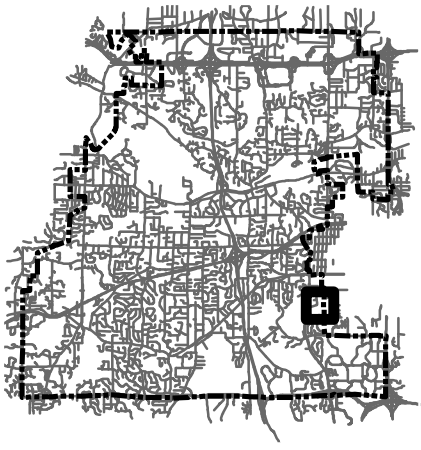
CITY OF MINNETONKA

LOCATION MAP

Project: Rainbow Tree Care
Location: 11501 K-Tel Dr



Narrative from the tenant utilizing the expanded parking lot areas

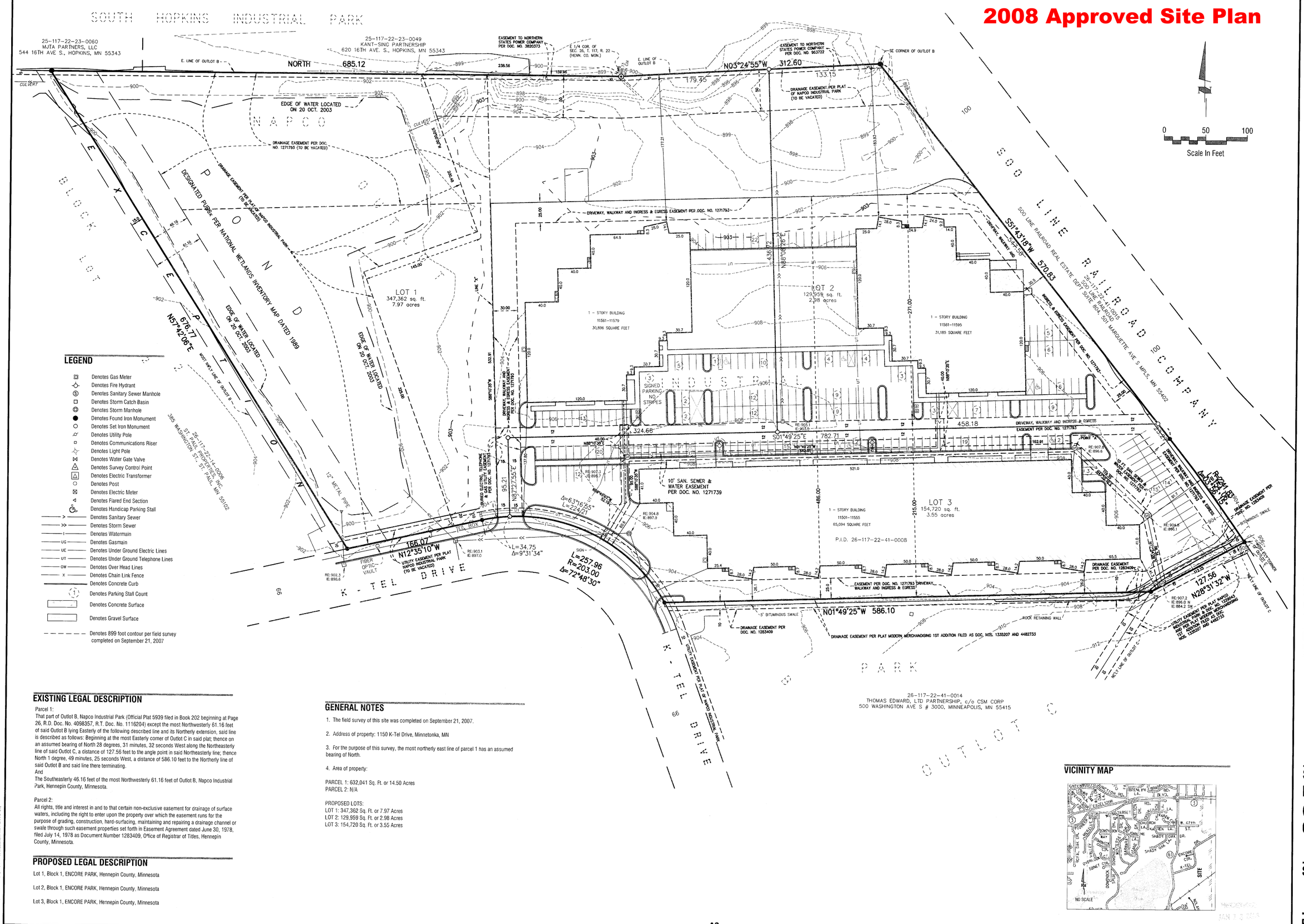
To the City of Minnetonka officials, we Rainbow Tree Care are applying for this permit to continue to operate our business after being notified that the property was altered without proper permitting. This is related to an outside storage area that was present on the property when we took possession. We have also used portions of the property, under verbal approval of the prior landowners, that we now understand are not complaint. Upon being notified the property was not in compliance we began an effort to bring the property into conformity, while still effectively operating in the facility. We are requesting this permit as it will allow us to continue to operate our business in current Minnetonka location. We are committed to adjust our operations to work within the proposed land use changes. We also kindly ask for any support available to make the changes without significantly interrupting or limiting our work. To speak to the use of the facility we would like to provide some background about who we are.

Rainbow Treecare is an Employee-Owned Environmental Services company headquartered at 11571 K-Tel Drive, Minnetonka, MN. Rainbow provides various services to the Twin Cities Metro area related to Tree and Lawn Health, Structural Pest Control, and Seasonal Lighting. Rainbow also own and invents Tree Preservation tools and supplies used by arborists thought the US to save trees and improve tree health.

Due to the seasonal nature of Rainbow's business, particularly it's tree preservation efforts with Dutch Elm Disease (Elm) and Emerald Ash Borer (Ash), Rainbow staff fluctuates with the peak period of spring through fall.
Apart from the growth of the business, Rainbows use of the building has changed little since it moved into the location in late 2008. The premise is roughly half office and half warehouse space. The office space serves as Rainbow corporate headquarters and is comprised of a mix of offices, cubicles and conference rooms.

Rainbow uses the warehouse to store inventory and equipment, provide maintenance to equipment, and to ship products to it's customers. The facility and outdoor space are utilized for storage of equipment and supplies used in the delivery of it's services. The majority of Rainbow's employes access equipment and supplies from the facility and are deployed to work sites each day.

2008 Approved Site Plan



LEGEND

- Denotes Gas Meter
- Denotes Fire Hydrant
- Denotes Sanitary Sewer Manhole
- Denotes Storm Catch Basin
- Denotes Storm Manhole
- Denotes Found Iron Monument
- Denotes Set Iron Monument
- Denotes Utility Pole
- Denotes Communications Riser
- Denotes Light Pole
- Denotes Water Gate Valve
- Denotes Survey Control Point
- Denotes Electric Transformer
- Denotes Post
- Denotes Electric Meter
- Denotes Flared End Section
- Denotes Handicap Parking Stall
- Denotes Sanitary Sewer
- Denotes Storm Sewer
- Denotes Watermain
- Denotes Gasmain
- Denotes Under Ground Electric Lines
- Denotes Under Ground Telephone Lines
- Denotes Over Head Lines
- Denotes Chain Link Fence
- Denotes Concrete Curb
- Denotes Parking Stall Count
- Denotes Concrete Surface
- Denotes Gravel Surface
- Denotes 899 foot contour per field survey completed on September 21, 2007

EXISTING LEGAL DESCRIPTION

Parcel 1:
That part of Outlot B, Napco Industrial Park (Official Plat 5939 filed in Book 202 beginning at Page 26, R.D. Doc. No. 4098357, R.T. Doc. No. 1116204) except the most Northwesterly 61.16 feet of said Outlot B lying Easterly of the following described line and its Northerly extension, said line is described as follows: Beginning at the most Easterly corner of Outlot C in said plat; thence on an assumed bearing of North 28 degrees, 31 minutes, 32 seconds West along the Northeasterly line of said Outlot C, a distance of 127.56 feet to the angle point in said Northeasterly line; thence North 1 degree, 49 minutes, 25 seconds West, a distance of 586.10 feet to the Northerly line of said Outlot B and said line there terminating.
And
The Southeasterly 46.16 feet of the most Northwesterly 61.16 feet of Outlot B, Napco Industrial Park, Hennepin County, Minnesota.

Parcel 2:
All rights, title and interest in and to that certain non-exclusive easement for drainage of surface waters, including the right to enter upon the property over which the easement runs for the purpose of grading, construction, hard-surfacing, maintaining and repairing a drainage channel or swale through such easement properties set forth in Easement Agreement dated June 30, 1978, filed July 14, 1978 as Document Number 1283409, Office of Registrar of Titles, Hennepin County, Minnesota.

PROPOSED LEGAL DESCRIPTION

Lot 1, Block 1, ENCORE PARK, Hennepin County, Minnesota

Lot 2, Block 1, ENCORE PARK, Hennepin County, Minnesota

Lot 3, Block 1, ENCORE PARK, Hennepin County, Minnesota

GENERAL NOTES

1. The field survey of this site was completed on September 21, 2007.
2. Address of property: 1150 K-Tel Drive, Minnetonka, MN
3. For the purpose of this survey, the most northerly east line of parcel 1 has an assumed bearing of North.
4. Area of property:

PARCEL 1: 632,041 Sq. Ft. or 14.50 Acres
PARCEL 2: N/A

PROPOSED LOTS:
LOT 1: 347,362 Sq. Ft. or 7.97 Acres
LOT 2: 129,959 Sq. Ft. or 2.98 Acres
LOT 3: 154,720 Sq. Ft. or 3.55 Acres

VICINITY MAP

Engineering • Planning • Surveying
MFRA
McCombs Frank Roos Associates, Inc.
14800 28th Avenue North, Suite 140
Plymouth • Minnesota • 55447
phone: 763/476-6010 • fax: 763/476-8527
website: www.mfra.com

Client
Hoyt Properties
Minneapolis, MN

Project
Encore Park

Location
11501 K-tel Drive
Minnetonka, MN

Certification
I hereby certify that this survey, plan 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.

Travis W. Van Neste
Registration No. 44109 Date: 1/17/08

This certification is not valid unless wet signed in blue ink. If applicable, contact us for a wet signed copy of this survey which is available upon request at McCombs Frank Roos Associates, Inc., Plymouth, MN office.

