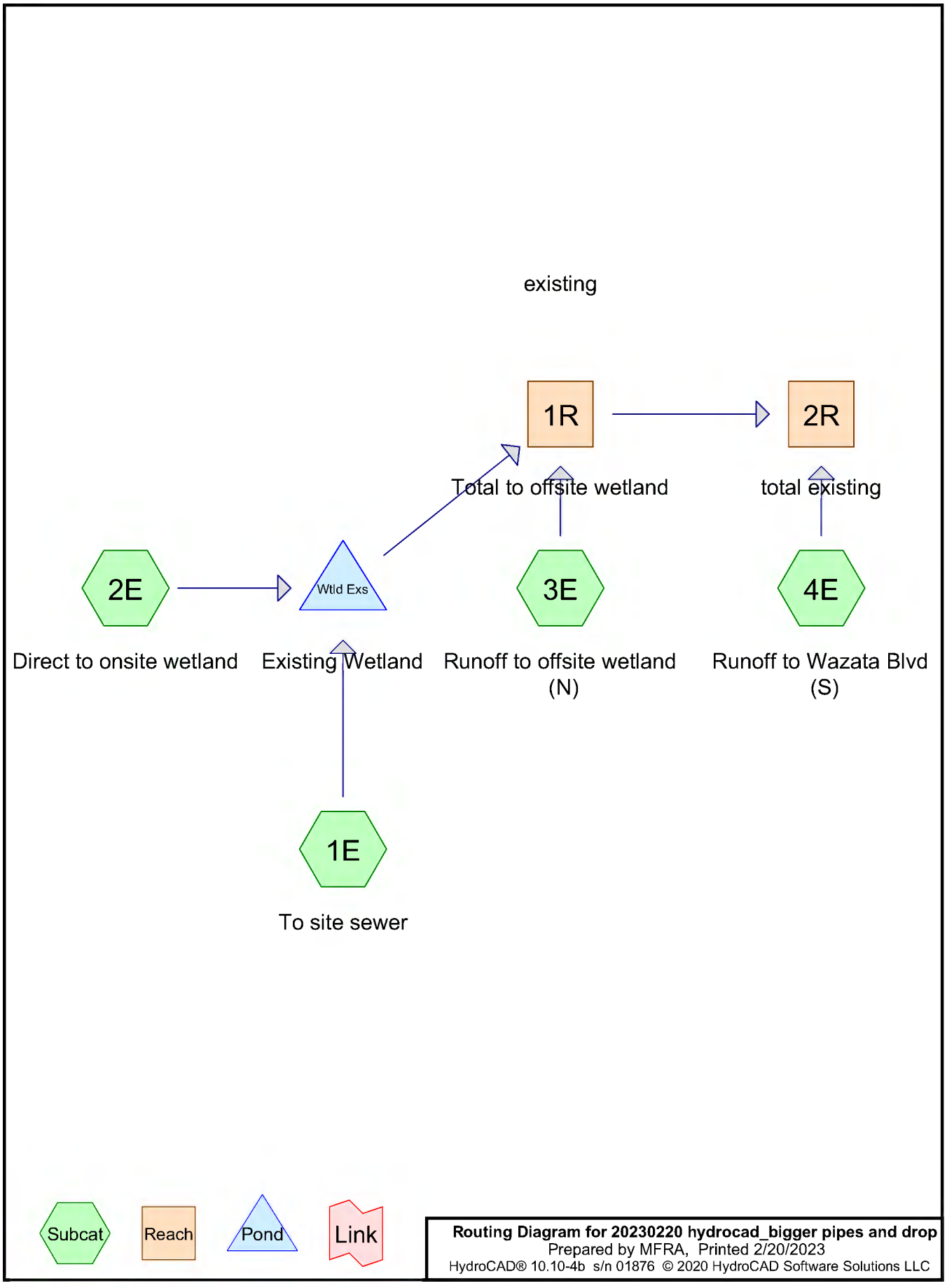
PROJECT NO: PN

APPENDIX B – HYDROCAD REPORT



Routing Diagram for 20230220 hydrocad_bigger pipes and drop
Prepared by MFRA, Printed 2/20/2023

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 5327 MN Hennepin

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	MSE 24-hr	3	Default	24.00	1	2.48	2
2	2-Year	MSE 24-hr	3	Default	24.00	1	2.86	2
3	10-Year	MSE 24-hr	3	Default	24.00	1	4.26	2
4	100-Year	MSE 24-hr	3	Default	24.00	1	7.32	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.520	80	>75% Grass cover, Good, HSG D (1E, 4E)
1.542	98	Paved parking, HSG D (1E, 4E)
1.841	79	Woods/grass comb., Good, HSG D (2E, 3E)
3.902	**87**	**TOTAL AREA**

Soil Listing (selected nodes)

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

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.520	0.000	0.520	>75% Grass cover, Good	1E, 4E
0.000	0.000	0.000	1.542	0.000	1.542	Paved parking	1E, 4E
0.000	0.000	0.000	1.841	0.000	1.841	Woods/grass comb., Good	2E, 3E
0.000	**0.000**	**0.000**	**3.902**	**0.000**	**3.902**	**TOTAL AREA**	

Pipe Listing (selected 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	Wtld Exs	916.35	916.22	18.0	0.0072	0.010	0.0	15.0	0.0
2	Wtld Exs	917.07	916.39	12.0	0.0567	0.010	0.0	15.0	0.0

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1E: To site sewer Runoff Area=80,945 sf 78.49% Impervious Runoff Depth=1.85"
Tc=7.0 min CN=94 Runoff=5.68 cfs 0.287 af

Subcatchment2E: Direct to onsite wetland Runoff Area=52,054 sf 0.00% Impervious Runoff Depth=0.82"
Tc=7.0 min CN=79 Runoff=1.69 cfs 0.082 af

Subcatchment3E: Runoff to offsite wetland Runoff Area=28,124 sf 0.00% Impervious Runoff Depth=0.82"
Flow Length=170' Slope=0.1000 '/' Tc=12.6 min CN=79 Runoff=0.72 cfs 0.044 af

Subcatchment4E: Runoff to Wazata Blvd Runoff Area=8,855 sf 40.99% Impervious Runoff Depth=1.29"
Tc=7.0 min CN=87 Runoff=0.46 cfs 0.022 af

Reach 1R: Total to offsite wetland Inflow=0.72 cfs 0.044 af
Outflow=0.72 cfs 0.044 af

Reach 2R: total existing Inflow=1.07 cfs 0.066 af
Outflow=1.07 cfs 0.066 af

Pond Wtld Exs: Existing Wetland Peak Elev=916.71' Storage=16,056 cf Inflow=7.36 cfs 0.369 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.902 ac Runoff Volume = 0.435 af Average Runoff Depth = 1.34"
60.49% Pervious = 2.360 ac 39.51% Impervious = 1.542 ac

Summary for Subcatchment 1E: To site sewer

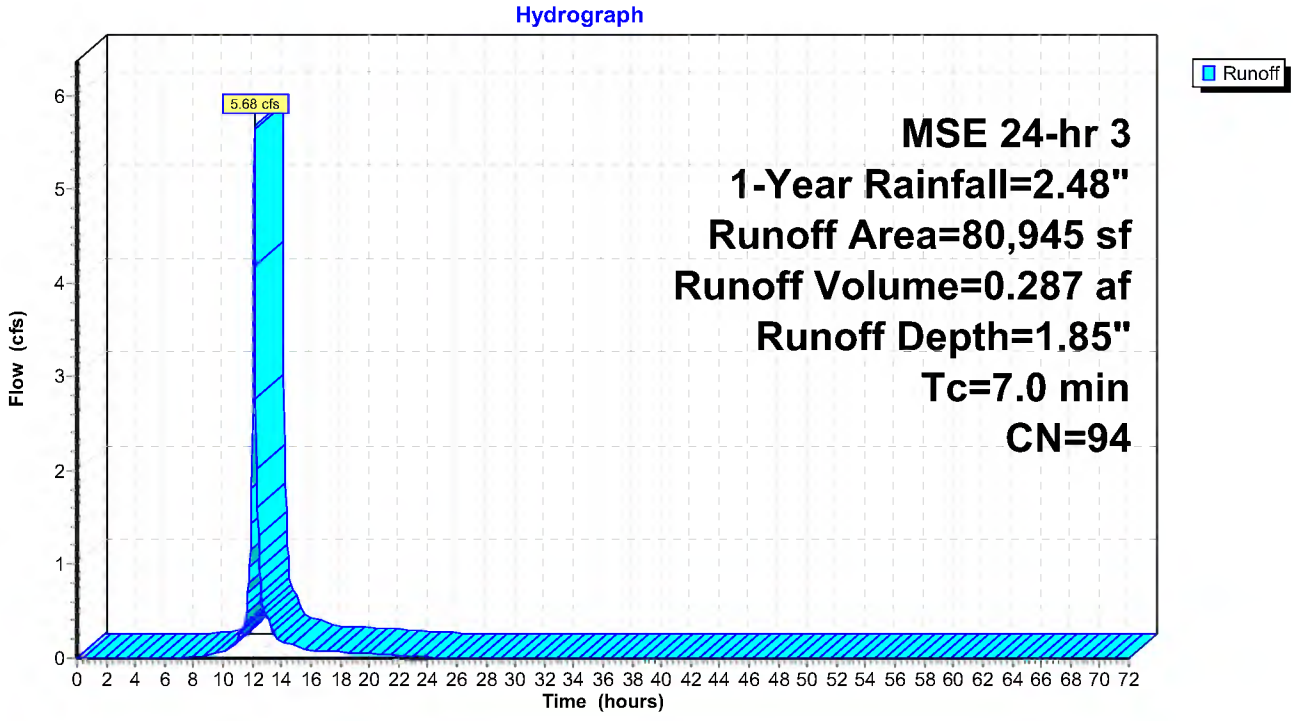
Runoff = 5.68 cfs @ 12.14 hrs, Volume= 0.287 af, Depth= 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
63,533	98	Paved parking, HSG D
17,412	80	>75% Grass cover, Good, HSG D
80,945	94	Weighted Average
17,412		21.51% Pervious Area
63,533		78.49% Impervious Area

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

Subcatchment 1E: To site sewer



Summary for Subcatchment 2E: Direct to onsite wetland

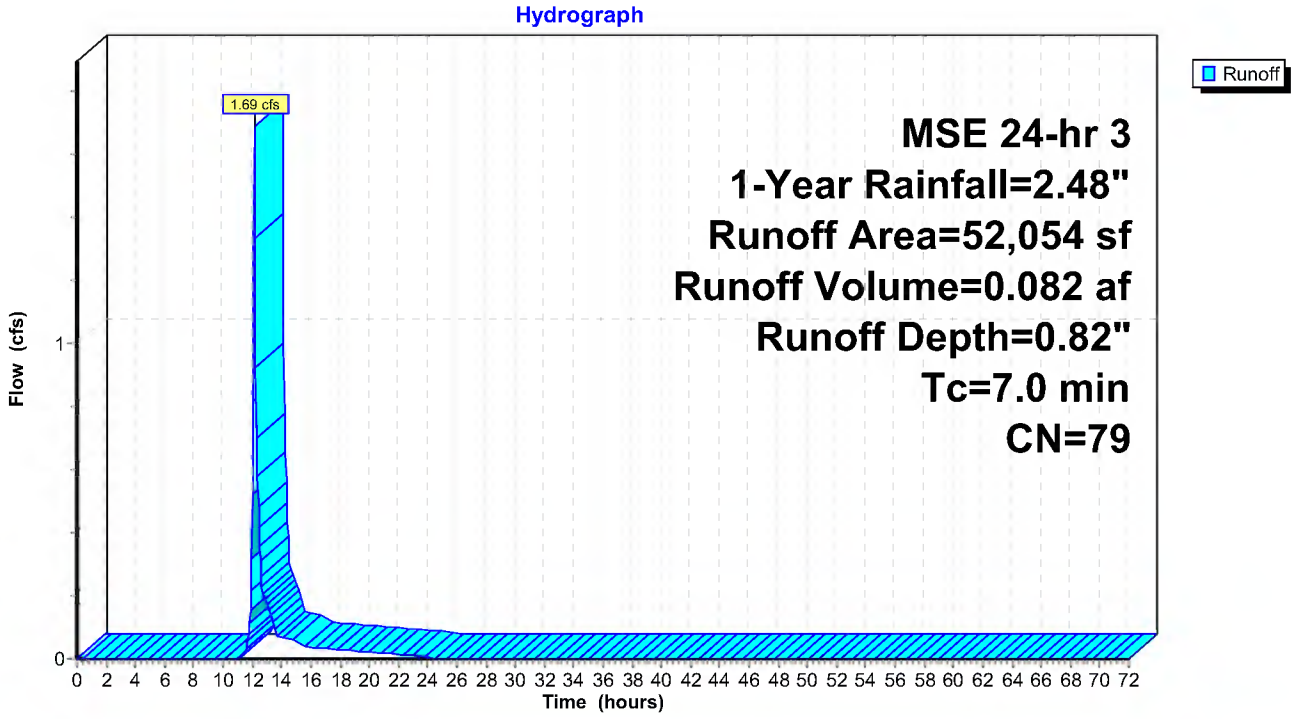
Runoff = 1.69 cfs @ 12.15 hrs, Volume= 0.082 af, Depth= 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
52,054	79	Woods/grass comb., Good, HSG D
52,054	79	Weighted Average
52,054		100.00% Pervious Area

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

Subcatchment 2E: Direct to onsite wetland



Summary for Subcatchment 3E: Runoff to offsite wetland (N)

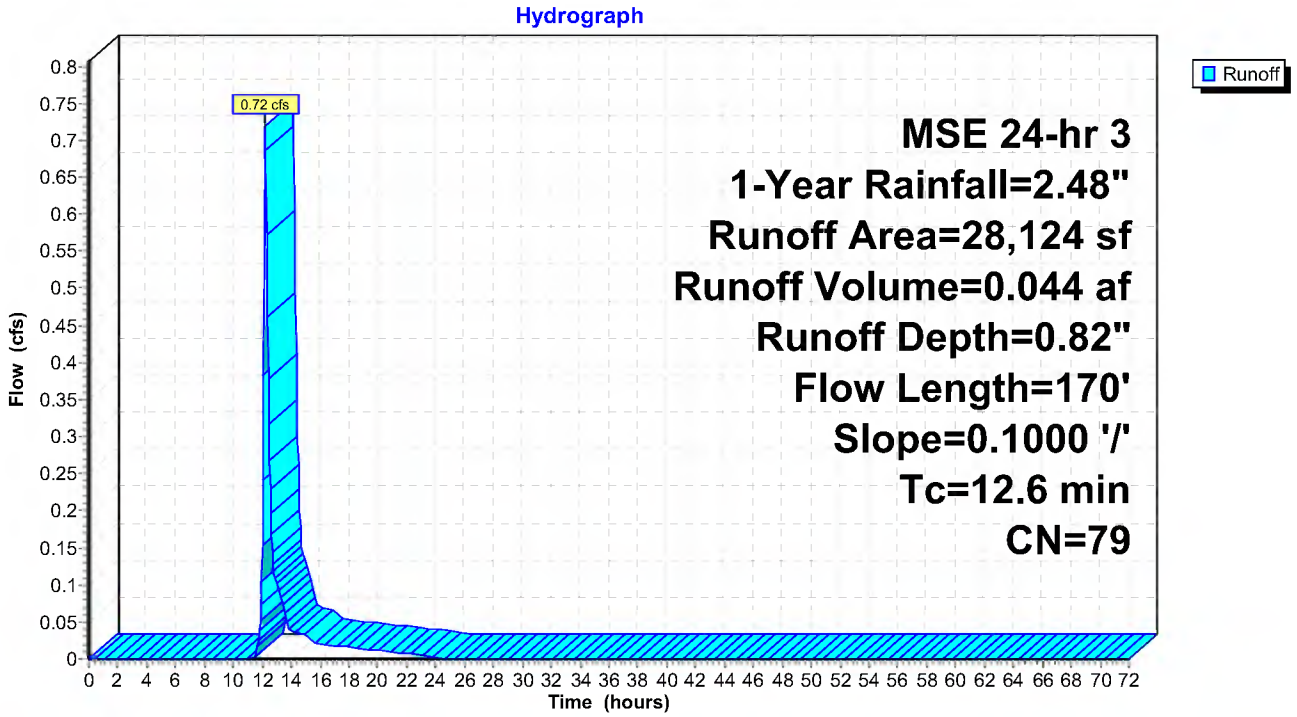
Runoff = 0.72 cfs @ 12.22 hrs, Volume= 0.044 af, Depth= 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
28,124	79	Woods/grass comb., Good, HSG D
28,124	79	Weighted Average
28,124		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.86"
0.7	70	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.6	170	Total			

Subcatchment 3E: Runoff to offsite wetland (N)



Summary for Subcatchment 4E: Runoff to Wazata Blvd (S)

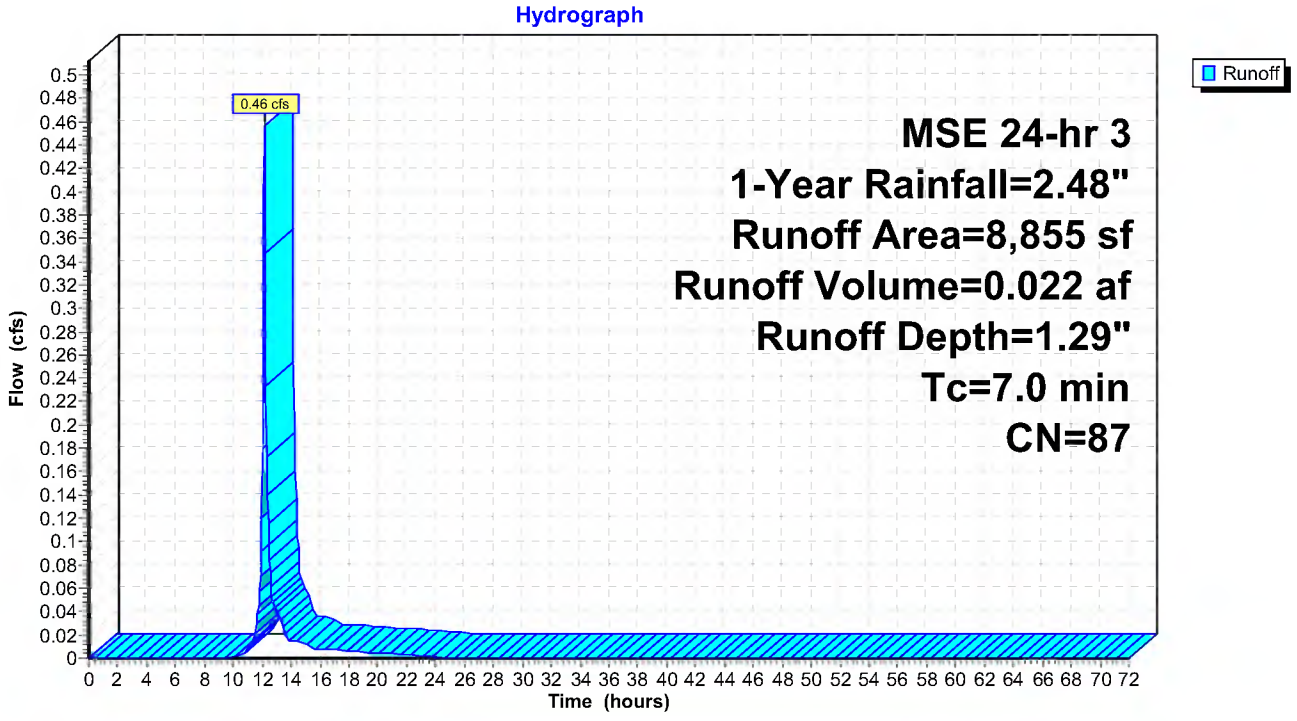
Runoff = 0.46 cfs @ 12.14 hrs, Volume= 0.022 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
3,630	98	Paved parking, HSG D
5,225	80	>75% Grass cover, Good, HSG D
8,855	87	Weighted Average
5,225		59.01% Pervious Area
3,630		40.99% Impervious Area

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

Subcatchment 4E: Runoff to Wazata Blvd (S)



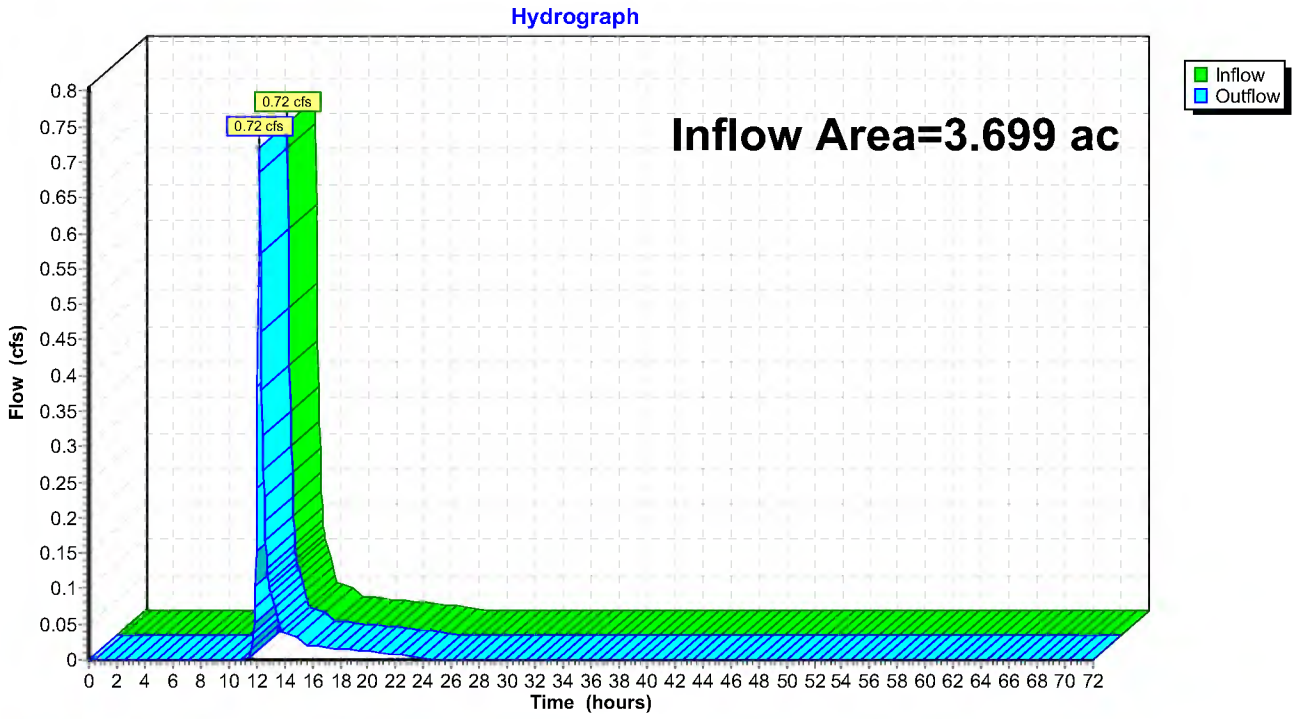
Summary for Reach 1R: Total to offsite wetland

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

Inflow Area = 3.699 ac, 39.43% Impervious, Inflow Depth = 0.14" for 1-Year event
Inflow = 0.72 cfs @ 12.22 hrs, Volume= 0.044 af
Outflow = 0.72 cfs @ 12.22 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

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

Reach 1R: Total to offsite wetland



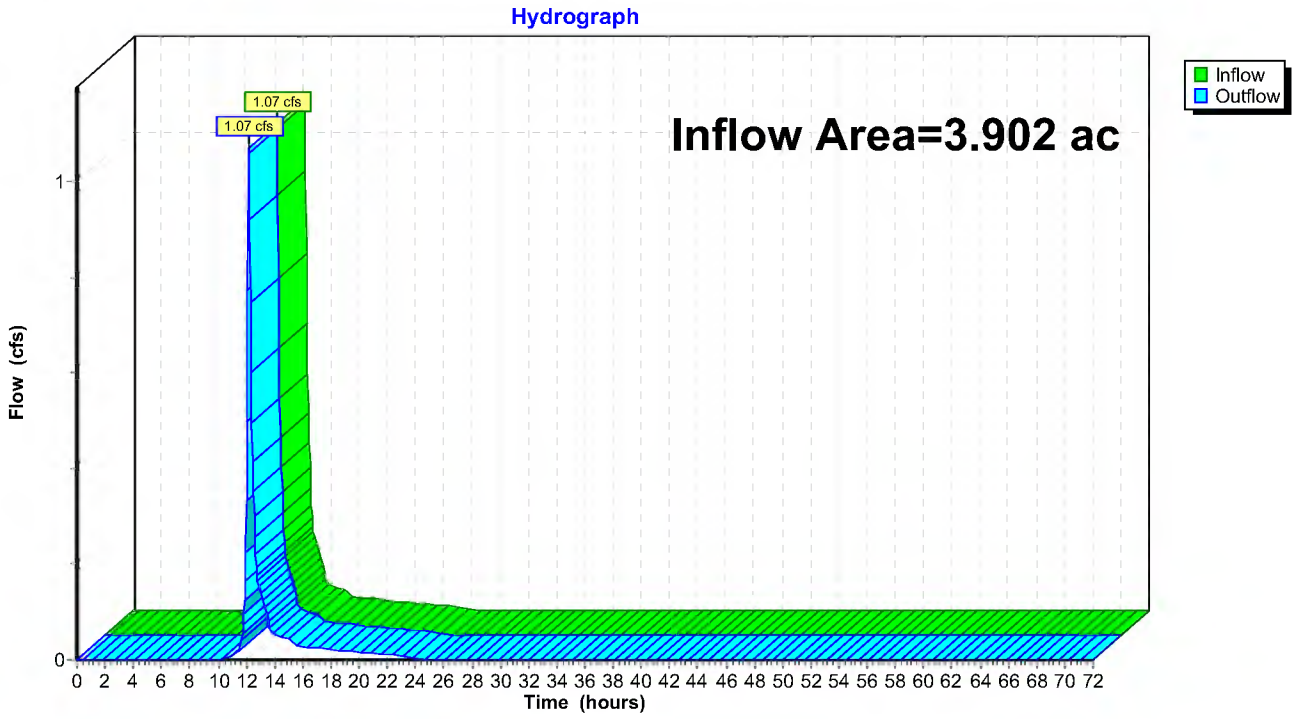
Summary for Reach 2R: total existing

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

Inflow Area = 3.902 ac, 39.51% Impervious, Inflow Depth = 0.20" for 1-Year event
Inflow = 1.07 cfs @ 12.18 hrs, Volume= 0.066 af
Outflow = 1.07 cfs @ 12.18 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: total existing



Summary for Pond Wtld Exs: Existing Wetland

Inflow Area = 3.053 ac, 47.77% Impervious, Inflow Depth = 1.45" for 1-Year event
Inflow = 7.36 cfs @ 12.14 hrs, Volume= 0.369 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 916.71' @ 24.45 hrs Surf.Area= 23,389 sf Storage= 16,056 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

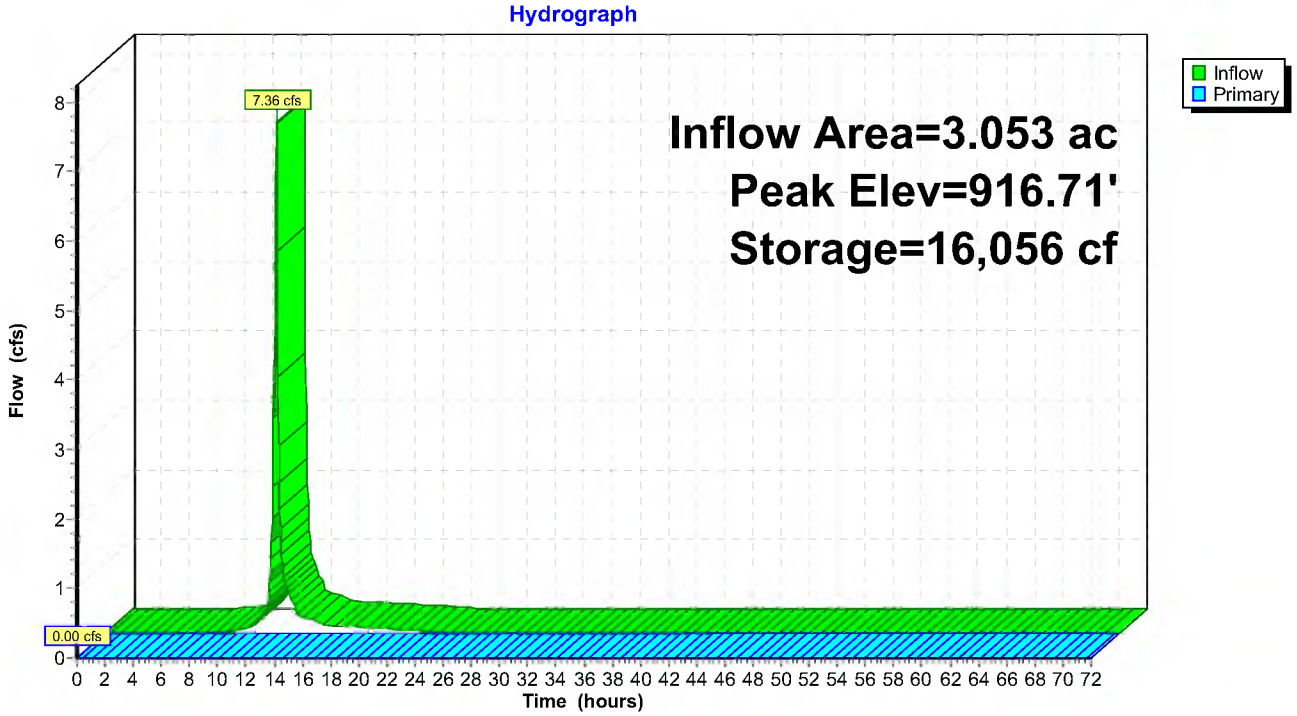
Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	76,784 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.00	21,538	0	0
917.00	24,128	22,833	22,833
918.00	26,828	25,478	48,311
919.00	30,118	28,473	76,784

Device	Routing	Invert	Outlet Devices
#1	Primary	916.35'	**15.0" Round ocs outlet** L= 18.0' Ke= 0.900 Inlet / Outlet Invert= 916.35' / 916.22' S= 0.0072 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#2	Device 1	918.08'	**4.0' long ocs weir wall** 2 End Contraction(s)
#3	Device 2	917.07'	**15.0" Round ocs inlet** L= 12.0' Ke= 0.900 Inlet / Outlet Invert= 917.07' / 916.39' S= 0.0567 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=916.00' TW=0.00' (Dynamic Tailwater)
↑**1=ocs outlet** (Controls 0.00 cfs)
↑**2=ocs weir wall** (Controls 0.00 cfs)
↑**3=ocs inlet** (Controls 0.00 cfs)

Pond Wtld Exs: Existing Wetland



Stage-Area-Storage for Pond Wtld Exs: Existing Wetland

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
916.00	21,538	0
916.05	21,667	1,080
916.10	21,797	2,167
916.15	21,926	3,260
916.20	22,056	4,359
916.25	22,186	5,465
916.30	22,315	6,578
916.35	22,445	7,697
916.40	22,574	8,822
916.45	22,704	9,954
916.50	22,833	11,093
916.55	22,962	12,238
916.60	23,092	13,389
916.65	23,221	14,547
916.70	23,351	15,711
916.75	23,481	16,882
916.80	23,610	18,059
916.85	23,740	19,243
916.90	23,869	20,433
916.95	23,999	21,630
917.00	24,128	22,833
917.05	24,263	24,043
917.10	24,398	25,259
917.15	24,533	26,483
917.20	24,668	27,713
917.25	24,803	28,949
917.30	24,938	30,193
917.35	25,073	31,443
917.40	25,208	32,700
917.45	25,343	33,964
917.50	25,478	35,235
917.55	25,613	36,512
917.60	25,748	37,796
917.65	25,883	39,087
917.70	26,018	40,384
917.75	26,153	41,688
917.80	26,288	42,999
917.85	26,423	44,317
917.90	26,558	45,642
917.95	26,693	46,973
918.00	26,828	48,311
918.05	26,992	49,657
918.10	27,157	51,010
918.15	27,321	52,372
918.20	27,486	53,742
918.25	27,651	55,121
918.30	27,815	56,507
918.35	27,980	57,902
918.40	28,144	59,305
918.45	28,309	60,717
918.50	28,473	62,136
918.55	28,637	63,564
918.60	28,802	65,000
918.65	28,966	66,444
918.70	29,131	67,897
918.75	29,296	69,357
918.80	29,460	70,826
918.85	29,625	72,303
918.90	29,789	73,789
918.95	29,954	75,282
919.00	**30,118**	**76,784**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1E: To site sewer Runoff Area=80,945 sf 78.49% Impervious Runoff Depth=2.21"
Tc=7.0 min CN=94 Runoff=6.73 cfs 0.343 af

Subcatchment2E: Direct to onsite wetland Runoff Area=52,054 sf 0.00% Impervious Runoff Depth=1.09"
Tc=7.0 min CN=79 Runoff=2.25 cfs 0.108 af

Subcatchment3E: Runoff to offsite wetland Runoff Area=28,124 sf 0.00% Impervious Runoff Depth=1.09"
Flow Length=170' Slope=0.1000 '/' Tc=12.6 min CN=79 Runoff=0.97 cfs 0.058 af

Subcatchment4E: Runoff to Wazata Blvd Runoff Area=8,855 sf 40.99% Impervious Runoff Depth=1.62"
Tc=7.0 min CN=87 Runoff=0.57 cfs 0.027 af

Reach 1R: Total to offsite wetland Inflow=0.97 cfs 0.058 af
Outflow=0.97 cfs 0.058 af

Reach 2R: total existing Inflow=1.40 cfs 0.086 af
Outflow=1.40 cfs 0.086 af

Pond Wtld Exs: Existing Wetland Peak Elev=916.87' Storage=19,656 cf Inflow=8.97 cfs 0.451 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.902 ac Runoff Volume = 0.537 af Average Runoff Depth = 1.65"
60.49% Pervious = 2.360 ac 39.51% Impervious = 1.542 ac

Summary for Subcatchment 1E: To site sewer

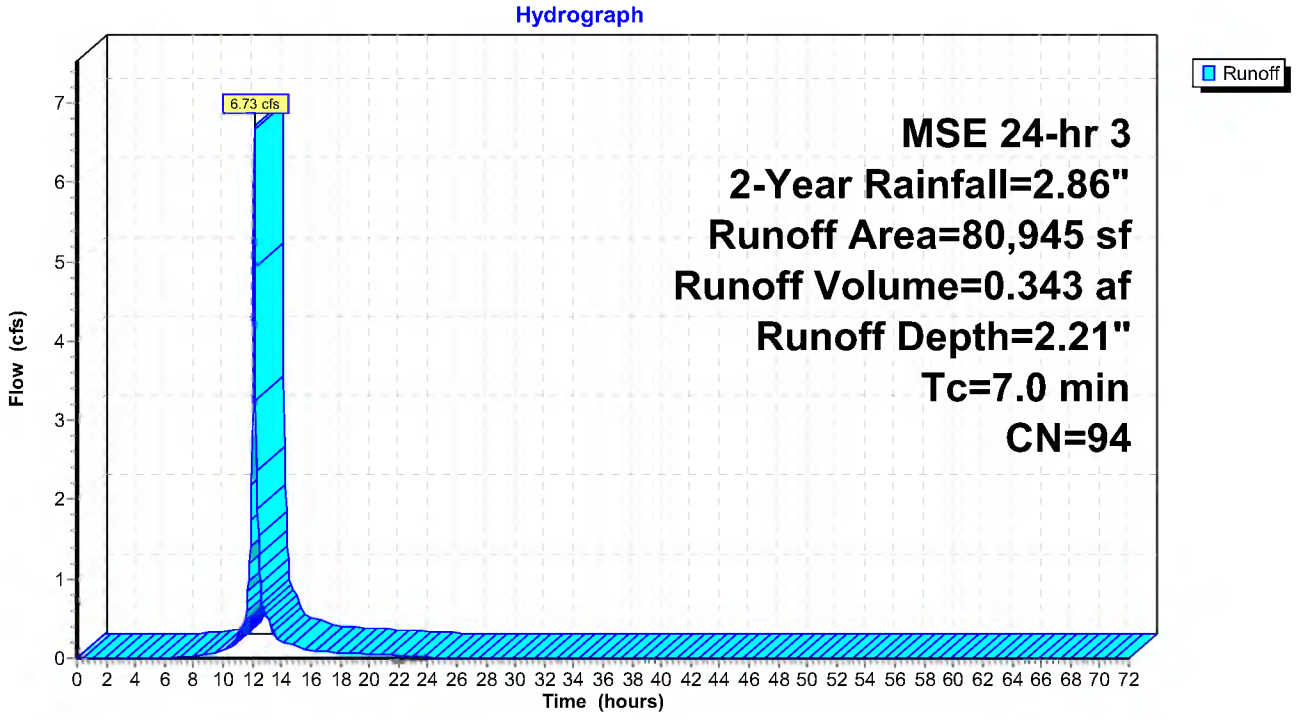
Runoff = 6.73 cfs @ 12.14 hrs, Volume= 0.343 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
63,533	98	Paved parking, HSG D
17,412	80	>75% Grass cover, Good, HSG D
80,945	94	Weighted Average
17,412		21.51% Pervious Area
63,533		78.49% Impervious Area

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

Subcatchment 1E: To site sewer



Summary for Subcatchment 2E: Direct to onsite wetland

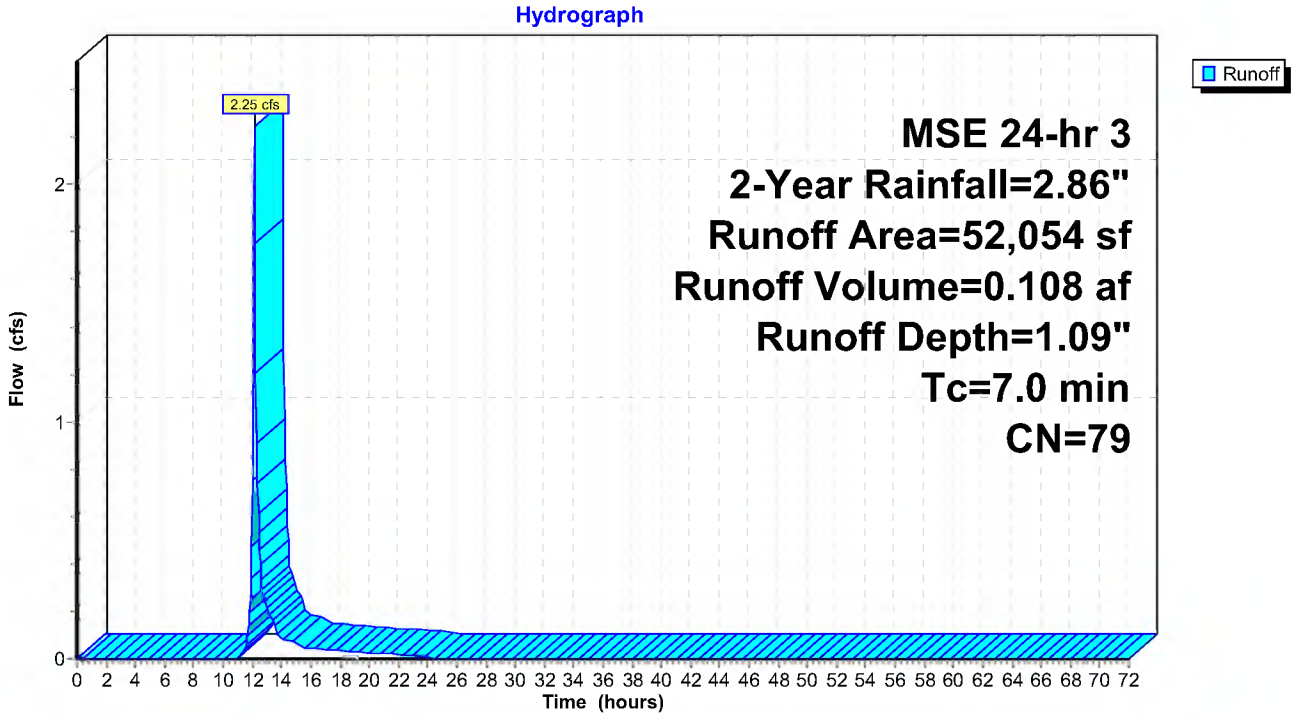
Runoff = 2.25 cfs @ 12.15 hrs, Volume= 0.108 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
52,054	79	Woods/grass comb., Good, HSG D
52,054	79	Weighted Average
52,054		100.00% Pervious Area

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

Subcatchment 2E: Direct to onsite wetland



Summary for Subcatchment 3E: Runoff to offsite wetland (N)