Summary
Designed: Drawn: TWVN
Approved: TWVN Book / Page: 606/51
Phase: Initial Issue: 12/2007

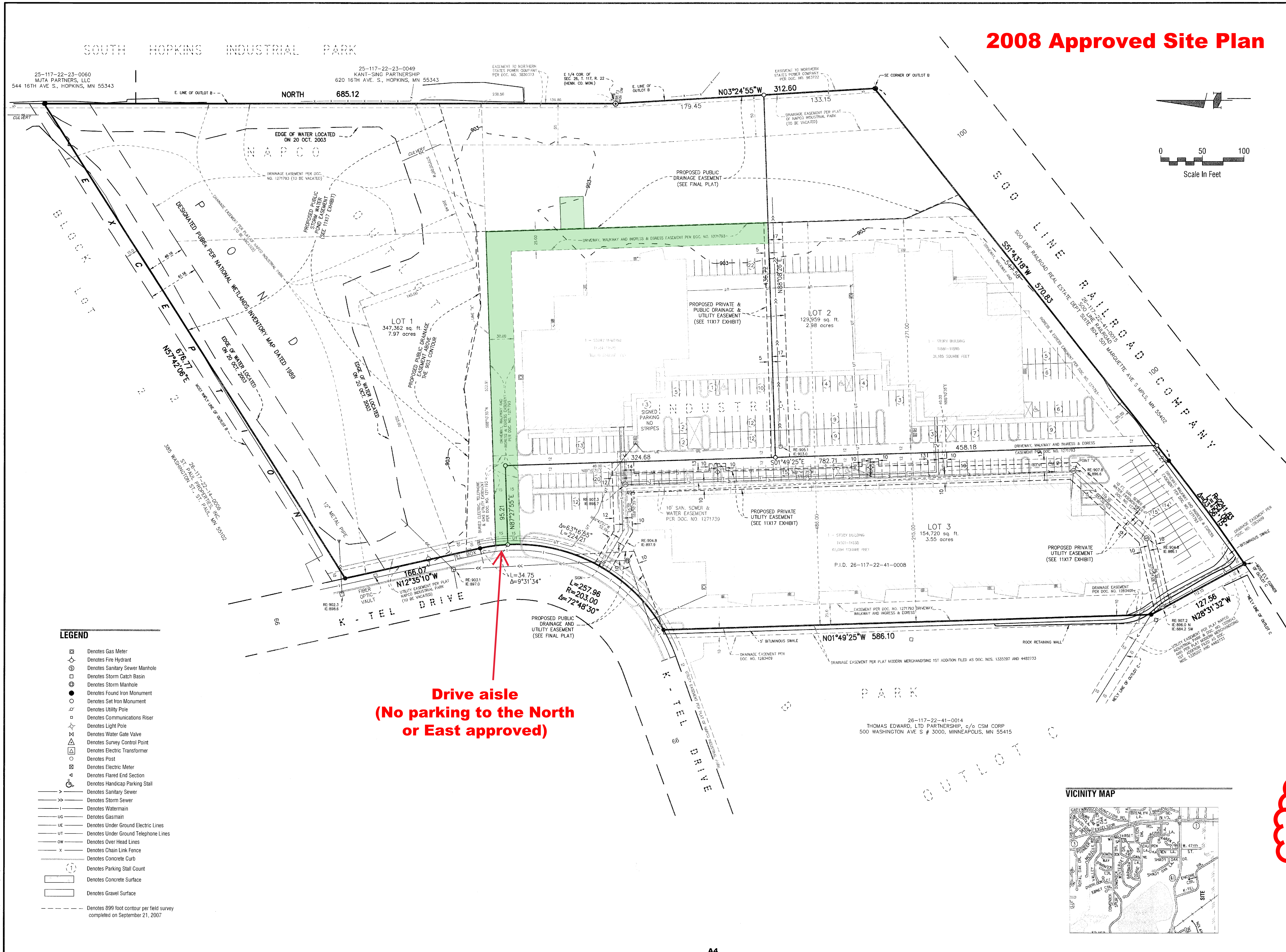
Revision History

No.	Date	By	Submittal / Revision
A	1/16/08	TWVN	City comment letter 12/21/07

Sheet Title
Preliminary Plat (Existing Conditions)

Sheet Number 1/2 **Revision** A

Encore Park
11501 K-Tel Drive
Project No. 07066.HOY17130



Engineering • Planning • Surveying

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phone: 763/476-6010 • fax: 763/476-8532
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Client
Hoyt Properties
Minneapolis, MN

Project
Encore Park

Location
11501 K-tel Drive
Minnetonka, MN

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Phase: Initial Issue: 12/2007

Revision History

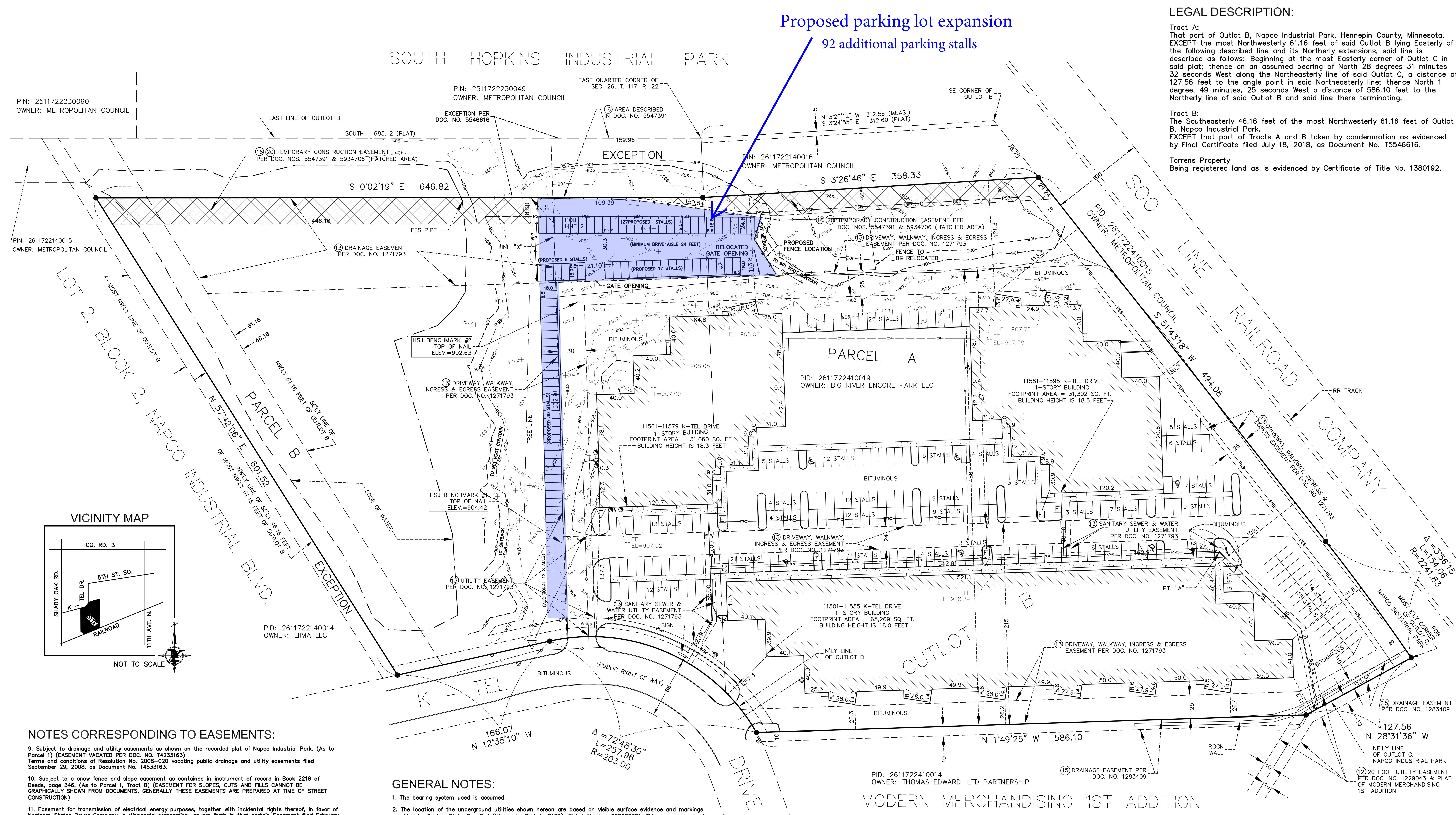
No.	Date	By	Submittal / Revision
A	1/16/08	TWVN	City comment letter 12/21/07

Sheet Title
Preliminary Plat (Utilities and Easements)

Sheet Number 2/2 **Revision** A

Encore Park
11501 K-Tel Drive
Project No. HOY17130
07065.07a

Progression of unapproved parking lot expansion



LEGAL DESCRIPTION:

Tract A:
That part of Outlot B, Napco Industrial Park, Hennepin County, Minnesota, EXCEPT the most Northwesterly 61.16 feet of said Outlot B lying Easterly of the following described line and its Northerly extensions, said line is described as follows: Beginning at the most Easterly corner of Outlot C in said plat; thence on an assumed bearing of North 28 degrees 31 minutes 32 seconds West along the Northeasterly line of said Outlot C, a distance of 127.56 feet to the angle point in said Northeasterly line; thence North 1 degree, 49 minutes, 25 seconds West a distance of 586.10 feet to the Northerly line of said Outlot B and said line there terminating.

Tract B:
The Southeasterly 46.16 feet of the most Northwesterly 61.16 feet of Outlot B, Napco Industrial Park.
EXCEPT that part of Tracts A and B taken by condemnation as evidenced by Final Certificate filed July 18, 2018, as Document No. T5546616.

Torrens Property
Being registered land as is evidenced by Certificate of Title No. 1380192.

NOTES CORRESPONDING TO EASEMENTS:

9. Subject to drainage and utility easements as shown on the recorded plat of Napco Industrial Park. (As to Parcel 1) (EASEMENT VACATED PER DOC. NO. T4233163)
Terms and conditions of Resolution No. 2008-020 vacating public drainage and utility easements filed September 29, 2008, as Document No. T4533163.

10. Subject to a snow fence and slope easement as contained in instrument of record in Book 2218 of Deeds, page 346. (As to Parcel 1, Tract B) (EASEMENT FOR SLOPES, CUTS AND FILLS CANNOT BE GRAPHICALLY SHOWN FROM DOCUMENTS, GENERALLY THESE EASEMENTS ARE PREPARED AT TIME OF STREET CONSTRUCTION)

11. Easement for transmission of electrical energy purposes, together with incidental rights thereof, in favor of Northern States Power Company, a Minnesota corporation, as set forth in that certain Easement filed February 5, 1970, as Document No. T963722. (NOT ON SUBJECT PROPERTY)

12. Easement for sanitary sewer purposes, together with incidental rights thereof, in favor of the City of Minnetonka as evidenced by Final Certificate filed July 26, 1977, as Document No. T1229043. (As to Parcel 1) (AS SHOWN ON SURVEY)

13. Subject to easements set forth in that certain Deed Document No. T1271793. (As to Parcel 1) (AS SHOWN ON SURVEY)

14. Subject to an electric transmission line easement and other rights incident thereto in favor of Northern States Power Company (a MN corp), over the East 5 feet of above premises as set forth in CR Doc No. 3820373. (As to Parcel 1, Tract B) (NOT ON SUBJECT PROPERTY)

15. Terms and conditions of, and easement(s) contained within, that certain Easement Agreement dated June 30, 1978, filed July 14, 1978, as Document No. T1283409. (As to Parcel 1) (AS SHOWN ON SURVEY)

16. Restrictions and encumbrances as set forth in that certain Declaration dated June 5, 2018, filed July 23, 2018, as Document No. T5547391. (As to Parcel 1) (SHOWN ON SURVEY AS HATCHED AREA)

17. Terms and conditions of Resolution No. 2018-105 approving a conditional use permit filed September 11, 2018, as Document No. T5559915. (As to Parcel 1) (NON-SURVEY MATTER)

18. Final Certificate for acquisition of a temporary easement filed June 26, 2019, as Document No. T5623528. (As to Parcel 1) (EASEMENT EXPIRED) NOTE: Temporary easement expires June 1, 2022.

19. Terms and conditions Resolution No. 2019-117 approving a conditional use permit filed December 20, 2019, as Document No. T5672349. (As to Parcel 1) (NON-SURVEY MATTER)

20. Terms and conditions of, and easement for construction purposes contained within, that certain Temporary Construction Easement Agreement filed April 5, 2022, as Document No. T5934706. (As to Parcel 1) (SHOWN ON SURVEY AS HATCHED AREA)
NOTE: Temporary easement expires on December 1, 2024.
Consent from Riversource Life Insurance Company filed April 5, 2022, as Document No. T5934707.

21. A portion of the property contains wetlands which may be subject to federal, state, or local regulation. The right to use or improve these wetlands is excepted herein. (As to Parcel 1) (NO WETLAND OBSERVED)

GENERAL NOTES:

1. The bearing system used is assumed.

2. The location of the underground utilities shown hereon are based on visible surface evidence and markings provided by Gopher State One Call (Minnesota Statute 216D), Ticket Number 222020361. This survey represents the underground utilities that participated with the request and were marked at the time of the survey. Additional utilities may exist, but were non-responsive to the request.

3. Subject property is identified as being in "Zone X, Other Areas" on Flood Insurance Rate Map No. 27053C0341F, effective date November 4, 2016.

4. Site Area = 568,658 square feet = 13.055 acres.

5. There are a total of 255 striped parking stalls on said property, of which there are 7 designated as handicap.

6. This survey was made on the ground.

7. Zoning Classification: PUD, Planned Unit Development.

8. In preparing this survey I have relied upon the supporting documents and the Commitment for Title Insurance issued by Old Republic National Title Insurance Company, having an effective date of June 30, 2022 and bearing file number ORTE748521, Supplemental #3.

9. There are no visible markings denoting wetlands as delineated by appropriate authorities.

10. Subject property has direct access to and from K-Tel Drive, a public right of way.

11. PROOF OF PARKING: There are 83 Proposed parking stalls on said property, with possiblity of an additional 12 stalls, as shown.

12. Elevation datum is based on NAVD 88 data.
HSJ Benchmark #1 is located Top of Nail (AS SHOWN ON SURVEY)
Elevation = 904.42

13. LIDAR contour information was used to make this survey, see LIDAR note.

LIDAR TOPO NOTE:

LIDAR contour information was used to fill-in overgrown and heavily wooded areas of the site and areas beyond the scope of the survey to show the continuations of the desired contours.

Note: These areas have contours only and no spot elevations.
DISCLAIMER AND CREDITS: LIDAR data shown and provided is subject to the disclaimers provided in the data documentation from MnTOPO. MnTOPO is a collaborative effort between MN.IT Services @ Minnesota Department of Natural Resources and MN.IT Services @ MnGeo.

LEGEND

- Property Corner
- Concrete
- Concrete Curb
- Fence
- Underground Electric
- Underground Telephone
- Water
- Gas
- Sanitary Sewer
- Storm Sewer
- Parking Setback Line
- Electric Meter
- Electric Box
- Hydrant
- Unknown Manhole
- Gate Valve
- Guard Post
- Catchbasin
- Catchbasin
- Light Pole
- Gas Meter
- Telephone Box
- Sanitary Manhole
- Storm Manhole
- Existing Contour (902)
- Existing Spot Elevation (X 904.3)

50 25 0 50 100 150
SCALE IN FEET

SCALE: 1 INCH = 50 FEET

REVISIONS

Date:	
2-6-23	per comments

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

Thomas E. Hodorff, L.S.
Minnesota Reg. No. 23677

Date: January 18, 2023

SITE PLAN FOR 11501-11595 K-TEL DRIVE

For:

BIG RIVER REAL ESTATE FUND LLC

SITE:

11501-11595 K-TEL DRIVE
HOPKINS, MINNESOTA

HENNEPIN COUNTY

HARRY S. JOHNSON CO., INC.
LAND SURVEYORS
9063 Lyndale Avenue South
Bloomington, MN. 55437
Tele. 952-884-5341 Fax 952-884-5344
www.hsjsurveyors.com

Book	File No.
677	2022391
Page 72	W.O. Number 2022391
CAD Technician CT	
Sheet No.	1 OF 1

CAD File: 2022391.DWG
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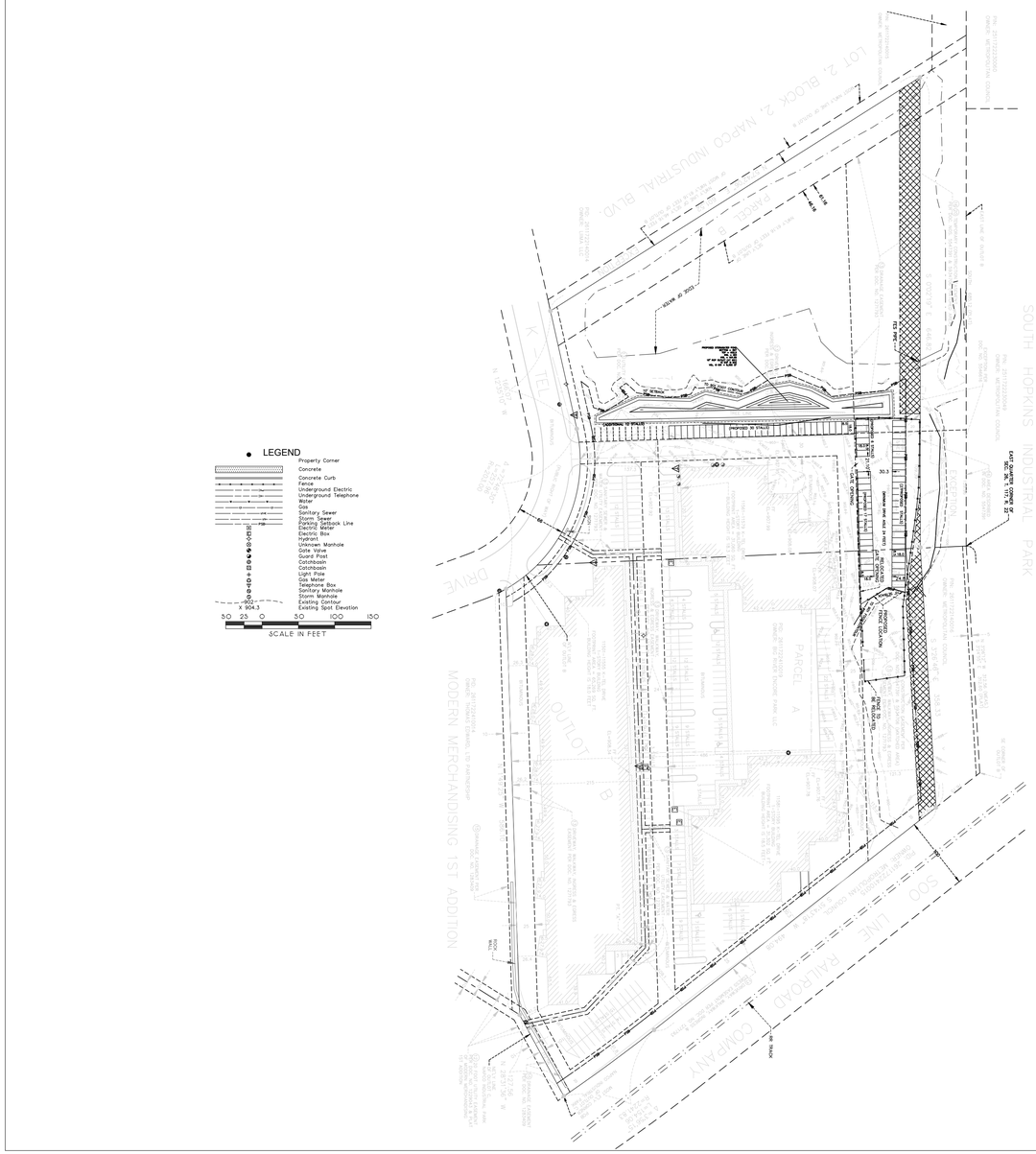

BLOCH ENGINEERING

BLOCH ENGINEERING, PLLC
blochengineering.com

32210 XEON ST NW
CAMBRIDGE, MN 55008

krystle@blochengineering.com

JOB NO. 23-13

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.

PRELIMINARY

KRYSTLE L. BLOCH

8-11-2023 — DATE

49893 — LIC. NO.

BIG RIVER REAL ESTATE
11501-11595 K-TEL DRIVE
MINNETONKA, MN

OVERALL SITE PLAN

REVISIONS

NO.	DATE	BY	DESCRIPTION

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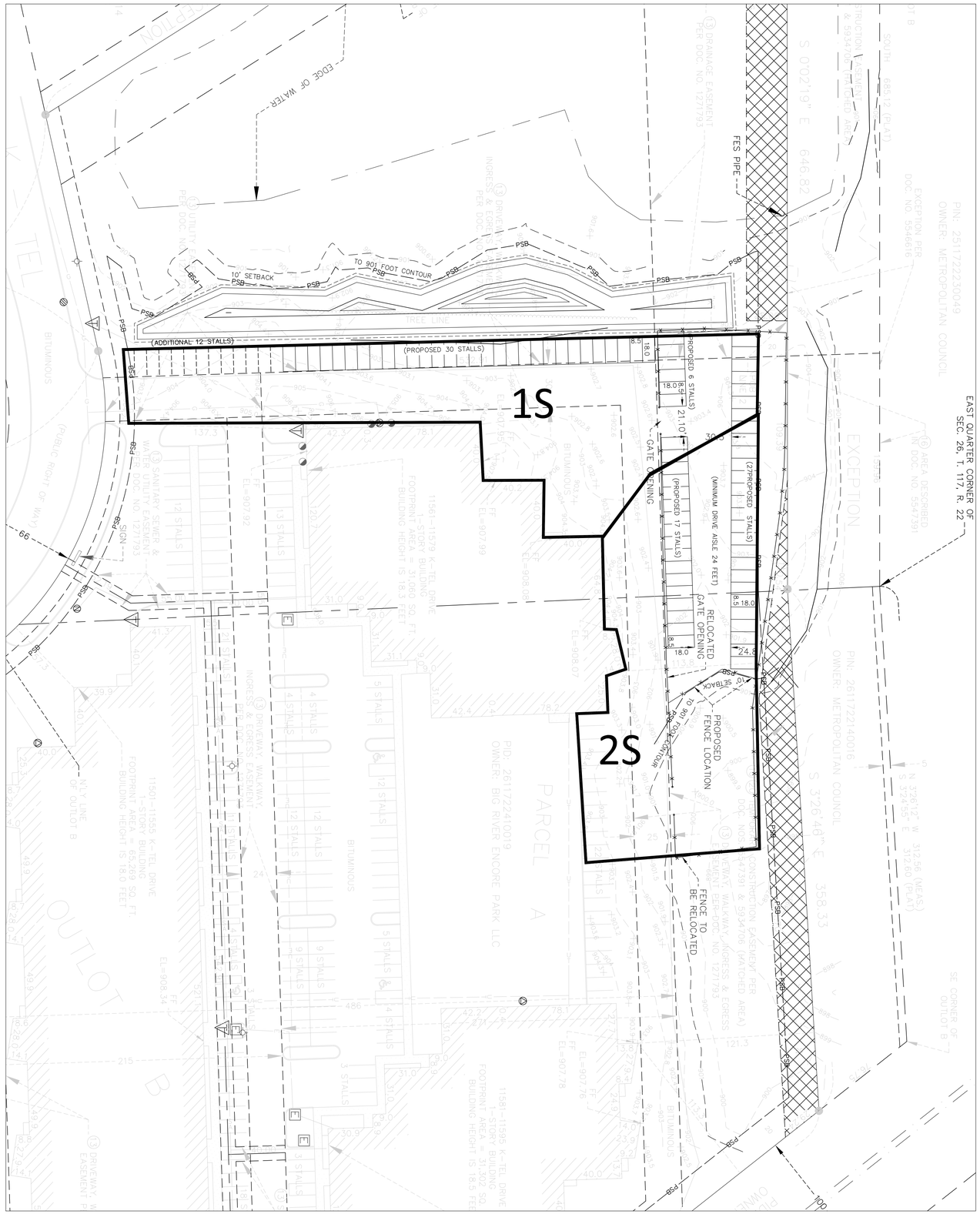
SCALE FEET



EROSION CONTROL (AND LANDSCAPING) NOTES:
1. ALL DISTURBED AREAS TO BE SEEDED AND MULCHED, EXCEPT AS NOTED IN NUMBER 6 BELOW.
2. MULCH TYPE 1 (DISK ANCHORED) IN DISTURBED AREAS OTHER THAN SOD AND INFILTRATION AREA.
3. SEED MNDOT TYPE 25–151, AT A RATE OF 61 LB/AC
4. ALL SLOPES STEEPER THAN 4:1, SHALL BE RESTORED WITH SEED AND PROTECTED WITH EROSION CONTROL BLANKET. EC BLANKET MUST BE BIODEGRADABLE, LOOSE–WEAVE BLANKET.
5. MINIMIZE SOIL COMPACTION IN INFILTRATION AREAS
6. ALL DISTURBED AREAS WITHIN THE RIGHT OF WAY SHALL BE SODDED.
7. SEE SWPPP FOR TEMPORARY STABILIZATION REQUIREMENTS.
8. TWO ROWS OF SILT FENCE ALONG WETLAND/WESTERN GRADING EDGE

EROSION CONTROL SUPERVISOR:
XXX XXX
XXX@XXX.COM
XXX–XXX–XXXX

SITE GRADING NOTES:
1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR SHALL VERIFY THE FIELD LOCATION OF ALL PUBLIC AND PRIVATE UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT GOPHER STATE ONE CALL AT (651) 454–0002.
2. ALL CUT OR FILL SLOPES SHALL BE 3:1 OR FLATTER UNLESS OTHERWISE NOTED.
3. EXISTING GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT INTERVALS.
4. PROPOSED GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT INTERVALS.
5. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.
6. TOPOGRAPHIC INFORMATION TAKEN FROM A TOPOGRAPHIC SURVEY BY LAND SURVEYORS, IF CONTRACTOR DOES NOT ACCEPT EXISTING TOPOGRAPHY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, THEY SHALL HAVE MADE, AT THEIR EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED LAND SURVEYOR AND SUBMIT TO THE OWNER FOR REVIEW.
7. CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE GOVERNING CODES AND BE CONSTRUCTED TO SAME.
8. ALL DISTURBED AREAS WITHIN THE PUBLIC RIGHT OF WAY SHALL BE SODDED.
9. EXISTING SLOPES BEING TIED INTO ARE GREATER THAN 3:1, AND EXTRA CARE SHOULD BE TAKEN IN GRADING THESE AREAS. EROSION CONTROL BLANKET SHALL BE APPLIED TO THESE SLOPES IMMEDIATELY AFTER GRADING.