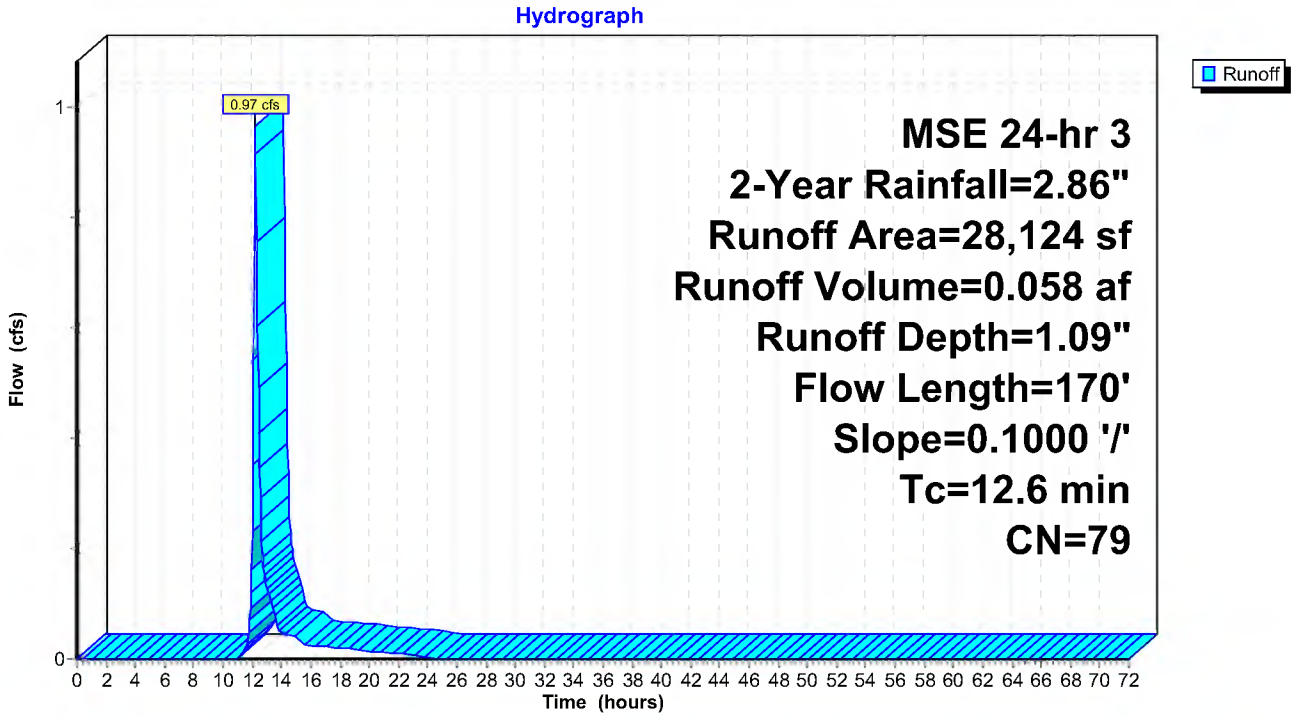
Runoff = 0.97 cfs @ 12.21 hrs, Volume= 0.058 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
28,124	79	Woods/grass comb., Good, HSG D
28,124	79	Weighted Average
28,124		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.86"
0.7	70	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.6	170	Total			

Subcatchment 3E: Runoff to offsite wetland (N)



Summary for Subcatchment 4E: Runoff to Wazata Blvd (S)

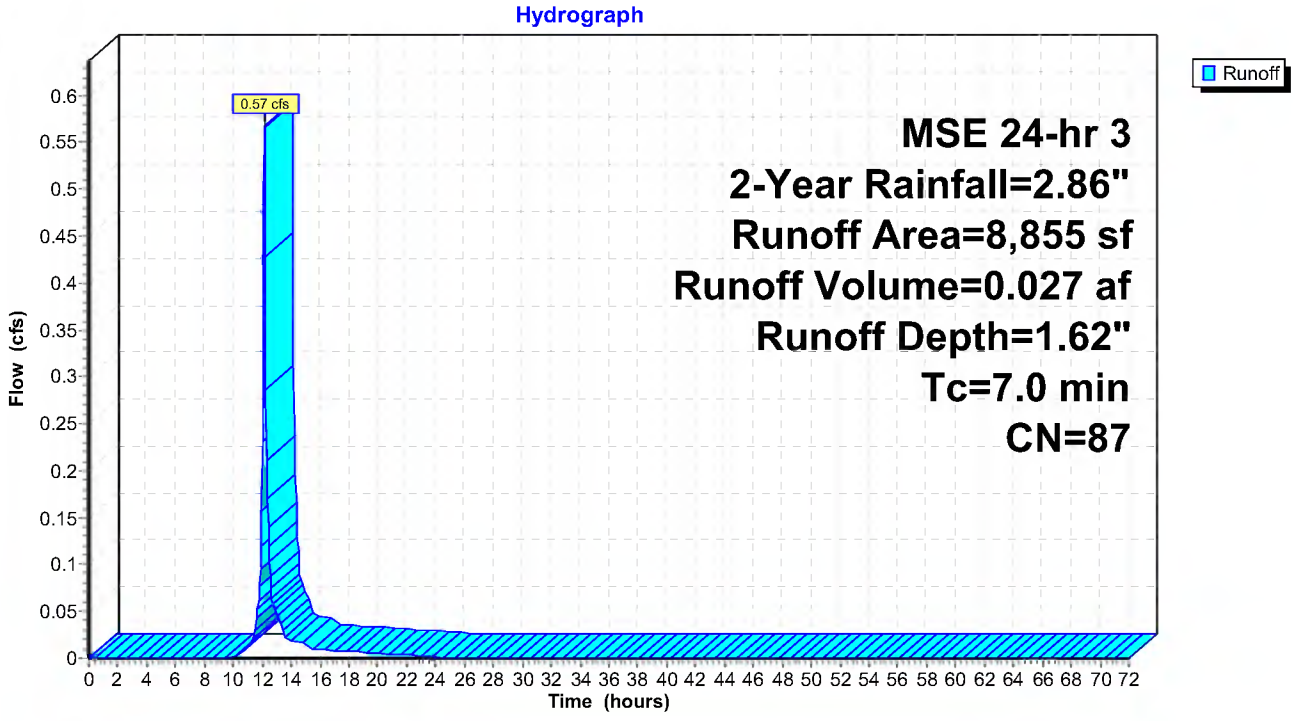
Runoff = 0.57 cfs @ 12.14 hrs, Volume= 0.027 af, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
3,630	98	Paved parking, HSG D
5,225	80	>75% Grass cover, Good, HSG D
8,855	87	Weighted Average
5,225		59.01% Pervious Area
3,630		40.99% Impervious Area

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

Subcatchment 4E: Runoff to Wazata Blvd (S)



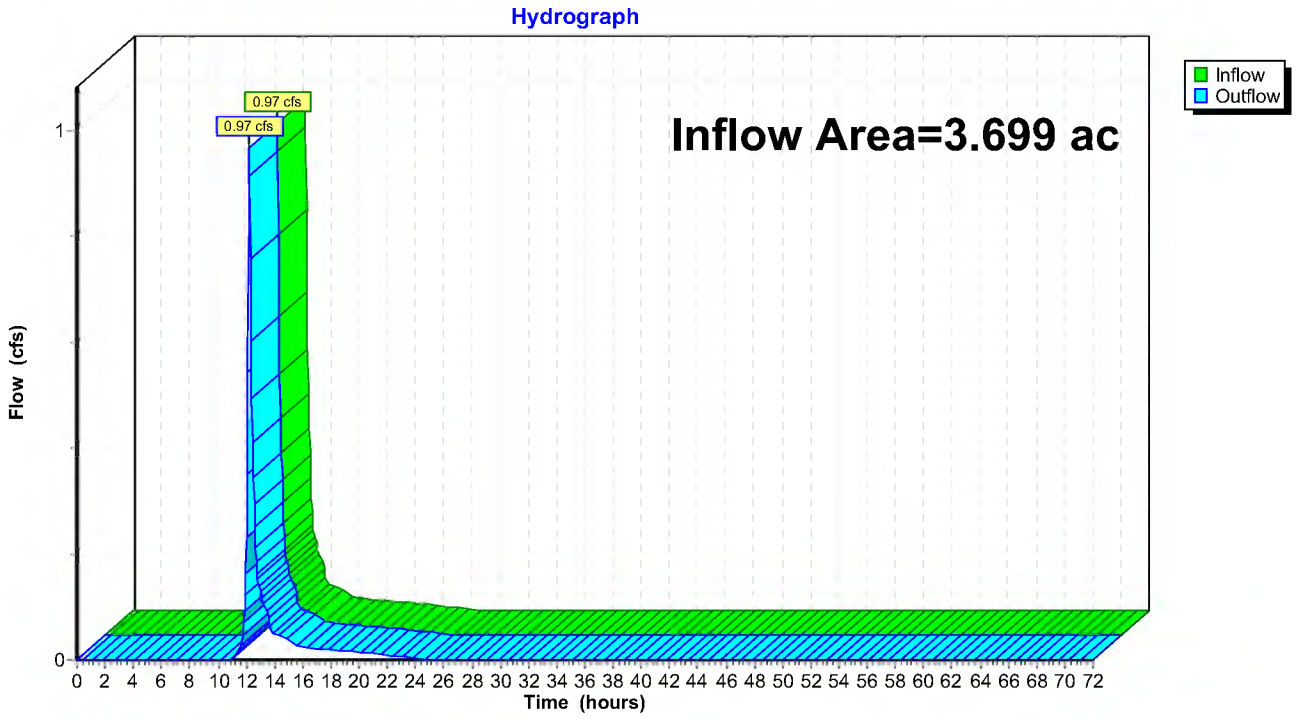
Summary for Reach 1R: Total to offsite wetland

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

Inflow Area = 3.699 ac, 39.43% Impervious, Inflow Depth = 0.19" for 2-Year event
Inflow = 0.97 cfs @ 12.21 hrs, Volume= 0.058 af
Outflow = 0.97 cfs @ 12.21 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min

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

Reach 1R: Total to offsite wetland



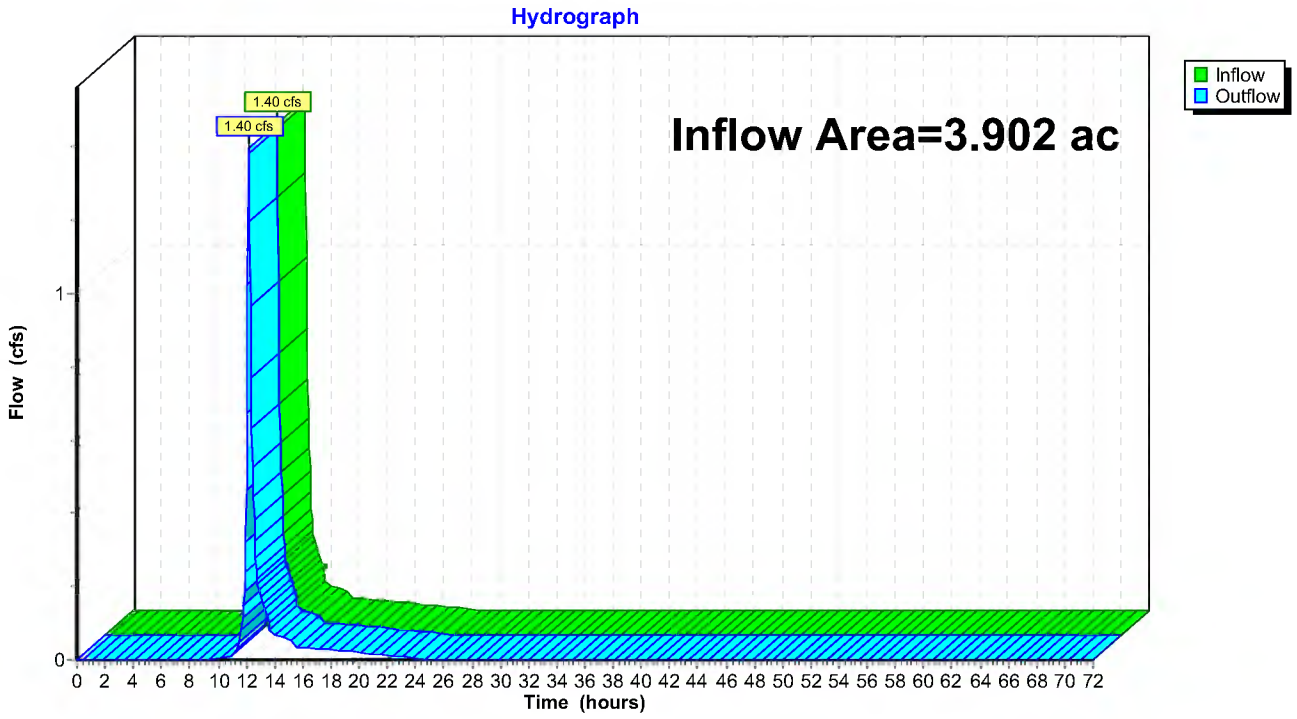
Summary for Reach 2R: total existing

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

Inflow Area = 3.902 ac, 39.51% Impervious, Inflow Depth = 0.26" for 2-Year event
Inflow = 1.40 cfs @ 12.18 hrs, Volume= 0.086 af
Outflow = 1.40 cfs @ 12.18 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: total existing



Summary for Pond Wtld Exs: Existing Wetland

Inflow Area = 3.053 ac, 47.77% Impervious, Inflow Depth = 1.77" for 2-Year event
Inflow = 8.97 cfs @ 12.14 hrs, Volume= 0.451 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 916.87' @ 24.45 hrs Surf.Area= 23,785 sf Storage= 19,656 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

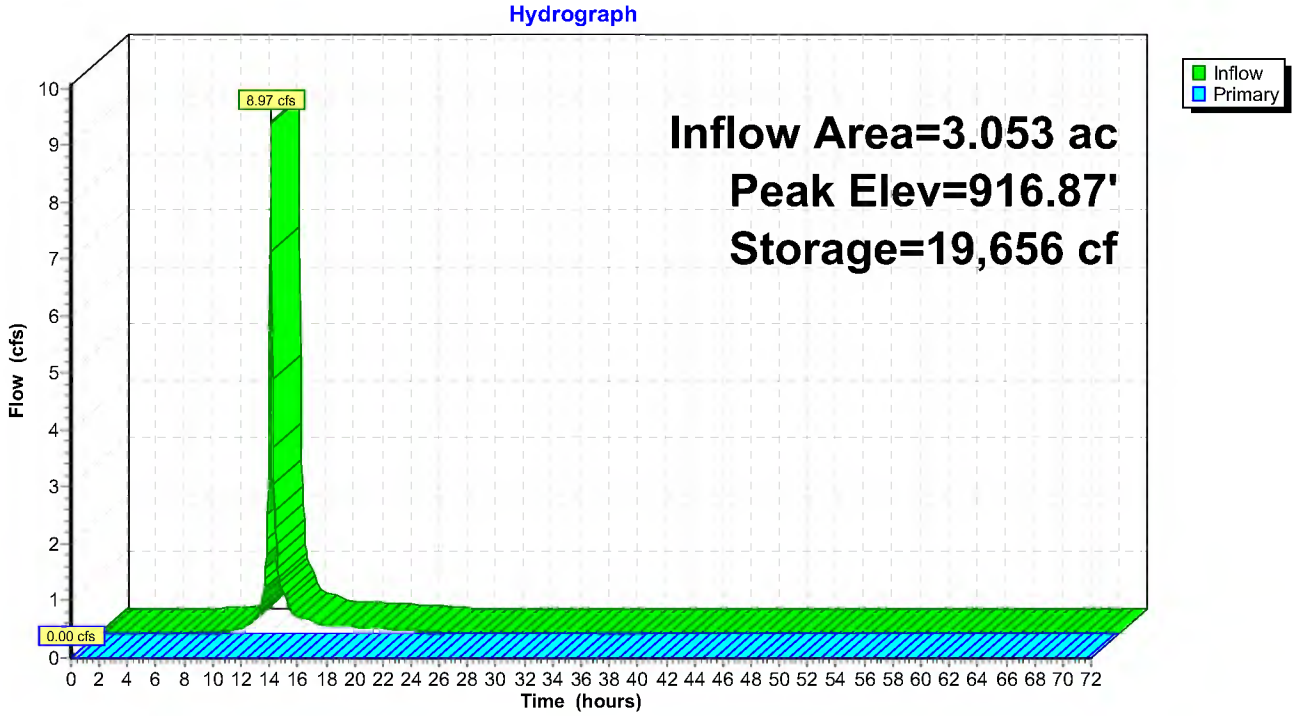
Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	76,784 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.00	21,538	0	0
917.00	24,128	22,833	22,833
918.00	26,828	25,478	48,311
919.00	30,118	28,473	76,784

Device	Routing	Invert	Outlet Devices
#1	Primary	916.35'	**15.0" Round ocs outlet** L= 18.0' Ke= 0.900 Inlet / Outlet Invert= 916.35' / 916.22' S= 0.0072 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#2	Device 1	918.08'	**4.0' long ocs weir wall** 2 End Contraction(s)
#3	Device 2	917.07'	**15.0" Round ocs inlet** L= 12.0' Ke= 0.900 Inlet / Outlet Invert= 917.07' / 916.39' S= 0.0567 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=916.00' TW=0.00' (Dynamic Tailwater)
↑**1=ocs outlet** (Controls 0.00 cfs)
↑**2=ocs weir wall** (Controls 0.00 cfs)
↑**3=ocs inlet** (Controls 0.00 cfs)

Pond Wtld Exs: Existing Wetland



Stage-Area-Storage for Pond Wtld Exs: Existing Wetland

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
916.00	21,538	0
916.05	21,667	1,080
916.10	21,797	2,167
916.15	21,926	3,260
916.20	22,056	4,359
916.25	22,186	5,465
916.30	22,315	6,578
916.35	22,445	7,697
916.40	22,574	8,822
916.45	22,704	9,954
916.50	22,833	11,093
916.55	22,962	12,238
916.60	23,092	13,389
916.65	23,221	14,547
916.70	23,351	15,711
916.75	23,481	16,882
916.80	23,610	18,059
916.85	23,740	19,243
916.90	23,869	20,433
916.95	23,999	21,630
917.00	24,128	22,833
917.05	24,263	24,043
917.10	24,398	25,259
917.15	24,533	26,483
917.20	24,668	27,713
917.25	24,803	28,949
917.30	24,938	30,193
917.35	25,073	31,443
917.40	25,208	32,700
917.45	25,343	33,964
917.50	25,478	35,235
917.55	25,613	36,512
917.60	25,748	37,796
917.65	25,883	39,087
917.70	26,018	40,384
917.75	26,153	41,688
917.80	26,288	42,999
917.85	26,423	44,317
917.90	26,558	45,642
917.95	26,693	46,973
918.00	26,828	48,311
918.05	26,992	49,657
918.10	27,157	51,010
918.15	27,321	52,372
918.20	27,486	53,742
918.25	27,651	55,121
918.30	27,815	56,507
918.35	27,980	57,902
918.40	28,144	59,305
918.45	28,309	60,717
918.50	28,473	62,136
918.55	28,637	63,564
918.60	28,802	65,000
918.65	28,966	66,444
918.70	29,131	67,897
918.75	29,296	69,357
918.80	29,460	70,826
918.85	29,625	72,303
918.90	29,789	73,789
918.95	29,954	75,282
919.00	**30,118**	**76,784**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1E: To site sewer Runoff Area=80,945 sf 78.49% Impervious Runoff Depth=3.58"
Tc=7.0 min CN=94 Runoff=10.54 cfs 0.554 af

Subcatchment2E: Direct to onsite wetland Runoff Area=52,054 sf 0.00% Impervious Runoff Depth=2.18"
Tc=7.0 min CN=79 Runoff=4.52 cfs 0.217 af

Subcatchment3E: Runoff to offsite wetland Runoff Area=28,124 sf 0.00% Impervious Runoff Depth=2.18"
Flow Length=170' Slope=0.1000 '/' Tc=12.6 min CN=79 Runoff=1.96 cfs 0.117 af

Subcatchment4E: Runoff to Wazata Blvd Runoff Area=8,855 sf 40.99% Impervious Runoff Depth=2.88"
Tc=7.0 min CN=87 Runoff=0.99 cfs 0.049 af

Reach 1R: Total to offsite wetland Inflow=1.96 cfs 0.117 af
Outflow=1.96 cfs 0.117 af

Reach 2R: total existing Inflow=2.73 cfs 0.166 af
Outflow=2.73 cfs 0.166 af

Pond Wtld Exs: Existing Wetland Peak Elev=917.44' Storage=33,586 cf Inflow=15.06 cfs 0.771 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.902 ac Runoff Volume = 0.937 af Average Runoff Depth = 2.88"
60.49% Pervious = 2.360 ac 39.51% Impervious = 1.542 ac

Summary for Subcatchment 1E: To site sewer

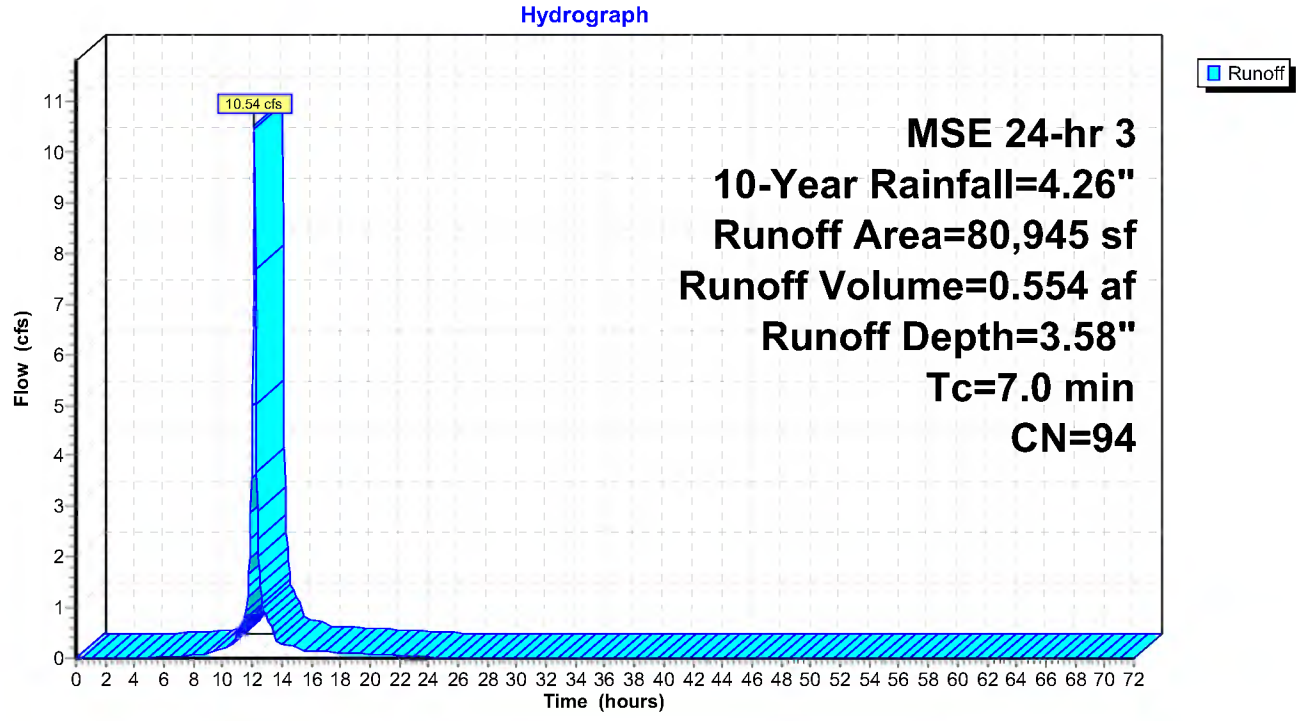
Runoff = 10.54 cfs @ 12.14 hrs, Volume= 0.554 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
63,533	98	Paved parking, HSG D
17,412	80	>75% Grass cover, Good, HSG D
80,945	94	Weighted Average
17,412		21.51% Pervious Area
63,533		78.49% Impervious Area

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

Subcatchment 1E: To site sewer



Summary for Subcatchment 2E: Direct to onsite wetland

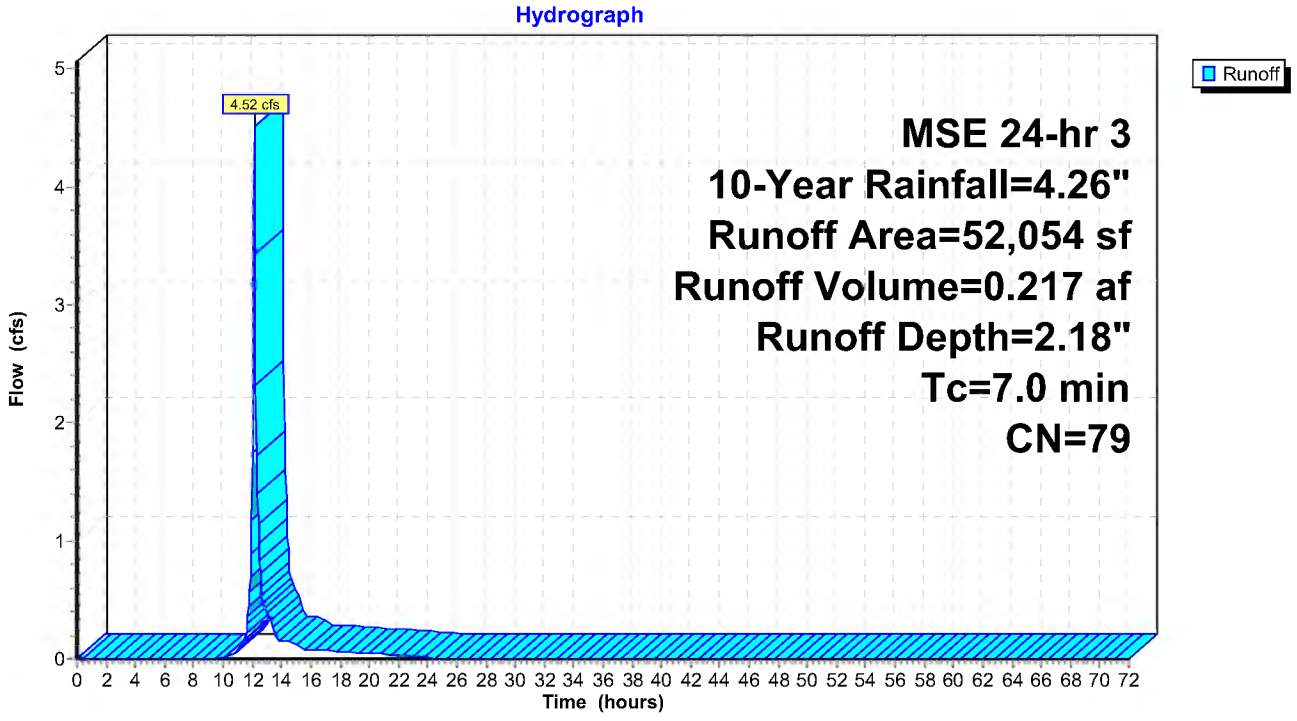
Runoff = 4.52 cfs @ 12.14 hrs, Volume= 0.217 af, Depth= 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
52,054	79	Woods/grass comb., Good, HSG D
52,054	79	Weighted Average
52,054		100.00% Pervious Area

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

Subcatchment 2E: Direct to onsite wetland



Summary for Subcatchment 3E: Runoff to offsite wetland (N)

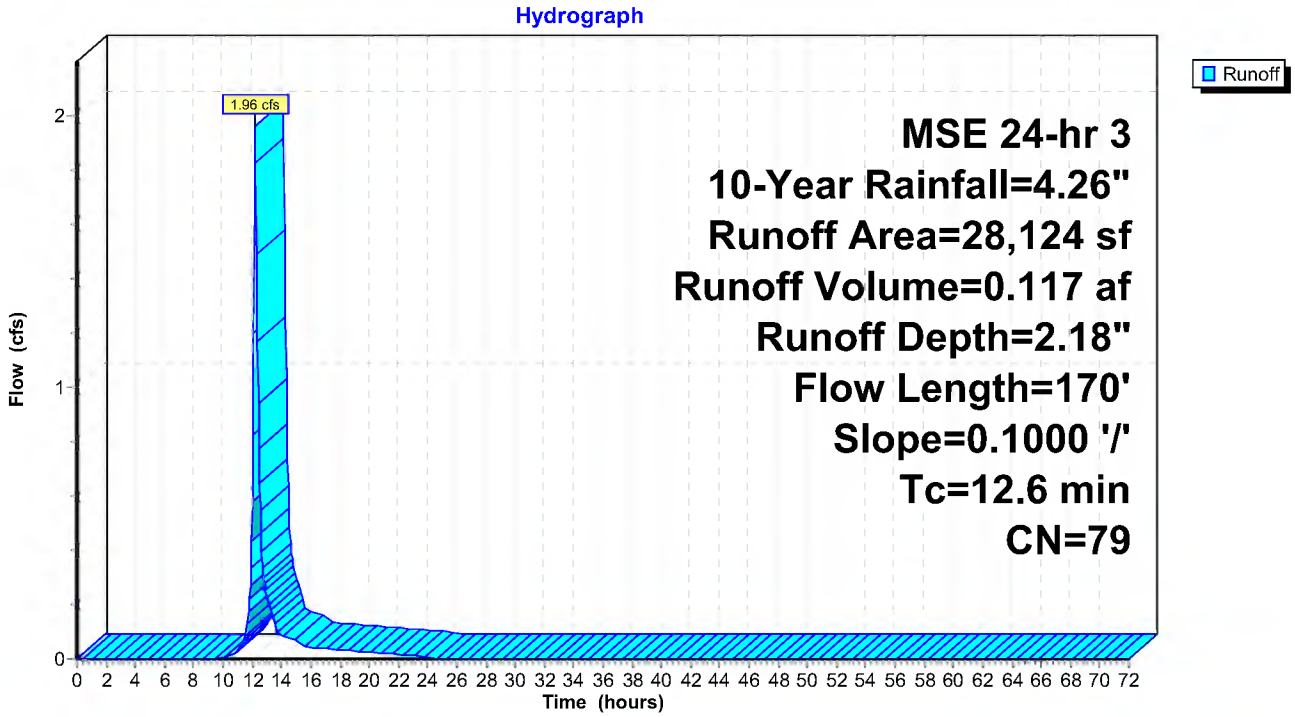
Runoff = 1.96 cfs @ 12.21 hrs, Volume= 0.117 af, Depth= 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
28,124	79	Woods/grass comb., Good, HSG D
28,124	79	Weighted Average
28,124		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.86"
0.7	70	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.6	170	Total			

Subcatchment 3E: Runoff to offsite wetland (N)



Summary for Subcatchment 4E: Runoff to Wazata Blvd (S)

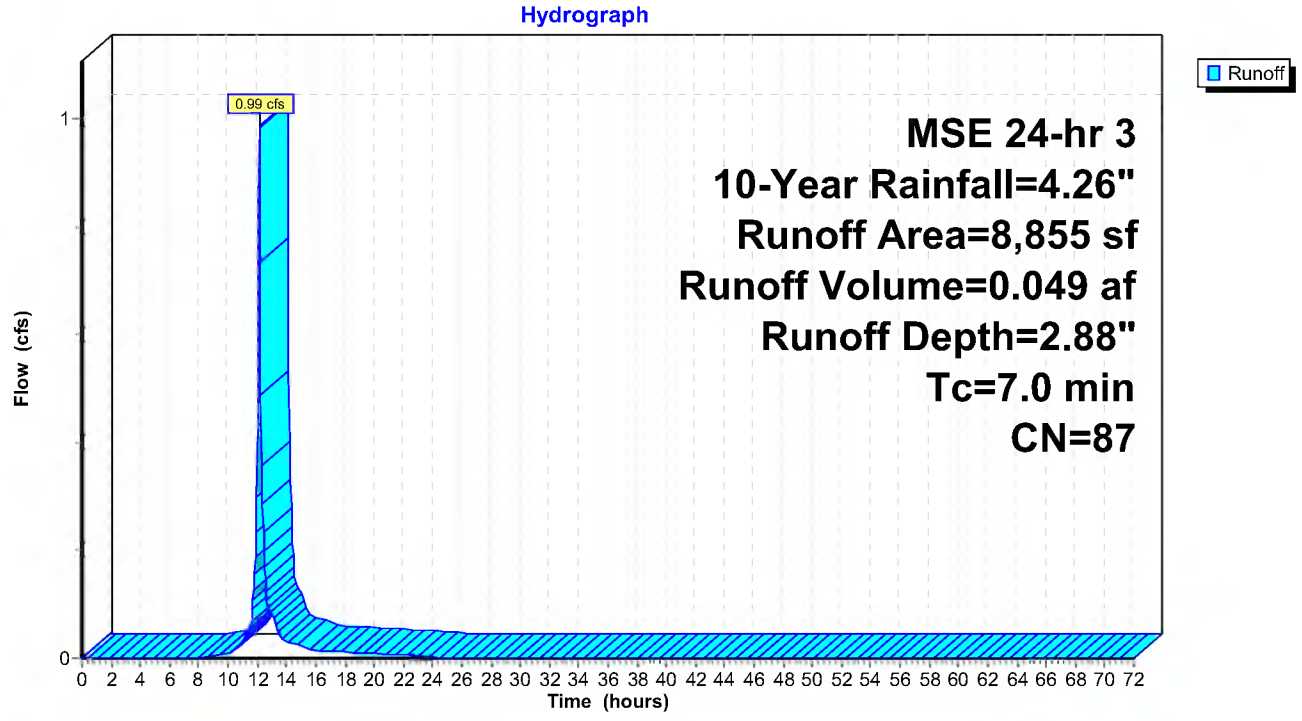
Runoff = 0.99 cfs @ 12.14 hrs, Volume= 0.049 af, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
3,630	98	Paved parking, HSG D
5,225	80	>75% Grass cover, Good, HSG D
8,855	87	Weighted Average
5,225		59.01% Pervious Area
3,630		40.99% Impervious Area

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

Subcatchment 4E: Runoff to Wazata Blvd (S)



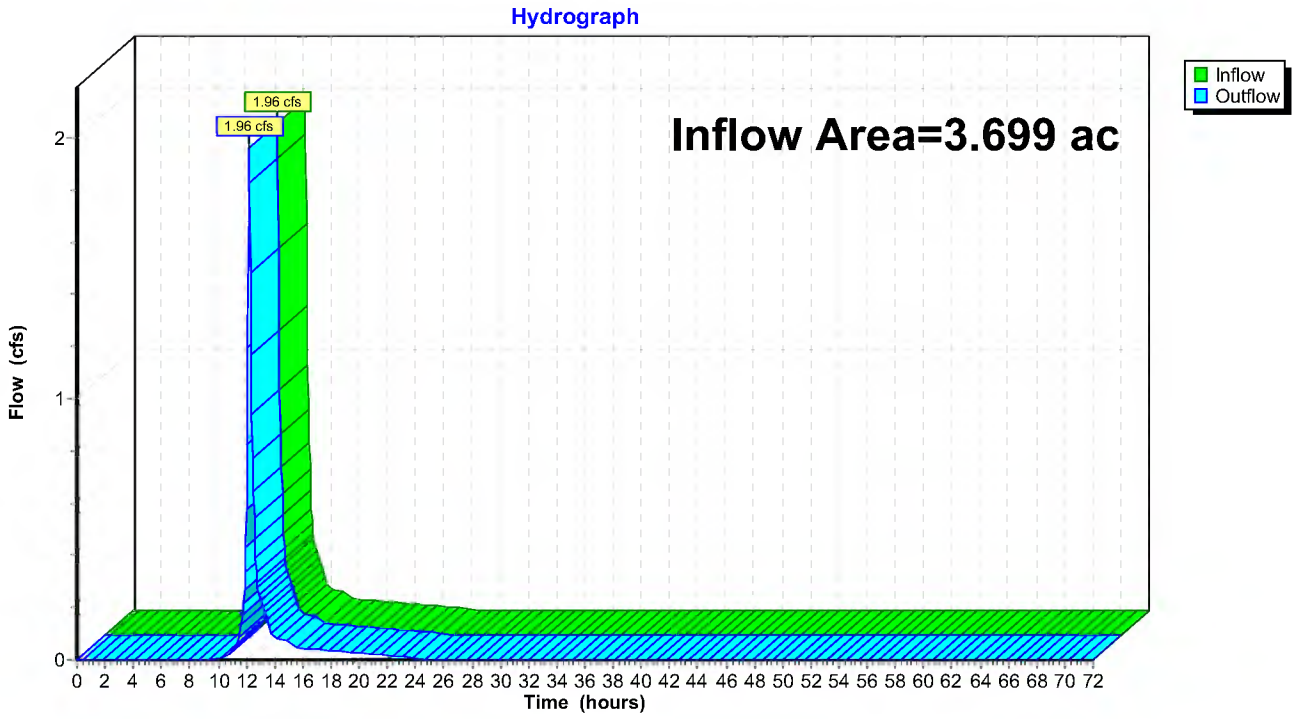
Summary for Reach 1R: Total to offsite wetland

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

Inflow Area = 3.699 ac, 39.43% Impervious, Inflow Depth = 0.38" for 10-Year event
Inflow = 1.96 cfs @ 12.21 hrs, Volume= 0.117 af
Outflow = 1.96 cfs @ 12.21 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min

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

Reach 1R: Total to offsite wetland



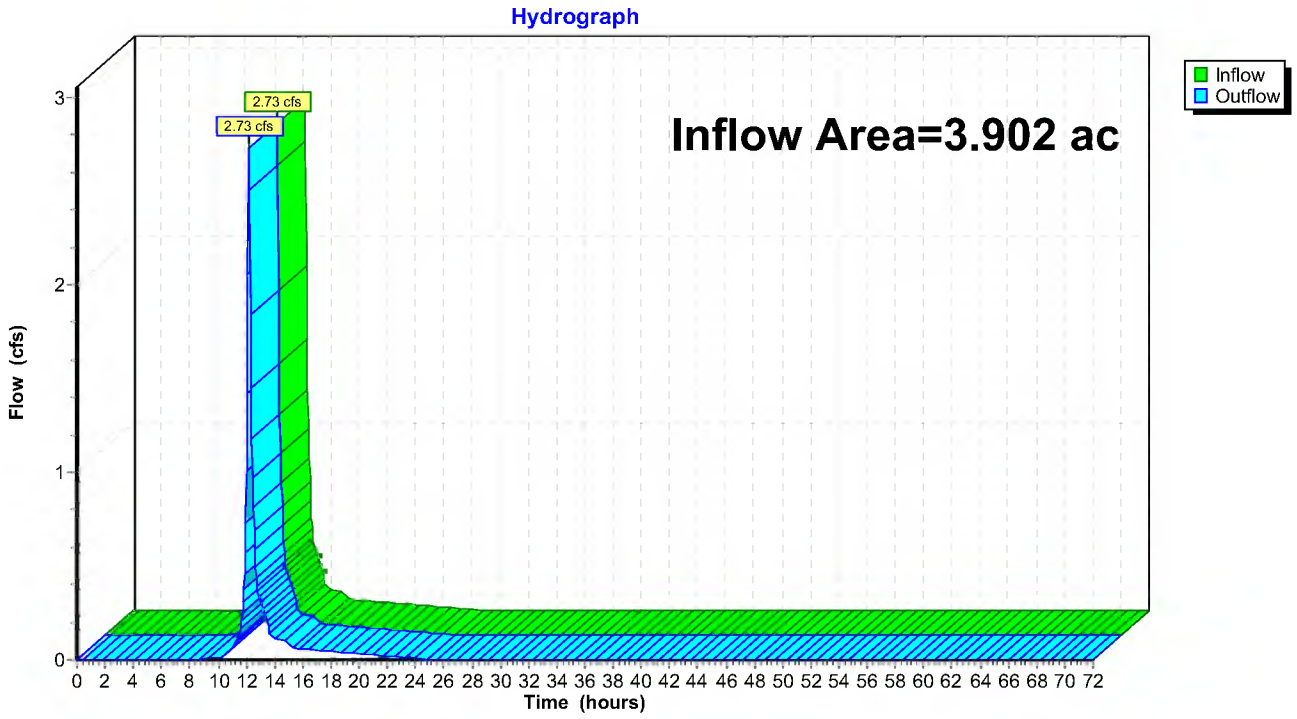
Summary for Reach 2R: total existing

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

Inflow Area = 3.902 ac, 39.51% Impervious, Inflow Depth = 0.51" for 10-Year event
Inflow = 2.73 cfs @ 12.18 hrs, Volume= 0.166 af
Outflow = 2.73 cfs @ 12.18 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: total existing



Summary for Pond Wtld Exs: Existing Wetland

Inflow Area = 3.053 ac, 47.77% Impervious, Inflow Depth = 3.03" for 10-Year event
Inflow = 15.06 cfs @ 12.14 hrs, Volume= 0.771 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 917.44' @ 24.45 hrs Surf.Area= 25,303 sf Storage= 33,586 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

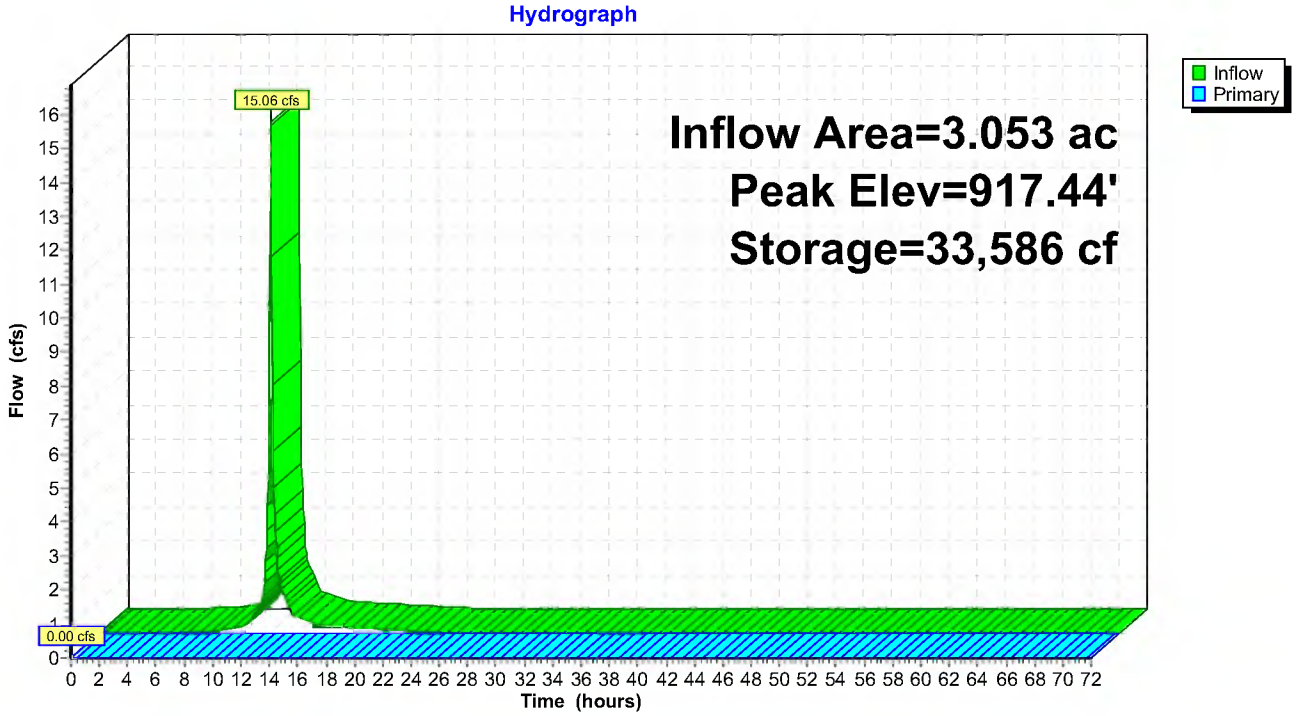
Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	76,784 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.00	21,538	0	0
917.00	24,128	22,833	22,833
918.00	26,828	25,478	48,311
919.00	30,118	28,473	76,784

Device	Routing	Invert	Outlet Devices
#1	Primary	916.35'	**15.0" Round ocs outlet** L= 18.0' Ke= 0.900 Inlet / Outlet Invert= 916.35' / 916.22' S= 0.0072 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#2	Device 1	918.08'	**4.0' long ocs weir wall** 2 End Contraction(s)
#3	Device 2	917.07'	**15.0" Round ocs inlet** L= 12.0' Ke= 0.900 Inlet / Outlet Invert= 917.07' / 916.39' S= 0.0567 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=916.00' TW=0.00' (Dynamic Tailwater)
↑**1=ocs outlet** (Controls 0.00 cfs)
↑**2=ocs weir wall** (Controls 0.00 cfs)
↑**3=ocs inlet** (Controls 0.00 cfs)

Pond Wtld Exs: Existing Wetland



Stage-Area-Storage for Pond Wtld Exs: Existing Wetland

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
916.00	21,538	0
916.05	21,667	1,080
916.10	21,797	2,167
916.15	21,926	3,260
916.20	22,056	4,359
916.25	22,186	5,465
916.30	22,315	6,578
916.35	22,445	7,697
916.40	22,574	8,822
916.45	22,704	9,954
916.50	22,833	11,093
916.55	22,962	12,238
916.60	23,092	13,389
916.65	23,221	14,547
916.70	23,351	15,711
916.75	23,481	16,882
916.80	23,610	18,059
916.85	23,740	19,243
916.90	23,869	20,433
916.95	23,999	21,630
917.00	24,128	22,833
917.05	24,263	24,043
917.10	24,398	25,259
917.15	24,533	26,483
917.20	24,668	27,713
917.25	24,803	28,949
917.30	24,938	30,193
917.35	25,073	31,443
917.40	25,208	32,700
917.45	25,343	33,964
917.50	25,478	35,235
917.55	25,613	36,512
917.60	25,748	37,796
917.65	25,883	39,087
917.70	26,018	40,384
917.75	26,153	41,688
917.80	26,288	42,999
917.85	26,423	44,317
917.90	26,558	45,642
917.95	26,693	46,973
918.00	26,828	48,311
918.05	26,992	49,657
918.10	27,157	51,010
918.15	27,321	52,372
918.20	27,486	53,742
918.25	27,651	55,121
918.30	27,815	56,507
918.35	27,980	57,902
918.40	28,144	59,305
918.45	28,309	60,717
918.50	28,473	62,136
918.55	28,637	63,564
918.60	28,802	65,000
918.65	28,966	66,444
918.70	29,131	67,897
918.75	29,296	69,357
918.80	29,460	70,826
918.85	29,625	72,303
918.90	29,789	73,789
918.95	29,954	75,282
919.00	**30,118**	**76,784**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1E: To site sewer Runoff Area=80,945 sf 78.49% Impervious Runoff Depth=6.61"
Tc=7.0 min CN=94 Runoff=18.74 cfs 1.023 af

Subcatchment2E: Direct to onsite wetland Runoff Area=52,054 sf 0.00% Impervious Runoff Depth=4.88"
Tc=7.0 min CN=79 Runoff=9.88 cfs 0.486 af

Subcatchment3E: Runoff to offsite wetland Runoff Area=28,124 sf 0.00% Impervious Runoff Depth=4.88"
Flow Length=170' Slope=0.1000 '/' Tc=12.6 min CN=79 Runoff=4.33 cfs 0.262 af

Subcatchment4E: Runoff to Wazata Blvd Runoff Area=8,855 sf 40.99% Impervious Runoff Depth=5.79"
Tc=7.0 min CN=87 Runoff=1.91 cfs 0.098 af

Reach 1R: Total to offsite wetland Inflow=4.33 cfs 0.612 af
Outflow=4.33 cfs 0.612 af

Reach 2R: total existing Inflow=5.82 cfs 0.710 af
Outflow=5.82 cfs 0.710 af

Pond Wtld Exs: Existing Wetland Peak Elev=918.22' Storage=54,202 cf Inflow=28.61 cfs 1.509 af
Outflow=0.66 cfs 0.350 af

Total Runoff Area = 3.902 ac Runoff Volume = 1.869 af Average Runoff Depth = 5.75"
60.49% Pervious = 2.360 ac 39.51% Impervious = 1.542 ac

Summary for Subcatchment 1E: To site sewer

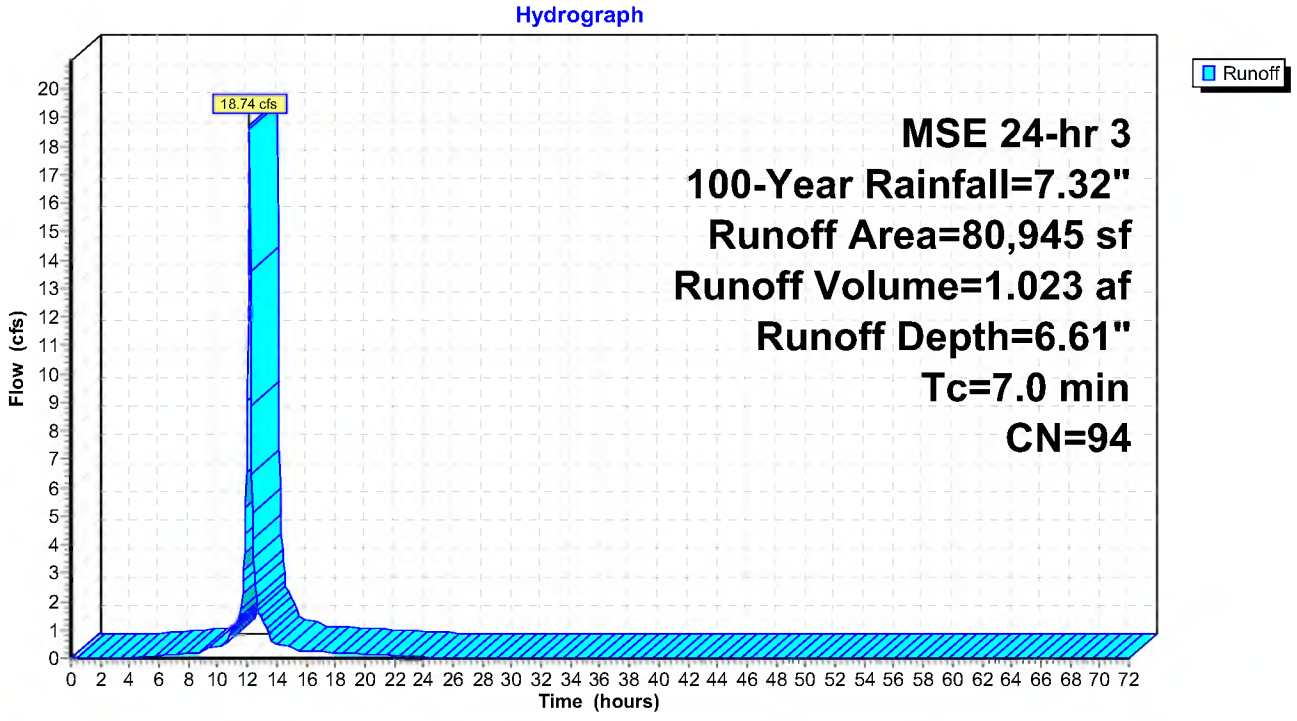
Runoff = 18.74 cfs @ 12.14 hrs, Volume= 1.023 af, Depth= 6.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
63,533	98	Paved parking, HSG D
17,412	80	>75% Grass cover, Good, HSG D
80,945	94	Weighted Average
17,412		21.51% Pervious Area
63,533		78.49% Impervious Area

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

Subcatchment 1E: To site sewer



Summary for Subcatchment 2E: Direct to onsite wetland

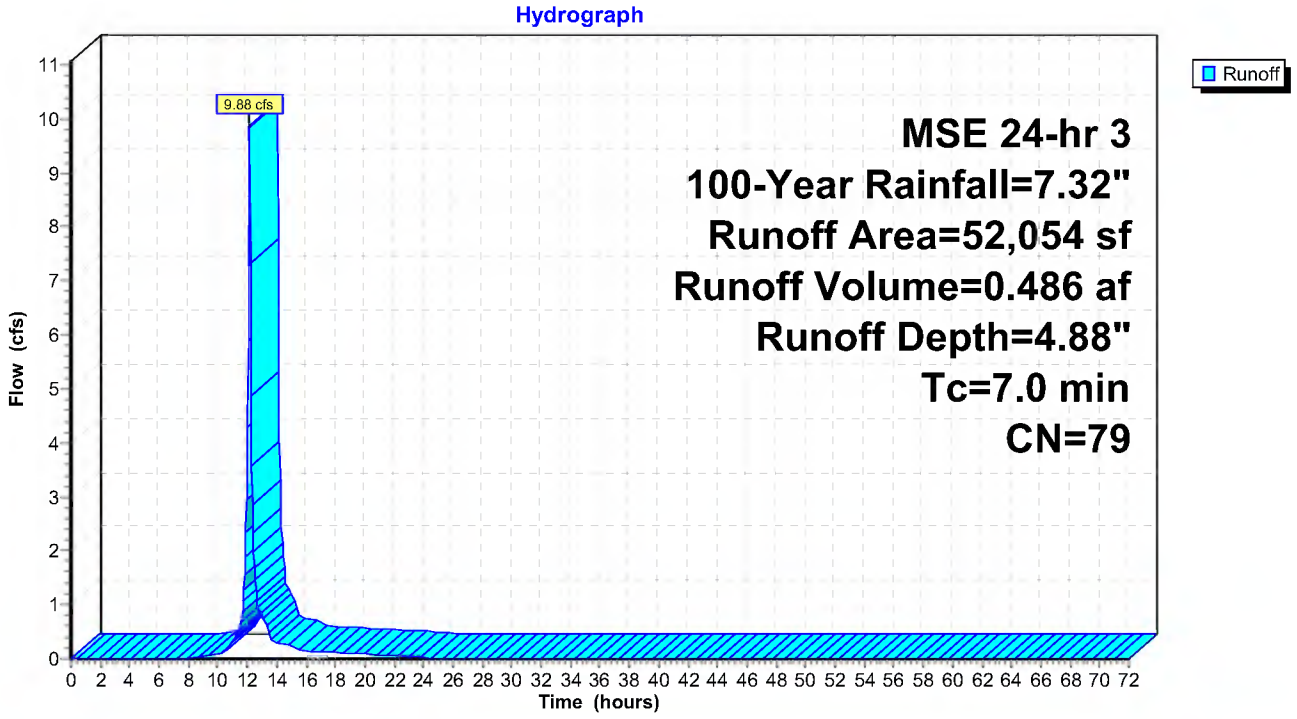
Runoff = 9.88 cfs @ 12.14 hrs, Volume= 0.486 af, Depth= 4.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
52,054	79	Woods/grass comb., Good, HSG D
52,054	79	Weighted Average
52,054		100.00% Pervious Area

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

Subcatchment 2E: Direct to onsite wetland



Summary for Subcatchment 3E: Runoff to offsite wetland (N)

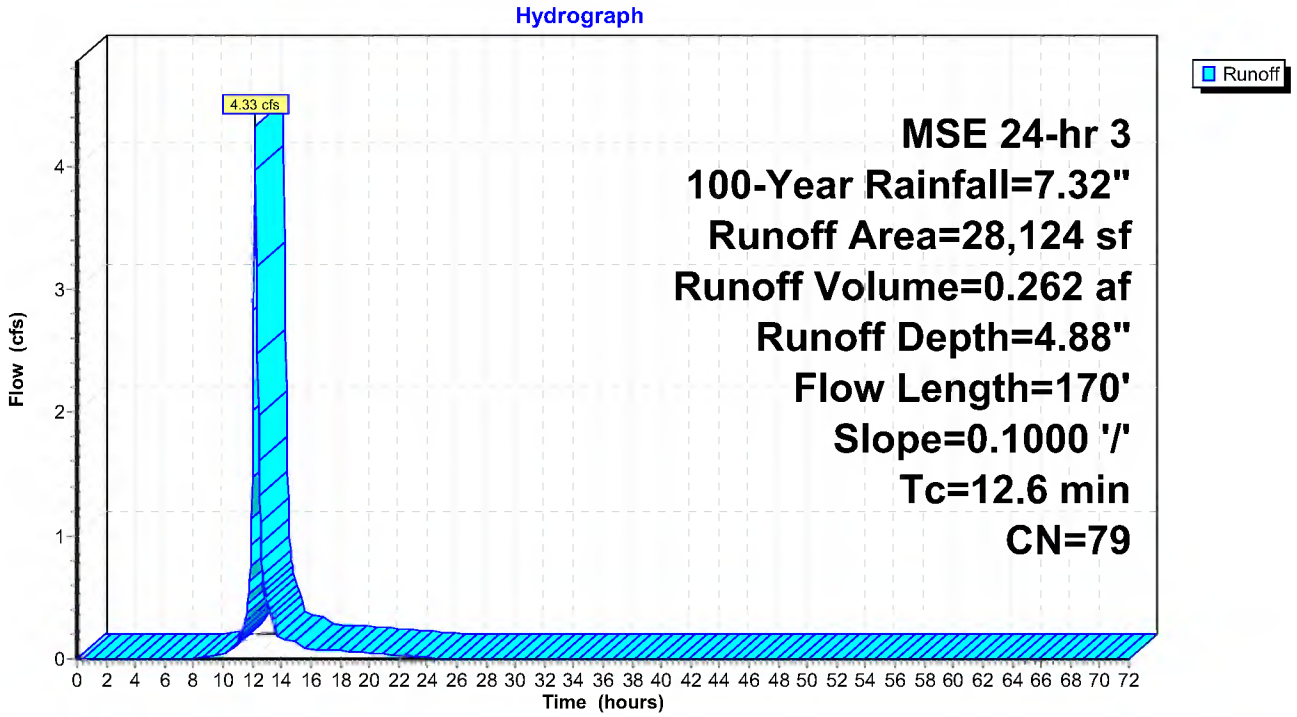
Runoff = 4.33 cfs @ 12.20 hrs, Volume= 0.262 af, Depth= 4.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
28,124	79	Woods/grass comb., Good, HSG D
28,124	79	Weighted Average
28,124		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.1000	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.86"
0.7	70	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.6	170	Total			

Subcatchment 3E: Runoff to offsite wetland (N)



Summary for Subcatchment 4E: Runoff to Wazata Blvd (S)

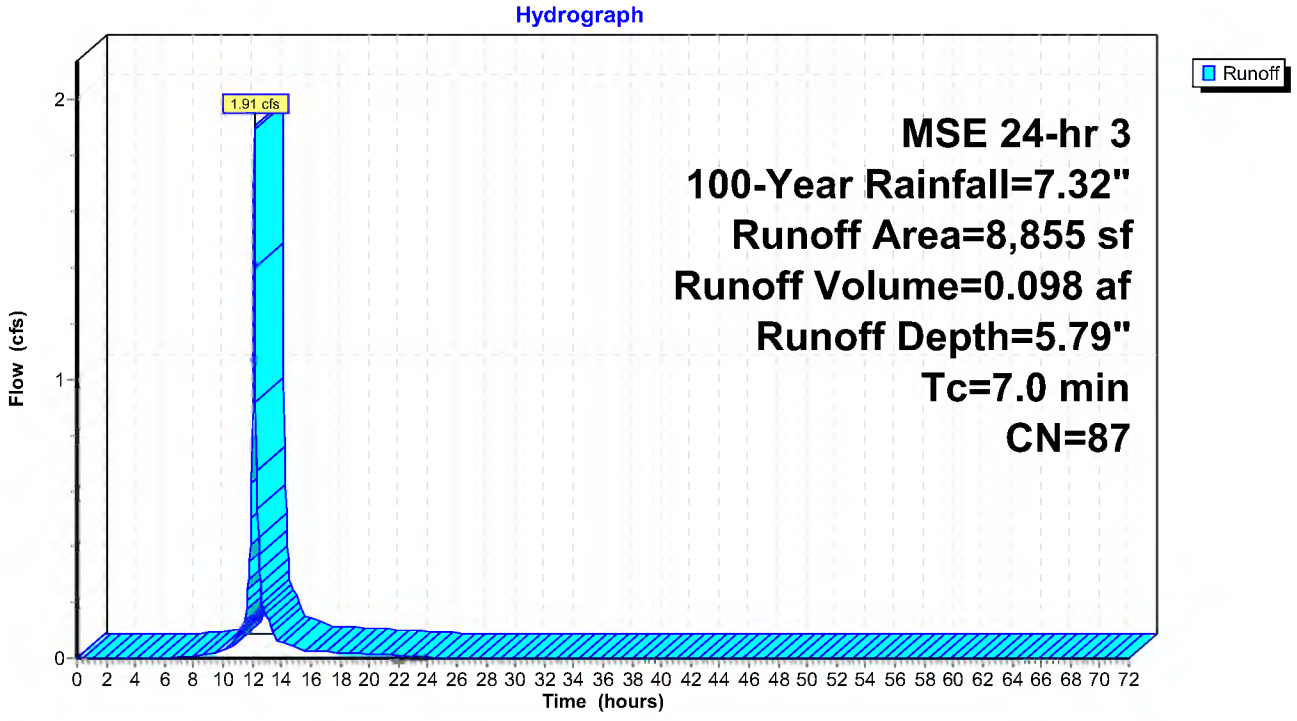
Runoff = 1.91 cfs @ 12.14 hrs, Volume= 0.098 af, Depth= 5.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
3,630	98	Paved parking, HSG D
5,225	80	>75% Grass cover, Good, HSG D
8,855	87	Weighted Average
5,225		59.01% Pervious Area
3,630		40.99% Impervious Area

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

Subcatchment 4E: Runoff to Wazata Blvd (S)



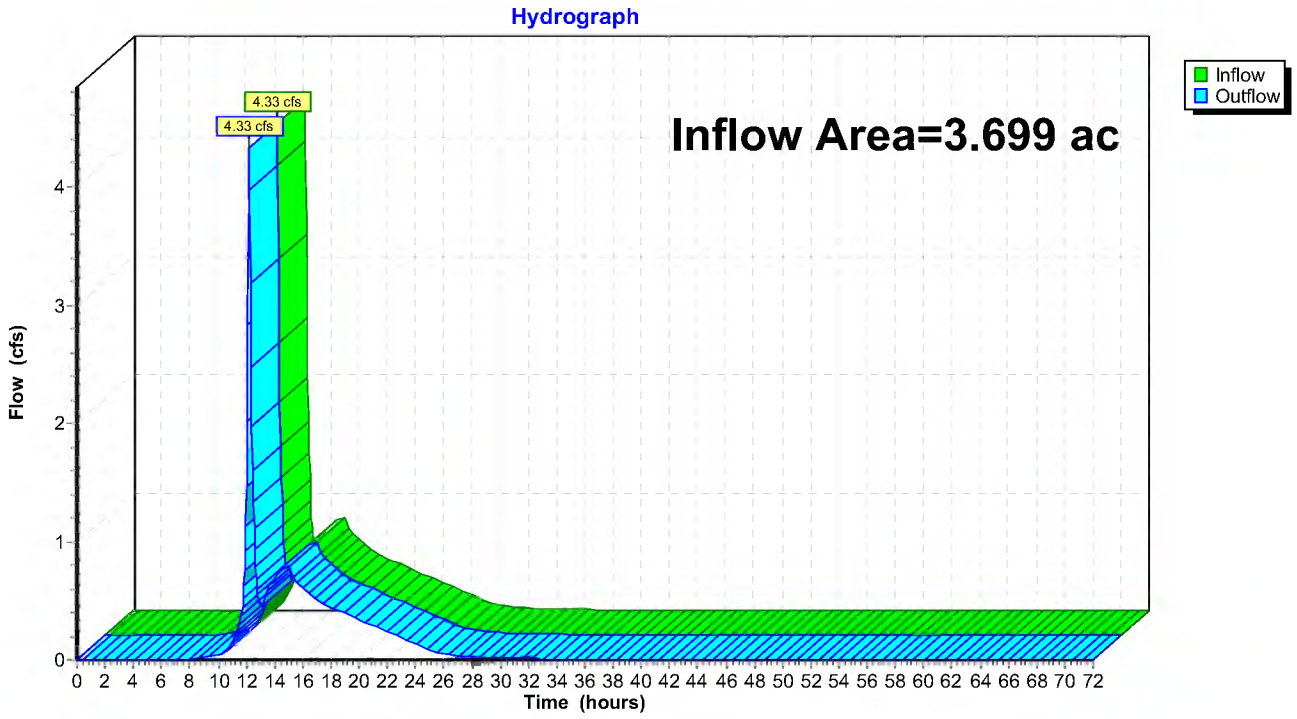
Summary for Reach 1R: Total to offsite wetland

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

Inflow Area = 3.699 ac, 39.43% Impervious, Inflow Depth = 1.99" for 100-Year event
Inflow = 4.33 cfs @ 12.20 hrs, Volume= 0.612 af
Outflow = 4.33 cfs @ 12.20 hrs, Volume= 0.612 af, Atten= 0%, Lag= 0.0 min

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

Reach 1R: Total to offsite wetland



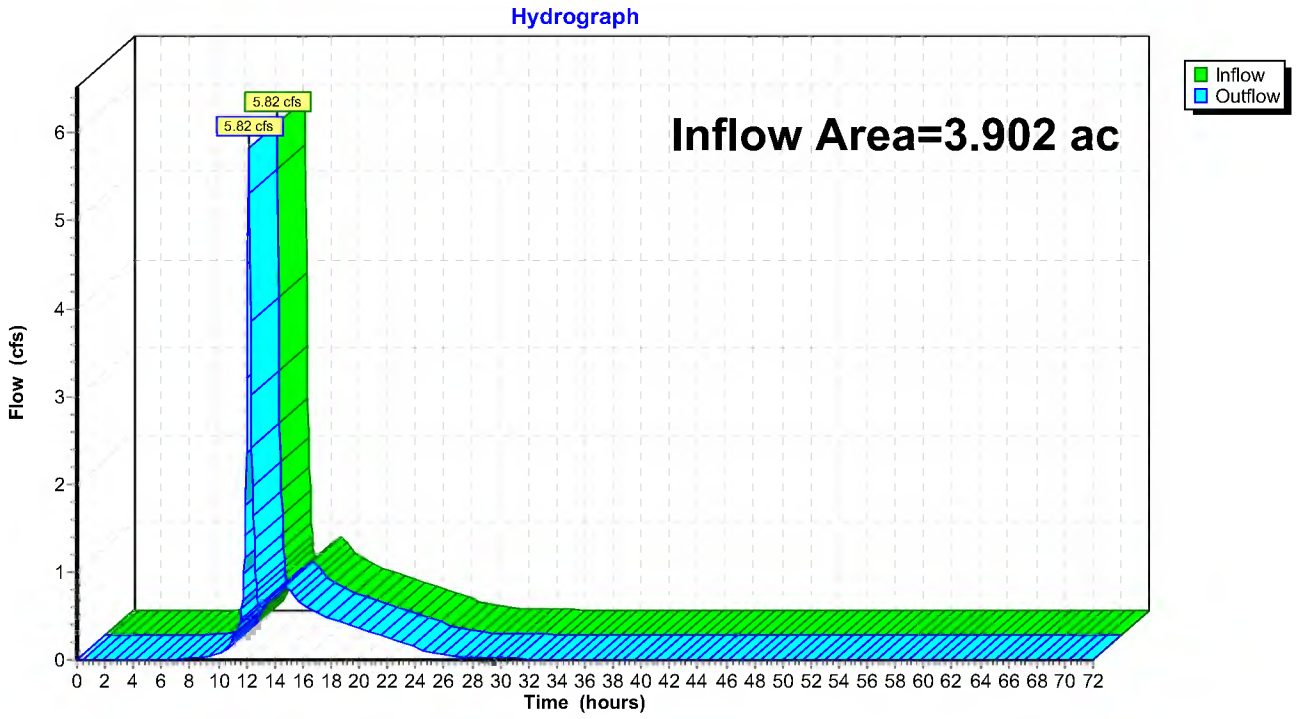
Summary for Reach 2R: total existing

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

Inflow Area = 3.902 ac, 39.51% Impervious, Inflow Depth = 2.18" for 100-Year event
Inflow = 5.82 cfs @ 12.18 hrs, Volume= 0.710 af
Outflow = 5.82 cfs @ 12.18 hrs, Volume= 0.710 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: total existing



Summary for Pond Wtld Exs: Existing Wetland

Inflow Area = 3.053 ac, 47.77% Impervious, Inflow Depth = 5.93" for 100-Year event
Inflow = 28.61 cfs @ 12.14 hrs, Volume= 1.509 af
Outflow = 0.66 cfs @ 15.05 hrs, Volume= 0.350 af, Atten= 98%, Lag= 174.5 min
Primary = 0.66 cfs @ 15.05 hrs, Volume= 0.350 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 918.22' @ 15.05 hrs Surf.Area= 27,541 sf Storage= 54,202 cf

Plug-Flow detention time= 465.9 min calculated for 0.350 af (23% of inflow)
Center-of-Mass det. time= 334.2 min (1,103.1 - 768.9)

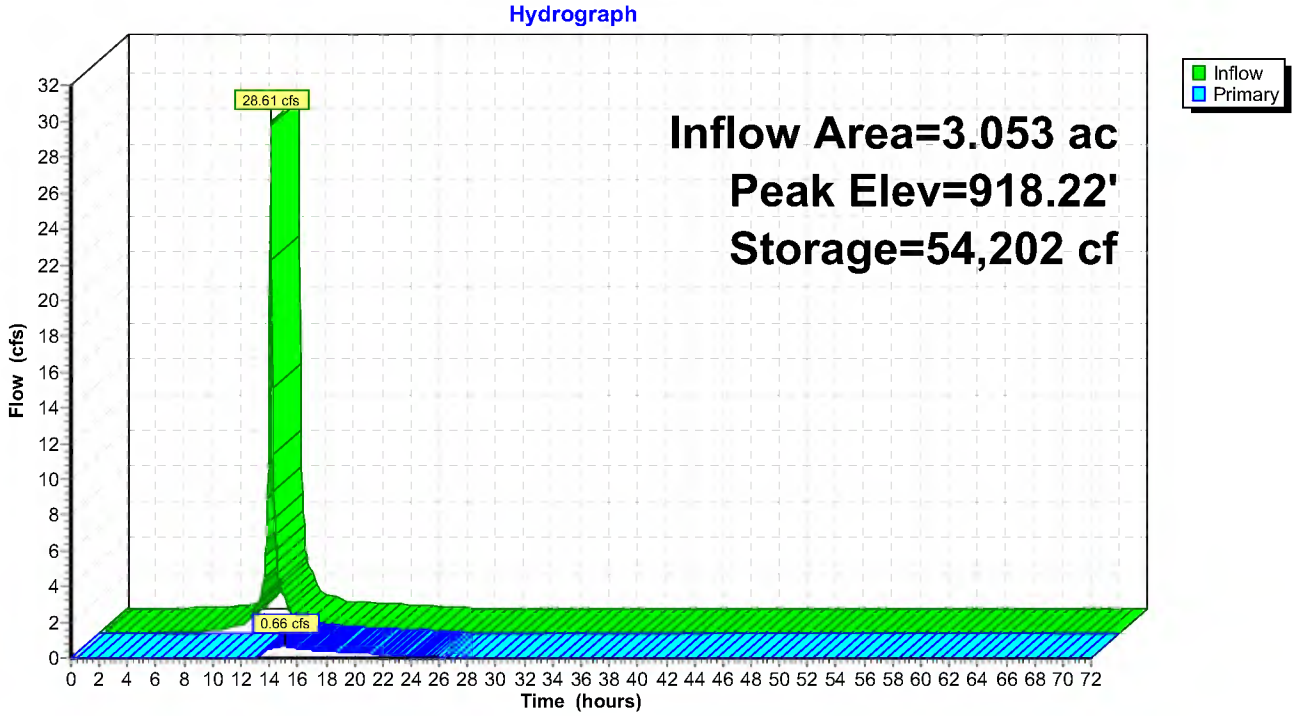
Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	76,784 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.00	21,538	0	0
917.00	24,128	22,833	22,833
918.00	26,828	25,478	48,311
919.00	30,118	28,473	76,784

Device	Routing	Invert	Outlet Devices
#1	Primary	916.35'	**15.0" Round ocs outlet** L= 18.0' Ke= 0.900 Inlet / Outlet Invert= 916.35' / 916.22' S= 0.0072 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#2	Device 1	918.08'	**4.0' long ocs weir wall** 2 End Contraction(s)
#3	Device 2	917.07'	**15.0" Round ocs inlet** L= 12.0' Ke= 0.900 Inlet / Outlet Invert= 917.07' / 916.39' S= 0.0567 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=0.66 cfs @ 15.05 hrs HW=918.22' TW=0.00' (Dynamic Tailwater)
↑**1=ocs outlet** (Passes 0.66 cfs of 5.20 cfs potential flow)
↑**2=ocs weir wall** (Weir Controls 0.66 cfs @ 1.21 fps)
↑**3=ocs inlet** (Passes 0.66 cfs of 1.66 cfs potential flow)

Pond Wtld Exs: Existing Wetland



Stage-Area-Storage for Pond Wtld Exs: Existing Wetland

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
916.00	21,538	0
916.05	21,667	1,080
916.10	21,797	2,167
916.15	21,926	3,260
916.20	22,056	4,359
916.25	22,186	5,465
916.30	22,315	6,578
916.35	22,445	7,697
916.40	22,574	8,822
916.45	22,704	9,954
916.50	22,833	11,093
916.55	22,962	12,238
916.60	23,092	13,389
916.65	23,221	14,547
916.70	23,351	15,711
916.75	23,481	16,882
916.80	23,610	18,059
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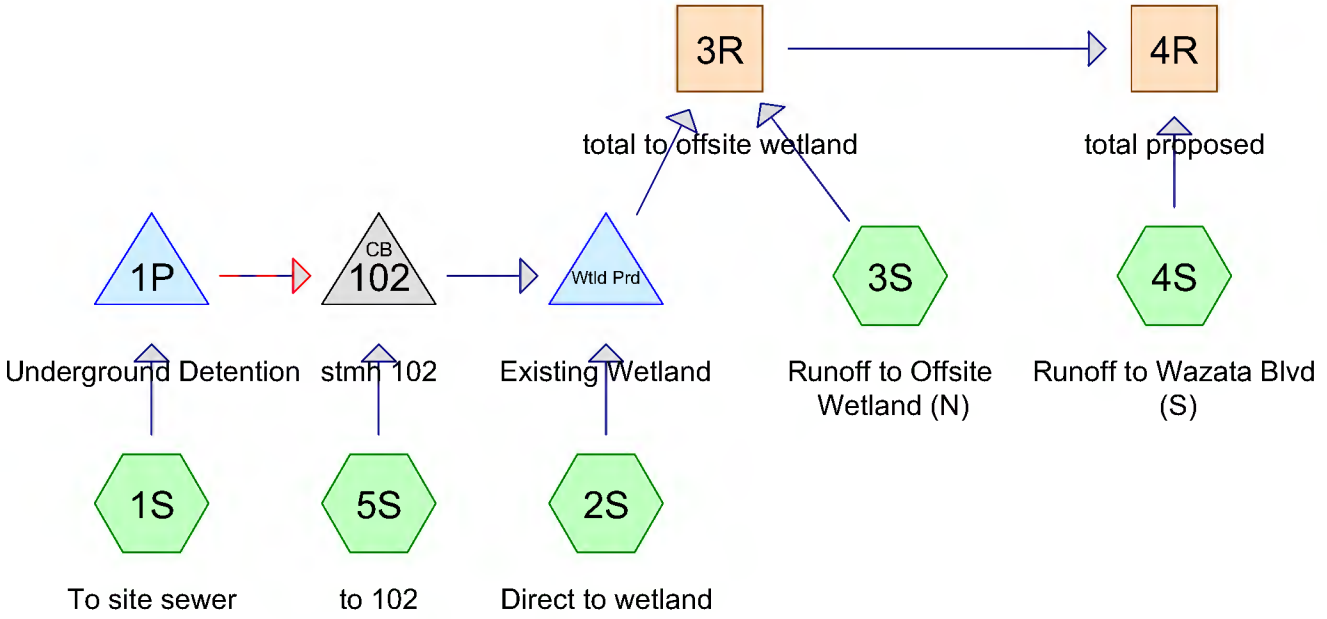
917.00	24,128	22,833
917.05	24,263	24,043
917.10	24,398	25,259
917.15	24,533	26,483
917.20	24,668	27,713
917.25	24,803	28,949
917.30	24,938	30,193
917.35	25,073	31,443
917.40	25,208	32,700
917.45	25,343	33,964
917.50	25,478	35,235
917.55	25,613	36,512
917.60	25,748	37,796
917.65	25,883	39,087
917.70	26,018	40,384
917.75	26,153	41,688
917.80	26,288	42,999
917.85	26,423	44,317
917.90	26,558	45,642
917.95	26,693	46,973
918.00	26,828	48,311
918.05	26,992	49,657
918.10	27,157	51,010
918.15	27,321	52,372
918.20	27,486	53,742
918.25	27,651	55,121
918.30	27,815	56,507
918.35	27,980	57,902
918.40	28,144	59,305
918.45	28,309	60,717
918.50	28,473	62,136
918.55	28,637	63,564
918.60	28,802	65,000
918.65	28,966	66,444
918.70	29,131	67,897
918.75	29,296	69,357
918.80	29,460	70,826
918.85	29,625	72,303
918.90	29,789	73,789
918.95	29,954	75,282
919.00	**30,118**	**76,784**

Proposed



Subcat Reach Pond Link

Routing Diagram for 20230222 hydrocad
Prepared by MFRA, Printed 2/22/2023

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 5327 MN Hennepin

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	MSE 24-hr	3	Default	24.00	1	2.48	2
2	2-Year	MSE 24-hr	3	Default	24.00	1	2.86	2
3	10-Year	MSE 24-hr	3	Default	24.00	1	4.26	2
4	100-Year	MSE 24-hr	3	Default	24.00	1	7.32	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.372	80	>75% Grass cover, Good, HSG D (1S, 2S, 4S, 5S)
1.980	98	Paved parking, HSG D (1S, 2S, 3S, 4S, 5S)
0.560	79	Woods/grass comb., Good, HSG D (3S)
3.913	**89**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.913	HSG D	1S, 2S, 3S, 4S, 5S
0.000	Other	
3.913		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	1.372	0.000	1.372	>75% Grass cover, Good	1S, 2S, 4S, 5S
0.000	0.000	0.000	1.980	0.000	1.980	Paved parking	1S, 2S, 3S, 4S, 5S
0.000	0.000	0.000	0.560	0.000	0.560	Woods/grass comb., Good	3S
0.000	**0.000**	**0.000**	**3.913**	**0.000**	**3.913**	**TOTAL AREA**	

Pipe Listing (selected 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	1P	920.70	920.17	108.0	0.0049	0.011	0.0	24.0	0.0
2	102	919.93	918.80	281.0	0.0040	0.011	0.0	24.0	0.0
3	Wtld Prd	916.35	916.22	18.0	0.0072	0.010	0.0	15.0	0.0
4	Wtld Prd	917.07	916.39	12.0	0.0567	0.010	0.0	15.0	0.0

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: To site sewer Runoff Area=79,886 sf 95.12% Impervious Runoff Depth=2.14"
Tc=7.0 min CN=97 Runoff=6.15 cfs 0.328 af

Subcatchment2S: Direct to wetland Runoff Area=47,288 sf 6.48% Impervious Runoff Depth=0.93"
Tc=7.0 min CN=81 Runoff=1.74 cfs 0.084 af

Subcatchment3S: Runoff to Offsite Runoff Area=25,698 sf 5.00% Impervious Runoff Depth=0.88"
Flow Length=260' Slope=0.0200 '/' Tc=17.8 min CN=80 Runoff=0.59 cfs 0.043 af

Subcatchment4S: Runoff to Wazata Blvd Runoff Area=10,922 sf 16.27% Impervious Runoff Depth=1.04"
Tc=7.0 min CN=83 Runoff=0.45 cfs 0.022 af

Subcatchment5S: to 102 Runoff Area=6,651 sf 62.29% Impervious Runoff Depth=1.59"
Tc=7.0 min CN=91 Runoff=0.41 cfs 0.020 af

Reach 3R: total to offsite wetland Inflow=0.59 cfs 0.043 af
Outflow=0.59 cfs 0.043 af

Reach 4R: total proposed Inflow=0.84 cfs 0.065 af
Outflow=0.84 cfs 0.065 af

Pond 1P: Underground Detention Peak Elev=926.39' Storage=7,086 cf Inflow=6.15 cfs 0.328 af
Outflow=0.48 cfs 0.328 af

Pond 102: stmh 102 Peak Elev=920.37' Inflow=0.89 cfs 0.348 af
24.0" Round Culvert n=0.011 L=281.0' S=0.0040 '/' Outflow=0.89 cfs 0.348 af

Pond Wtld Prd: Existing Wetland Peak Elev=916.83' Storage=18,813 cf Inflow=2.64 cfs 0.432 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.913 ac Runoff Volume = 0.497 af Average Runoff Depth = 1.52"
49.39% Pervious = 1.933 ac 50.61% Impervious = 1.980 ac

Summary for Subcatchment 1S: To site sewer

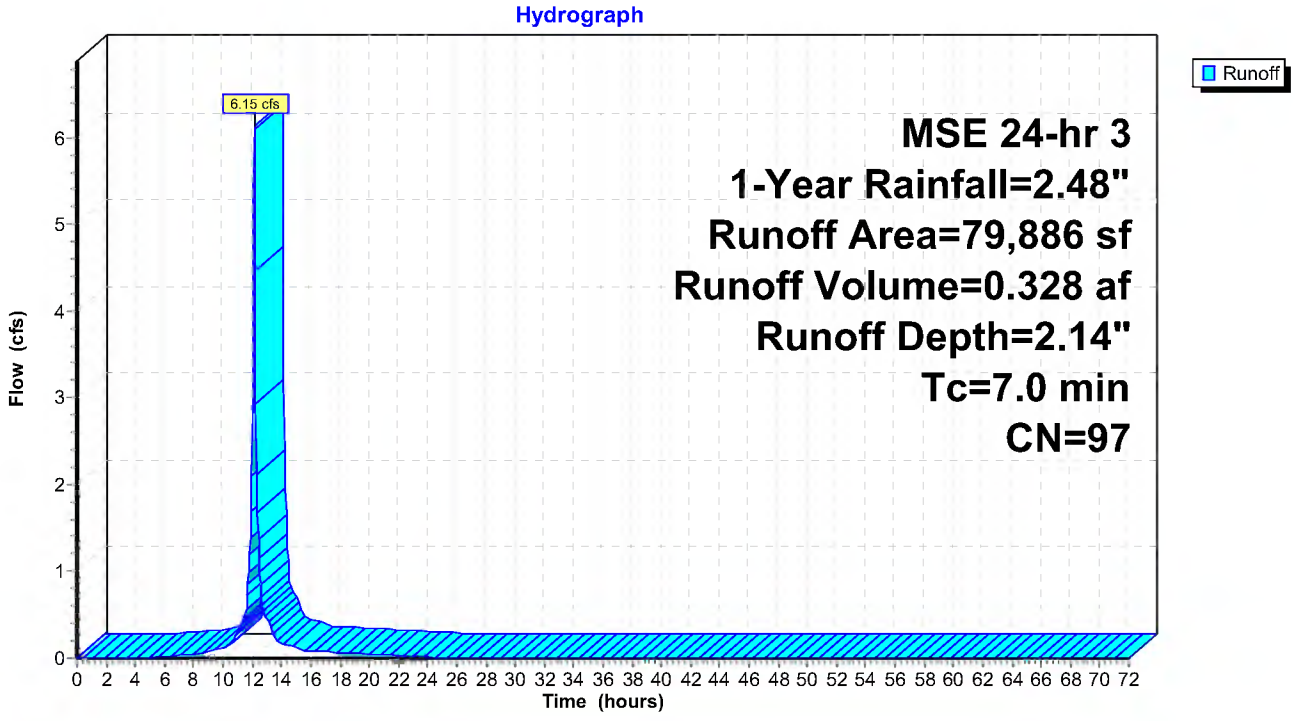
Runoff = 6.15 cfs @ 12.14 hrs, Volume= 0.328 af, Depth= 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
75,991	98	Paved parking, HSG D
3,895	80	>75% Grass cover, Good, HSG D
79,886	97	Weighted Average
3,895		4.88% Pervious Area
75,991		95.12% Impervious Area