BLOCH ENGINEERING

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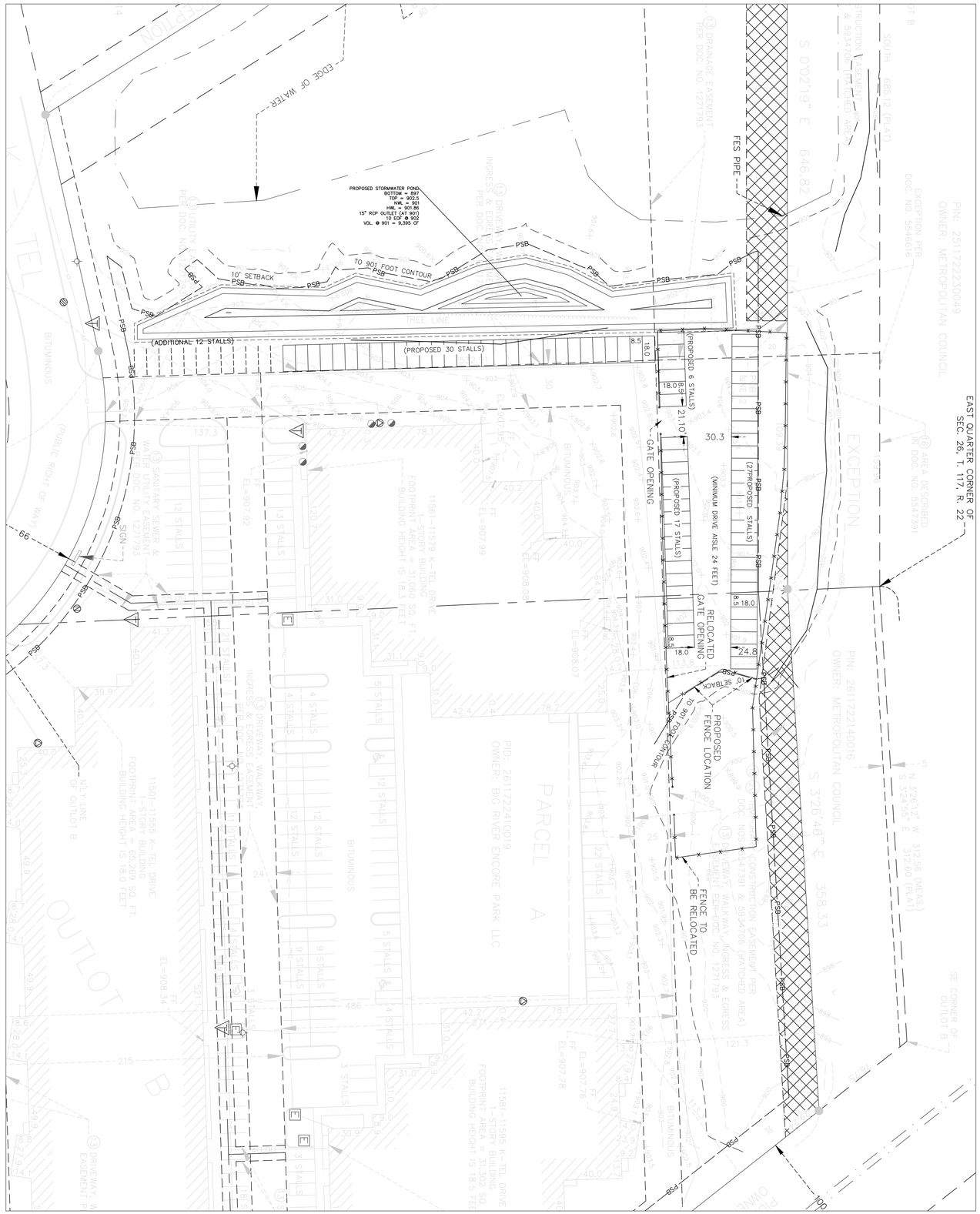
PRELIMINARY

KRYSTLE L. BLOCH — 49893
8–11–2023 — LIC. NO.
DATE

BIG RIVER REAL ESTATE
11501–11595 K–TEL DRIVE
MINNETONKA, MN

REVISIONS			
NO.	DATE	BY	DESCRIPTION



EROSION CONTROL SUPERVISOR:
XXX XXX
XXX@XXX.COM
XXX-XXX-XXXX

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DRAINAGE CALCS:
NEW IMPERVIOUS = 28093 SF

REQD TREATMENT = 28093 SF X (1.1"/12) = 2576 CF

EXISTING RUNOFF: 2 YR = 2.62 CFS
10YR = 5.67 CFS
100YR = 11.66 CFS

PROPOSED RUNOFF: 2 YR = 2.59 CFS
10YR = 4.11 CFS
100YR = 7.5 CFS

BLOCH ENGINEERING

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blochengineering.com

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PRELIMINARY

KRYSTLE L. BLOCH — 49893
8-11-2023 — LIC. NO.
DATE

BIG RIVER REAL ESTATE
11501-11595 K-TEL DRIVE
MINNETONKA, MN

GRADING AND EROSION CONTROL PLAN

REVISIONS

NO.	DATE	BY	DESCRIPTION

0 40 80
SCALE FEET

BLOCH ENGINEERING, PLLC

BIG RIVER REAL ESTATE
1150 K-TEL DRIVE
MINNETONKA, MN

STORM WATER NARRATIVE

PREPARED BY: KRYSTLE BLOCH, MN PE 49893

August 17, 2023

BLOCH
ENGINEERING

TABLE OF CONTENTS

EXISTING SITE CONDITIONS

The existing site is located at 11501 K-tel Drive in the City of Minnetonka in Hennepin County, Minnesota. The existing site is a mix of wetland and upland, which ultimately drains to north of the property.
The USDA Soils Map shows a majority of undesignated soils along with some type A soils in the area. For the sake of consistency, a Hydrologic Soil Group of C was used, which is reflected in the HydroCAD modeling.

The areas of "new" impervious have already been graded and paved, but are considered new impervious in the HydroCAD modeling and in this drainage report.

PROPOSED DEVELOPMENT

This proposed site plan shows the new construction of parking lots, but these have already been constructed and are being shown to exhibit the "new" impervious areas. This proposed project will consist of corresponding stormwater management areas to treat the "new" impervious areas.
This has included regrading and paving on past projects; and will only consist of grading for the new pond area for this project. The total area of current construction and grading is approximately 0.4 acres .
See attachment for impaired waters search.

This is modeled in the HydroCAD attachments.

JURISDICTIONAL BODIES AND REQUIREMENTS

Runoff Rates and Volumes:

Runoff rate and volume must be less or equal to the existing rates for the 2,10, and 100 - year rainfall events, using the following design storms (Atlas 14, Type II, MSE 3):

Rainfall Frequency	Rainfall (inches)
2-Year, 24- Hour	2.86
10-Year, 24-Hour	4.26
100- Year, 24-Hour	7.32

Appendix A & B shows that the NRCS methodology of HydroCAD was used to provide stormwater modeling on this site for the existing and proposed conditions respectively.

CALCULATIONS

AREAS

Total Area to Pond = 1.44 Acres
New Impervious Area = 0.6 Acres = 28093 SqFt

INFILTRATION AND STORAGE

Required Infiltration = (1.1 in x 28093SqFt) / (12in/1ft) = 2575 CuFt (Also the amount required for *Water Quality/Live Storage*)

Available Live Storage = 27657 cf (at 902.4) – 9395 cf (at 901) = 18262 CuFt

Available dead Storage = (Total under outlet at 901) = 9395 cf

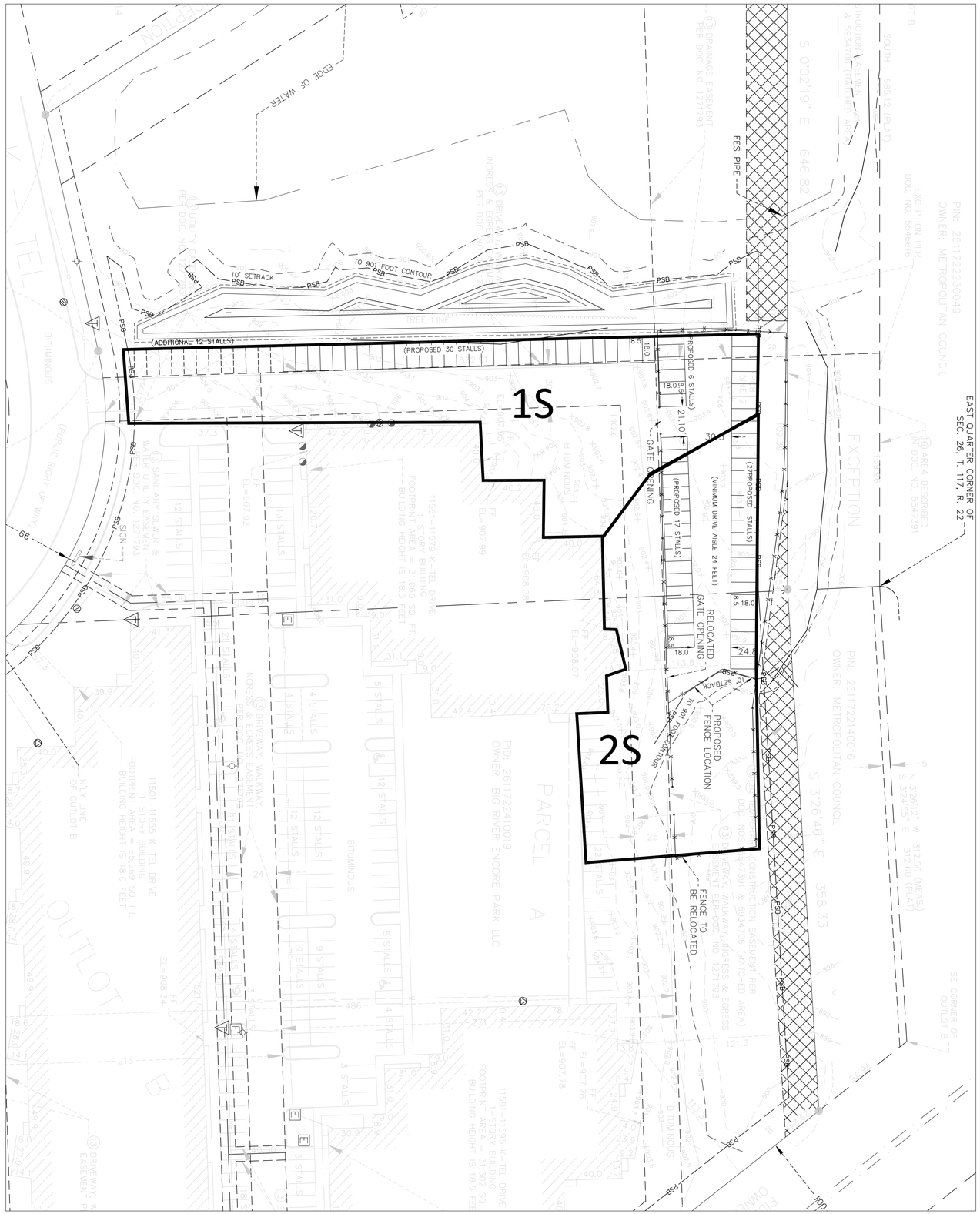
Existing Site and Proposed Discharge Rates

EXISTING	1S (to North)	2S (to East/North)	**TOTAL**
Rainfall Frequency	Discharge Rate (cfs)	Discharge Rate (cfs)	Discharge Rate (cfs)
2-Year, 24-Hour	2.11	0.51	**2.62**
10-Year, 24-Hour	3.52	2.35	**5.87**
100-Year, 24-Hour	6.57	5.09	**11.66**

PROPOSED	1S (to North)	2S (to East/North)	**TOTAL**
Rainfall Frequency	Discharge Rate (cfs)	Discharge Rate (cfs)	Discharge Rate (cfs)
2-Year, 24-Hour	0.36	2.23	**2.59**
10-Year, 24-Hour	0.73	3.38	**4.11**
100-Year, 24-Hour	1.64	5.86	**27.5**

CONCLUSION

All rate control, water quality and volume requirements are met. Soil erosion and sediment control BMPs will consist of silt fence placed at toe of grades away from the site, as well as seed and mulch on all graded areas.



EROSION CONTROL (AND LANDSCAPING) NOTES:
1. ALL DISTURBED AREAS TO BE SEEDED AND MULCHED, EXCEPT AS NOTED IN NUMBER 6 BELOW.
2. MULCH TYPE 1 (DISK ANCHORED) IN DISTURBED AREAS OTHER THAN SOD AND INFILTRATION AREA.
3. SEED MNDOT TYPE 25–151, AT A RATE OF 61 LB/AC
4. ALL SLOPES STEEPER THAN 4:1, SHALL BE RESTORED WITH SEED AND PROTECTED WITH EROSION CONTROL BLANKET. EC BLANKET MUST BE BIODEGRADABLE, LOOSE–WEAVE BLANKET.
5. MINIMIZE SOIL COMPACTION IN INFILTRATION AREAS
6. ALL DISTURBED AREAS WITHIN THE RIGHT OF WAY SHALL BE SODDED.
7. SEE SWPPP FOR TEMPORARY STABILIZATION REQUIREMENTS.
8. TWO ROWS OF SILT FENCE ALONG WETLAND/WESTERN GRADING EDGE

EROSION CONTROL SUPERVISOR:
XXX XXX
XXX@XXX.COM
XXX–XXX–XXXX

SITE GRADING NOTES:
1. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR SHALL VERIFY THE FIELD LOCATION OF ALL PUBLIC AND PRIVATE UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT GOPHER STATE ONE CALL AT (651) 454–0002.
2. ALL CUT OR FILL SLOPES SHALL BE 3:1 OR FLATTER UNLESS OTHERWISE NOTED.
3. EXISTING GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT INTERVALS.
4. PROPOSED GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT INTERVALS.
5. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.
6. TOPOGRAPHIC INFORMATION TAKEN FROM A TOPOGRAPHIC SURVEY BY LAND SURVEYORS, IF CONTRACTOR DOES NOT ACCEPT EXISTING TOPOGRAPHY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, THEY SHALL HAVE MADE, AT THEIR EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED LAND SURVEYOR AND SUBMIT TO THE OWNER FOR REVIEW.
7. CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE GOVERNING CODES AND BE CONSTRUCTED TO SAME.
8. ALL DISTURBED AREAS WITHIN THE PUBLIC RIGHT OF WAY SHALL BE SODDED.
9. EXISTING SLOPES BEING TIED INTO ARE GREATER THAN 3:1, AND EXTRA CARE SHOULD BE TAKEN IN GRADING THESE AREAS. EROSION CONTROL BLANKET SHALL BE APPLIED TO THESE SLOPES IMMEDIATELY AFTER GRADING.

BLOCH ENGINEERING

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32210 XEON ST NW
CAMBRIDGE, MN 55008

krystle@blochengineering.com

JOB NO. 23–13

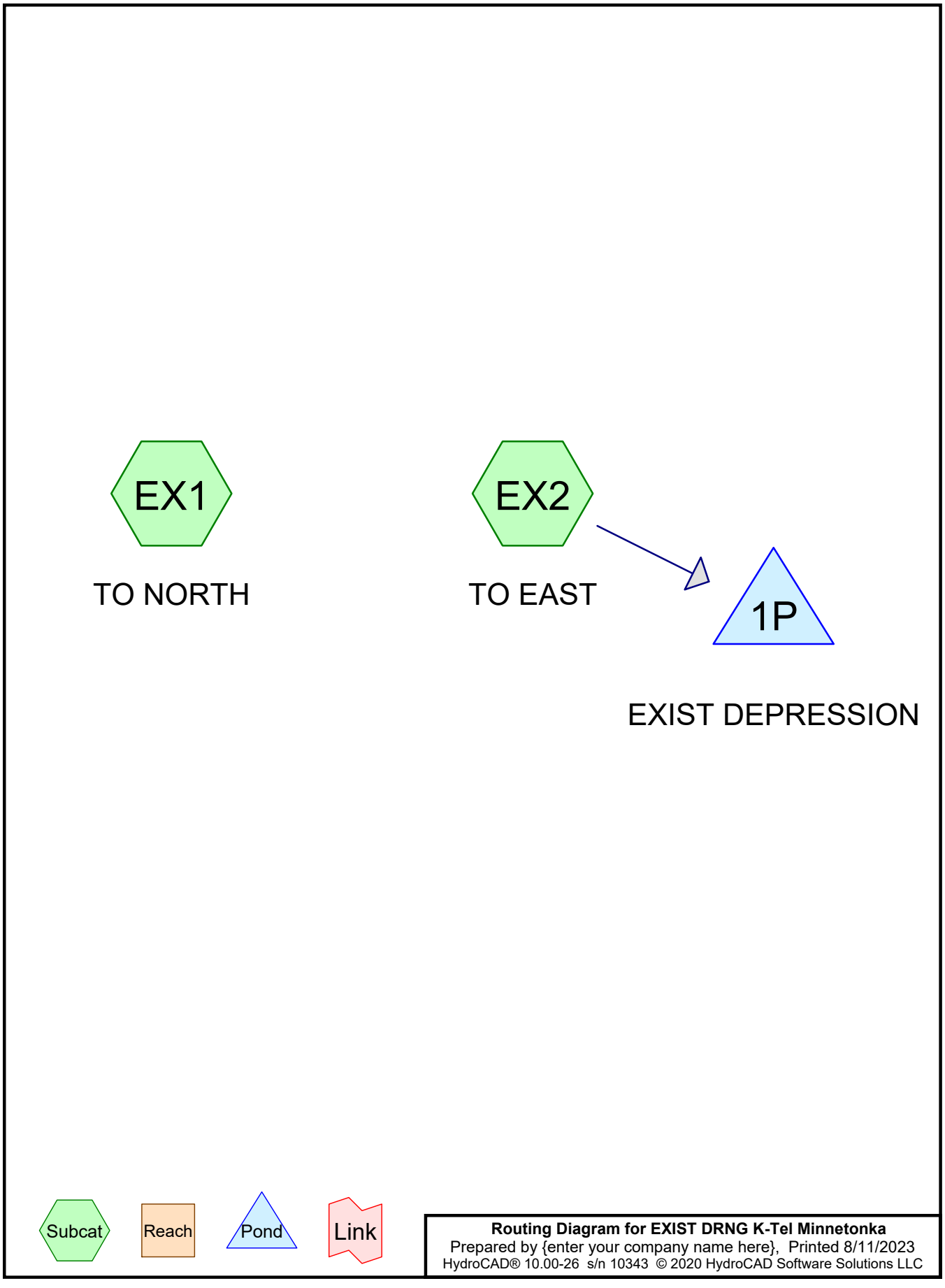
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRELIMINARY

KRYSTLE L. BLOCH — 49893
8–11–2023 — LIC. NO.
DATE

BIG RIVER REAL ESTATE
11501–11595 K–TEL DRIVE
MINNETONKA, MN

REVISIONS			
NO.	DATE	BY	DESCRIPTION



Routing Diagram for EXIST DRNG K-Tel Minnetonka
Prepared by {enter your company name here}, Printed 8/11/2023
HydroCAD® 10.00-26 s/n 10343 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment EX1: TO NORTH

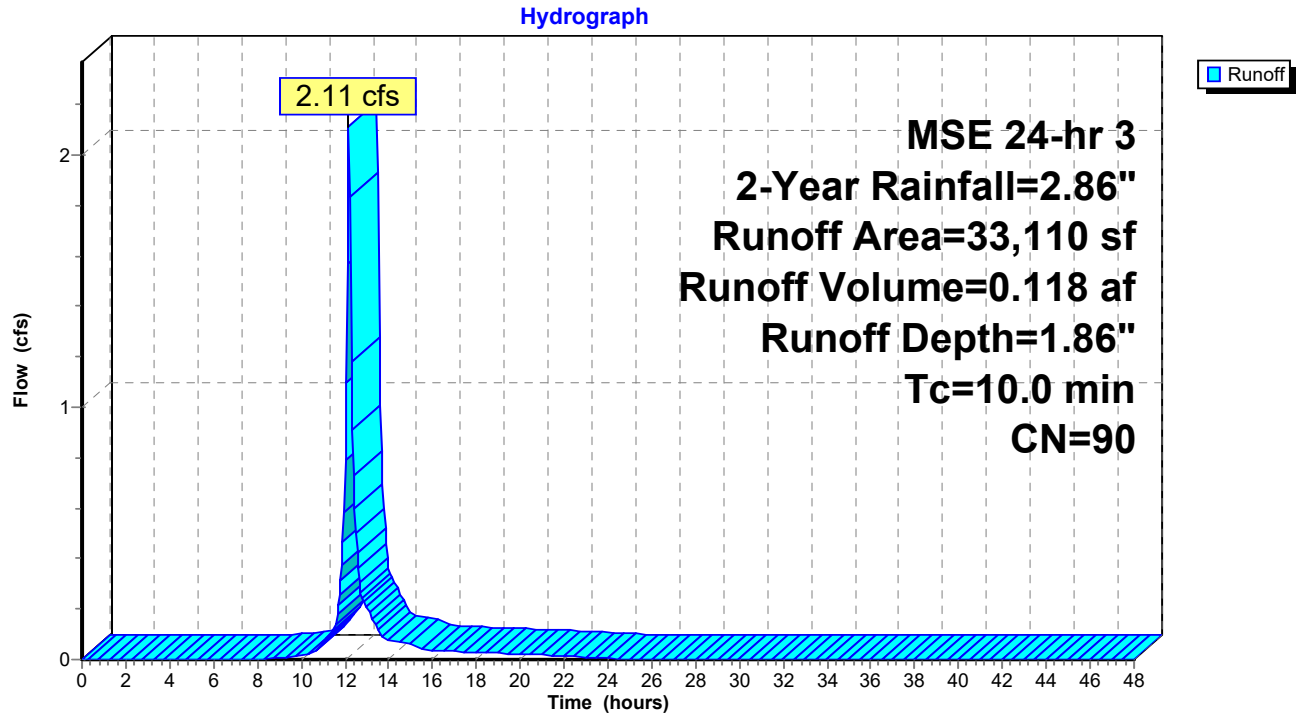
Runoff = 2.11 cfs @ 12.17 hrs, Volume= 0.118 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

	Area (sf)	CN	Description
*	22,450	98	Impervious Bldg, Gravel
	10,660	74	>75% Grass cover, Good, HSG C
	33,110	90	Weighted Average
	10,660		32.20% Pervious Area
	22,450		67.80% Impervious Area