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

Subcatchment 1S: To site sewer



Summary for Subcatchment 2S: Direct to wetland

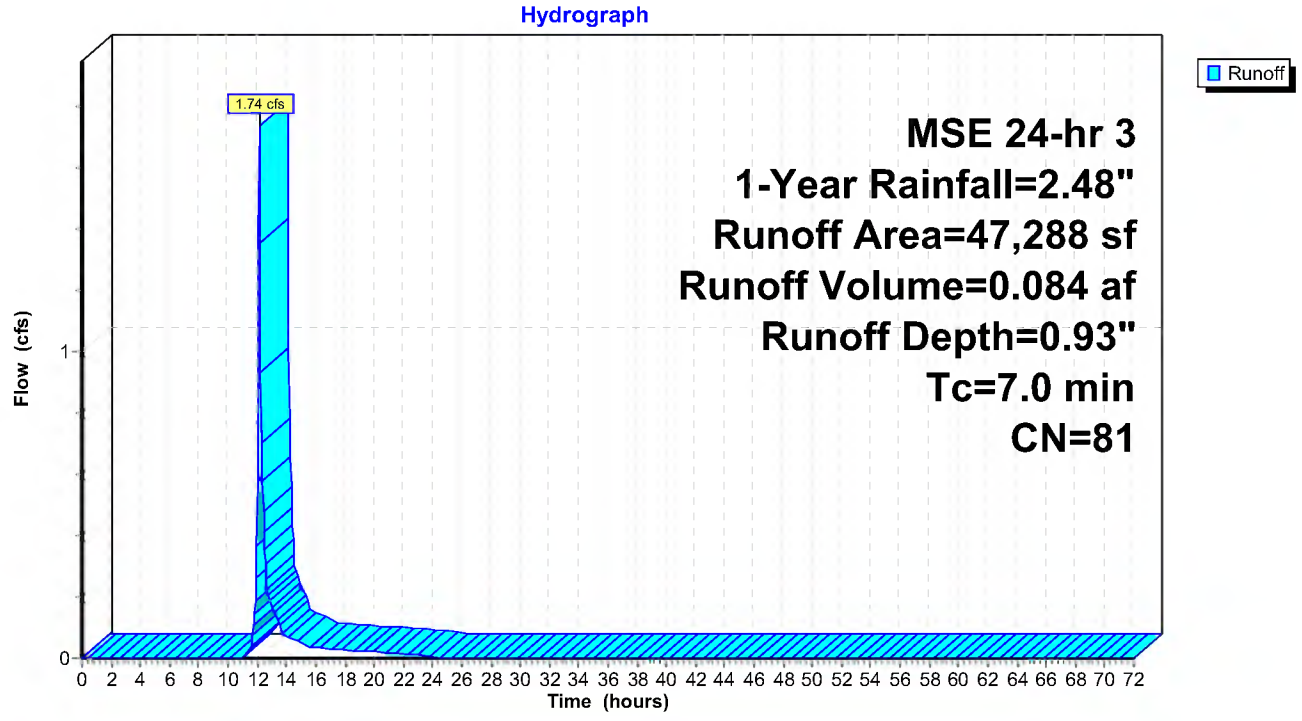
Runoff = 1.74 cfs @ 12.15 hrs, Volume= 0.084 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
3,064	98	Paved parking, HSG D
44,224	80	>75% Grass cover, Good, HSG D
47,288	81	Weighted Average
44,224		93.52% Pervious Area
3,064		6.48% Impervious Area

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

Subcatchment 2S: Direct to wetland



Summary for Subcatchment 3S: Runoff to Offsite Wetland (N)

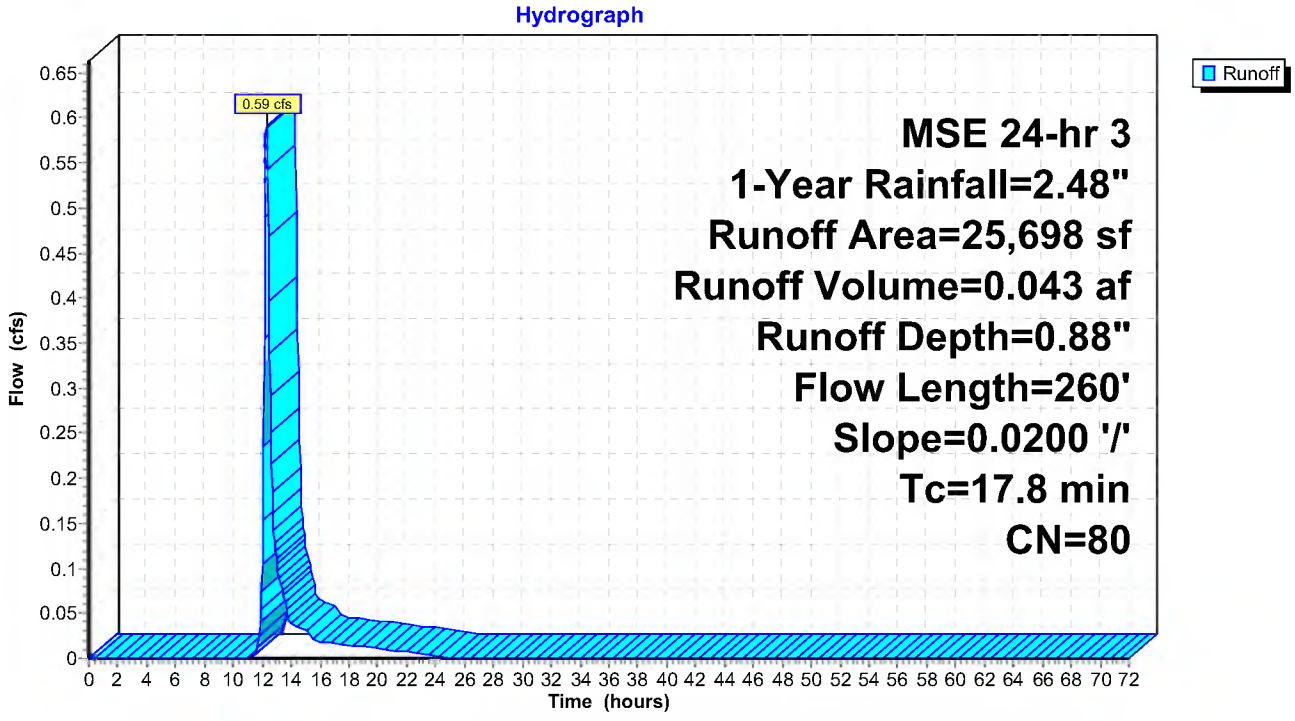
Runoff = 0.59 cfs @ 12.28 hrs, Volume= 0.043 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
1,286	98	Paved parking, HSG D
24,412	79	Woods/grass comb., Good, HSG D
25,698	80	Weighted Average
24,412		95.00% Pervious Area
1,286		5.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0200	0.11		**Sheet Flow, SWALE** Grass: Dense n= 0.240 P2= 2.86"
2.7	160	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.8	260	Total			

Subcatchment 3S: Runoff to Offsite Wetland (N)



Summary for Subcatchment 4S: Runoff to Wazata Blvd (S)

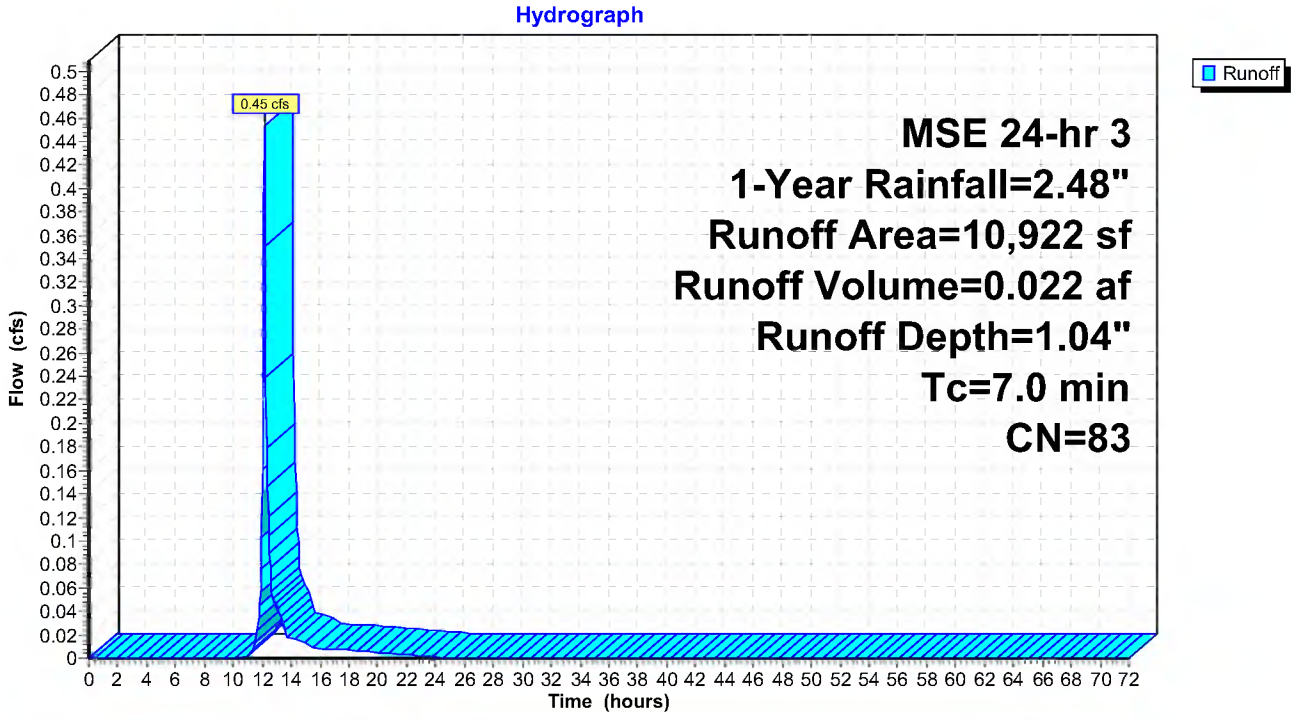
Runoff = 0.45 cfs @ 12.15 hrs, Volume= 0.022 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
1,777	98	Paved parking, HSG D
9,145	80	>75% Grass cover, Good, HSG D
10,922	83	Weighted Average
9,145		83.73% Pervious Area
1,777		16.27% Impervious Area

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

Subcatchment 4S: Runoff to Wazata Blvd (S)



Summary for Subcatchment 5S: to 102

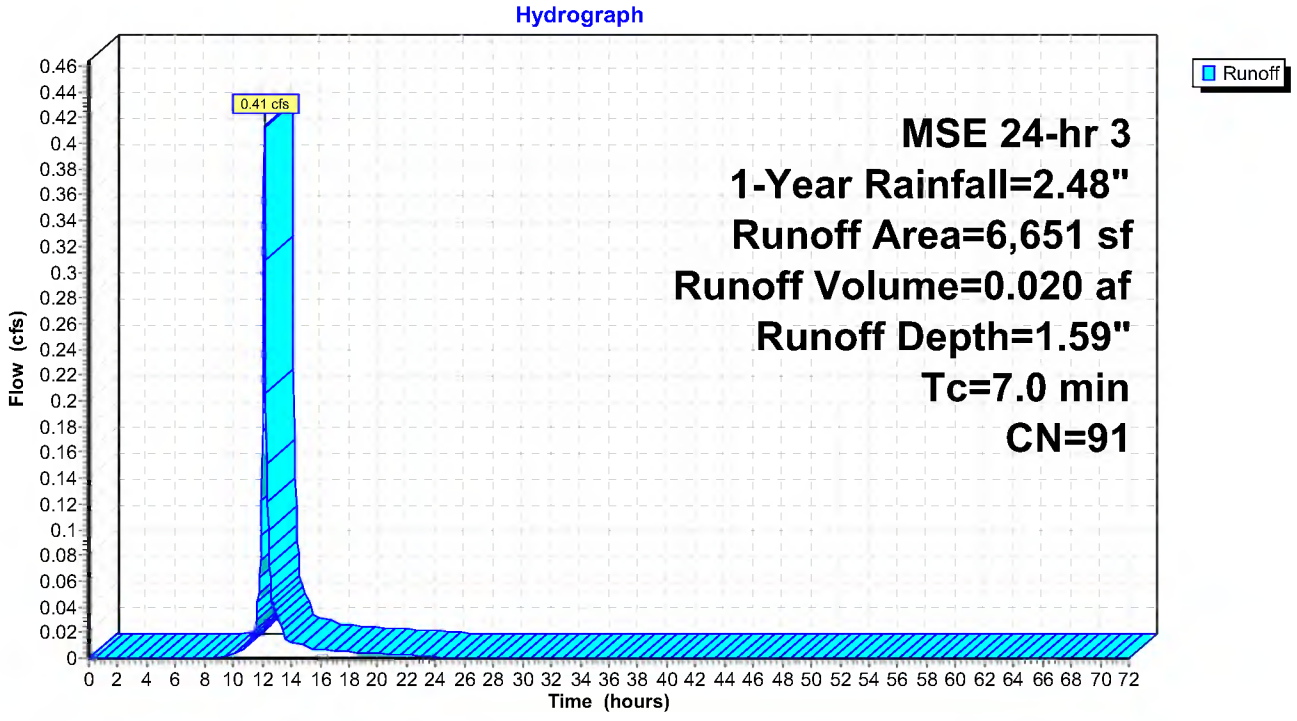
Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.020 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
4,143	98	Paved parking, HSG D
2,508	80	>75% Grass cover, Good, HSG D
6,651	91	Weighted Average
2,508		37.71% Pervious Area
4,143		62.29% Impervious Area

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

Subcatchment 5S: to 102



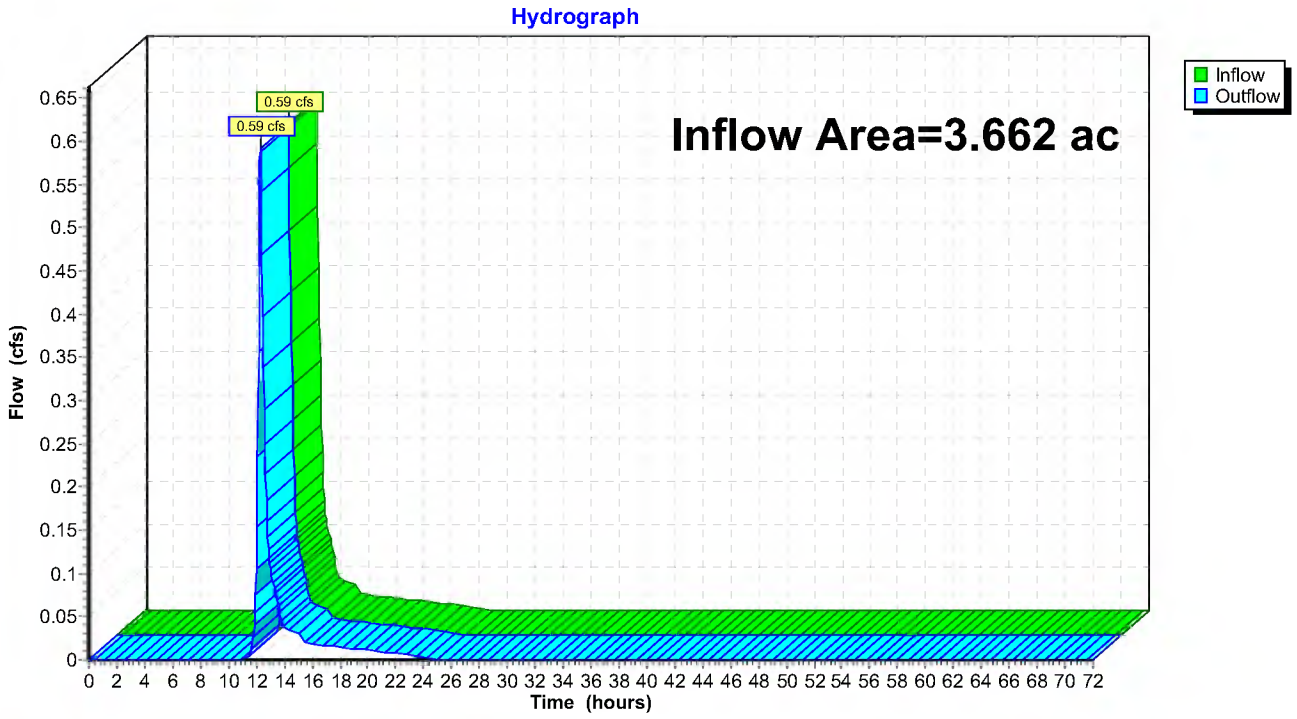
Summary for Reach 3R: total to offsite wetland

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

Inflow Area = 3.662 ac, 52.96% Impervious, Inflow Depth = 0.14" for 1-Year event
Inflow = 0.59 cfs @ 12.28 hrs, Volume= 0.043 af
Outflow = 0.59 cfs @ 12.28 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

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

Reach 3R: total to offsite wetland



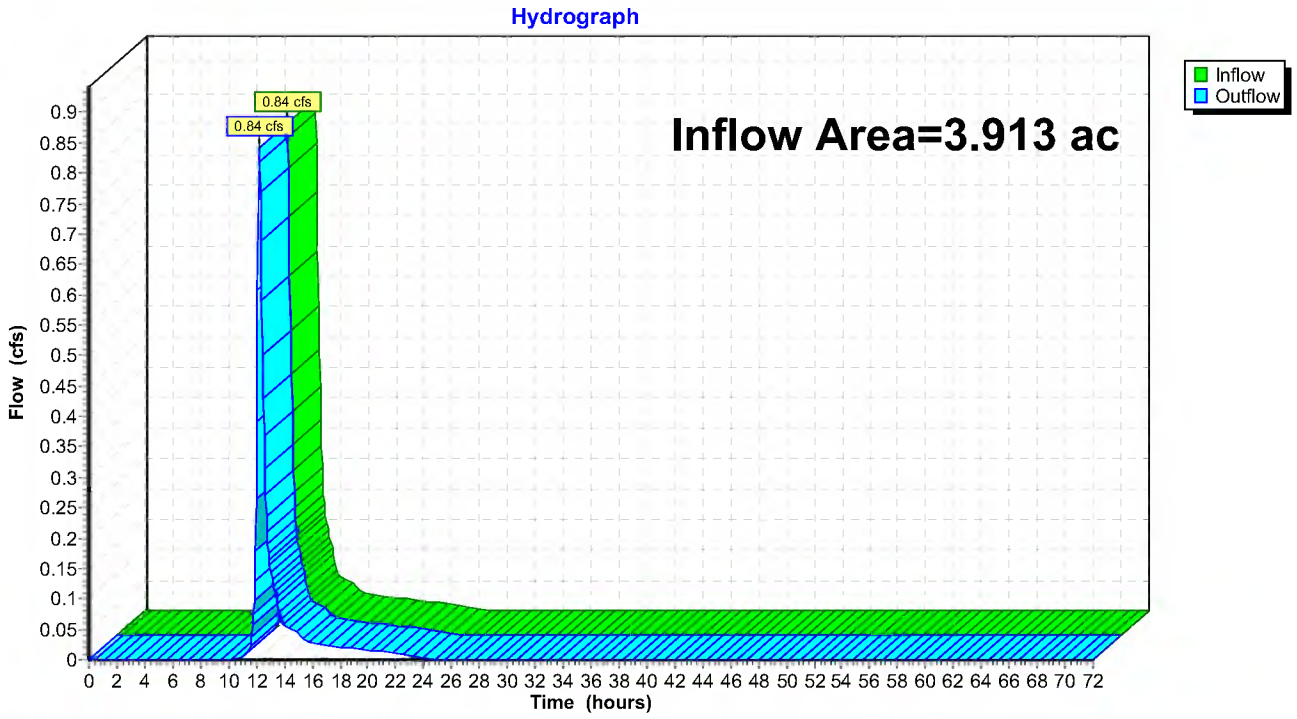
Summary for Reach 4R: total proposed

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

Inflow Area = 3.913 ac, 50.61% Impervious, Inflow Depth = 0.20" for 1-Year event
Inflow = 0.84 cfs @ 12.20 hrs, Volume= 0.065 af
Outflow = 0.84 cfs @ 12.20 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min

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

Reach 4R: total proposed



Summary for Pond 1P: Underground Detention

Inflow Area = 1.834 ac, 95.12% Impervious, Inflow Depth = 2.14" for 1-Year event
Inflow = 6.15 cfs @ 12.14 hrs, Volume= 0.328 af
Outflow = 0.48 cfs @ 12.05 hrs, Volume= 0.328 af, Atten= 92%, Lag= 0.0 min
Primary = 0.48 cfs @ 12.05 hrs, Volume= 0.328 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 926.39' @ 12.91 hrs Surf.Area= 3,774 sf Storage= 7,086 cf
Flood Elev= 926.76' Surf.Area= 3,774 sf Storage= 7,920 cf

Plug-Flow detention time= 128.2 min calculated for 0.327 af (100% of inflow)
Center-of-Mass det. time= 128.2 min (893.6 - 765.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	922.50'	0 cf	**37.00'W x 102.00'L x 6.00'H Field A** 22,644 cf Overall - 9,817 cf Embedded = 12,827 cf x 0.0% Voids
#2A	923.00'	9,817 cf	**CMP Round 60** x 25 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 25 Chambers in 5 Rows
#3	928.00'	137 cf	**riser storage (Prismatic)**Listed below (Recalc)
		9,954 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
928.00	65	0	0
930.10	65	137	137

Device	Routing	Invert	Outlet Devices
#1	Primary	920.70'	**24.0" Round device outlet** L= 108.0' Ke= 0.900 Inlet / Outlet Invert= 920.70' / 920.17' S= 0.0049 '/' Cc= 0.900 n= 0.011, Flow Area= 3.14 sf
#2	Device 1	923.00'	**0.480 cfs 18" phospho, 14 cartridge**
#3	Device 2	923.00'	**4.0" Vert. device inlet** C= 0.600 Limited to weir flow at low heads
#4	Device 1	926.76'	**4.0' long device bypass weir** 2 End Contraction(s)

Primary OutFlow Max=0.48 cfs @ 12.05 hrs HW=924.58' TW=920.32' (Dynamic Tailwater)
↑—**1=device outlet** (Passes 0.48 cfs of 20.26 cfs potential flow)
↑—**2=18" phospho, 14 cartridge** (Constant Controls 0.48 cfs)
↑—**3=device inlet** (Passes 0.48 cfs of 0.50 cfs potential flow)
—**4=device bypass weir** (Controls 0.00 cfs)

Pond 1P: Underground Detention - Chamber Wizard Field A

Chamber Model = CMP Round 60 (Round Corrugated Metal Pipe)
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

60.0" Wide + 30.0" Spacing = 90.0" C-C Row Spacing

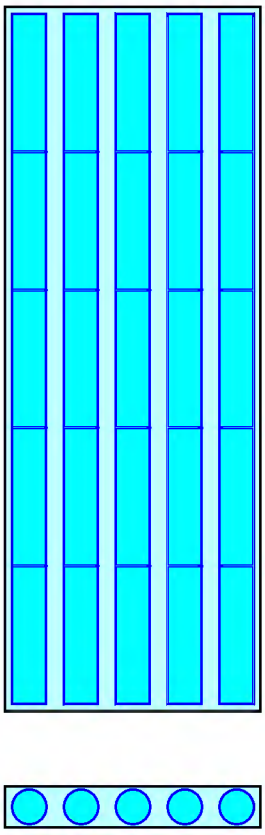
5 Chambers/Row x 20.00' Long = 100.00' Row Length +12.0" End Stone x 2 = 102.00' Base Length
5 Rows x 60.0" Wide + 30.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.00' Base Width
6.0" Stone Base + 60.0" Chamber Height + 6.0" Stone Cover = 6.00' Field Height

25 Chambers x 392.7 cf = 9,817.5 cf Chamber Storage

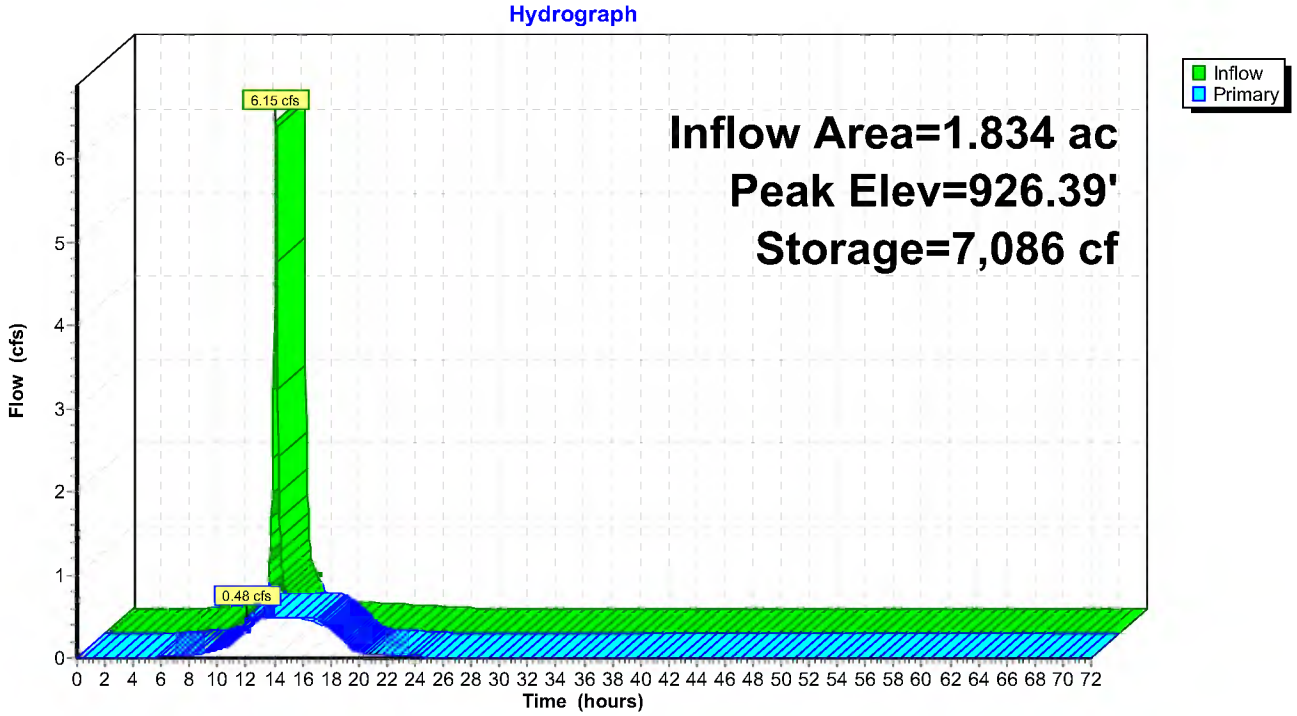
22,644.0 cf Field - 9,817.5 cf Chambers = 12,826.5 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 9,817.5 cf = 0.225 af
Overall Storage Efficiency = 43.4%
Overall System Size = 102.00' x 37.00' x 6.00'

25 Chambers
838.7 cy Field
475.1 cy Stone



Pond 1P: Underground Detention



Stage-Area-Storage for Pond 1P: Underground Detention

Elevation (feet)	Storage (cubic-feet)
922.50	0
922.60	0
922.70	0
922.80	0
922.90	0
923.00	0
923.10	47
923.20	132
923.30	240
923.40	368
923.50	511
923.60	667
923.70	835
923.80	1,014
923.90	1,202
924.00	1,398
924.10	1,601
924.20	1,812
924.30	2,028
924.40	2,250
924.50	2,477
924.60	2,708
924.70	2,943
924.80	3,182
924.90	3,423
925.00	3,667
925.10	3,913
925.20	4,161
925.30	4,409
925.40	4,659
925.50	4,909
925.60	5,159
925.70	5,408
925.80	5,657
925.90	5,904
926.00	6,150
926.10	6,394
926.20	6,636
926.30	6,874
926.40	7,109
926.50	7,340
926.60	7,567
926.70	7,789
926.80	8,006
926.90	8,216
927.00	8,420
927.10	8,616
927.20	8,804
927.30	8,982
927.40	9,150
927.50	9,307
927.60	9,450
927.70	9,577
927.80	9,686
927.90	9,770
928.00	9,817
928.10	9,824
928.20	9,830
928.30	9,837
928.40	9,843
928.50	9,850
928.60	9,856
928.70	9,863
928.80	9,869
928.90	9,876
929.00	9,882
929.10	9,889
929.20	9,895
929.30	9,902
929.40	9,908
929.50	9,915
929.60	9,921
929.70	9,928
929.80	9,934
929.90	9,941
930.00	9,947
930.10	**9,954**

Summary for Pond 102: stmh 102

[57] Hint: Peaked at 920.37' (Flood elevation advised)

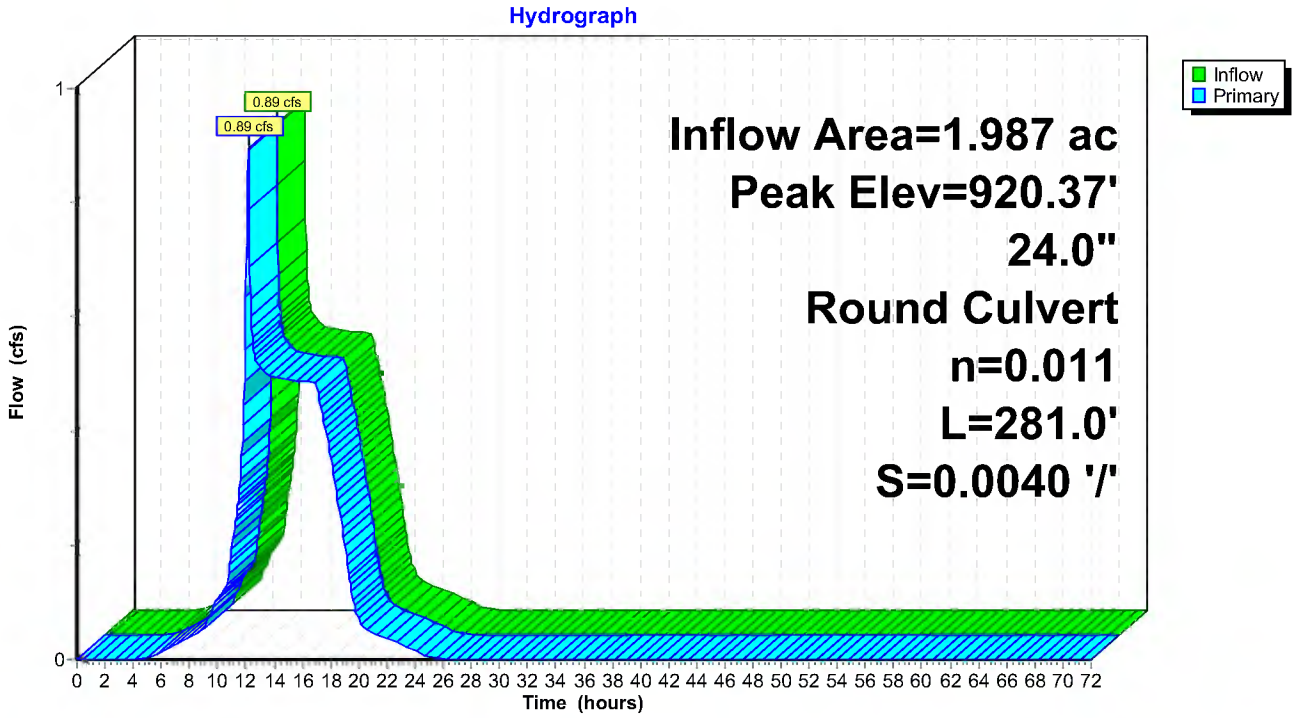
Inflow Area = 1.987 ac, 92.60% Impervious, Inflow Depth = 2.10" for 1-Year event
Inflow = 0.89 cfs @ 12.14 hrs, Volume= 0.348 af
Outflow = 0.89 cfs @ 12.14 hrs, Volume= 0.348 af, Atten= 0%, Lag= 0.0 min
Primary = 0.89 cfs @ 12.14 hrs, Volume= 0.348 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 920.37' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	919.93'	**24.0" Round Culvert** L= 281.0' Ke= 0.900 Inlet / Outlet Invert= 919.93' / 918.80' S= 0.0040 '/' Cc= 0.900 n= 0.011, Flow Area= 3.14 sf

Primary OutFlow Max=0.88 cfs @ 12.14 hrs HW=920.36' TW=916.17' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.88 cfs @ 1.77 fps)

Pond 102: stmh 102



Stage-Area-Storage for Pond 102: stmh 102

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
919.93	**0.000**	920.95	0.000
919.95	0.000	920.97	0.000
919.97	0.000	920.99	0.000
919.99	0.000	921.01	0.000
920.01	0.000	921.03	0.000
920.03	0.000	921.05	0.000
920.05	0.000	921.07	0.000
920.07	0.000	921.09	0.000
920.09	0.000	921.11	0.000
920.11	0.000	921.13	0.000
920.13	0.000	921.15	0.000
920.15	0.000	921.17	0.000
920.17	0.000	921.19	0.000
920.19	0.000	921.21	0.000
920.21	0.000	921.23	0.000
920.23	0.000	921.25	0.000
920.25	0.000	921.27	0.000
920.27	0.000	921.29	0.000
920.29	0.000	921.31	0.000
920.31	0.000	921.33	0.000
920.33	0.000	921.35	0.000
920.35	0.000	921.37	0.000
920.37	0.000	921.39	0.000
920.39	0.000	921.41	0.000
920.41	0.000	921.43	0.000
920.43	0.000	921.45	0.000
920.45	0.000	921.47	0.000
920.47	0.000	921.49	0.000
920.49	0.000	921.51	0.000
920.51	0.000	921.53	0.000
920.53	0.000	921.55	0.000
920.55	0.000	921.57	0.000
920.57	0.000	921.59	0.000
920.59	0.000	921.61	0.000
920.61	0.000	921.63	0.000
920.63	0.000	921.65	0.000
920.65	0.000	921.67	0.000
920.67	0.000	921.69	0.000
920.69	0.000	921.71	0.000
920.71	0.000	921.73	0.000
920.73	0.000	921.75	0.000
920.75	0.000	921.77	0.000
920.77	0.000	921.79	0.000
920.79	0.000	921.81	0.000
920.81	0.000	921.83	0.000
920.83	0.000	921.85	0.000
920.85	0.000	921.87	0.000
920.87	0.000	921.89	0.000
920.89	0.000	921.91	0.000
920.91	0.000	921.93	0.000
920.93	0.000		

Summary for Pond Wtld Prd: Existing Wetland

Inflow Area = 3.072 ac, 62.17% Impervious, Inflow Depth = 1.69" for 1-Year event
Inflow = 2.64 cfs @ 12.15 hrs, Volume= 0.432 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 916.83' @ 37.35 hrs Surf.Area= 23,693 sf Storage= 18,813 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

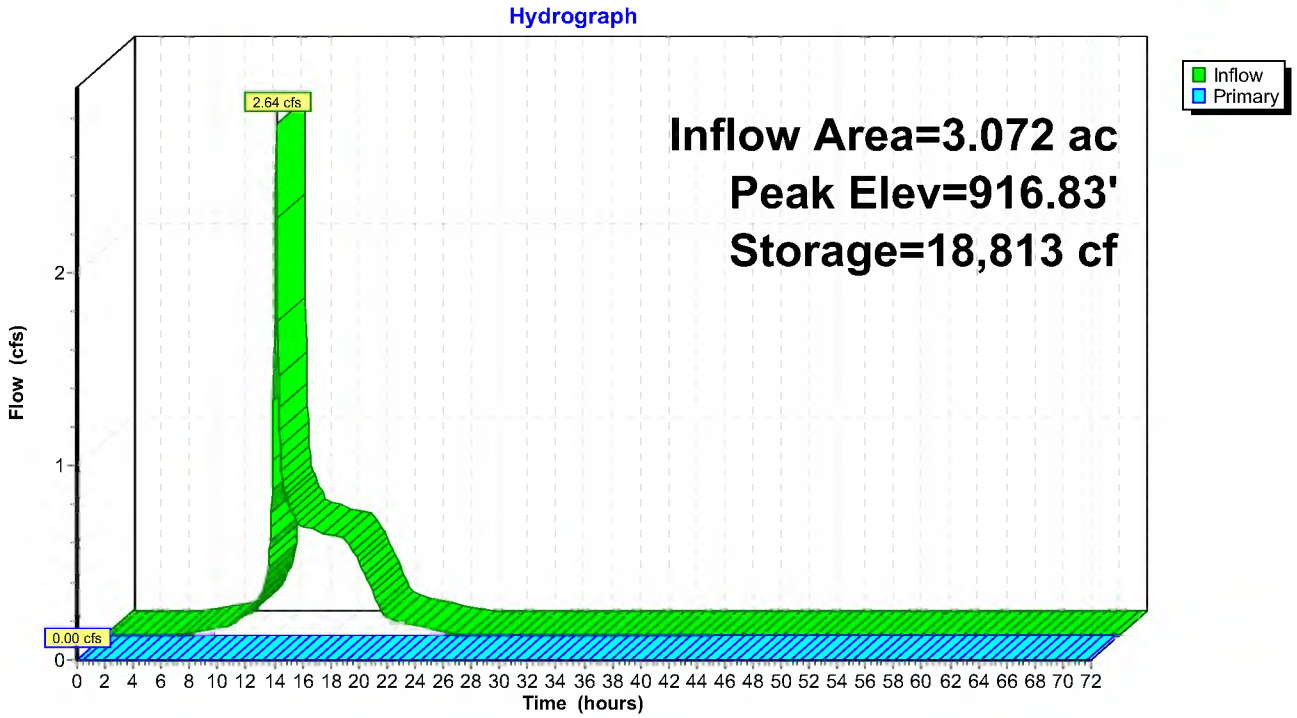
Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	76,784 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.00	21,538	0	0
917.00	24,128	22,833	22,833
918.00	26,828	25,478	48,311
919.00	30,118	28,473	76,784

Device	Routing	Invert	Outlet Devices
#1	Primary	916.35'	**15.0" Round ocs outlet** L= 18.0' Ke= 0.900 Inlet / Outlet Invert= 916.35' / 916.22' S= 0.0072 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#2	Device 1	918.08'	**4.0' long ocs weir wall** 2 End Contraction(s)
#3	Device 2	917.07'	**15.0" Round ocs inlet** L= 12.0' Ke= 0.900 Inlet / Outlet Invert= 917.07' / 916.39' S= 0.0567 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=916.00' TW=0.00' (Dynamic Tailwater)
↑**1=ocs outlet** (Controls 0.00 cfs)
↑**2=ocs weir wall** (Controls 0.00 cfs)
↑**3=ocs inlet** (Controls 0.00 cfs)

Pond Wtld Prd: Existing Wetland



Stage-Area-Storage for Pond Wtld Prd: Existing Wetland

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
916.00	21,538	0
916.05	21,667	1,080
916.10	21,797	2,167
916.15	21,926	3,260
916.20	22,056	4,359
916.25	22,186	5,465
916.30	22,315	6,578
916.35	22,445	7,697
916.40	22,574	8,822
916.45	22,704	9,954
916.50	22,833	11,093
916.55	22,962	12,238
916.60	23,092	13,389
916.65	23,221	14,547
916.70	23,351	15,711
916.75	23,481	16,882
916.80	23,610	18,059
916.85	23,740	19,243
916.90	23,869	20,433
916.95	23,999	21,630
917.00	24,128	22,833
917.05	24,263	24,043
917.10	24,398	25,259
917.15	24,533	26,483
917.20	24,668	27,713
917.25	24,803	28,949
917.30	24,938	30,193
917.35	25,073	31,443
917.40	25,208	32,700
917.45	25,343	33,964
917.50	25,478	35,235
917.55	25,613	36,512
917.60	25,748	37,796
917.65	25,883	39,087
917.70	26,018	40,384
917.75	26,153	41,688
917.80	26,288	42,999
917.85	26,423	44,317
917.90	26,558	45,642
917.95	26,693	46,973
918.00	26,828	48,311
918.05	26,992	49,657
918.10	27,157	51,010
918.15	27,321	52,372
918.20	27,486	53,742
918.25	27,651	55,121
918.30	27,815	56,507
918.35	27,980	57,902
918.40	28,144	59,305
918.45	28,309	60,717
918.50	28,473	62,136
918.55	28,637	63,564
918.60	28,802	65,000
918.65	28,966	66,444
918.70	29,131	67,897
918.75	29,296	69,357
918.80	29,460	70,826
918.85	29,625	72,303
918.90	29,789	73,789
918.95	29,954	75,282
919.00	**30,118**	**76,784**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: To site sewer Runoff Area=79,886 sf 95.12% Impervious Runoff Depth=2.52"
Tc=7.0 min CN=97 Runoff=7.15 cfs 0.385 af