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

Subcatchment EX1: TO NORTH



Summary for Subcatchment EX2: TO EAST

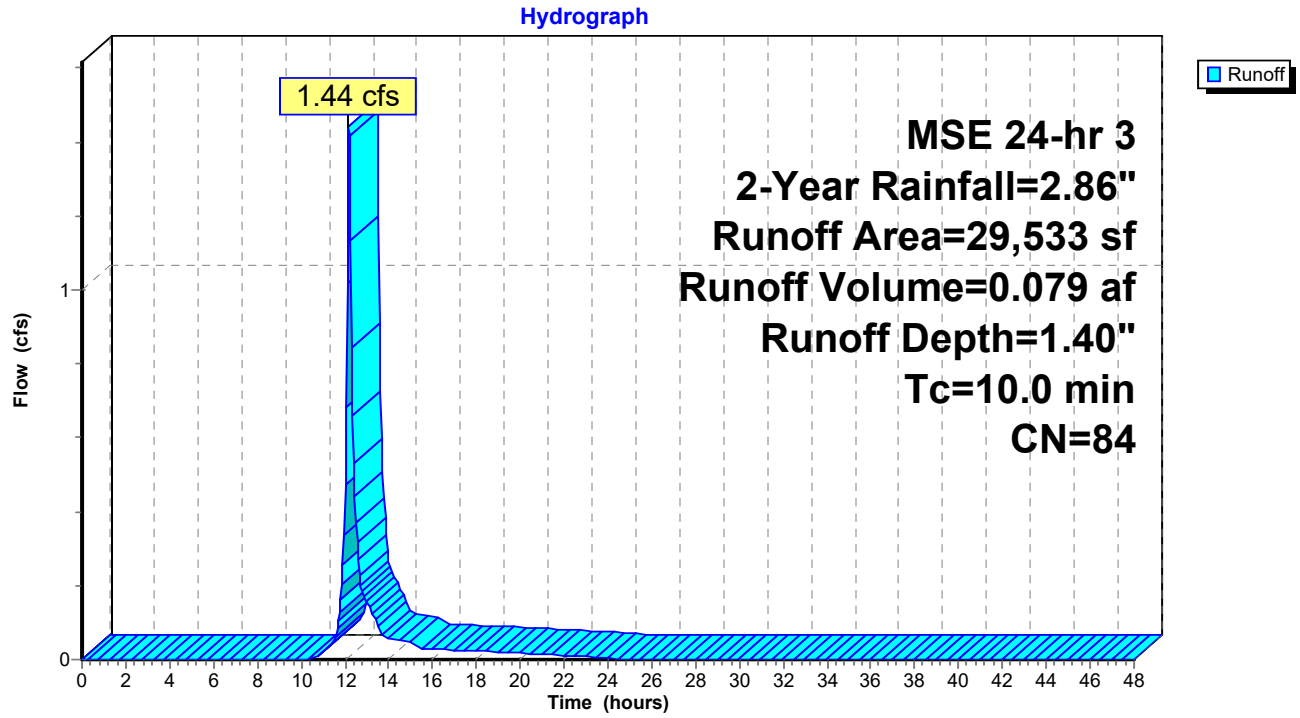
Runoff = 1.44 cfs @ 12.18 hrs, Volume= 0.079 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

	Area (sf)	CN	Description
*	12,100	98	Impervious Bldg, Gravel
	17,433	74	>75% Grass cover, Good, HSG C
	29,533	84	Weighted Average
	17,433		59.03% Pervious Area
	12,100		40.97% Impervious Area

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

Subcatchment EX2: TO EAST



Summary for Pond 1P: EXIST DEPRESSION

Inflow Area = 0.678 ac, 40.97% Impervious, Inflow Depth = 1.40" for 2-Year event
Inflow = 1.44 cfs @ 12.18 hrs, Volume= 0.079 af
Outflow = 0.51 cfs @ 12.42 hrs, Volume= 0.044 af, Atten= 64%, Lag= 14.5 min
Primary = 0.51 cfs @ 12.42 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.04' @ 12.42 hrs Surf.Area= 3,331 sf Storage= 1,655 cf

Plug-Flow detention time= 161.2 min calculated for 0.044 af (56% of inflow)
Center-of-Mass det. time= 76.4 min (888.8 - 812.4)

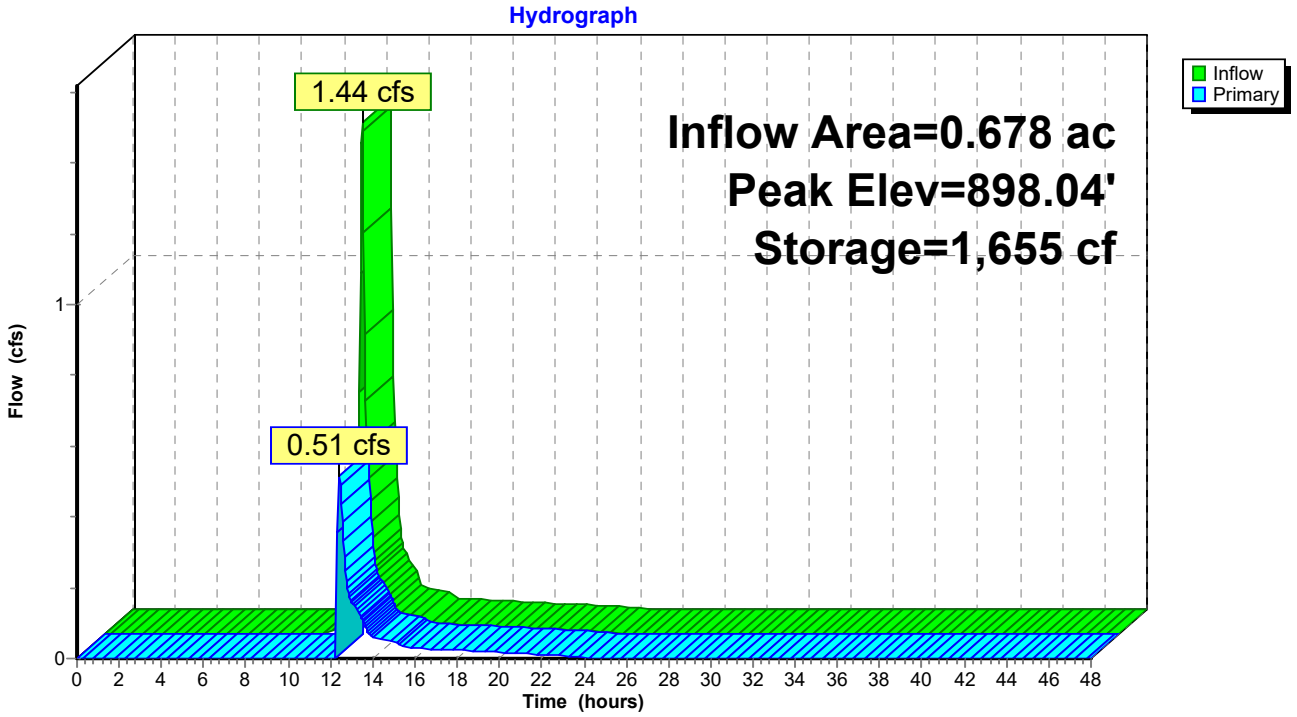
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.49 cfs @ 12.42 hrs HW=898.04' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.49 cfs @ 0.56 fps)

Pond 1P: EXIST DEPRESSION



Summary for Subcatchment EX1: TO NORTH

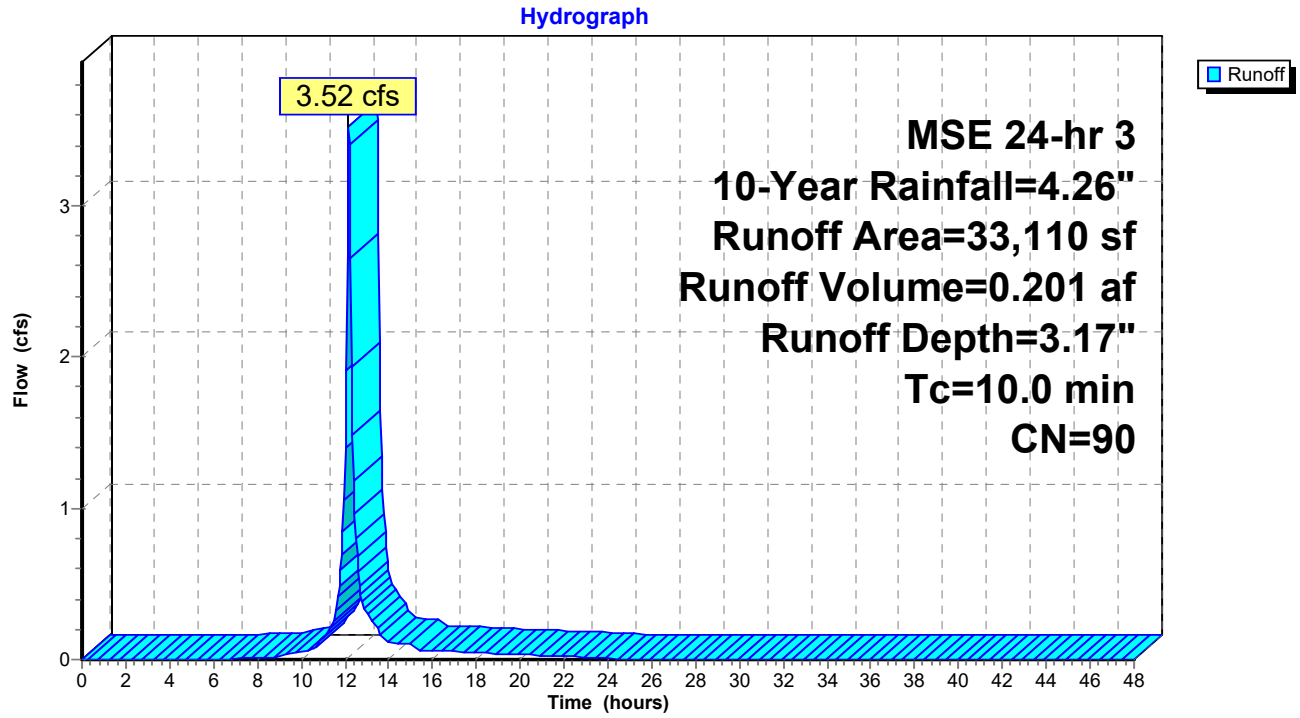
Runoff = 3.52 cfs @ 12.17 hrs, Volume= 0.201 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

	Area (sf)	CN	Description
*	22,450	98	Impervious Bldg, Gravel
	10,660	74	>75% Grass cover, Good, HSG C
	33,110	90	Weighted Average
	10,660		32.20% Pervious Area
	22,450		67.80% Impervious Area