Subcatchment2S: Direct to wetland Runoff Area=47,288 sf 6.48% Impervious Runoff Depth=1.21"
Tc=7.0 min CN=81 Runoff=2.28 cfs 0.109 af

Subcatchment3S: Runoff to Offsite Runoff Area=25,698 sf 5.00% Impervious Runoff Depth=1.15"
Flow Length=260' Slope=0.0200 '/' Tc=17.8 min CN=80 Runoff=0.79 cfs 0.056 af

Subcatchment4S: Runoff to Wazata Blvd Runoff Area=10,922 sf 16.27% Impervious Runoff Depth=1.33"
Tc=7.0 min CN=83 Runoff=0.58 cfs 0.028 af

Subcatchment5S: to 102 Runoff Area=6,651 sf 62.29% Impervious Runoff Depth=1.94"
Tc=7.0 min CN=91 Runoff=0.50 cfs 0.025 af

Reach 3R: total to offsite wetland Inflow=0.79 cfs 0.056 af
Outflow=0.79 cfs 0.056 af

Reach 4R: total proposed Inflow=1.11 cfs 0.084 af
Outflow=1.11 cfs 0.084 af

Pond 1P: Underground Detention Peak Elev=926.88' Storage=8,173 cf Inflow=7.15 cfs 0.385 af
Outflow=1.02 cfs 0.385 af

Pond 102: stmh 102 Peak Elev=920.41' Inflow=1.09 cfs 0.410 af
24.0" Round Culvert n=0.011 L=281.0' S=0.0040 '/' Outflow=1.09 cfs 0.410 af

Pond Wtld Prd: Existing Wetland Peak Elev=916.99' Storage=22,605 cf Inflow=3.26 cfs 0.519 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.913 ac Runoff Volume = 0.603 af Average Runoff Depth = 1.85"
49.39% Pervious = 1.933 ac 50.61% Impervious = 1.980 ac

Summary for Subcatchment 1S: To site sewer

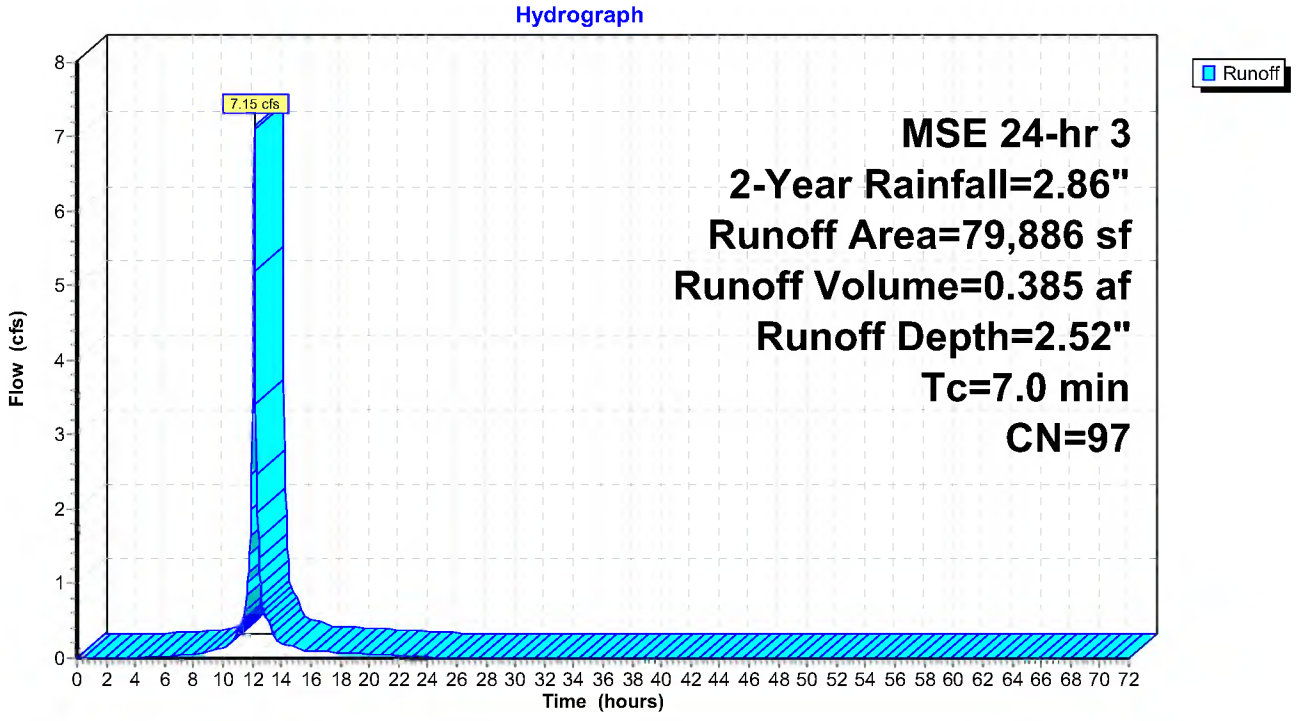
Runoff = 7.15 cfs @ 12.14 hrs, Volume= 0.385 af, Depth= 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
75,991	98	Paved parking, HSG D
3,895	80	>75% Grass cover, Good, HSG D
79,886	97	Weighted Average
3,895		4.88% Pervious Area
75,991		95.12% Impervious Area

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

Subcatchment 1S: To site sewer



Summary for Subcatchment 2S: Direct to wetland

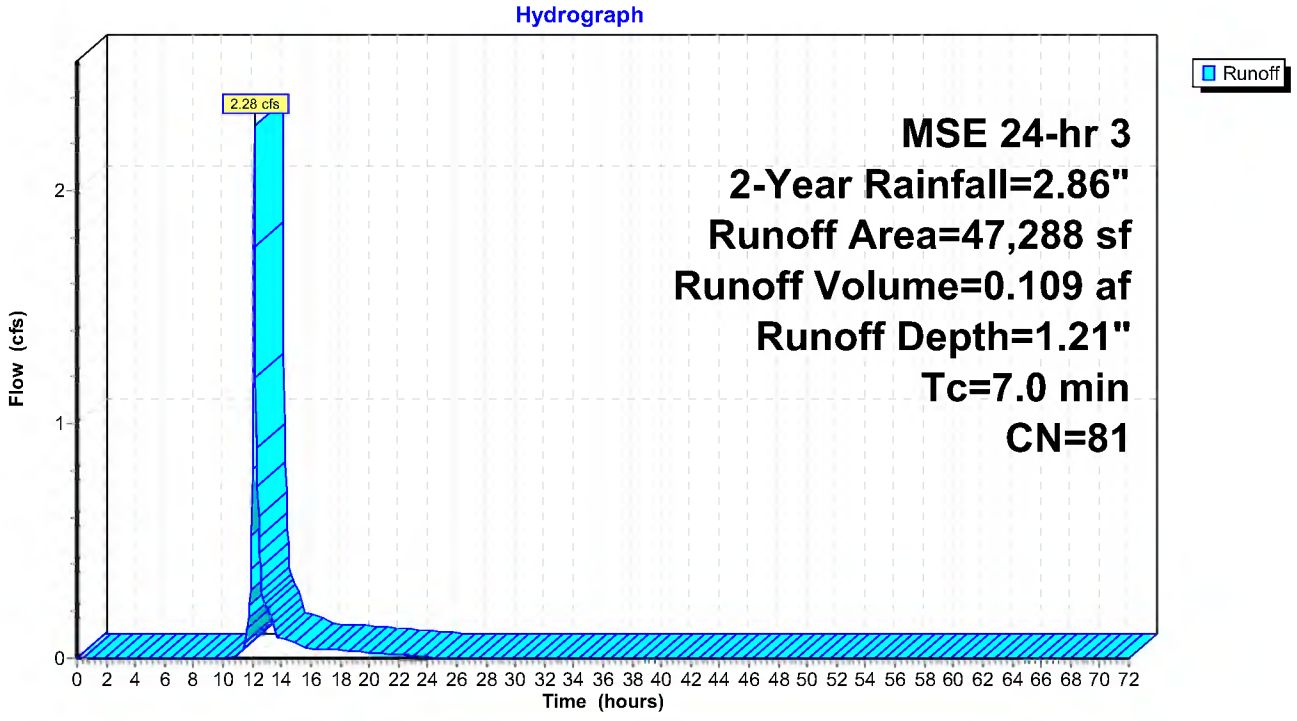
Runoff = 2.28 cfs @ 12.15 hrs, Volume= 0.109 af, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
3,064	98	Paved parking, HSG D
44,224	80	>75% Grass cover, Good, HSG D
47,288	81	Weighted Average
44,224		93.52% Pervious Area
3,064		6.48% Impervious Area

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

Subcatchment 2S: Direct to wetland



Summary for Subcatchment 3S: Runoff to Offsite Wetland (N)

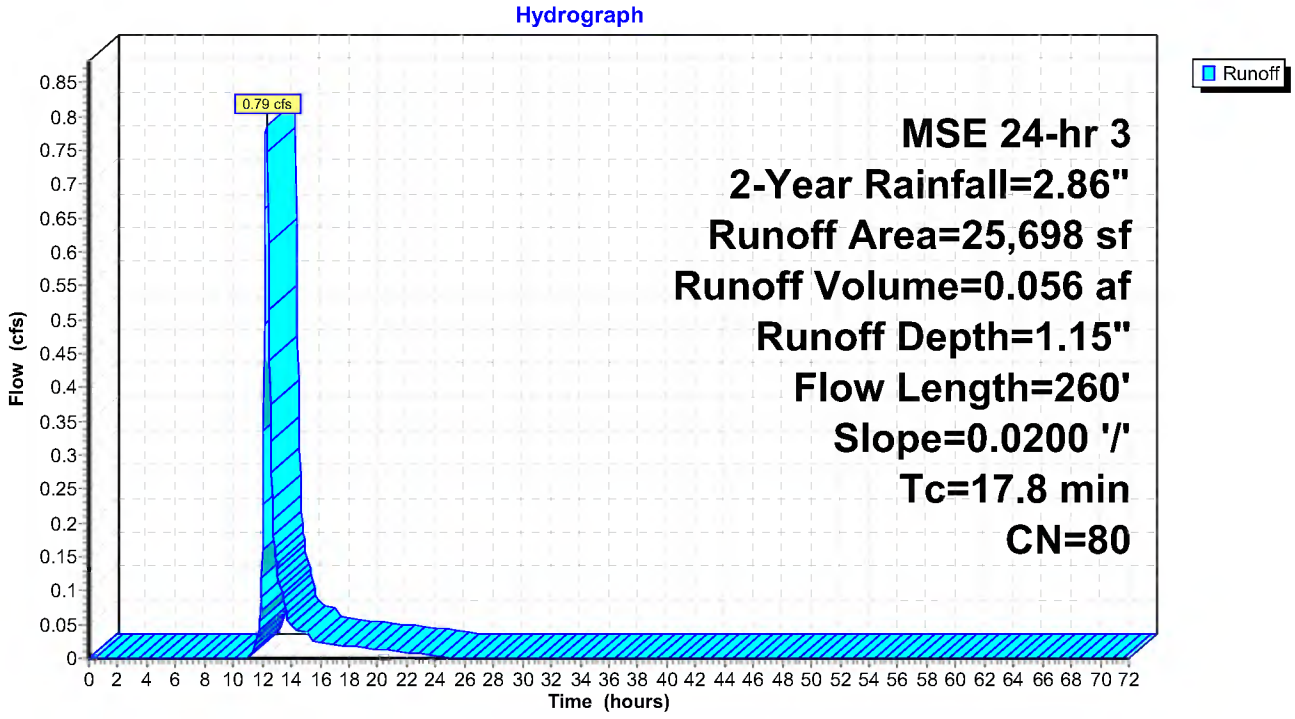
Runoff = 0.79 cfs @ 12.28 hrs, Volume= 0.056 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
1,286	98	Paved parking, HSG D
24,412	79	Woods/grass comb., Good, HSG D
25,698	80	Weighted Average
24,412		95.00% Pervious Area
1,286		5.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0200	0.11		**Sheet Flow, SWALE** Grass: Dense n= 0.240 P2= 2.86"
2.7	160	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.8	260	Total			

Subcatchment 3S: Runoff to Offsite Wetland (N)



Summary for Subcatchment 4S: Runoff to Wazata Blvd (S)

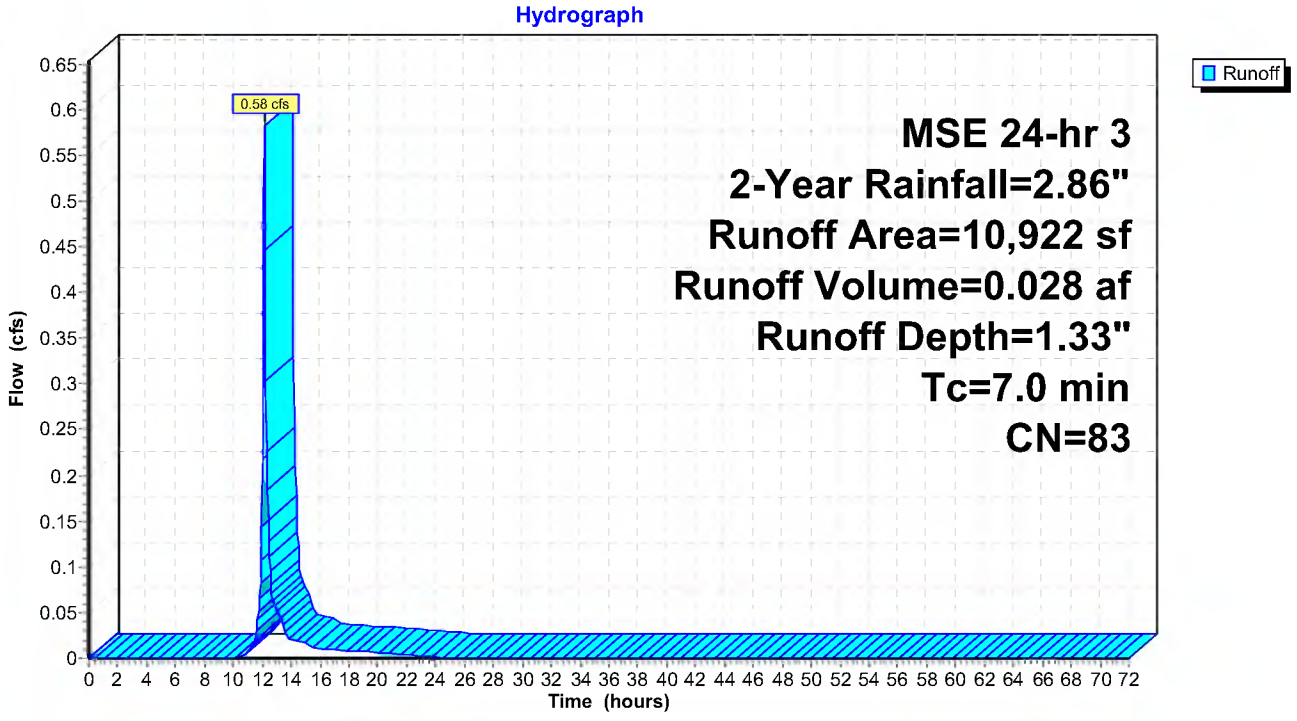
Runoff = 0.58 cfs @ 12.15 hrs, Volume= 0.028 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
1,777	98	Paved parking, HSG D
9,145	80	>75% Grass cover, Good, HSG D
10,922	83	Weighted Average
9,145		83.73% Pervious Area
1,777		16.27% Impervious Area

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

Subcatchment 4S: Runoff to Wazata Blvd (S)



Summary for Subcatchment 5S: to 102

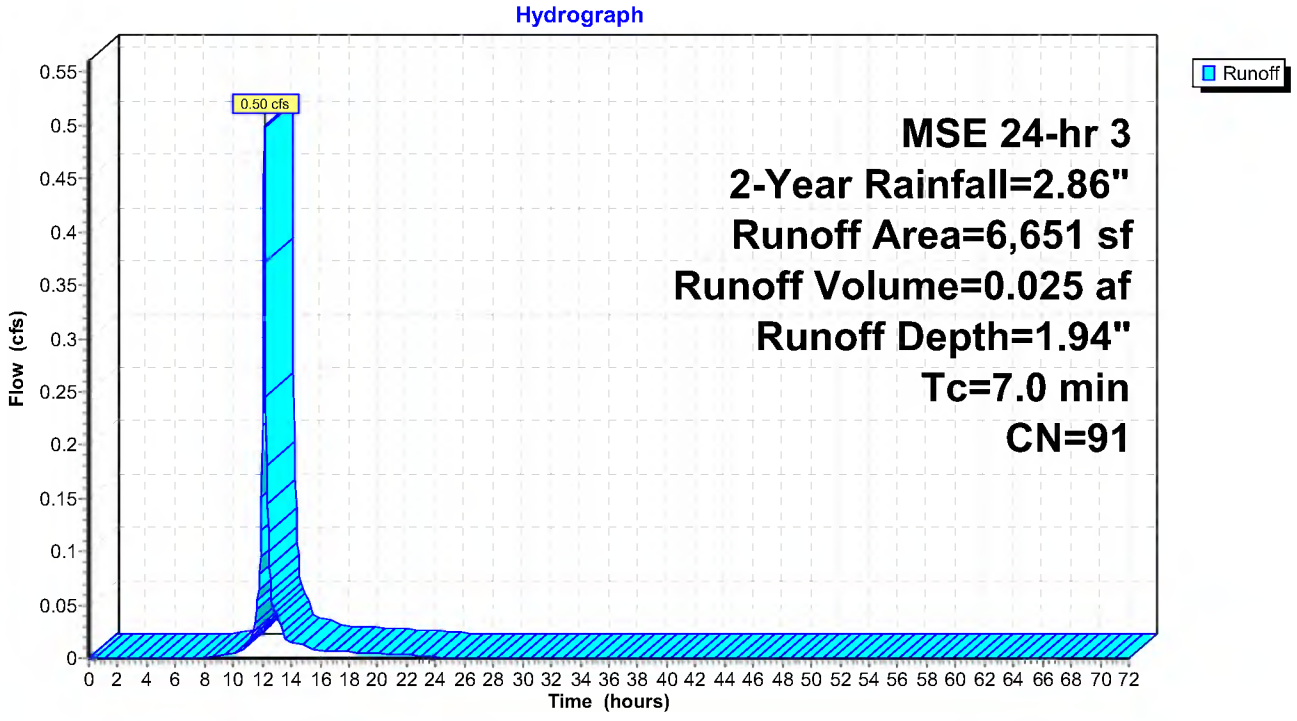
Runoff = 0.50 cfs @ 12.14 hrs, Volume= 0.025 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
4,143	98	Paved parking, HSG D
2,508	80	>75% Grass cover, Good, HSG D
6,651	91	Weighted Average
2,508		37.71% Pervious Area
4,143		62.29% Impervious Area

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

Subcatchment 5S: to 102



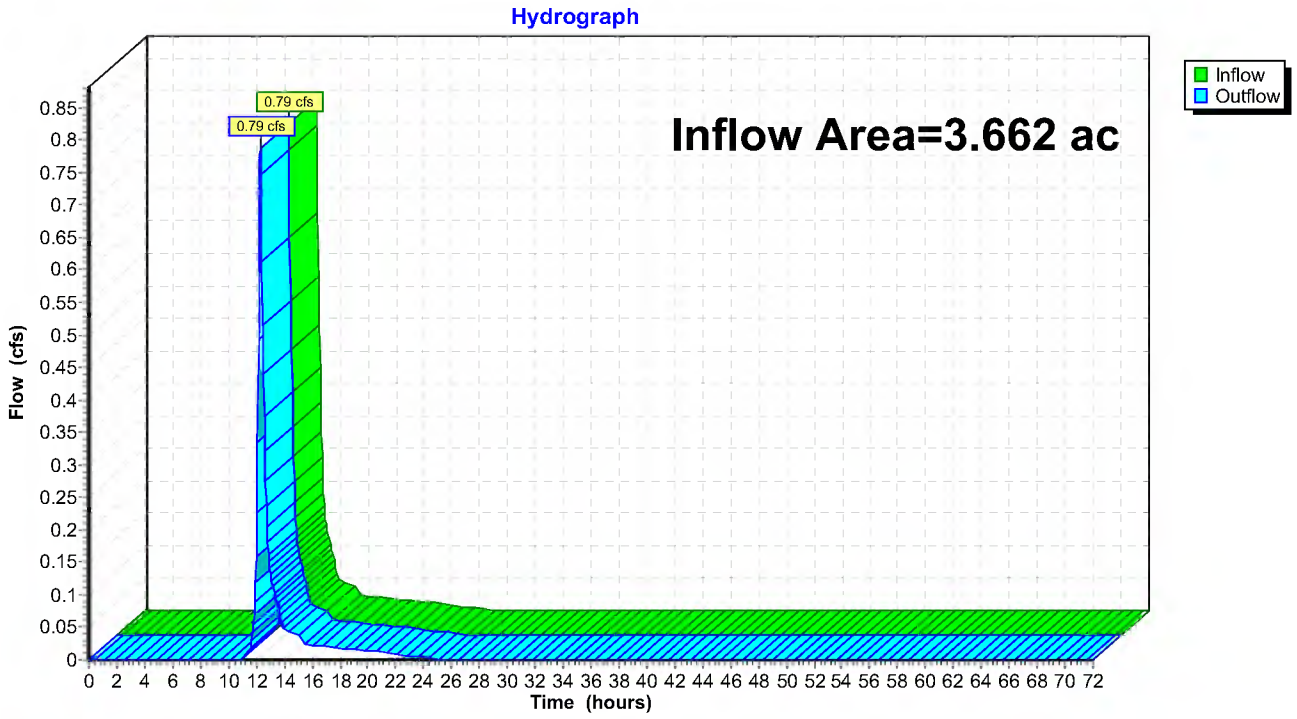
Summary for Reach 3R: total to offsite wetland

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

Inflow Area = 3.662 ac, 52.96% Impervious, Inflow Depth = 0.18" for 2-Year event
Inflow = 0.79 cfs @ 12.28 hrs, Volume= 0.056 af
Outflow = 0.79 cfs @ 12.28 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min

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

Reach 3R: total to offsite wetland



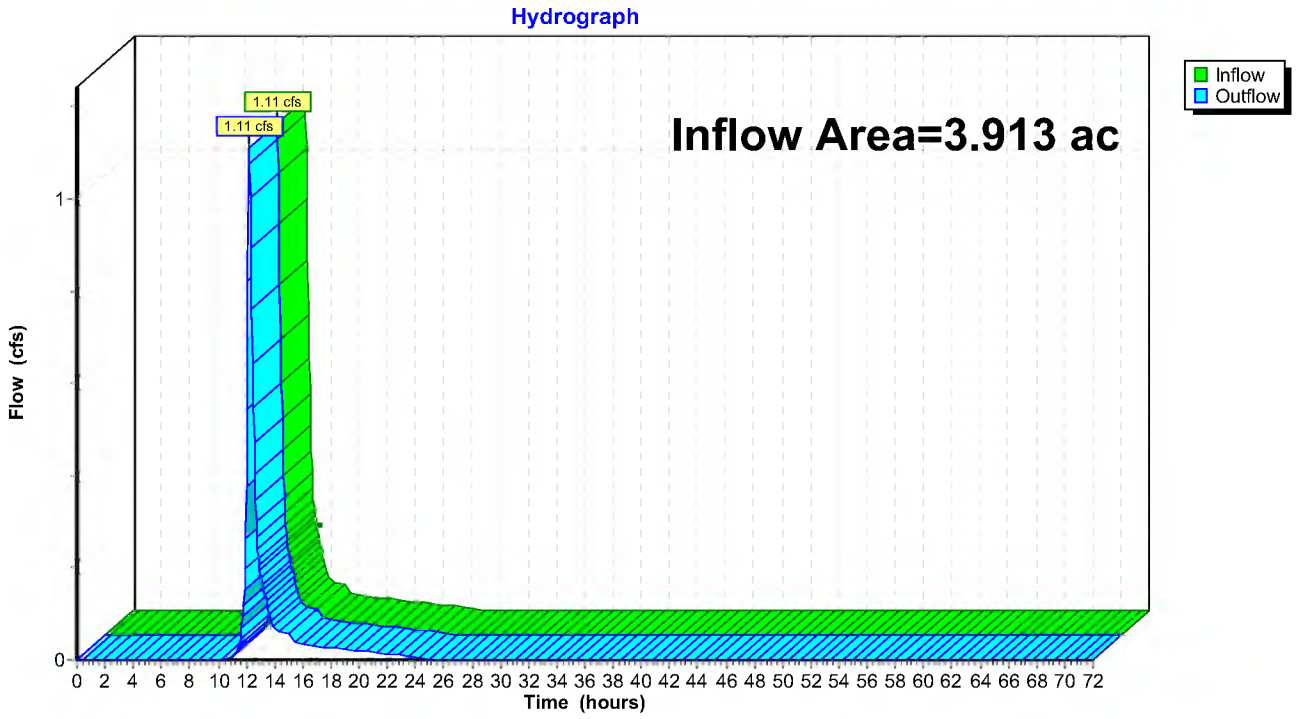
Summary for Reach 4R: total proposed

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

Inflow Area = 3.913 ac, 50.61% Impervious, Inflow Depth = 0.26" for 2-Year event
Inflow = 1.11 cfs @ 12.20 hrs, Volume= 0.084 af
Outflow = 1.11 cfs @ 12.20 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.0 min

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

Reach 4R: total proposed



Summary for Pond 1P: Underground Detention

[58] Hint: Peaked 0.12' above defined flood level

Inflow Area = 1.834 ac, 95.12% Impervious, Inflow Depth = 2.52" for 2-Year event
Inflow = 7.15 cfs @ 12.14 hrs, Volume= 0.385 af
Outflow = 1.02 cfs @ 12.55 hrs, Volume= 0.385 af, Atten= 86%, Lag= 24.5 min
Primary = 1.02 cfs @ 12.55 hrs, Volume= 0.385 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 926.88' @ 12.55 hrs Surf.Area= 3,774 sf Storage= 8,173 cf
Flood Elev= 926.76' Surf.Area= 3,774 sf Storage= 7,920 cf

Plug-Flow detention time= 138.9 min calculated for 0.385 af (100% of inflow)
Center-of-Mass det. time= 138.6 min (901.0 - 762.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	922.50'	0 cf	**37.00'W x 102.00'L x 6.00'H Field A** 22,644 cf Overall - 9,817 cf Embedded = 12,827 cf x 0.0% Voids
#2A	923.00'	9,817 cf	**CMP Round 60** x 25 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 25 Chambers in 5 Rows
#3	928.00'	137 cf	**riser storage (Prismatic)** Listed below (Recalc)
		9,954 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
928.00	65	0	0
930.10	65	137	137

Device	Routing	Invert	Outlet Devices
#1	Primary	920.70'	**24.0" Round device outlet** L= 108.0' Ke= 0.900 Inlet / Outlet Invert= 920.70' / 920.17' S= 0.0049 '/' Cc= 0.900 n= 0.011, Flow Area= 3.14 sf
#2	Device 1	923.00'	**0.480 cfs 18" phospho, 14 cartridge**
#3	Device 2	923.00'	**4.0" Vert. device inlet** C= 0.600 Limited to weir flow at low heads
#4	Device 1	926.76'	**4.0' long device bypass weir** 2 End Contraction(s)

Primary OutFlow Max=1.01 cfs @ 12.55 hrs HW=926.88' TW=920.41' (Dynamic Tailwater)
- **1=device outlet** (Passes 1.01 cfs of 27.18 cfs potential flow)
  - **2=18" phospho, 14 cartridge** (Constant Controls 0.48 cfs)
    - **3=device inlet** (Passes 0.48 cfs of 0.81 cfs potential flow)
  - **4=device bypass weir** (Weir Controls 0.53 cfs @ 1.13 fps)

Pond 1P: Underground Detention - Chamber Wizard Field A

Chamber Model = CMP Round 60 (Round Corrugated Metal Pipe)
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

60.0" Wide + 30.0" Spacing = 90.0" C-C Row Spacing

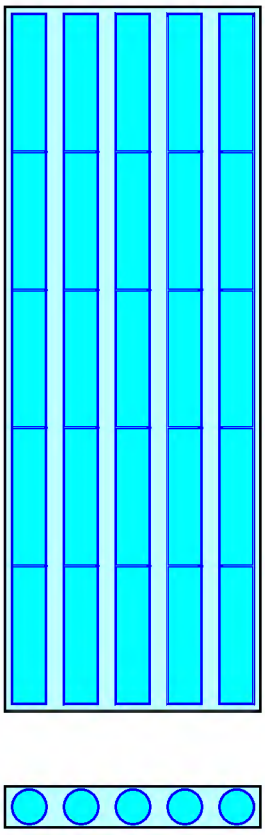
5 Chambers/Row x 20.00' Long = 100.00' Row Length +12.0" End Stone x 2 = 102.00' Base Length
5 Rows x 60.0" Wide + 30.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.00' Base Width
6.0" Stone Base + 60.0" Chamber Height + 6.0" Stone Cover = 6.00' Field Height

25 Chambers x 392.7 cf = 9,817.5 cf Chamber Storage

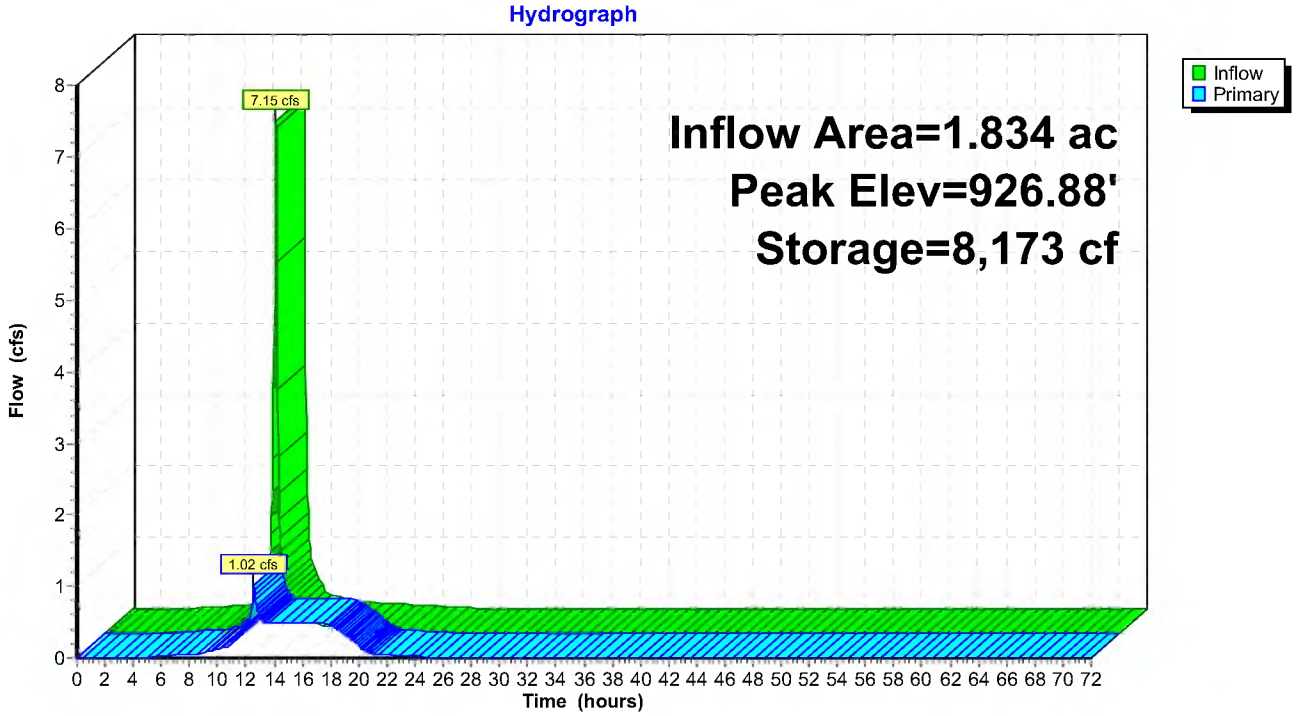
22,644.0 cf Field - 9,817.5 cf Chambers = 12,826.5 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 9,817.5 cf = 0.225 af
Overall Storage Efficiency = 43.4%
Overall System Size = 102.00' x 37.00' x 6.00'

25 Chambers
838.7 cy Field
475.1 cy Stone



Pond 1P: Underground Detention



Stage-Area-Storage for Pond 1P: Underground Detention

Elevation (feet)	Storage (cubic-feet)
922.50	0
922.60	0
922.70	0
922.80	0
922.90	0
923.00	0
923.10	47
923.20	132
923.30	240
923.40	368
923.50	511
923.60	667
923.70	835
923.80	1,014
923.90	1,202
924.00	1,398
924.10	1,601
924.20	1,812
924.30	2,028
924.40	2,250
924.50	2,477
924.60	2,708
924.70	2,943
924.80	3,182
924.90	3,423
925.00	3,667
925.10	3,913
925.20	4,161
925.30	4,409
925.40	4,659
925.50	4,909
925.60	5,159
925.70	5,408
925.80	5,657
925.90	5,904
926.00	6,150
926.10	6,394
926.20	6,636
926.30	6,874
926.40	7,109
926.50	7,340
926.60	7,567
926.70	7,789
926.80	8,006
926.90	8,216
927.00	8,420
927.10	8,616
927.20	8,804
927.30	8,982
927.40	9,150
927.50	9,307
927.60	9,450
927.70	9,577
927.80	9,686
927.90	9,770
928.00	9,817
928.10	9,824
928.20	9,830
928.30	9,837
928.40	9,843
928.50	9,850
928.60	9,856
928.70	9,863
928.80	9,869
928.90	9,876
929.00	9,882
929.10	9,889
929.20	9,895
929.30	9,902
929.40	9,908
929.50	9,915
929.60	9,921
929.70	9,928
929.80	9,934
929.90	9,941
930.00	9,947
930.10	**9,954**

Summary for Pond 102: stmh 102

[57] Hint: Peaked at 920.41' (Flood elevation advised)

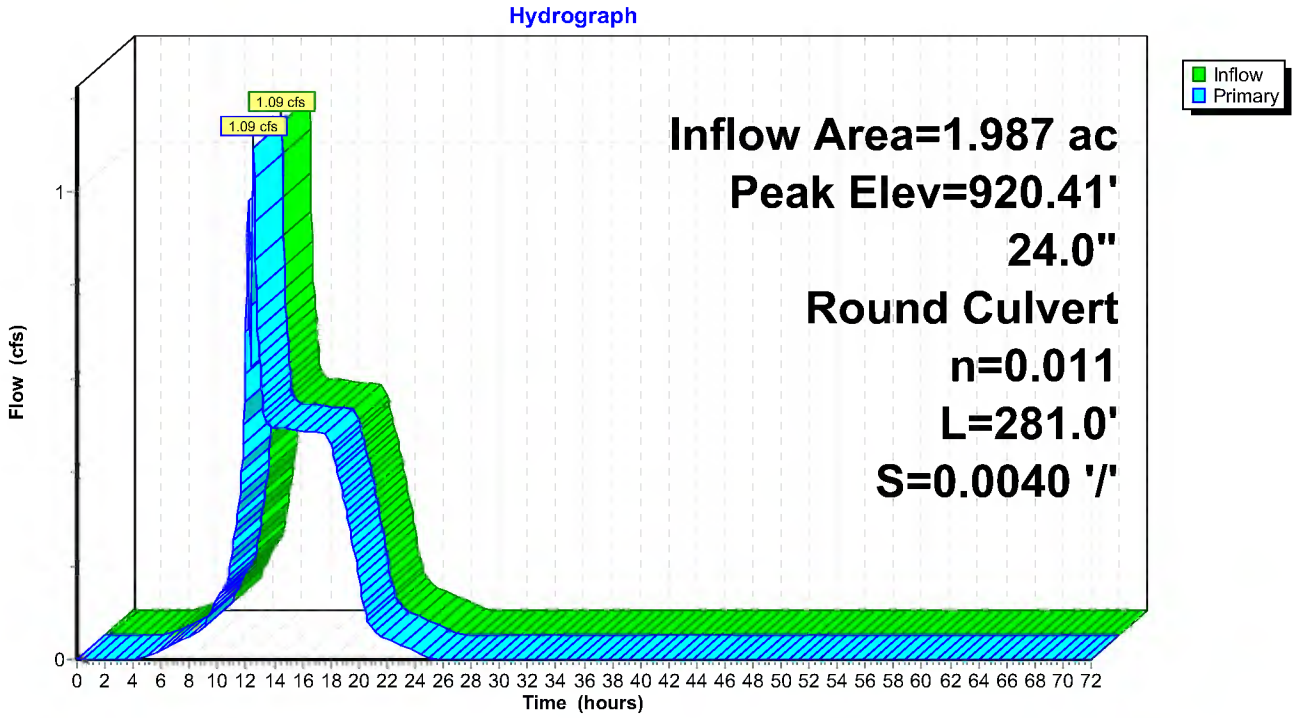
Inflow Area = 1.987 ac, 92.60% Impervious, Inflow Depth = 2.48" for 2-Year event
Inflow = 1.09 cfs @ 12.54 hrs, Volume= 0.410 af
Outflow = 1.09 cfs @ 12.54 hrs, Volume= 0.410 af, Atten= 0%, Lag= 0.0 min
Primary = 1.09 cfs @ 12.54 hrs, Volume= 0.410 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 920.41' @ 12.54 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	919.93'	**24.0" Round Culvert** L= 281.0' Ke= 0.900 Inlet / Outlet Invert= 919.93' / 918.80' S= 0.0040 '/' Cc= 0.900 n= 0.011, Flow Area= 3.14 sf

Primary OutFlow Max=1.08 cfs @ 12.54 hrs HW=920.41' TW=916.32' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.08 cfs @ 1.86 fps)

Pond 102: stmh 102



Stage-Area-Storage for Pond 102: stmh 102

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
919.93	**0.000**	920.95	0.000
919.95	0.000	920.97	0.000
919.97	0.000	920.99	0.000
919.99	0.000	921.01	0.000
920.01	0.000	921.03	0.000
920.03	0.000	921.05	0.000
920.05	0.000	921.07	0.000
920.07	0.000	921.09	0.000
920.09	0.000	921.11	0.000
920.11	0.000	921.13	0.000
920.13	0.000	921.15	0.000
920.15	0.000	921.17	0.000
920.17	0.000	921.19	0.000
920.19	0.000	921.21	0.000
920.21	0.000	921.23	0.000
920.23	0.000	921.25	0.000
920.25	0.000	921.27	0.000
920.27	0.000	921.29	0.000
920.29	0.000	921.31	0.000
920.31	0.000	921.33	0.000
920.33	0.000	921.35	0.000
920.35	0.000	921.37	0.000
920.37	0.000	921.39	0.000
920.39	0.000	921.41	0.000
920.41	0.000	921.43	0.000
920.43	0.000	921.45	0.000
920.45	0.000	921.47	0.000
920.47	0.000	921.49	0.000
920.49	0.000	921.51	0.000
920.51	0.000	921.53	0.000
920.53	0.000	921.55	0.000
920.55	0.000	921.57	0.000
920.57	0.000	921.59	0.000
920.59	0.000	921.61	0.000
920.61	0.000	921.63	0.000
920.63	0.000	921.65	0.000
920.65	0.000	921.67	0.000
920.67	0.000	921.69	0.000
920.69	0.000	921.71	0.000
920.71	0.000	921.73	0.000
920.73	0.000	921.75	0.000
920.75	0.000	921.77	0.000
920.77	0.000	921.79	0.000
920.79	0.000	921.81	0.000
920.81	0.000	921.83	0.000
920.83	0.000	921.85	0.000
920.85	0.000	921.87	0.000
920.87	0.000	921.89	0.000
920.89	0.000	921.91	0.000
920.91	0.000	921.93	0.000
920.93	0.000		

Summary for Pond Wtld Prd: Existing Wetland

Inflow Area = 3.072 ac, 62.17% Impervious, Inflow Depth = 2.03" for 2-Year event
Inflow = 3.26 cfs @ 12.15 hrs, Volume= 0.519 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 916.99' @ 38.25 hrs Surf.Area= 24,104 sf Storage= 22,605 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

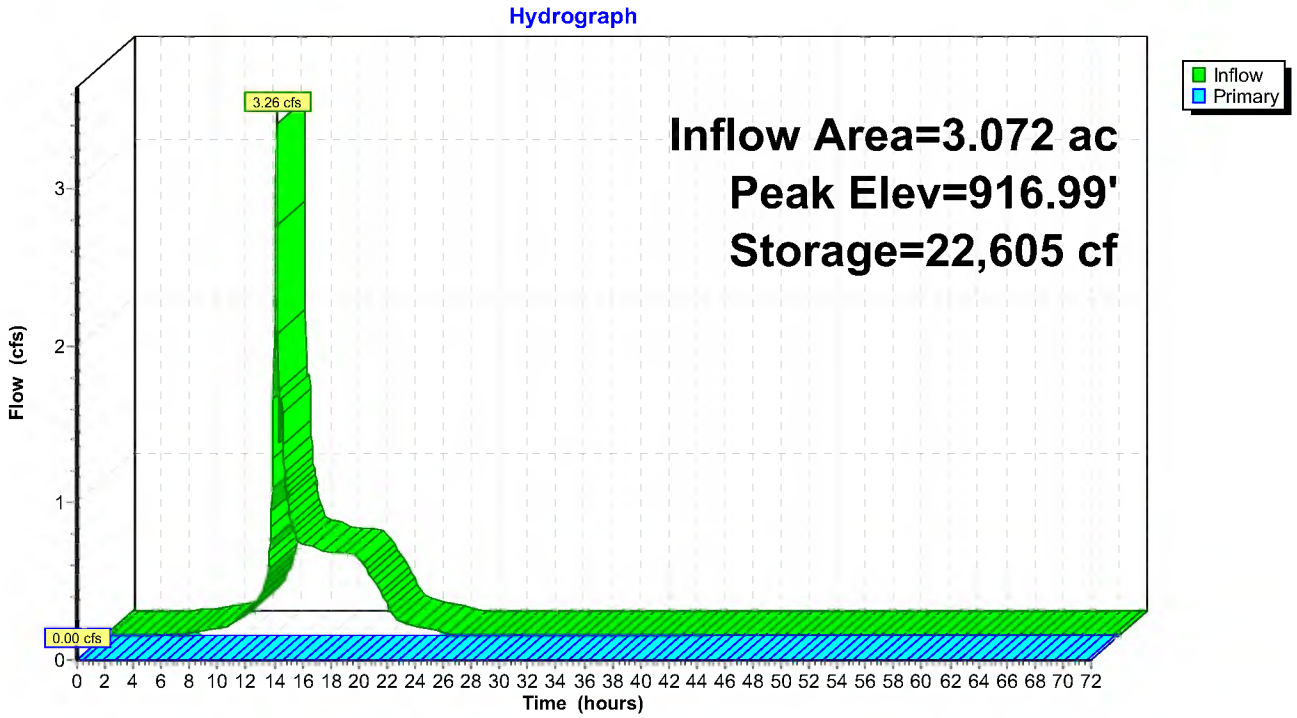
Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	76,784 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.00	21,538	0	0
917.00	24,128	22,833	22,833
918.00	26,828	25,478	48,311
919.00	30,118	28,473	76,784

Device	Routing	Invert	Outlet Devices
#1	Primary	916.35'	**15.0" Round ocs outlet** L= 18.0' Ke= 0.900 Inlet / Outlet Invert= 916.35' / 916.22' S= 0.0072 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#2	Device 1	918.08'	**4.0' long ocs weir wall** 2 End Contraction(s)
#3	Device 2	917.07'	**15.0" Round ocs inlet** L= 12.0' Ke= 0.900 Inlet / Outlet Invert= 917.07' / 916.39' S= 0.0567 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=916.00' TW=0.00' (Dynamic Tailwater)
↑**1=ocs outlet** (Controls 0.00 cfs)
↑**2=ocs weir wall** (Controls 0.00 cfs)
↑**3=ocs inlet** (Controls 0.00 cfs)

Pond Wtld Prd: Existing Wetland



Stage-Area-Storage for Pond Wtld Prd: Existing Wetland

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
916.00	21,538	0
916.05	21,667	1,080
916.10	21,797	2,167
916.15	21,926	3,260
916.20	22,056	4,359
916.25	22,186	5,465
916.30	22,315	6,578
916.35	22,445	7,697
916.40	22,574	8,822
916.45	22,704	9,954
916.50	22,833	11,093
916.55	22,962	12,238
916.60	23,092	13,389
916.65	23,221	14,547
916.70	23,351	15,711
916.75	23,481	16,882
916.80	23,610	18,059
916.85	23,740	19,243
916.90	23,869	20,433
916.95	23,999	21,630
917.00	24,128	22,833
917.05	24,263	24,043
917.10	24,398	25,259
917.15	24,533	26,483
917.20	24,668	27,713
917.25	24,803	28,949
917.30	24,938	30,193
917.35	25,073	31,443
917.40	25,208	32,700
917.45	25,343	33,964
917.50	25,478	35,235
917.55	25,613	36,512
917.60	25,748	37,796
917.65	25,883	39,087
917.70	26,018	40,384
917.75	26,153	41,688
917.80	26,288	42,999
917.85	26,423	44,317
917.90	26,558	45,642
917.95	26,693	46,973
918.00	26,828	48,311
918.05	26,992	49,657
918.10	27,157	51,010
918.15	27,321	52,372
918.20	27,486	53,742
918.25	27,651	55,121
918.30	27,815	56,507
918.35	27,980	57,902
918.40	28,144	59,305
918.45	28,309	60,717
918.50	28,473	62,136
918.55	28,637	63,564
918.60	28,802	65,000
918.65	28,966	66,444
918.70	29,131	67,897
918.75	29,296	69,357
918.80	29,460	70,826
918.85	29,625	72,303
918.90	29,789	73,789
918.95	29,954	75,282
919.00	**30,118**	**76,784**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: To site sewer Runoff Area=79,886 sf 95.12% Impervious Runoff Depth=3.91"
Tc=7.0 min CN=97 Runoff=10.83 cfs 0.598 af

Subcatchment2S: Direct to wetland Runoff Area=47,288 sf 6.48% Impervious Runoff Depth=2.34"
Tc=7.0 min CN=81 Runoff=4.40 cfs 0.212 af

Subcatchment3S: Runoff to Offsite Runoff Area=25,698 sf 5.00% Impervious Runoff Depth=2.26"
Flow Length=260' Slope=0.0200 '/' Tc=17.8 min CN=80 Runoff=1.58 cfs 0.111 af

Subcatchment4S: Runoff to Wazata Blvd Runoff Area=10,922 sf 16.27% Impervious Runoff Depth=2.51"
Tc=7.0 min CN=83 Runoff=1.09 cfs 0.053 af

Subcatchment5S: to 102 Runoff Area=6,651 sf 62.29% Impervious Runoff Depth=3.27"
Tc=7.0 min CN=91 Runoff=0.82 cfs 0.042 af

Reach 3R: total to offsite wetland Inflow=1.58 cfs 0.111 af
Outflow=1.58 cfs 0.111 af

Reach 4R: total proposed Inflow=2.19 cfs 0.164 af
Outflow=2.19 cfs 0.164 af

Pond 1P: Underground Detention Peak Elev=927.49' Storage=9,293 cf Inflow=10.83 cfs 0.598 af
Outflow=8.26 cfs 0.598 af

Pond 102: stmh 102 Peak Elev=921.49' Inflow=8.80 cfs 0.639 af
24.0" Round Culvert n=0.011 L=281.0' S=0.0040 '/' Outflow=8.80 cfs 0.639 af

Pond Wtld Prd: Existing Wetland Peak Elev=917.57' Storage=37,069 cf Inflow=11.92 cfs 0.851 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.913 ac Runoff Volume = 1.015 af Average Runoff Depth = 3.11"
49.39% Pervious = 1.933 ac 50.61% Impervious = 1.980 ac

Summary for Subcatchment 1S: To site sewer

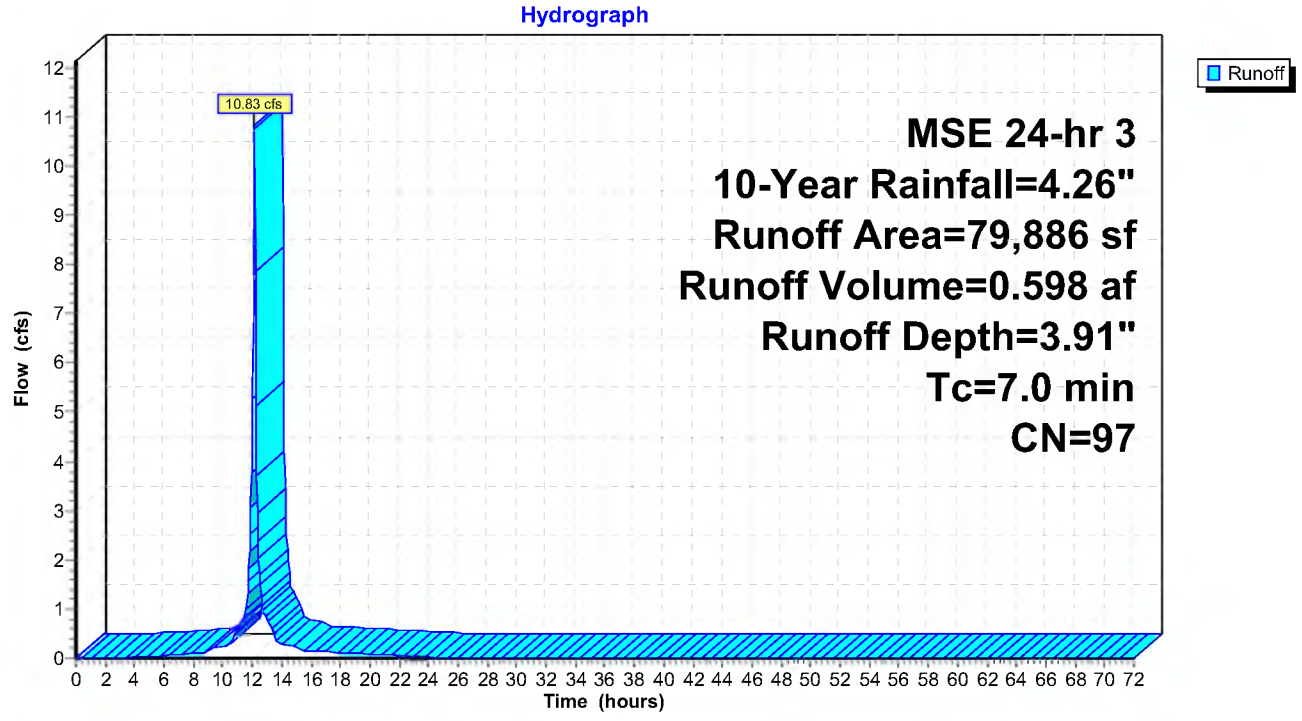
Runoff = 10.83 cfs @ 12.14 hrs, Volume= 0.598 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
75,991	98	Paved parking, HSG D
3,895	80	>75% Grass cover, Good, HSG D
79,886	97	Weighted Average
3,895		4.88% Pervious Area
75,991		95.12% Impervious Area

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

Subcatchment 1S: To site sewer



Summary for Subcatchment 2S: Direct to wetland

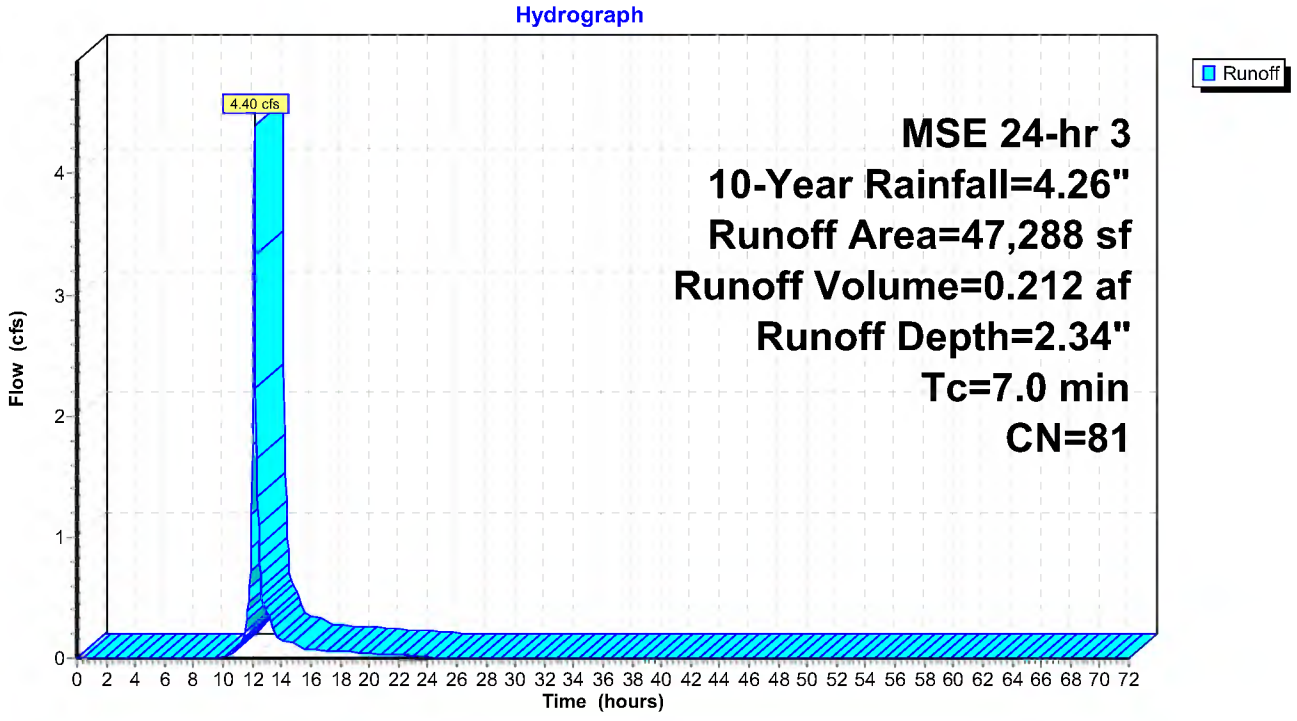
Runoff = 4.40 cfs @ 12.14 hrs, Volume= 0.212 af, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
3,064	98	Paved parking, HSG D
44,224	80	>75% Grass cover, Good, HSG D
47,288	81	Weighted Average
44,224		93.52% Pervious Area
3,064		6.48% Impervious Area

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

Subcatchment 2S: Direct to wetland



Summary for Subcatchment 3S: Runoff to Offsite Wetland (N)

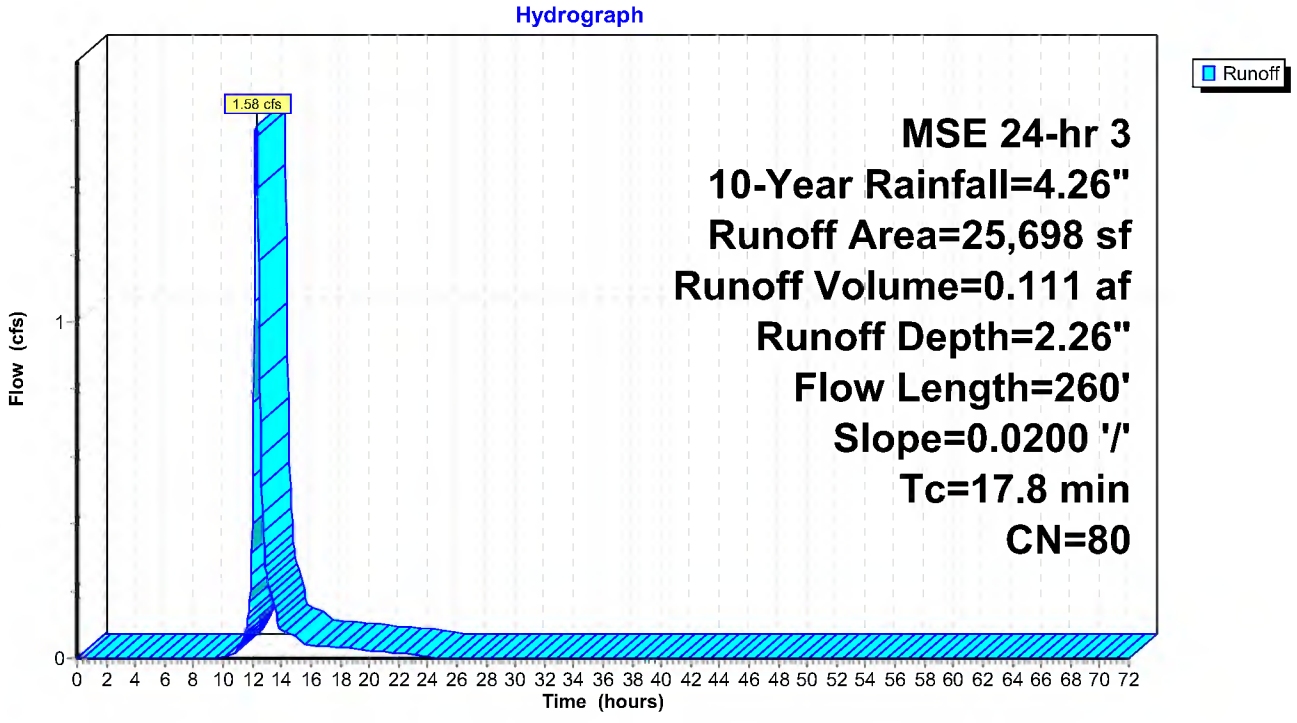
Runoff = 1.58 cfs @ 12.27 hrs, Volume= 0.111 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
1,286	98	Paved parking, HSG D
24,412	79	Woods/grass comb., Good, HSG D
25,698	80	Weighted Average
24,412		95.00% Pervious Area
1,286		5.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0200	0.11		**Sheet Flow, SWALE** Grass: Dense n= 0.240 P2= 2.86"
2.7	160	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.8	260	Total			

Subcatchment 3S: Runoff to Offsite Wetland (N)



Summary for Subcatchment 4S: Runoff to Wazata Blvd (S)

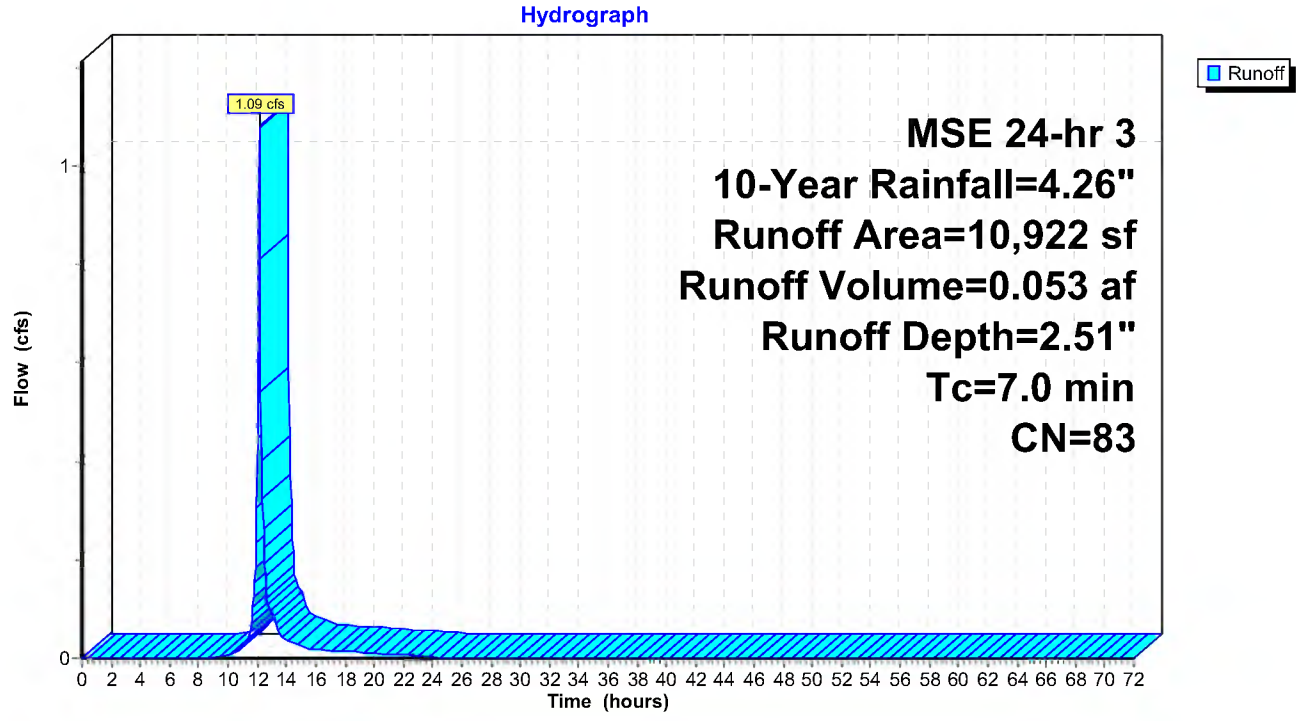
Runoff = 1.09 cfs @ 12.14 hrs, Volume= 0.053 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
1,777	98	Paved parking, HSG D
9,145	80	>75% Grass cover, Good, HSG D
10,922	83	Weighted Average
9,145		83.73% Pervious Area
1,777		16.27% Impervious Area

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

Subcatchment 4S: Runoff to Wazata Blvd (S)



Summary for Subcatchment 5S: to 102

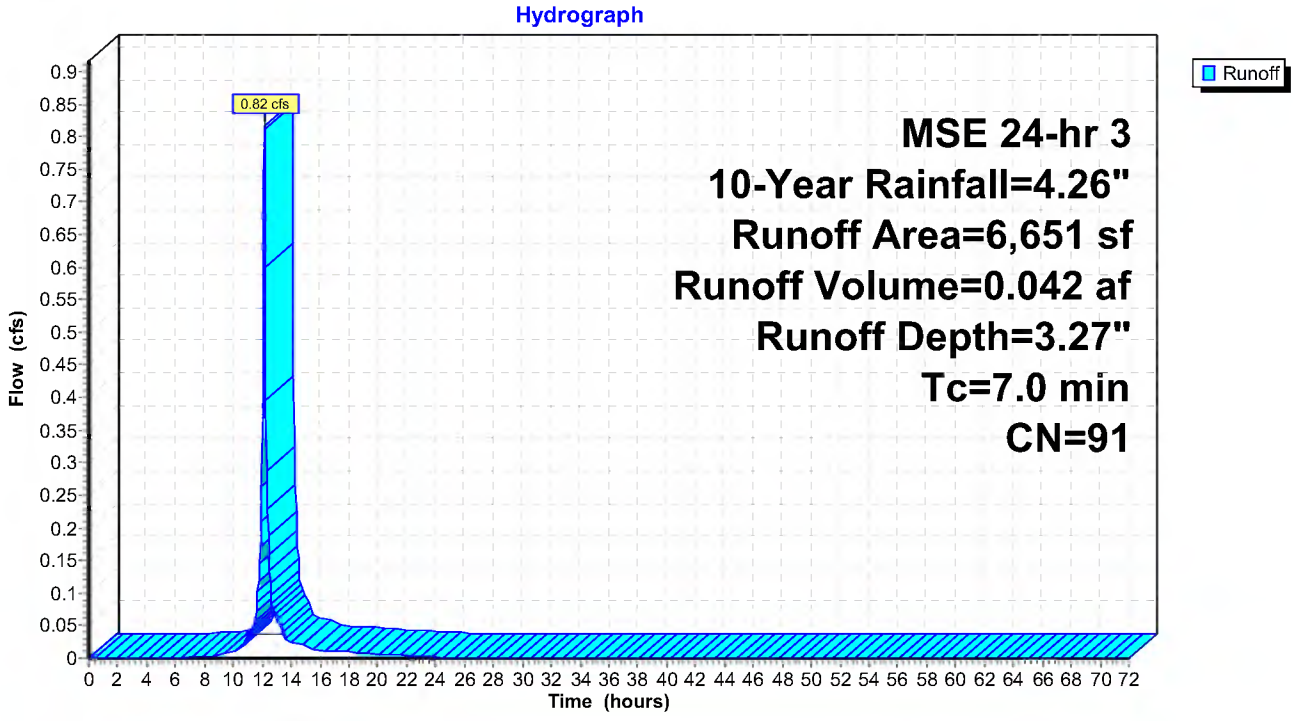
Runoff = 0.82 cfs @ 12.14 hrs, Volume= 0.042 af, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
4,143	98	Paved parking, HSG D
2,508	80	>75% Grass cover, Good, HSG D
6,651	91	Weighted Average
2,508		37.71% Pervious Area
4,143		62.29% Impervious Area

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

Subcatchment 5S: to 102



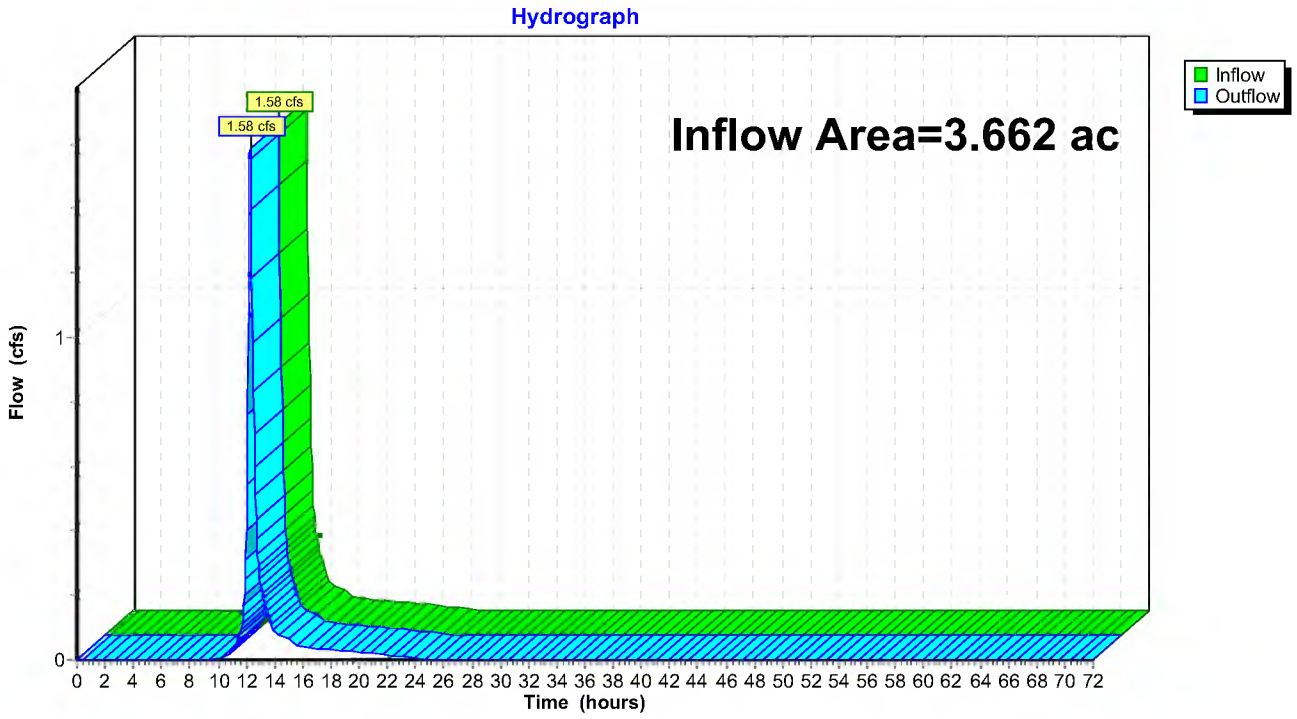
Summary for Reach 3R: total to offsite wetland

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

Inflow Area = 3.662 ac, 52.96% Impervious, Inflow Depth = 0.36" for 10-Year event
Inflow = 1.58 cfs @ 12.27 hrs, Volume= 0.111 af
Outflow = 1.58 cfs @ 12.27 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min

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

Reach 3R: total to offsite wetland



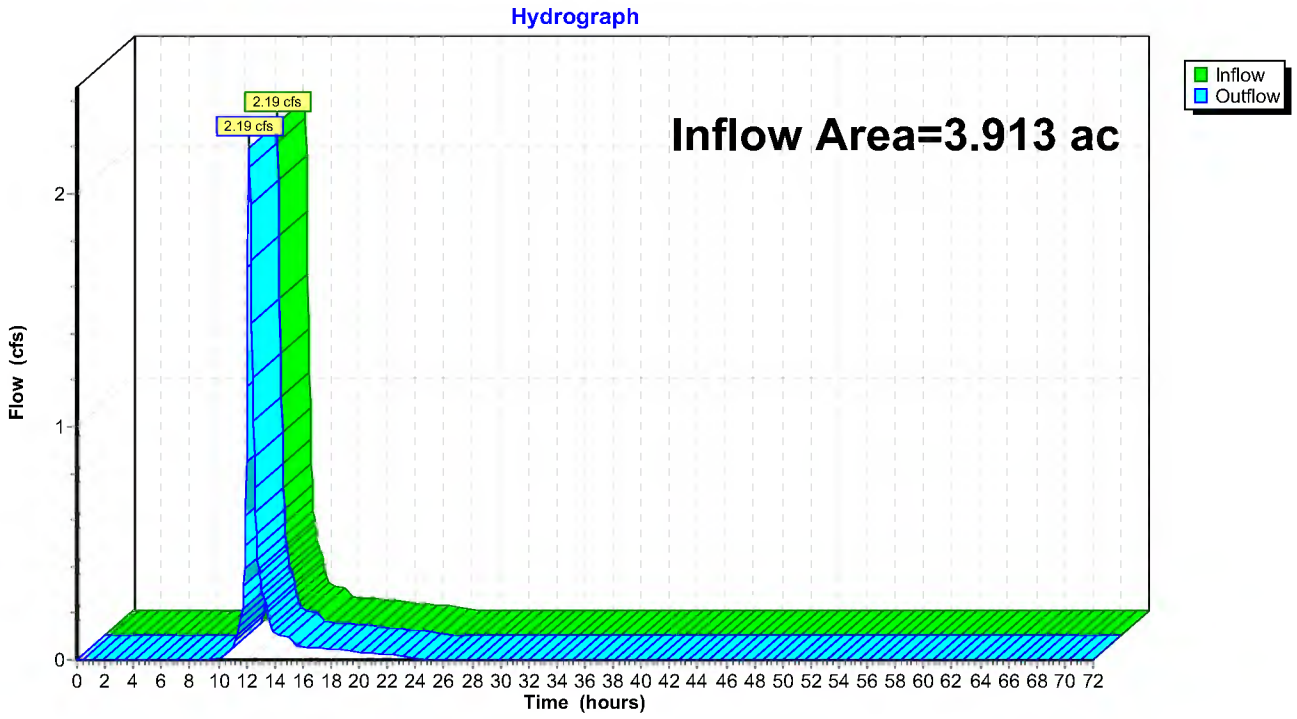
Summary for Reach 4R: total proposed

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

Inflow Area = 3.913 ac, 50.61% Impervious, Inflow Depth = 0.50" for 10-Year event
Inflow = 2.19 cfs @ 12.19 hrs, Volume= 0.164 af
Outflow = 2.19 cfs @ 12.19 hrs, Volume= 0.164 af, Atten= 0%, Lag= 0.0 min

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

Reach 4R: total proposed



Summary for Pond 1P: Underground Detention

[58] Hint: Peaked 0.73' above defined flood level

Inflow Area = 1.834 ac, 95.12% Impervious, Inflow Depth = 3.91" for 10-Year event
Inflow = 10.83 cfs @ 12.14 hrs, Volume= 0.598 af
Outflow = 8.26 cfs @ 12.22 hrs, Volume= 0.598 af, Atten= 24%, Lag= 4.6 min
Primary = 8.26 cfs @ 12.22 hrs, Volume= 0.598 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 927.49' @ 12.22 hrs Surf.Area= 3,774 sf Storage= 9,293 cf
Flood Elev= 926.76' Surf.Area= 3,774 sf Storage= 7,920 cf

Plug-Flow detention time= 108.6 min calculated for 0.597 af (100% of inflow)
Center-of-Mass det. time= 108.6 min (863.5 - 755.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	922.50'	0 cf	**37.00'W x 102.00'L x 6.00'H Field A** 22,644 cf Overall - 9,817 cf Embedded = 12,827 cf x 0.0% Voids
#2A	923.00'	9,817 cf	**CMP Round 60** x 25 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 25 Chambers in 5 Rows
#3	928.00'	137 cf	**riser storage (Prismatic)** Listed below (Recalc)
		9,954 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
928.00	65	0	0
930.10	65	137	137

Device	Routing	Invert	Outlet Devices
#1	Primary	920.70'	**24.0" Round device outlet** L= 108.0' Ke= 0.900 Inlet / Outlet Invert= 920.70' / 920.17' S= 0.0049 '/' Cc= 0.900 n= 0.011, Flow Area= 3.14 sf
#2	Device 1	923.00'	**0.480 cfs 18" phospho, 14 cartridge**
#3	Device 2	923.00'	**4.0" Vert. device inlet** C= 0.600 Limited to weir flow at low heads
#4	Device 1	926.76'	**4.0' long device bypass weir** 2 End Contraction(s)

Primary OutFlow Max=7.54 cfs @ 12.22 hrs HW=927.44' TW=921.40' (Dynamic Tailwater)
- **1=device outlet** (Passes 7.54 cfs of 28.61 cfs potential flow)
  - **2=18" phospho, 14 cartridge** (Constant Controls 0.48 cfs)
    - **3=device inlet** (Passes 0.48 cfs of 0.87 cfs potential flow)
  - **4=device bypass weir** (Weir Controls 7.06 cfs @ 2.69 fps)

Pond 1P: Underground Detention - Chamber Wizard Field A

Chamber Model = CMP Round 60 (Round Corrugated Metal Pipe)
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

60.0" Wide + 30.0" Spacing = 90.0" C-C Row Spacing

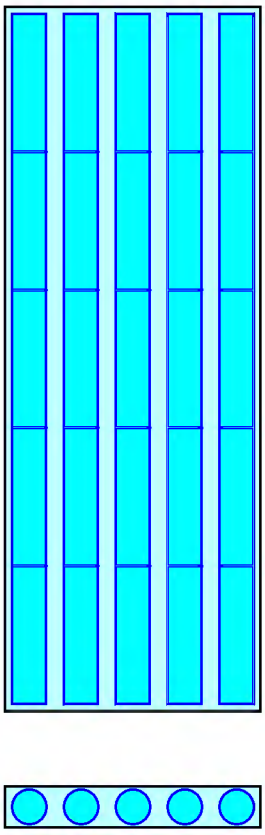
5 Chambers/Row x 20.00' Long = 100.00' Row Length +12.0" End Stone x 2 = 102.00' Base Length
5 Rows x 60.0" Wide + 30.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.00' Base Width
6.0" Stone Base + 60.0" Chamber Height + 6.0" Stone Cover = 6.00' Field Height

25 Chambers x 392.7 cf = 9,817.5 cf Chamber Storage

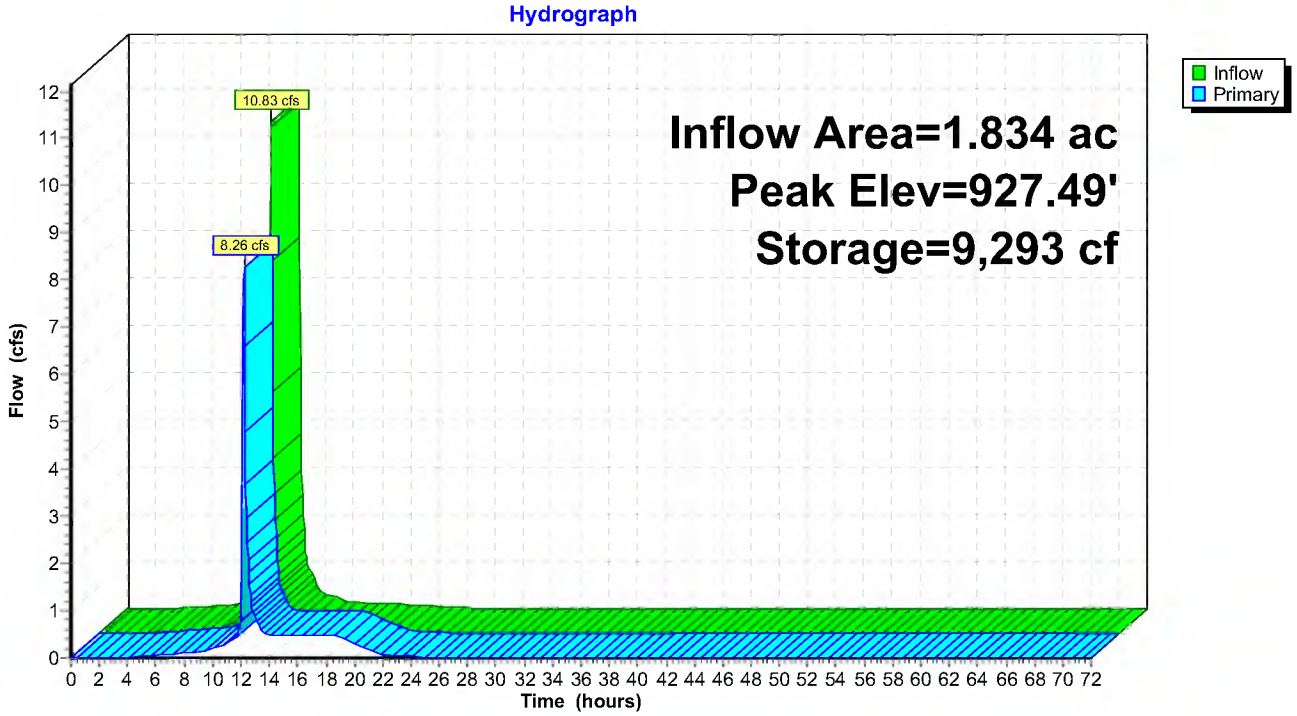
22,644.0 cf Field - 9,817.5 cf Chambers = 12,826.5 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 9,817.5 cf = 0.225 af
Overall Storage Efficiency = 43.4%
Overall System Size = 102.00' x 37.00' x 6.00'

25 Chambers
838.7 cy Field
475.1 cy Stone



Pond 1P: Underground Detention



Stage-Area-Storage for Pond 1P: Underground Detention

Elevation (feet)	Storage (cubic-feet)
922.50	0
922.60	0
922.70	0
922.80	0
922.90	0
923.00	0
923.10	47
923.20	132
923.30	240
923.40	368
923.50	511
923.60	667
923.70	835
923.80	1,014
923.90	1,202
924.00	1,398
924.10	1,601
924.20	1,812
924.30	2,028
924.40	2,250
924.50	2,477
924.60	2,708
924.70	2,943
924.80	3,182
924.90	3,423
925.00	3,667
925.10	3,913
925.20	4,161
925.30	4,409
925.40	4,659
925.50	4,909
925.60	5,159
925.70	5,408
925.80	5,657
925.90	5,904
926.00	6,150
926.10	6,394
926.20	6,636
926.30	6,874
926.40	7,109
926.50	7,340
926.60	7,567
926.70	7,789
926.80	8,006
926.90	8,216
927.00	8,420
927.10	8,616
927.20	8,804
927.30	8,982
927.40	9,150
927.50	9,307
927.60	9,450
927.70	9,577
927.80	9,686
927.90	9,770
928.00	9,817
928.10	9,824
928.20	9,830
928.30	9,837
928.40	9,843
928.50	9,850
928.60	9,856
928.70	9,863
928.80	9,869
928.90	9,876
929.00	9,882
929.10	9,889
929.20	9,895
929.30	9,902
929.40	9,908
929.50	9,915
929.60	9,921
929.70	9,928
929.80	9,934
929.90	9,941
930.00	9,947
930.10	**9,954**

Summary for Pond 102: stmh 102

[57] Hint: Peaked at 921.49' (Flood elevation advised)

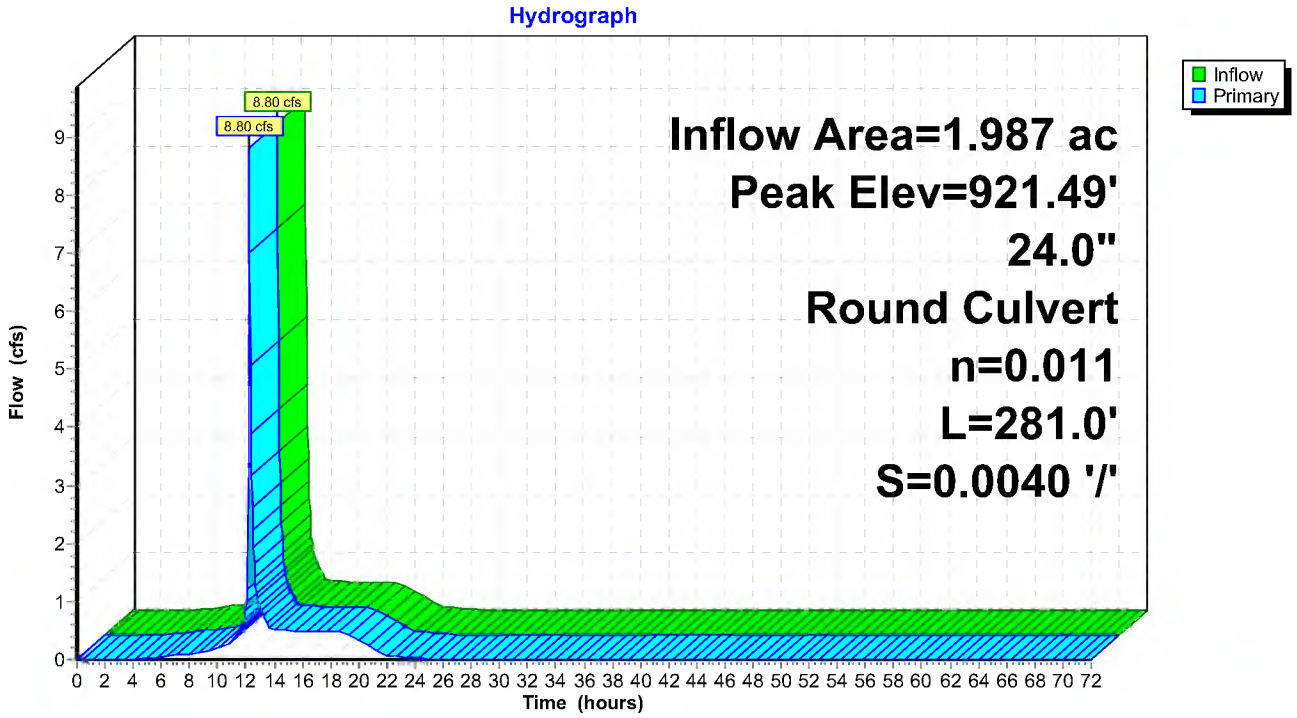
Inflow Area = 1.987 ac, 92.60% Impervious, Inflow Depth = 3.86" for 10-Year event
Inflow = 8.80 cfs @ 12.21 hrs, Volume= 0.639 af
Outflow = 8.80 cfs @ 12.21 hrs, Volume= 0.639 af, Atten= 0%, Lag= 0.0 min
Primary = 8.80 cfs @ 12.21 hrs, Volume= 0.639 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 921.49' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	919.93'	**24.0" Round Culvert** L= 281.0' Ke= 0.900 Inlet / Outlet Invert= 919.93' / 918.80' S= 0.0040 '/' Cc= 0.900 n= 0.011, Flow Area= 3.14 sf