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

Subcatchment EX1: TO NORTH



Summary for Subcatchment EX2: TO EAST

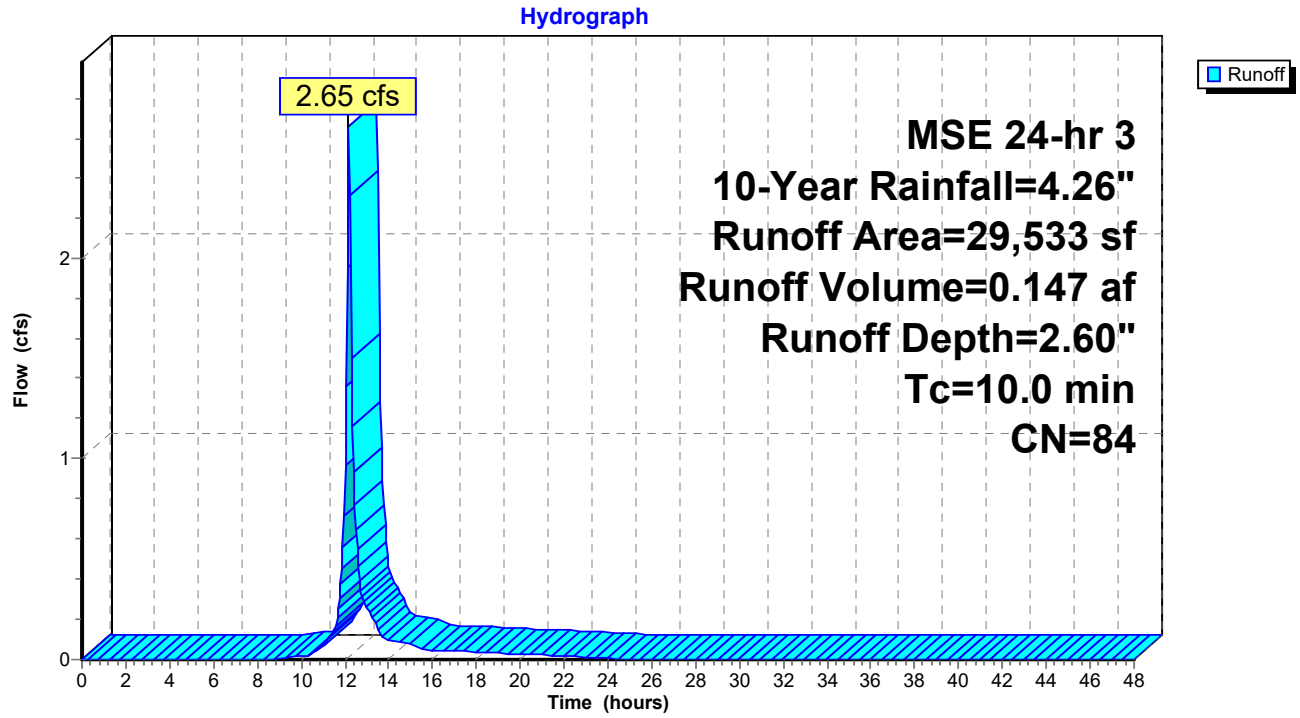
Runoff = 2.65 cfs @ 12.18 hrs, Volume= 0.147 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

	Area (sf)	CN	Description
*	12,100	98	Impervious Bldg, Gravel
	17,433	74	>75% Grass cover, Good, HSG C
	29,533	84	Weighted Average
	17,433		59.03% Pervious Area
	12,100		40.97% Impervious Area

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

Subcatchment EX2: TO EAST



Summary for Pond 1P: EXIST DEPRESSION

Inflow Area = 0.678 ac, 40.97% Impervious, Inflow Depth = 2.60" for 10-Year event
Inflow = 2.65 cfs @ 12.18 hrs, Volume= 0.147 af
Outflow = 2.35 cfs @ 12.23 hrs, Volume= 0.112 af, Atten= 11%, Lag= 3.1 min
Primary = 2.35 cfs @ 12.23 hrs, Volume= 0.112 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.12' @ 12.23 hrs Surf.Area= 4,110 sf Storage= 1,950 cf

Plug-Flow detention time= 102.6 min calculated for 0.112 af (76% of inflow)
Center-of-Mass det. time= 35.6 min (835.5 - 799.9)

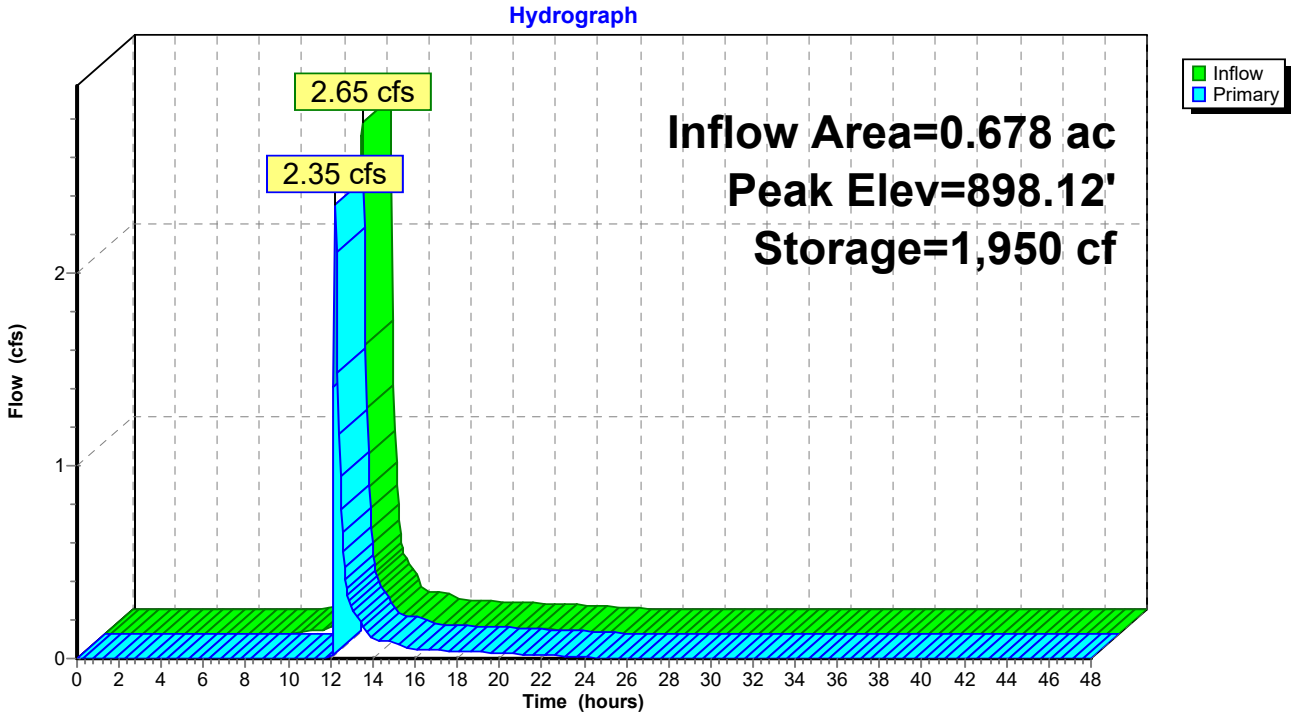
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.29 cfs @ 12.23 hrs HW=898.12' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 2.29 cfs @ 0.94 fps)

Pond 1P: EXIST DEPRESSION



Summary for Subcatchment EX1: TO NORTH

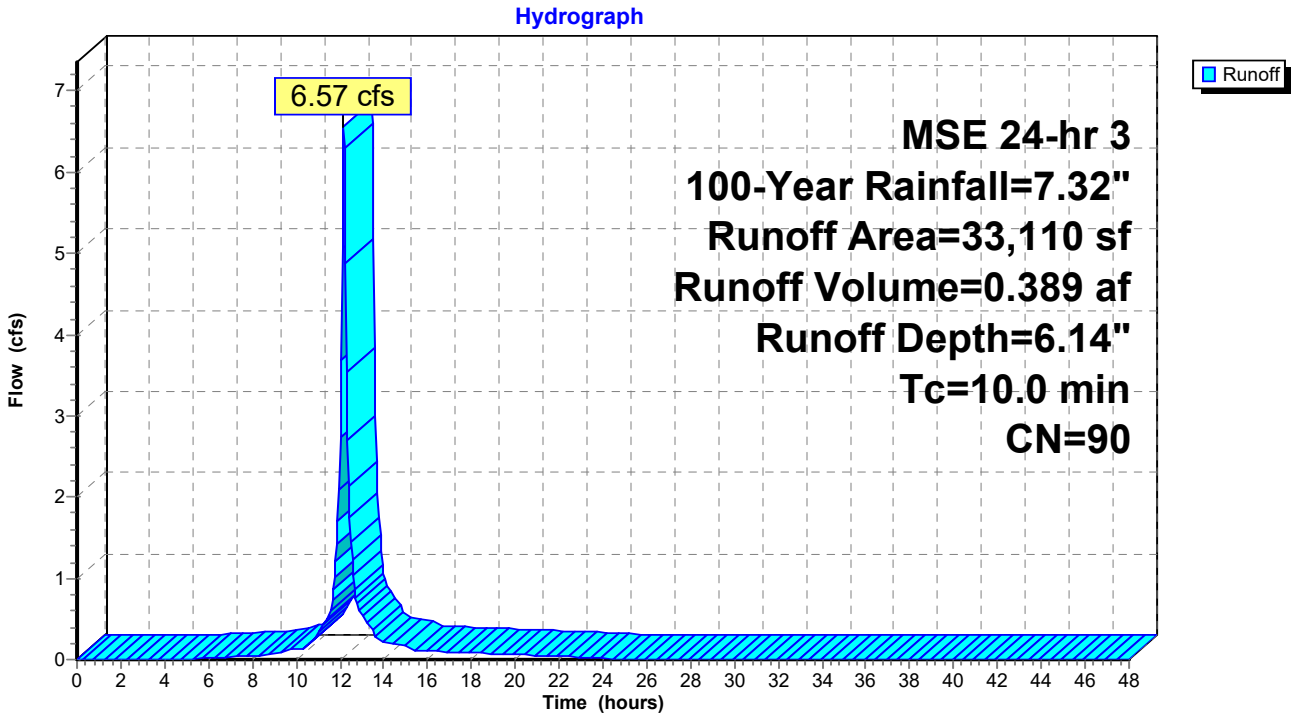
Runoff = 6.57 cfs @ 12.17 hrs, Volume= 0.389 af, Depth= 6.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

	Area (sf)	CN	Description
*	22,450	98	Impervious Bldg, Gravel
	10,660	74	>75% Grass cover, Good, HSG C
	33,110	90	Weighted Average
	10,660		32.20% Pervious Area
	22,450		67.80% Impervious Area

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

Subcatchment EX1: TO NORTH



Summary for Subcatchment EX2: TO EAST

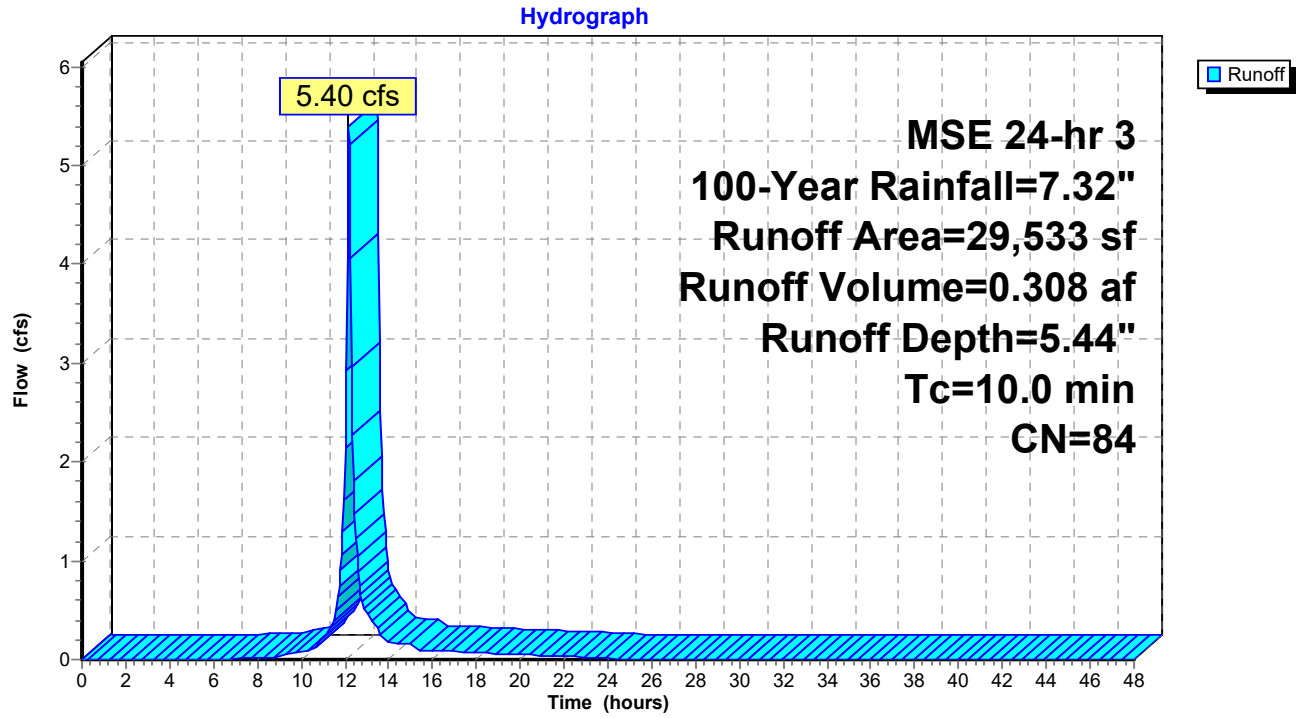
Runoff = 5.40 cfs @ 12.17 hrs, Volume= 0.308 af, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