Primary OutFlow Max=8.14 cfs @ 12.21 hrs HW=921.41' TW=916.48' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 8.14 cfs @ 3.27 fps)

Pond 102: stmh 102



Stage-Area-Storage for Pond 102: stmh 102

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
919.93	**0.000**	920.95	0.000
919.95	0.000	920.97	0.000
919.97	0.000	920.99	0.000
919.99	0.000	921.01	0.000
920.01	0.000	921.03	0.000
920.03	0.000	921.05	0.000
920.05	0.000	921.07	0.000
920.07	0.000	921.09	0.000
920.09	0.000	921.11	0.000
920.11	0.000	921.13	0.000
920.13	0.000	921.15	0.000
920.15	0.000	921.17	0.000
920.17	0.000	921.19	0.000
920.19	0.000	921.21	0.000
920.21	0.000	921.23	0.000
920.23	0.000	921.25	0.000
920.25	0.000	921.27	0.000
920.27	0.000	921.29	0.000
920.29	0.000	921.31	0.000
920.31	0.000	921.33	0.000
920.33	0.000	921.35	0.000
920.35	0.000	921.37	0.000
920.37	0.000	921.39	0.000
920.39	0.000	921.41	0.000
920.41	0.000	921.43	0.000
920.43	0.000	921.45	0.000
920.45	0.000	921.47	0.000
920.47	0.000	921.49	0.000
920.49	0.000	921.51	0.000
920.51	0.000	921.53	0.000
920.53	0.000	921.55	0.000
920.55	0.000	921.57	0.000
920.57	0.000	921.59	0.000
920.59	0.000	921.61	0.000
920.61	0.000	921.63	0.000
920.63	0.000	921.65	0.000
920.65	0.000	921.67	0.000
920.67	0.000	921.69	0.000
920.69	0.000	921.71	0.000
920.71	0.000	921.73	0.000
920.73	0.000	921.75	0.000
920.75	0.000	921.77	0.000
920.77	0.000	921.79	0.000
920.79	0.000	921.81	0.000
920.81	0.000	921.83	0.000
920.83	0.000	921.85	0.000
920.85	0.000	921.87	0.000
920.87	0.000	921.89	0.000
920.89	0.000	921.91	0.000
920.91	0.000	921.93	0.000
920.93	0.000		

Summary for Pond Wtld Prd: Existing Wetland

Inflow Area = 3.072 ac, 62.17% Impervious, Inflow Depth = 3.32" for 10-Year event
Inflow = 11.92 cfs @ 12.21 hrs, Volume= 0.851 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 917.57' @ 37.65 hrs Surf.Area= 25,672 sf Storage= 37,069 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

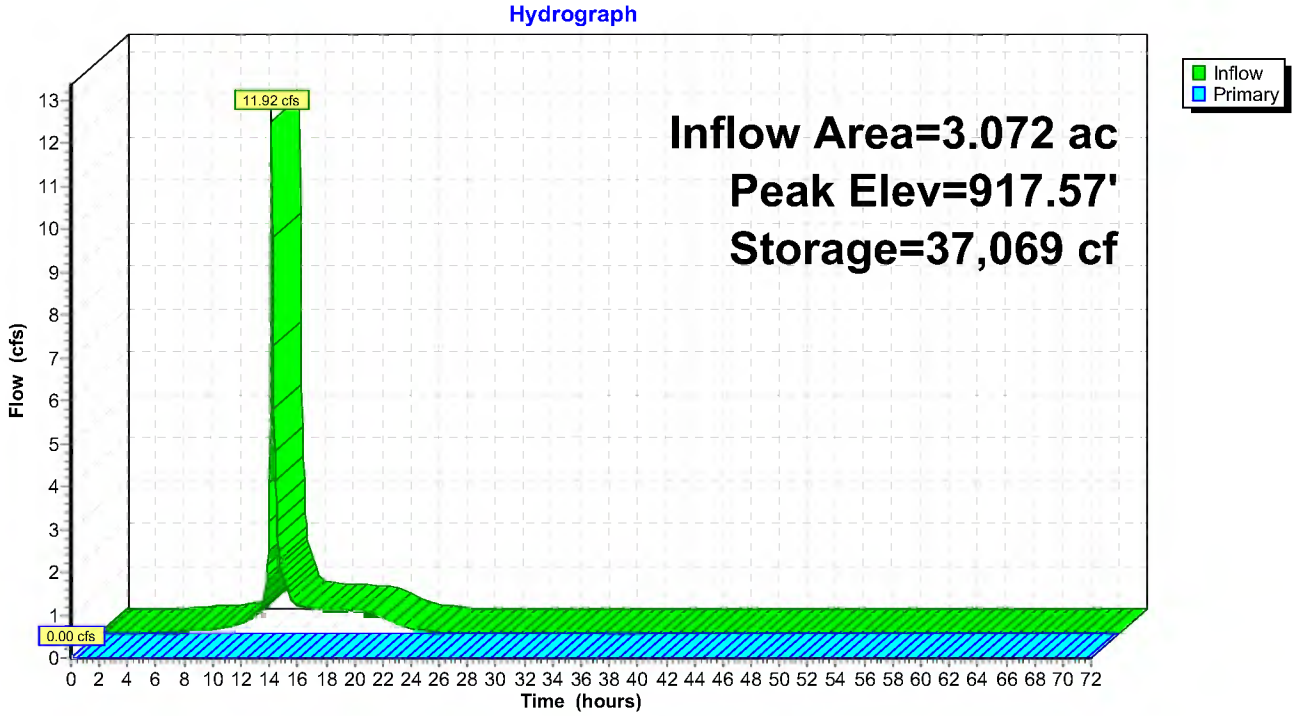
Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	76,784 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.00	21,538	0	0
917.00	24,128	22,833	22,833
918.00	26,828	25,478	48,311
919.00	30,118	28,473	76,784

Device	Routing	Invert	Outlet Devices
#1	Primary	916.35'	**15.0" Round ocs outlet** L= 18.0' Ke= 0.900 Inlet / Outlet Invert= 916.35' / 916.22' S= 0.0072 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#2	Device 1	918.08'	**4.0' long ocs weir wall** 2 End Contraction(s)
#3	Device 2	917.07'	**15.0" Round ocs inlet** L= 12.0' Ke= 0.900 Inlet / Outlet Invert= 917.07' / 916.39' S= 0.0567 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=916.00' TW=0.00' (Dynamic Tailwater)
↑**1=ocs outlet** (Controls 0.00 cfs)
↑**2=ocs weir wall** (Controls 0.00 cfs)
↑**3=ocs inlet** (Controls 0.00 cfs)

Pond Wtld Prd: Existing Wetland



Stage-Area-Storage for Pond Wtld Prd: Existing Wetland

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
916.00	21,538	0
916.05	21,667	1,080
916.10	21,797	2,167
916.15	21,926	3,260
916.20	22,056	4,359
916.25	22,186	5,465
916.30	22,315	6,578
916.35	22,445	7,697
916.40	22,574	8,822
916.45	22,704	9,954
916.50	22,833	11,093
916.55	22,962	12,238
916.60	23,092	13,389
916.65	23,221	14,547
916.70	23,351	15,711
916.75	23,481	16,882
916.80	23,610	18,059
916.85	23,740	19,243
916.90	23,869	20,433
916.95	23,999	21,630
917.00	24,128	22,833
917.05	24,263	24,043
917.10	24,398	25,259
917.15	24,533	26,483
917.20	24,668	27,713
917.25	24,803	28,949
917.30	24,938	30,193
917.35	25,073	31,443
917.40	25,208	32,700
917.45	25,343	33,964
917.50	25,478	35,235
917.55	25,613	36,512
917.60	25,748	37,796
917.65	25,883	39,087
917.70	26,018	40,384
917.75	26,153	41,688
917.80	26,288	42,999
917.85	26,423	44,317
917.90	26,558	45,642
917.95	26,693	46,973
918.00	26,828	48,311
918.05	26,992	49,657
918.10	27,157	51,010
918.15	27,321	52,372
918.20	27,486	53,742
918.25	27,651	55,121
918.30	27,815	56,507
918.35	27,980	57,902
918.40	28,144	59,305
918.45	28,309	60,717
918.50	28,473	62,136
918.55	28,637	63,564
918.60	28,802	65,000
918.65	28,966	66,444
918.70	29,131	67,897
918.75	29,296	69,357
918.80	29,460	70,826
918.85	29,625	72,303
918.90	29,789	73,789
918.95	29,954	75,282
919.00	**30,118**	**76,784**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: To site sewer Runoff Area=79,886 sf 95.12% Impervious Runoff Depth=6.96"
Tc=7.0 min CN=97 Runoff=18.80 cfs 1.064 af

Subcatchment2S: Direct to wetland Runoff Area=47,288 sf 6.48% Impervious Runoff Depth=5.10"
Tc=7.0 min CN=81 Runoff=9.31 cfs 0.462 af

Subcatchment3S: Runoff to Offsite Runoff Area=25,698 sf 5.00% Impervious Runoff Depth=4.99"
Flow Length=260' Slope=0.0200 '/' Tc=17.8 min CN=80 Runoff=3.45 cfs 0.245 af

Subcatchment4S: Runoff to Wazata Blvd Runoff Area=10,922 sf 16.27% Impervious Runoff Depth=5.33"
Tc=7.0 min CN=83 Runoff=2.22 cfs 0.111 af

Subcatchment5S: to 102 Runoff Area=6,651 sf 62.29% Impervious Runoff Depth=6.25"
Tc=7.0 min CN=91 Runoff=1.50 cfs 0.080 af

Reach 3R: total to offsite wetland Inflow=3.45 cfs 0.692 af
Outflow=3.45 cfs 0.692 af

Reach 4R: total proposed Inflow=4.74 cfs 0.803 af
Outflow=4.74 cfs 0.803 af

Pond 1P: Underground Detention Peak Elev=928.10' Storage=9,824 cf Inflow=18.80 cfs 1.064 af
Outflow=19.45 cfs 1.064 af

Pond 102: stmh 102 Peak Elev=924.00' Inflow=20.95 cfs 1.143 af
24.0" Round Culvert n=0.011 L=281.0' S=0.0040 '/' Outflow=20.95 cfs 1.143 af

Pond Wtld Prd: Existing Wetland Peak Elev=918.21' Storage=53,987 cf Inflow=30.24 cfs 1.605 af
Outflow=0.60 cfs 0.446 af

Total Runoff Area = 3.913 ac Runoff Volume = 1.962 af Average Runoff Depth = 6.02"
49.39% Pervious = 1.933 ac 50.61% Impervious = 1.980 ac

Summary for Subcatchment 1S: To site sewer

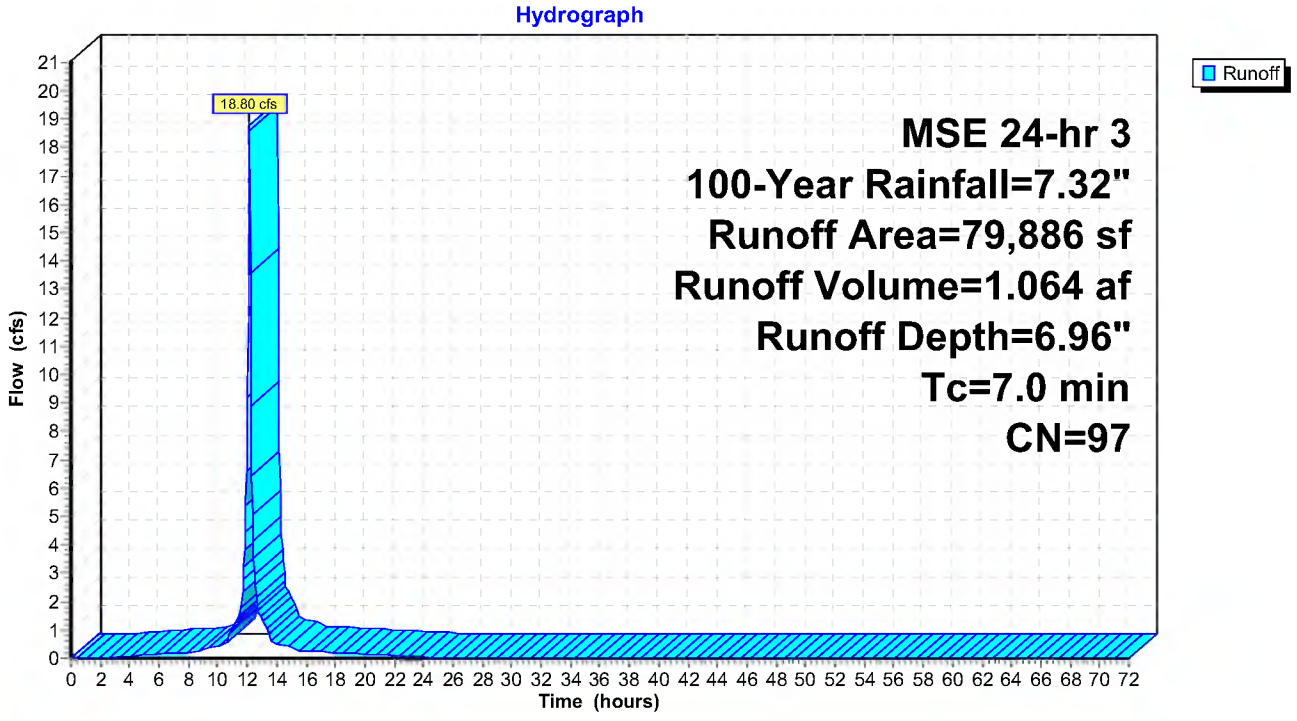
Runoff = 18.80 cfs @ 12.14 hrs, Volume= 1.064 af, Depth= 6.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
75,991	98	Paved parking, HSG D
3,895	80	>75% Grass cover, Good, HSG D
79,886	97	Weighted Average
3,895		4.88% Pervious Area
75,991		95.12% Impervious Area

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

Subcatchment 1S: To site sewer



Summary for Subcatchment 2S: Direct to wetland

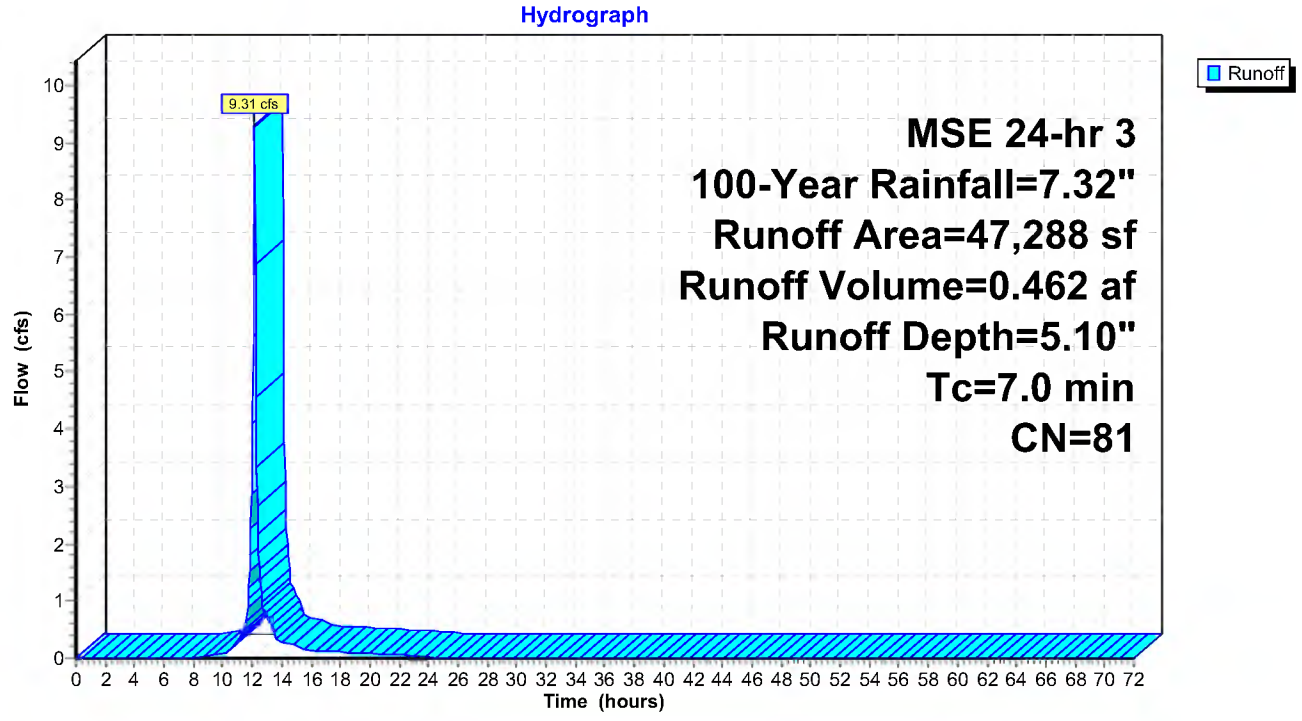
Runoff = 9.31 cfs @ 12.14 hrs, Volume= 0.462 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
3,064	98	Paved parking, HSG D
44,224	80	>75% Grass cover, Good, HSG D
47,288	81	Weighted Average
44,224		93.52% Pervious Area
3,064		6.48% Impervious Area

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

Subcatchment 2S: Direct to wetland



Summary for Subcatchment 3S: Runoff to Offsite Wetland (N)

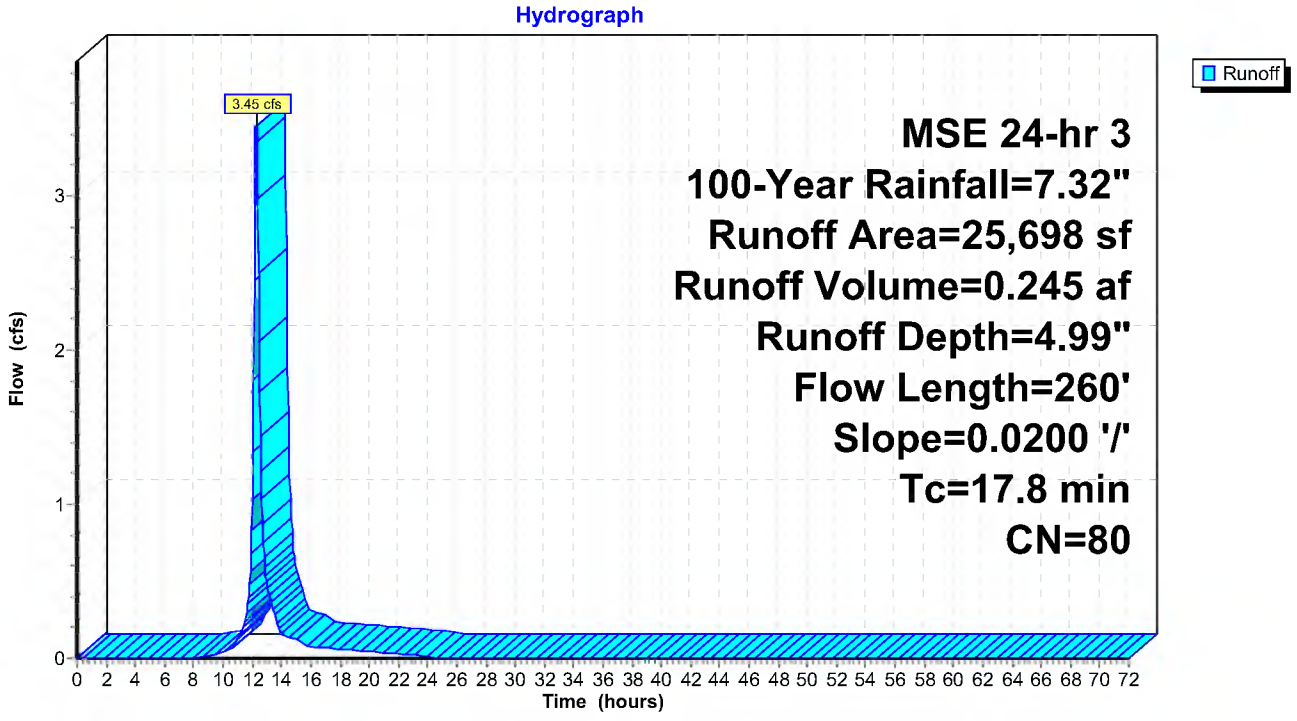
Runoff = 3.45 cfs @ 12.26 hrs, Volume= 0.245 af, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
1,286	98	Paved parking, HSG D
24,412	79	Woods/grass comb., Good, HSG D
25,698	80	Weighted Average
24,412		95.00% Pervious Area
1,286		5.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	100	0.0200	0.11		**Sheet Flow, SWALE** Grass: Dense n= 0.240 P2= 2.86"
2.7	160	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.8	260	Total			

Subcatchment 3S: Runoff to Offsite Wetland (N)



Summary for Subcatchment 4S: Runoff to Wazata Blvd (S)

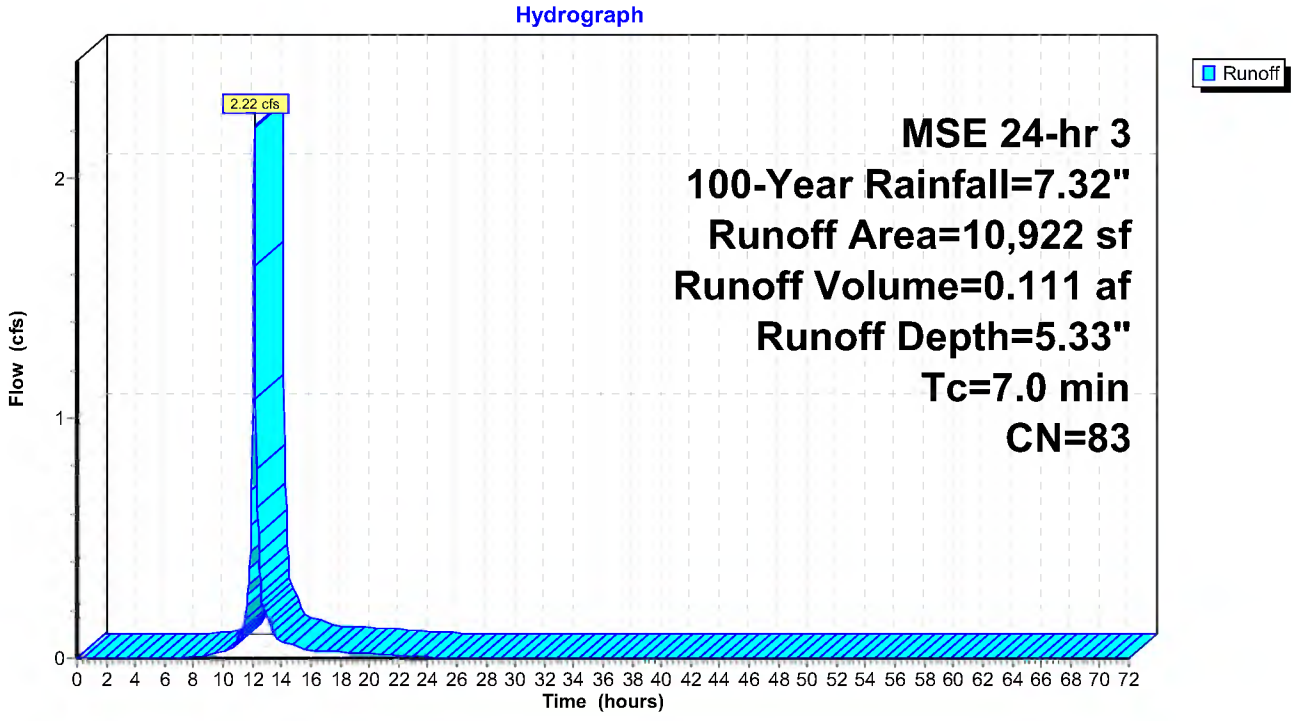
Runoff = 2.22 cfs @ 12.14 hrs, Volume= 0.111 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
1,777	98	Paved parking, HSG D
9,145	80	>75% Grass cover, Good, HSG D
10,922	83	Weighted Average
9,145		83.73% Pervious Area
1,777		16.27% Impervious Area

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

Subcatchment 4S: Runoff to Wazata Blvd (S)



Summary for Subcatchment 5S: to 102

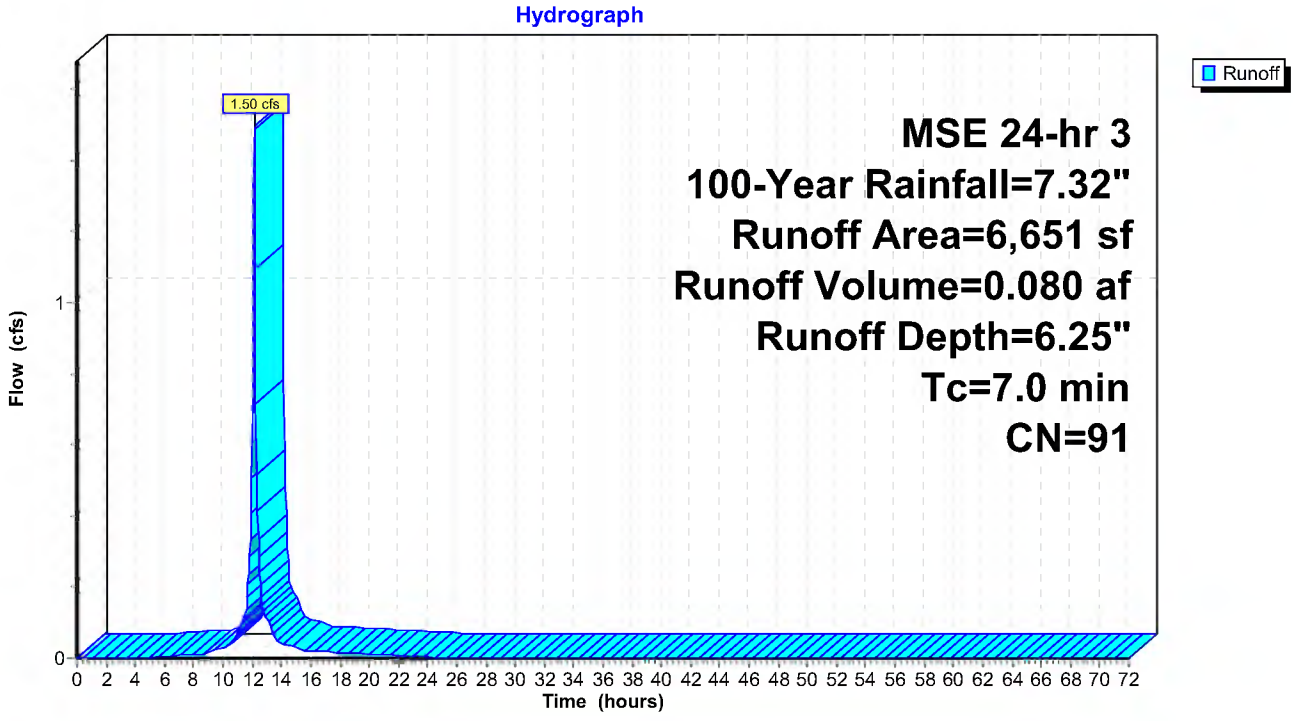
Runoff = 1.50 cfs @ 12.14 hrs, Volume= 0.080 af, Depth= 6.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
4,143	98	Paved parking, HSG D
2,508	80	>75% Grass cover, Good, HSG D
6,651	91	Weighted Average
2,508		37.71% Pervious Area
4,143		62.29% Impervious Area

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

Subcatchment 5S: to 102



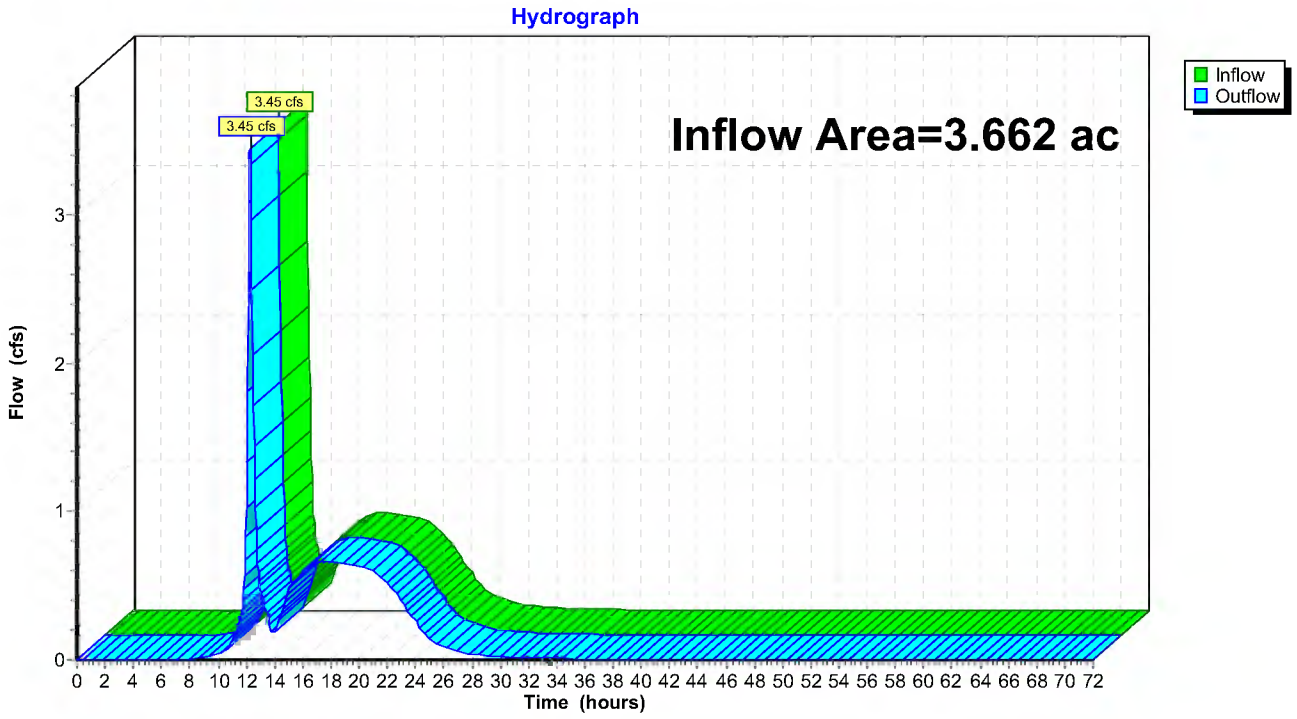
Summary for Reach 3R: total to offsite wetland

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

Inflow Area = 3.662 ac, 52.96% Impervious, Inflow Depth = 2.27" for 100-Year event
Inflow = 3.45 cfs @ 12.26 hrs, Volume= 0.692 af
Outflow = 3.45 cfs @ 12.26 hrs, Volume= 0.692 af, Atten= 0%, Lag= 0.0 min

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

Reach 3R: total to offsite wetland



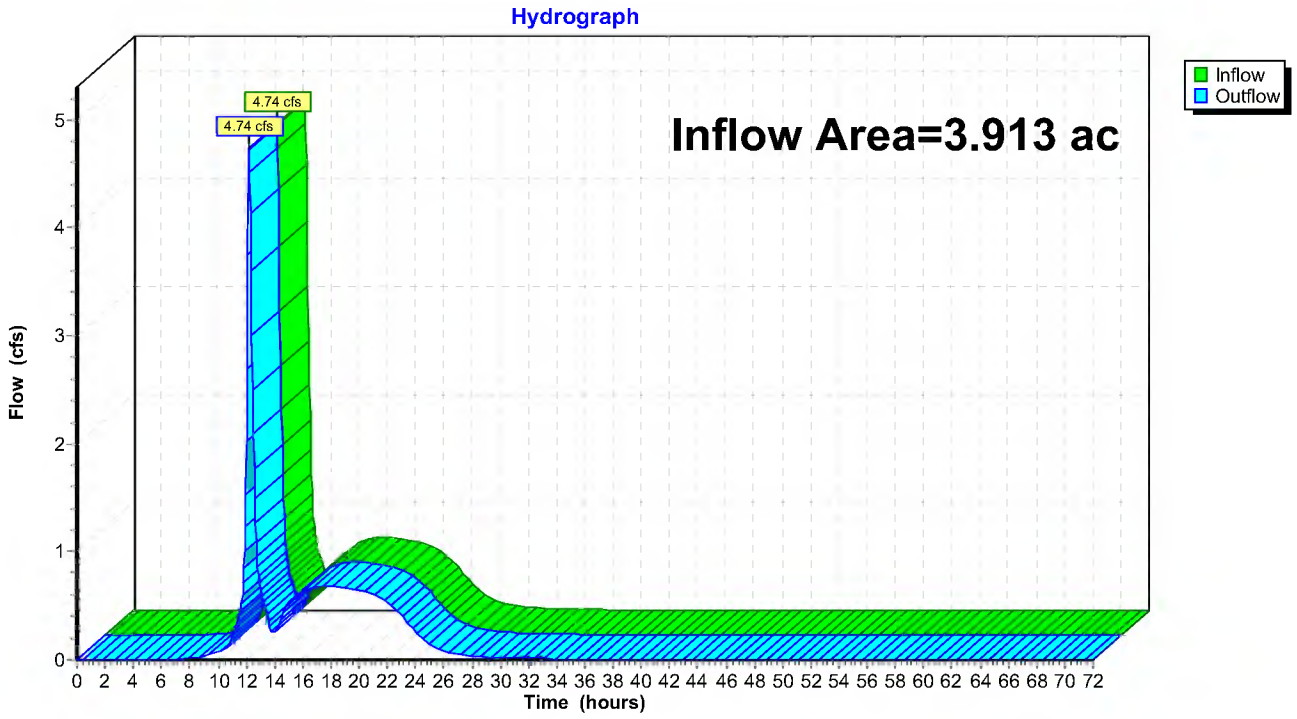
Summary for Reach 4R: total proposed

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

Inflow Area = 3.913 ac, 50.61% Impervious, Inflow Depth = 2.46" for 100-Year event
Inflow = 4.74 cfs @ 12.19 hrs, Volume= 0.803 af
Outflow = 4.74 cfs @ 12.19 hrs, Volume= 0.803 af, Atten= 0%, Lag= 0.0 min

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

Reach 4R: total proposed



Summary for Pond 1P: Underground Detention

[58] Hint: Peaked 1.34' above defined flood level
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.834 ac, 95.12% Impervious, Inflow Depth = 6.96" for 100-Year event
Inflow = 18.80 cfs @ 12.14 hrs, Volume= 1.064 af
Outflow = 19.45 cfs @ 12.15 hrs, Volume= 1.064 af, Atten= 0%, Lag= 0.5 min
Primary = 19.45 cfs @ 12.15 hrs, Volume= 1.064 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 928.10' @ 12.15 hrs Surf.Area= 3,839 sf Storage= 9,824 cf
Flood Elev= 926.76' Surf.Area= 3,774 sf Storage= 7,920 cf

Plug-Flow detention time= 84.7 min calculated for 1.063 af (100% of inflow)
Center-of-Mass det. time= 84.7 min (831.3 - 746.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	922.50'	0 cf	**37.00'W x 102.00'L x 6.00'H Field A** 22,644 cf Overall - 9,817 cf Embedded = 12,827 cf x 0.0% Voids
#2A	923.00'	9,817 cf	**CMP Round 60** x 25 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 25 Chambers in 5 Rows
#3	928.00'	137 cf	**riser storage (Prismatic)**Listed below (Recalc)
		9,954 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
928.00	65	0	0
930.10	65	137	137

Device	Routing	Invert	Outlet Devices
#1	Primary	920.70'	**24.0" Round device outlet** L= 108.0' Ke= 0.900 Inlet / Outlet Invert= 920.70' / 920.17' S= 0.0049 '/' Cc= 0.900 n= 0.011, Flow Area= 3.14 sf
#2	Device 1	923.00'	**0.480 cfs 18" phospho, 14 cartridge**
#3	Device 2	923.00'	**4.0" Vert. device inlet** C= 0.600 Limited to weir flow at low heads
#4	Device 1	926.76'	**4.0' long device bypass weir** 2 End Contraction(s)

Primary OutFlow Max=19.16 cfs @ 12.15 hrs HW=928.09' TW=923.93' (Dynamic Tailwater)
└─**1=device outlet** (Passes 19.16 cfs of 24.36 cfs potential flow)
  ├─**2=18" phospho, 14 cartridge** (Constant Controls 0.48 cfs)
  │ └─**3=device inlet** (Passes 0.48 cfs of 0.86 cfs potential flow)
  └─**4=device bypass weir** (Weir Controls 18.68 cfs @ 3.77 fps)

Pond 1P: Underground Detention - Chamber Wizard Field A

Chamber Model = CMP Round 60 (Round Corrugated Metal Pipe)
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

60.0" Wide + 30.0" Spacing = 90.0" C-C Row Spacing

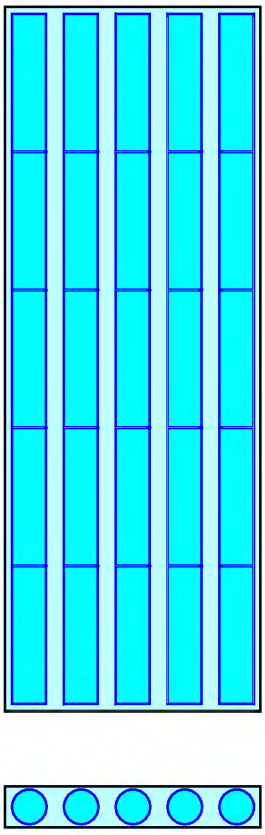
5 Chambers/Row x 20.00' Long = 100.00' Row Length +12.0" End Stone x 2 = 102.00' Base Length
5 Rows x 60.0" Wide + 30.0" Spacing x 4 + 12.0" Side Stone x 2 = 37.00' Base Width
6.0" Stone Base + 60.0" Chamber Height + 6.0" Stone Cover = 6.00' Field Height

25 Chambers x 392.7 cf = 9,817.5 cf Chamber Storage

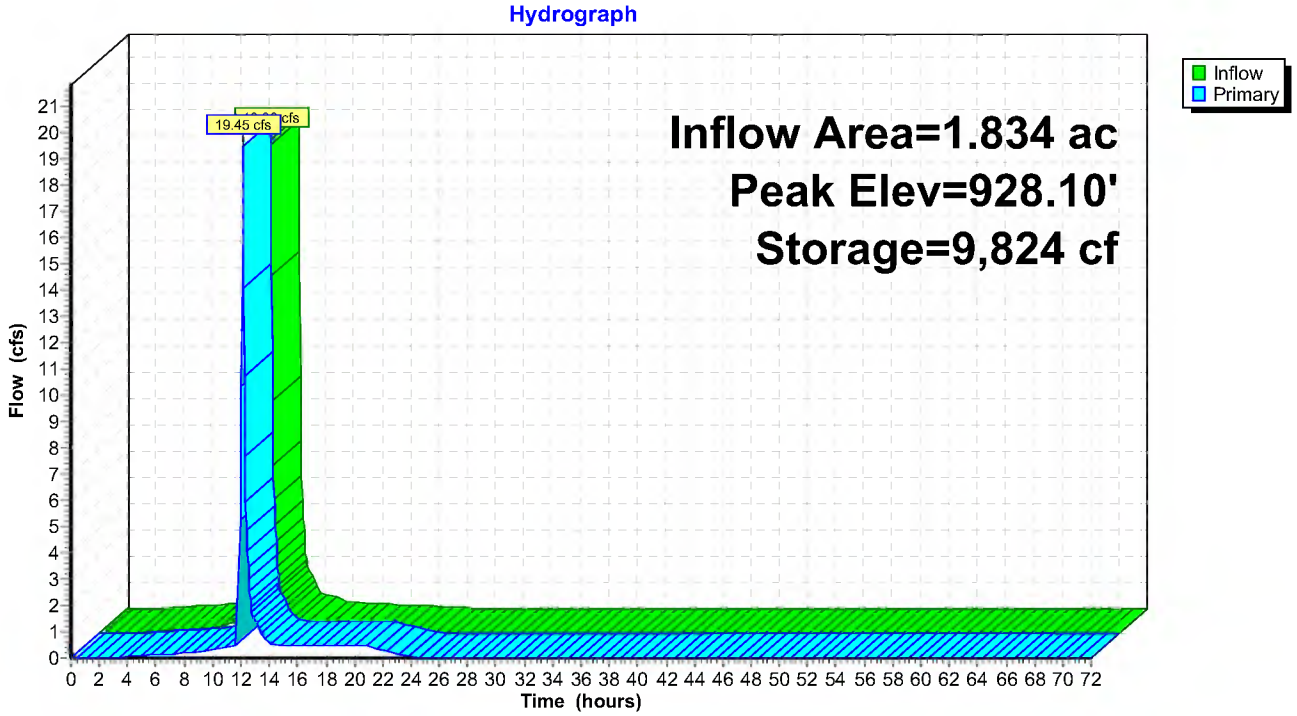
22,644.0 cf Field - 9,817.5 cf Chambers = 12,826.5 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 9,817.5 cf = 0.225 af
Overall Storage Efficiency = 43.4%
Overall System Size = 102.00' x 37.00' x 6.00'

25 Chambers
838.7 cy Field
475.1 cy Stone



Pond 1P: Underground Detention



Stage-Area-Storage for Pond 1P: Underground Detention

Elevation (feet)	Storage (cubic-feet)
922.50	0
922.60	0
922.70	0
922.80	0
922.90	0
923.00	0
923.10	47
923.20	132
923.30	240
923.40	368
923.50	511
923.60	667
923.70	835
923.80	1,014
923.90	1,202
924.00	1,398
924.10	1,601
924.20	1,812
924.30	2,028
924.40	2,250
924.50	2,477
924.60	2,708
924.70	2,943
924.80	3,182
924.90	3,423
925.00	3,667
925.10	3,913
925.20	4,161
925.30	4,409
925.40	4,659
925.50	4,909
925.60	5,159
925.70	5,408
925.80	5,657
925.90	5,904
926.00	6,150
926.10	6,394
926.20	6,636
926.30	6,874
926.40	7,109
926.50	7,340
926.60	7,567
926.70	7,789
926.80	8,006
926.90	8,216
927.00	8,420
927.10	8,616
927.20	8,804
927.30	8,982
927.40	9,150
927.50	9,307
927.60	9,450
927.70	9,577
927.80	9,686
927.90	9,770
928.00	9,817
928.10	9,824
928.20	9,830
928.30	9,837
928.40	9,843
928.50	9,850
928.60	9,856
928.70	9,863
928.80	9,869
928.90	9,876
929.00	9,882
929.10	9,889
929.20	9,895
929.30	9,902
929.40	9,908
929.50	9,915
929.60	9,921
929.70	9,928
929.80	9,934
929.90	9,941
930.00	9,947
930.10	**9,954**

Summary for Pond 102: stmh 102

[57] Hint: Peaked at 924.00' (Flood elevation advised)

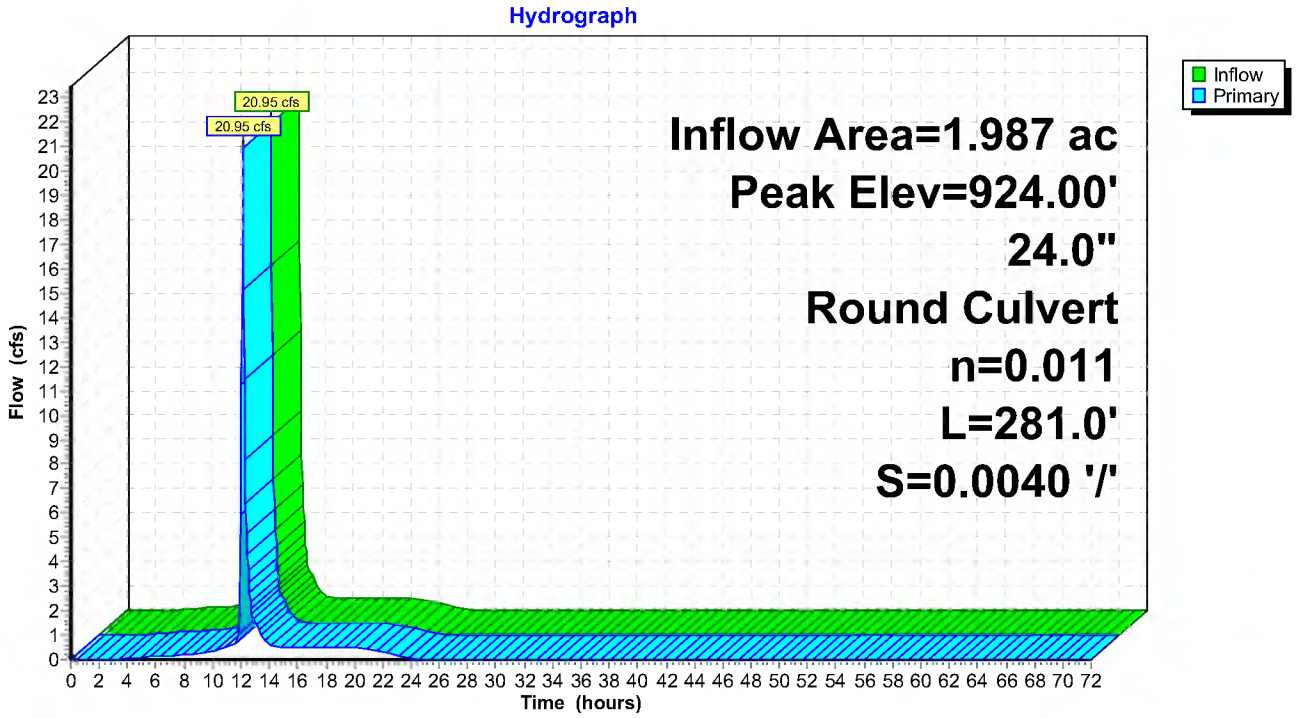
Inflow Area = 1.987 ac, 92.60% Impervious, Inflow Depth = 6.91" for 100-Year event
Inflow = 20.95 cfs @ 12.15 hrs, Volume= 1.143 af
Outflow = 20.95 cfs @ 12.15 hrs, Volume= 1.143 af, Atten= 0%, Lag= 0.0 min
Primary = 20.95 cfs @ 12.15 hrs, Volume= 1.143 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 924.00' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	919.93'	**24.0" Round Culvert** L= 281.0' Ke= 0.900 Inlet / Outlet Invert= 919.93' / 918.80' S= 0.0040 '/' Cc= 0.900 n= 0.011, Flow Area= 3.14 sf

Primary OutFlow Max=20.64 cfs @ 12.15 hrs HW=923.92' TW=917.02' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 20.64 cfs @ 6.57 fps)

Pond 102: stmh 102



Stage-Area-Storage for Pond 102: stmh 102

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
919.93	**0.000**	922.48	0.000
919.98	0.000	922.53	0.000
920.03	0.000	922.58	0.000
920.08	0.000	922.63	0.000
920.13	0.000	922.68	0.000
920.18	0.000	922.73	0.000
920.23	0.000	922.78	0.000
920.28	0.000	922.83	0.000
920.33	0.000	922.88	0.000
920.38	0.000	922.93	0.000
920.43	0.000	922.98	0.000
920.48	0.000	923.03	0.000
920.53	0.000	923.08	0.000
920.58	0.000	923.13	0.000
920.63	0.000	923.18	0.000
920.68	0.000	923.23	0.000
920.73	0.000	923.28	0.000
920.78	0.000	923.33	0.000
920.83	0.000	923.38	0.000
920.88	0.000	923.43	0.000
920.93	0.000	923.48	0.000
920.98	0.000	923.53	0.000
921.03	0.000	923.58	0.000
921.08	0.000	923.63	0.000
921.13	0.000	923.68	0.000
921.18	0.000	923.73	0.000
921.23	0.000	923.78	0.000
921.28	0.000	923.83	0.000
921.33	0.000	923.88	0.000
921.38	0.000	923.93	0.000
921.43	0.000	923.98	0.000
921.48	0.000		
921.53	0.000		
921.58	0.000		
921.63	0.000		
921.68	0.000		
921.73	0.000		
921.78	0.000		
921.83	0.000		
921.88	0.000		
921.93	0.000		
921.98	0.000		
922.03	0.000		
922.08	0.000		
922.13	0.000		
922.18	0.000		
922.23	0.000		
922.28	0.000		
922.33	0.000		
922.38	0.000		
922.43	0.000		

Summary for Pond Wtld Prd: Existing Wetland

Inflow Area = 3.072 ac, 62.17% Impervious, Inflow Depth = 6.27" for 100-Year event
Inflow = 30.24 cfs @ 12.15 hrs, Volume= 1.605 af
Outflow = 0.60 cfs @ 18.21 hrs, Volume= 0.446 af, Atten= 98%, Lag= 364.0 min
Primary = 0.60 cfs @ 18.21 hrs, Volume= 0.446 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 918.21' @ 18.21 hrs Surf.Area= 27,515 sf Storage= 53,987 cf

Plug-Flow detention time= 549.0 min calculated for 0.446 af (28% of inflow)
Center-of-Mass det. time= 383.9 min (1,199.5 - 815.6)

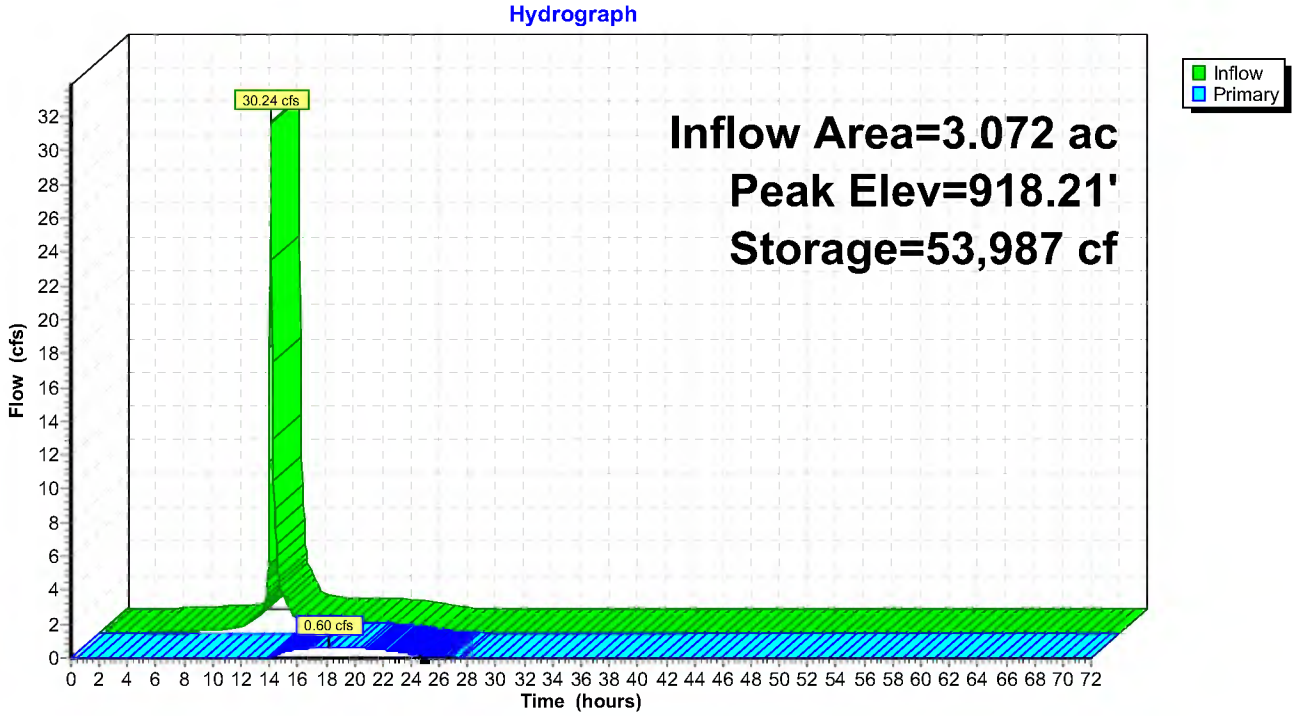
Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	76,784 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
916.00	21,538	0	0
917.00	24,128	22,833	22,833
918.00	26,828	25,478	48,311
919.00	30,118	28,473	76,784

Device	Routing	Invert	Outlet Devices
#1	Primary	916.35'	**15.0" Round ocs outlet** L= 18.0' Ke= 0.900 Inlet / Outlet Invert= 916.35' / 916.22' S= 0.0072 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf
#2	Device 1	918.08'	**4.0' long ocs weir wall** 2 End Contraction(s)
#3	Device 2	917.07'	**15.0" Round ocs inlet** L= 12.0' Ke= 0.900 Inlet / Outlet Invert= 917.07' / 916.39' S= 0.0567 '/' Cc= 0.900 n= 0.010, Flow Area= 1.23 sf

Primary OutFlow Max=0.60 cfs @ 18.21 hrs HW=918.21' TW=0.00' (Dynamic Tailwater)
↑**1=ocs outlet** (Passes 0.60 cfs of 5.18 cfs potential flow)
↑**2=ocs weir wall** (Weir Controls 0.60 cfs @ 1.17 fps)
↑**3=ocs inlet** (Passes 0.60 cfs of 1.60 cfs potential flow)

Pond Wtld Prd: Existing Wetland



Stage-Area-Storage for Pond Wtld Prd: Existing Wetland

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
916.00	21,538	0
916.05	21,667	1,080
916.10	21,797	2,167
916.15	21,926	3,260
916.20	22,056	4,359
916.25	22,186	5,465
916.30	22,315	6,578
916.35	22,445	7,697
916.40	22,574	8,822
916.45	22,704	9,954
916.50	22,833	11,093
916.55	22,962	12,238
916.60	23,092	13,389
916.65	23,221	14,547
916.70	23,351	15,711
916.75	23,481	16,882
916.80	23,610	18,059
916.85	23,740	19,243
916.90	23,869	20,433
916.95	23,999	21,630
917.00	24,128	22,833
917.05	24,263	24,043
917.10	24,398	25,259
917.15	24,533	26,483
917.20	24,668	27,713
917.25	24,803	28,949
917.30	24,938	30,193
917.35	25,073	31,443
917.40	25,208	32,700
917.45	25,343	33,964
917.50	25,478	35,235
917.55	25,613	36,512
917.60	25,748	37,796
917.65	25,883	39,087
917.70	26,018	40,384
917.75	26,153	41,688
917.80	26,288	42,999
917.85	26,423	44,317
917.90	26,558	45,642
917.95	26,693	46,973
918.00	26,828	48,311
918.05	26,992	49,657
918.10	27,157	51,010
918.15	27,321	52,372
918.20	27,486	53,742
918.25	27,651	55,121
918.30	27,815	56,507
918.35	27,980	57,902
918.40	28,144	59,305
918.45	28,309	60,717
918.50	28,473	62,136
918.55	28,637	63,564
918.60	28,802	65,000
918.65	28,966	66,444
918.70	29,131	67,897
918.75	29,296	69,357
918.80	29,460	70,826
918.85	29,625	72,303
918.90	29,789	73,789
918.95	29,954	75,282
919.00	**30,118**	**76,784**

APPENDIX C – MIDS MODEL

Project Information

Calculator Version:	Version 4: July 2020
Project Name:	Marsh Run II
User Name / Company Name:	Sambatek
Date:	2/20/2023
Project Description:	
Construction Permit?:	No

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	55305
Annual Rainfall (inches):	30.4
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed				1.93	1.93
				Impervious Area (acres)	1.98
				Total Area (acres)	3.91

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed				1.73	1.73
				Impervious Area (acres)	1.94
				Total Area (acres)	3.67

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	7906	ft3
Volume removed by BMPs towards performance goal:	210	ft^3
Percent volume removed towards performance goal	**3**	**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	5.3888	acre-ft
Annual runoff volume removed by BMPs:	0.0971	acre-ft
Percent annual runoff volume removed:	**2**	**%**
Post development annual particulate P load:	2.4185	lbs
Annual particulate P removed by BMPs:	1.851	lbs
Post development annual dissolved P load:	1.979	lbs
Annual dissolved P removed by BMPs:	0.929	lbs
Total P removed by BMPs	2.78	lbs
Percent annual total phosphorus removed:	**63**	**%**
Post development annual TSS load:	798.8	lbs
Annual TSS removed by BMPs:	716.2	lbs
Percent annual TSS removed:	**90**	**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)
Impervious disconnection	210	399	210	189	53
existing wetland	0	7536	0	7536	0
stormfilter + detention	0	6948	0	6948	0
jelllyfish	0	399	0	399	0
sump	0	6948	0	6948	0

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
Impervious disconnection	1.1172	0	0.0971	1.0201	9
existing wetland	0	5.0911	0	5.0911	0
stormfilter + detention	0	3.8201	0	3.8201	0
jelllyfish	0.2508	0	0	0.2508	0
sump	3.8201	0	0	3.8201	0

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Impervious disconnection	0.5014	0	0.0436	0.4578	9
existing wetland	0	1.1931	0.7159	0.4772	60
stormfilter + detention	0	1.7145	1.0287	0.6858	60
jelllyfish	0.1126	0	0.0631	0.0495	56
sump	1.7145	0	0	1.7145	0

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Impervious disconnection	0.4102	0	0.0356	0.3746	9
existing wetland	0	0.9762	0	0.9762	0
stormfilter + detention	0	1.4028	0.8417	0.5611	60
jelllyfish	0.0921	0	0.0516	0.0405	56
sump	1.4028	0	0	1.4028	0

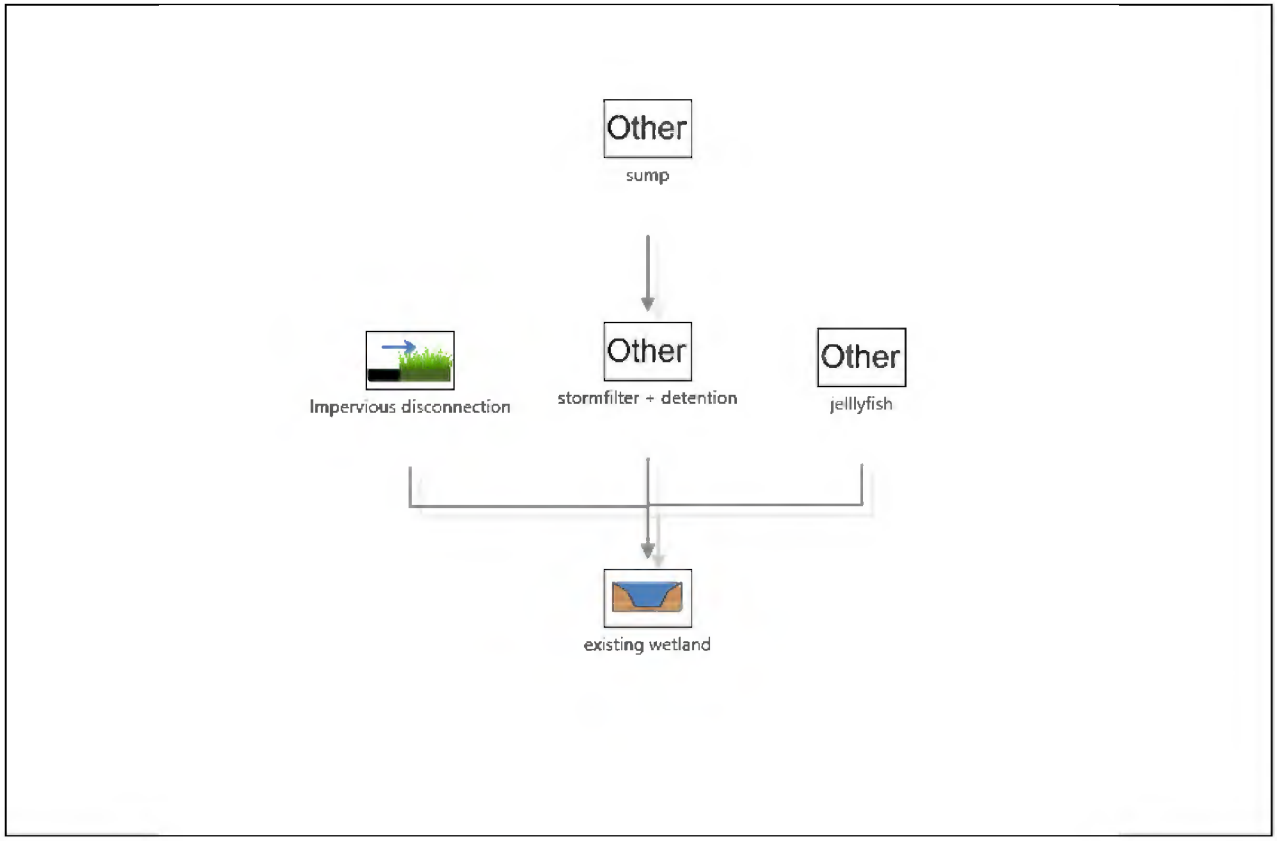
Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Impervious disconnection	0.9116	0	0.0792	0.8324	9
existing wetland	0	2.1693	0.7159	1.4534	30
stormfilter + detention	0	3.1173	1.8704	1.2469	60
jelllyfish	0.2047	0	0.1147	0.09	56
sump	3.1173	0	0	3.1173	0

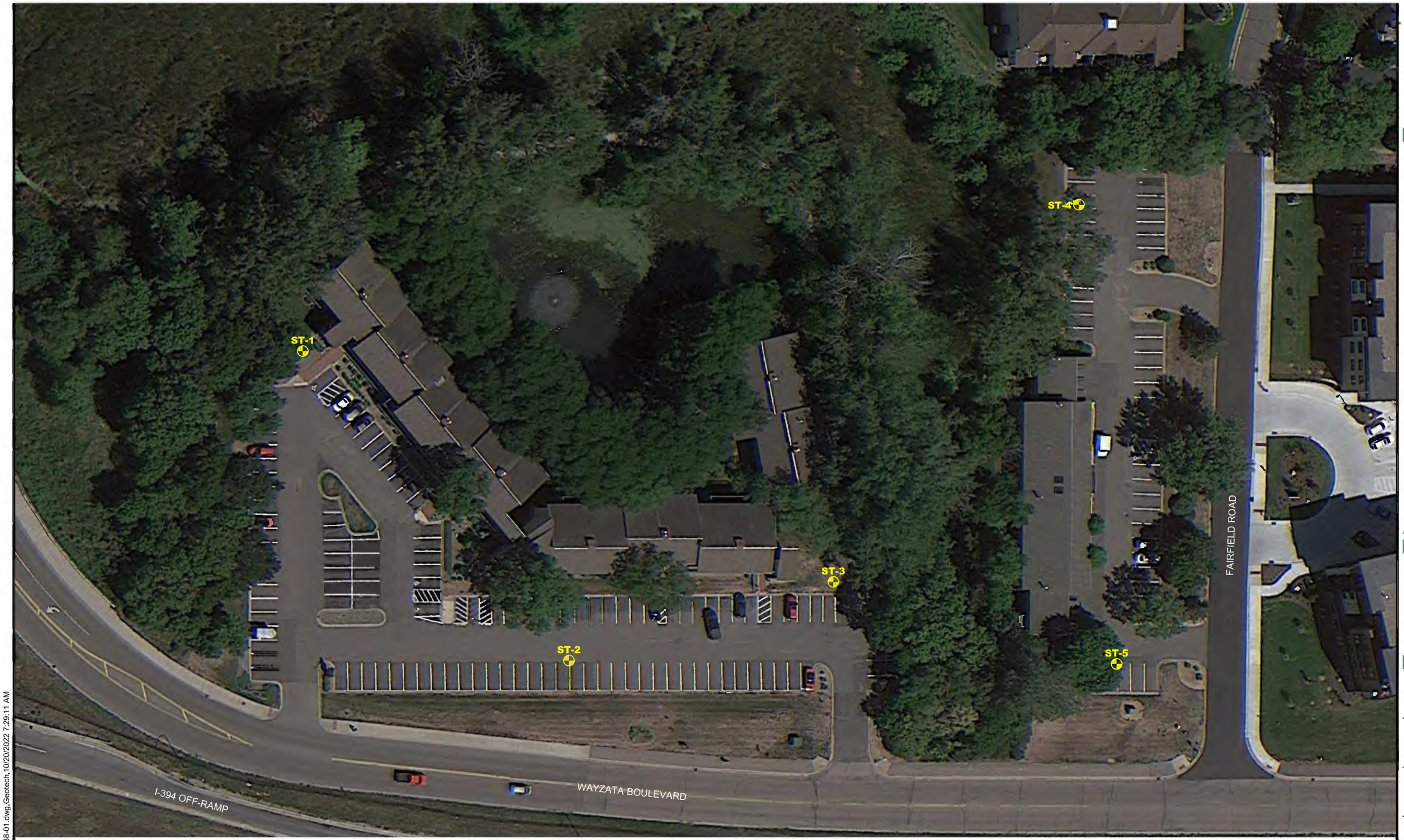
TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Impervious disconnection	165.61	0	117.22	48.39	71
existing wetland	0	132.28	79.37	52.909999999	60
stormfilter + detention	0	509.67	433.22	76.449999999	85
jelllyfish	37.18	0	29.74	7.44	80
sump	566.3	0	56.63	509.67	10

BMP Schematic



APPENDIX D – BORING LOGS



DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

30' 0 60'

SCALE: 1"= 60'

F:\2018\B1803638_01\CAD\B1803638-01.dwg,Geotech,10/20/2022 7:29:11 AM

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11001 Hampshire Avenue S
Minneapolis, MN 55438
952.995.2000
braunintertec.com

Drawing Information

Project No:	B1803638.01
Drawing No:	B1803638-01
Drawn By:	JAG
Date Drawn:	10/12/22
Checked By:	JLW
Last Modified:	10/20/22

Project Information

Marsh Run - Phase II

Northwest Quadrant of Wayzata Boulevard and Fairfield Road W.

Minnetonka, Minnesota

Soil Boring Location Sketch

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1803638.01
Geotechnical Evaluation
Marsh Run - Phase II
NW Quadrant of Wayzata Blvd and Fairfield Rd W
Minnetonka, Minnesota

BORING: **ST-1**
LOCATION: See attached sketch
DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 166000 EASTING: 487892
DRILLER: M. Takada LOGGED BY: R. Huber START DATE: 10/19/22 END DATE: 10/19/22
SURFACE ELEVATION: 924.9 ft RIG: 7507 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Sun

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
922.9		FILL: SILTY SAND (SM), fine-grained, black, moist					
2.0		FILL: SANDY LEAN CLAY (CL), trace Gravel, black and brown, moist		3-3-5 (8) 17"			
			5	3-3-3 (6) 18"			
917.9							
7.0		LEAN CLAY (CL), gray, moist, medium (ALLUVIUM)		1-2-3 (5) 17"			
915.9							
9.0		SANDY LEAN CLAY (CL), trace Gravel, gray to grayish brown, moist, medium to very stiff (GLACIAL TILL)	10	2-3-6 (9) 18"		19	
				4-6-9 (15) 17"			
			15	6-7-11 (18) 18"		16	Switched to mud rotary drilling at 15 feet
			20	5-8-11 (19) 15"			
			25	6-11-15 (26) 17"			
896.9							
28.0		CLAYEY SAND (SC), trace Gravel, grayish brown, moist, very stiff (GLACIAL TILL)	30	5-8-10 (18*)			*Low recovery

Continued on next page

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1803638.01
Geotechnical Evaluation
Marsh Run - Phase II
NW Quadrant of Wayzata Blvd and Fairfield Rd W
Minnetonka, Minnesota

BORING: **ST-1**
LOCATION: See attached sketch
DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 166000 EASTING: 487892
DRILLER: M. Takada LOGGED BY: R. Huber
START DATE: 10/19/22 END DATE: 10/19/22
SURFACE ELEVATION: 924.9 ft RIG: 7507 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Sun

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
		CLAYEY SAND (SC), trace Gravel, grayish brown, moist, very stiff (GLACIAL TILL)	35	5-11-12 (23) 18"			
			40	10-10-17 (27) 18"			
880.9							
44.0		SILTY, CLAYEY SAND (SC-SM), fine to medium-grained, trace Gravel, reddish brown, moist, medium dense to dense (GLACIAL TILL)	45	11-12-15 (27) 18"			
			50	12-15-20 (35) 18"			
870.9							
54.0		SILTY SAND (SM), fine to medium-grained, trace Gravel, gray, moist, medium dense (GLACIAL TILL)	55	15-15-15 (30*)			*Low recovery
865.9							
59.0		POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, gray, wet, medium dense to dense (GLACIAL OUTWASH)	60	9-8-8 (16) 18"			

Continued on next page

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1803638.01
Geotechnical Evaluation
Marsh Run - Phase II
NW Quadrant of Wayzata Blvd and Fairfield Rd W
Minnetonka, Minnesota

BORING: **ST-1**
LOCATION: See attached sketch
DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 166000 EASTING: 487892
DRILLER: M. Takada LOGGED BY: R. Huber
START DATE: 10/19/22 END DATE: 10/19/22
SURFACE ELEVATION: 924.9 ft RIG: 7507 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Sun

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
		POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, gray, wet, medium dense to dense (GLACIAL OUTWASH)	65	17-17-23 (40) 18"			
856.9							
68.0		SILTY, CLAYEY SAND (SC-SM), fine to medium-grained, trace Gravel, reddish brown, moist, very dense (GLACIAL TILL)	70	21-24-47 (71) 18"			
850.9							
74.0		SILTY SAND (SM), fine to medium-grained, trace Gravel, brown, moist, medium dense to very dense (GLACIAL TILL)	75	12-13-15 (28) 18"			
			80	16-30-20 (50) 12"			Auger met refusal at 82 feet
843.9							
81.0		LIMESTONE, brown, highly weathered		50/1" (REF*)			*Low recovery
842.9							
82.0		END OF BORING					
		Boring immediately backfilled					Water level obscured due to mud rotary drilling.
			85				
			90				
			95				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1803638.01
Geotechnical Evaluation
Marsh Run - Phase II
NW Quadrant of Wayzata Blvd and Fairfield Rd W
Minnetonka, Minnesota

BORING: **ST-2**
LOCATION: See attached sketch
DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 165800 EASTING: 488063
DRILLER: M. Takada LOGGED BY: R. Huber
START DATE: 10/17/22 END DATE: 10/17/22
SURFACE ELEVATION: 925.1 ft RIG: 7507 METHOD: 3 1/4" HSA
SURFACING: Asphalt WEATHER: Cloudy

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
923.1		FILL: CLAYEY SAND (SC), with Gravel, black and brown, moist					
2.0		FILL: SANDY LEAN CLAY (CL), trace Gravel, brownish gray, moist		4-4-6 (10) 15"			
			5	1-2-2 (4) 16"			
916.1				2-2-2 (4) 17"			
9.0		ORGANIC SOIL (OL), black, moist (BURIED TOPSOIL)	10	1-1-2 (3) 16"		44	OC=8%
913.1							
12.0		LEAN CLAY (CL), gray, moist, medium to stiff (ALLUVIUM)		1-2-5 (7) 15"			
			15	2-4-6 (10) 13"		20	
906.1							
19.0		SANDY LEAN CLAY (CL), trace Gravel, gray, moist, stiff (GLACIAL TILL)	20	6-6-11 (17) 17"		31	
			25	4-5-8 (13*)			*Low recovery
			30	4-5-6 (11) 18"			

Continued on next page

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Project Number B1803638.01
Geotechnical Evaluation
Marsh Run - Phase II
NW Quadrant of Wayzata Blvd and Fairfield Rd W
Minnetonka, Minnesota

BORING: **ST-2**
LOCATION: See attached sketch
DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 165800 EASTING: 488063
DRILLER: M. Takada LOGGED BY: R. Huber START DATE: 10/17/22 END DATE: 10/17/22
SURFACE ELEVATION: 925.1 ft RIG: 7507 METHOD: 3 1/4" HSA SURFACING: Asphalt WEATHER: Cloudy

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
891.1		SANDY LEAN CLAY (CL), trace Gravel, gray, moist, stiff (GLACIAL TILL)					
34.0	▼	SILTY SAND (SM), fine to medium-grained, brown, moist, medium dense (GLACIAL TILL)	35	4-7-11 (18) 14"			
	▽		40	8-10-13 (23) 18"			
884.1							
41.0		END OF BORING Boring immediately backfilled					Water observed at 40.0 feet with 40.0 feet of tooling in the ground while drilling. Water observed at 35.0 feet at end of drilling. Water not observed to cave-in depth of 30.0 feet immediately after withdrawal of auger.
			45				
			50				
			55				
			60				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1803638.01
Geotechnical Evaluation
Marsh Run - Phase II
NW Quadrant of Wayzata Blvd and Fairfield Rd W
Minnetonka, Minnesota

BORING: **ST-3**
LOCATION: See attached sketch
DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 165851 EASTING: 488234
START DATE: 10/18/22 END DATE: 10/18/22
SURFACE ELEVATION: 925.0 ft RIG: 7507 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Sun
DRILLER: M. Takada LOGGED BY: R. Huber

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
923.0		FILL: SILTY SAND (SM), fine to medium-grained, black, moist					
2.0		FILL: SANDY LEAN CLAY (CL), trace Gravel, black and brown, moist		7-8-8 (16) 17"			
			5	3-5-5 (10) 18"			
				7-14-9 (23) 16"			
			10	4-7-8 (15*)			*Low recovery
911.0				1-1-1 (2*) 0"			*No recovery
14.0		LEAN CLAY (CL), gray, wet, soft (ALLUVIUM)	15	2-2-2 (4) 18"		23	Switched to mud rotary drilling at 15 feet
			20	2-1-2 (3) 17"		27	
			25	2-2-2 (4) 18"			
898.0							
27.0		SANDY LEAN CLAY (CL), trace Gravel, gray, moist, soft to stiff (GLACIAL TILL)					
			30	2-3-5 (8) 18"			

Continued on next page

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1803638.01
Geotechnical Evaluation
Marsh Run - Phase II
NW Quadrant of Wayzata Blvd and Fairfield Rd W
Minnetonka, Minnesota

BORING: **ST-3**
LOCATION: See attached sketch
DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 165851 EASTING: 488234
DRILLER: M. Takada LOGGED BY: R. Huber START DATE: 10/18/22 END DATE: 10/18/22
SURFACE ELEVATION: 925.0 ft RIG: 7507 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Sun

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
		SANDY LEAN CLAY (CL), trace Gravel, gray, moist, soft to stiff (GLACIAL TILL)	35	4-4-7 (11) 18"			
			40	4-7-8 (15) 15"			
			45	4-6-8 (14) 18"			
			50	5-5-9 (14) 17"			
871.0 54.0		POORLY GRADED SAND (SP), fine to coarse-grained, with Gravel, gray, wet, loose (GLACIAL OUTWASH)	55	6-3-3 (6*) 0"			*No recovery
			60	3-3-4 (7) 15"			

Continued on next page

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1803638.01
Geotechnical Evaluation
Marsh Run - Phase II
NW Quadrant of Wayzata Blvd and Fairfield Rd W
Minnetonka, Minnesota

BORING: **ST-3**
LOCATION: See attached sketch
DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 165851 EASTING: 488234
DRILLER: M. Takada LOGGED BY: R. Huber
START DATE: 10/18/22 END DATE: 10/18/22
SURFACE ELEVATION: 925.0 ft RIG: 7507 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Sun

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
		POORLY GRADED SAND (SP), fine to coarse-grained, with Gravel, gray, wet, loose (GLACIAL OUTWASH)	65	9-4-5 (9) 18"			
856.0							
69.0		SILTY SAND (SM), fine to medium-grained, with Gravel, gray, wet, medium dense (GLACIAL TILL)	70	7-10-15 (25) 18"			
852.0							
73.0		SILTY, CLAYEY SAND (SC-SM), fine to medium-grained, with Gravel, reddish brown, moist, very dense (GLACIAL TILL)	75	11-30-46 (76) 17"			
846.0							
79.0		SILTY SAND (SM), fine to medium-grained, with Gravel, brown, moist, dense (GLACIAL TILL)	80	15-22-19 (41) 18"			
843.0							
82.0		LIMESTONE, brown, highly weathered		25-50/1" (REF*)			*Low recovery
842.5		END OF BORING					
82.5		Boring immediately backfilled					Water level obscured due to mud rotary drilling.
			85				
			90				
			95				

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1803638.01
Geotechnical Evaluation
Marsh Run - Phase II
NW Quadrant of Wayzata Blvd and Fairfield Rd W
Minnetonka, Minnesota

BORING: **ST-4**
LOCATION: See attached sketch
DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 166094 EASTING: 488393
DRILLER: M. Takada LOGGED BY: R. Huber
START DATE: 10/17/22 END DATE: 10/17/22
SURFACE ELEVATION: 920.7 ft RIG: 7507 METHOD: 3 1/4" HSA
SURFACING: Asphalt WEATHER: Cloudy

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
918.7		FILL: CLAYEY SAND (SC), brownish gray, moist					
2.0		FILL: SANDY LEAN CLAY (CL), gray and black, moist		2-3-4 (7) 15"			
916.7							
4.0		ORGANIC SOIL (OL), black, moist (BURIED TOPSOIL)	5	2-3-3 (6) 12"			
913.7							
7.0		LEAN CLAY (CL), gray, wet, soft (ALLUVIUM)		1-1-1 (2) 16"		40	LL=37, PL=16, PI=21
			10	1-1-2 (3) 18"		32	
				1-1-2 (3) 18"		37	LL=41, PL=19, PI=22
906.7							
14.0		SANDY LEAN CLAY (CL), with Gravel, gray, moist, medium to stiff (GLACIAL TILL)	15	2-4-4 (8) 18"			
			20	2-4-5 (9) 18"		18	
	▼		25	1-4-6 (10) 17"			
891.7							
29.0		CLAYEY SAND (SC), trace Gravel, gray, moist, stiff (GLACIAL TILL)	30	2-4-5 (9) 18"			
888.7							
32.0		Continued on next page					

BRAUN INTERTEC
The Science You Build On.

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

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Minnetonka, Minnesota

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DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 166094 EASTING: 488393
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SURFACE ELEVATION: 920.7 ft RIG: 7507 METHOD: 3 1/4" HSA SURFACING: Asphalt WEATHER: Cloudy

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
		SANDY LEAN CLAY (CL), trace Gravel, gray, moist, very stiff (GLACIAL TILL)	35	5-7-9 (16) 18"			
			40	4-7-10 (17) 18"			
879.7 41.0		END OF BORING Boring immediately backfilled					Water observed at 25.0 feet at end of drilling.
			45				
			50				
			55				
			60				

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Minnetonka, Minnesota

BORING: **ST-5**
LOCATION: See attached sketch
DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 165798 EASTING: 488417
DRILLER: M. Takada LOGGED BY: R. Huber
START DATE: 10/17/22 END DATE: 10/17/22
SURFACE ELEVATION: 922.5 ft RIG: 7507 METHOD: 3 1/4" HSA
SURFACING: Asphalt WEATHER: Cloudy

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
920.5		FILL: SILTY, CLAYEY SAND (SC-SM), trace Gravel, grayish brown, moist					
2.0		FILL: SANDY LEAN CLAY (CL), gray and black, moist		4-5-5 (10) 17"			
918.5							
4.0		FILL: ORGANIC SOIL (OL), black, moist	5	3-3-4 (7) 16"			
915.5							
7.0		FILL: CLAYEY SAND (SC), brown and dark gray, moist		2-1-1 (2) 14"			
913.5							
9.0	▽	LEAN CLAY (CL), with Silt lenses, gray, wet, soft to medium (ALLUVIUM)	10	4-3-1 (4) 18"			
				1-1-4 (5) 18"			
			15	1-1-1 (2) 18"		32	LL=33, PL=20, PI=13
904.5							
18.0		SANDY LEAN CLAY (CL), trace Gravel, gray, moist, medium to stiff (GLACIAL TILL)	20	2-2-4 (6) 18"			
			25	2-3-5 (8) 18"			
			30	3-4-9 (13) 16"			

Continued on next page

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Minnetonka, Minnesota

BORING: **ST-5**
LOCATION: See attached sketch
DATUM: NAD 1983 HARN Adj MN Hennepin (US Feet)
NORTHING: 165798 EASTING: 488417
START DATE: 10/17/22 END DATE: 10/17/22
SURFACE ELEVATION: 922.5 ft RIG: 7507 METHOD: 3 1/4" HSA
SURFACING: Asphalt WEATHER: Cloudy
DRILLER: M. Takada LOGGED BY: R. Huber

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
889.5		SANDY LEAN CLAY (CL), trace Gravel, gray, moist, medium to stiff (GLACIAL TILL)					
33.0		SANDY LEAN CLAY (CL), trace Gravel, with Sand seams, gray, moist, stiff to very stiff (GLACIAL TILL)	35	4-5-5 (10) 18"			
			40	8-17-10 (27*)			*Low recovery
881.5							
41.0		END OF BORING					Water observed at 12.5 feet while drilling.
		Boring immediately backfilled					
			45				
			50				
			55				
			60				