	Area (sf)	CN	Description
*	12,100	98	Impervious Bldg, Gravel
	17,433	74	>75% Grass cover, Good, HSG C
	29,533	84	Weighted Average
	17,433		59.03% Pervious Area
	12,100		40.97% Impervious Area

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

Subcatchment EX2: TO EAST



Summary for Pond 1P: EXIST DEPRESSION

Inflow Area = 0.678 ac, 40.97% Impervious, Inflow Depth = 5.44" for 100-Year event
Inflow = 5.40 cfs @ 12.17 hrs, Volume= 0.308 af
Outflow = 5.09 cfs @ 12.21 hrs, Volume= 0.273 af, Atten= 6%, Lag= 2.1 min
Primary = 5.09 cfs @ 12.21 hrs, Volume= 0.273 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.21' @ 12.21 hrs Surf.Area= 4,929 sf Storage= 2,328 cf

Plug-Flow detention time= 68.0 min calculated for 0.273 af (89% of inflow)
Center-of-Mass det. time= 22.9 min (808.1 - 785.2)

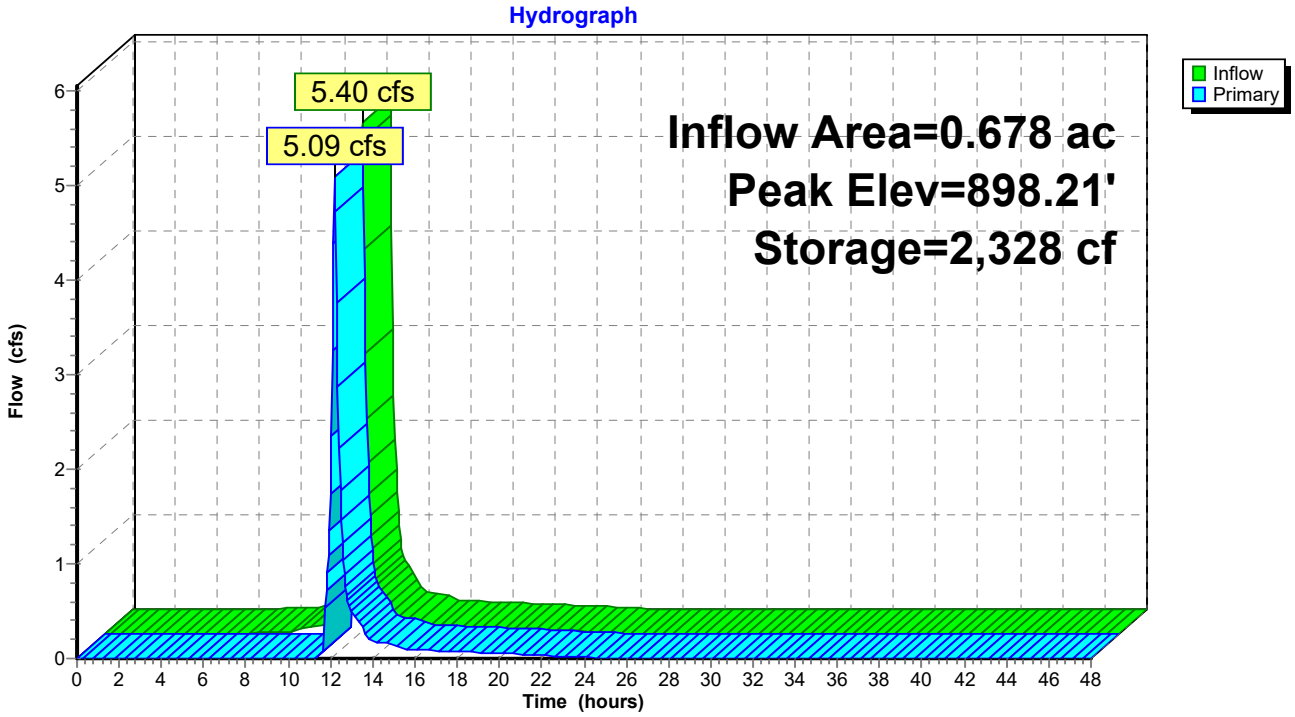
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

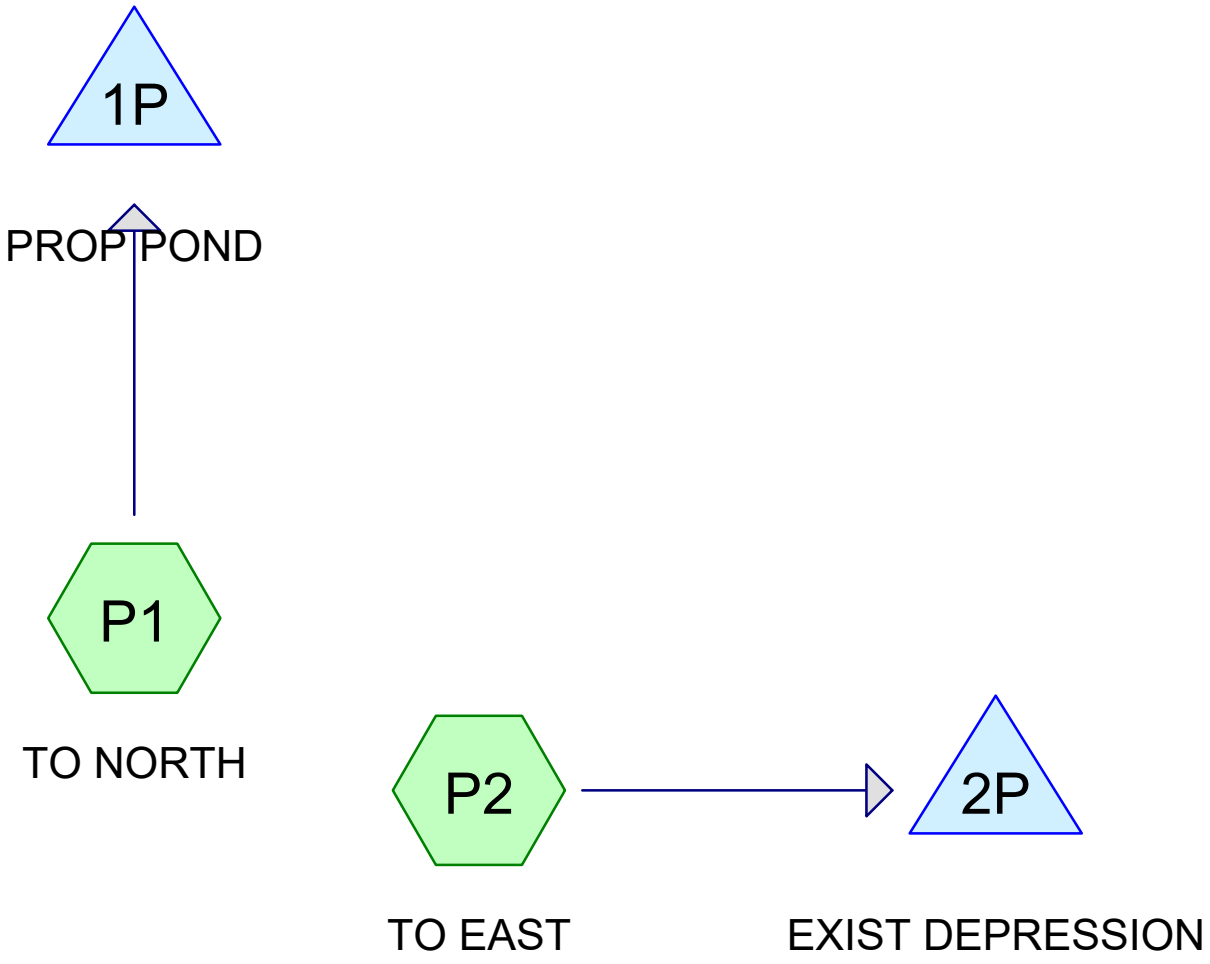
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.01 cfs @ 12.21 hrs HW=898.21' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 5.01 cfs @ 1.22 fps)

Pond 1P: EXIST DEPRESSION





Subcat Reach Pond Link

Routing Diagram for PROPOSED DRNG K-Tel Minnetonka
Prepared by {enter your company name here}, Printed 8/11/2023

Summary for Subcatchment P1: TO NORTH

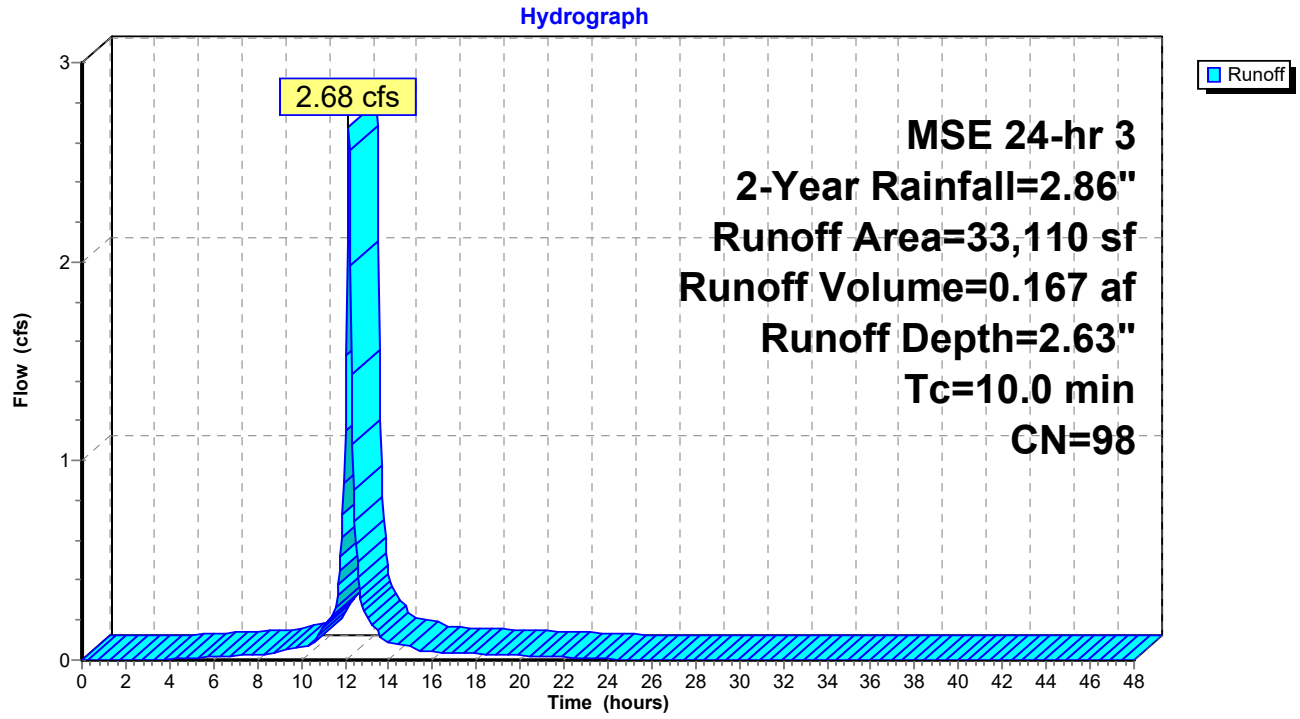
Runoff = 2.68 cfs @ 12.17 hrs, Volume= 0.167 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

	Area (sf)	CN	Description
*	33,110	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	33,110	98	Weighted Average
	33,110		100.00% Impervious Area

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

Subcatchment P1: TO NORTH



Summary for Subcatchment P2: TO EAST

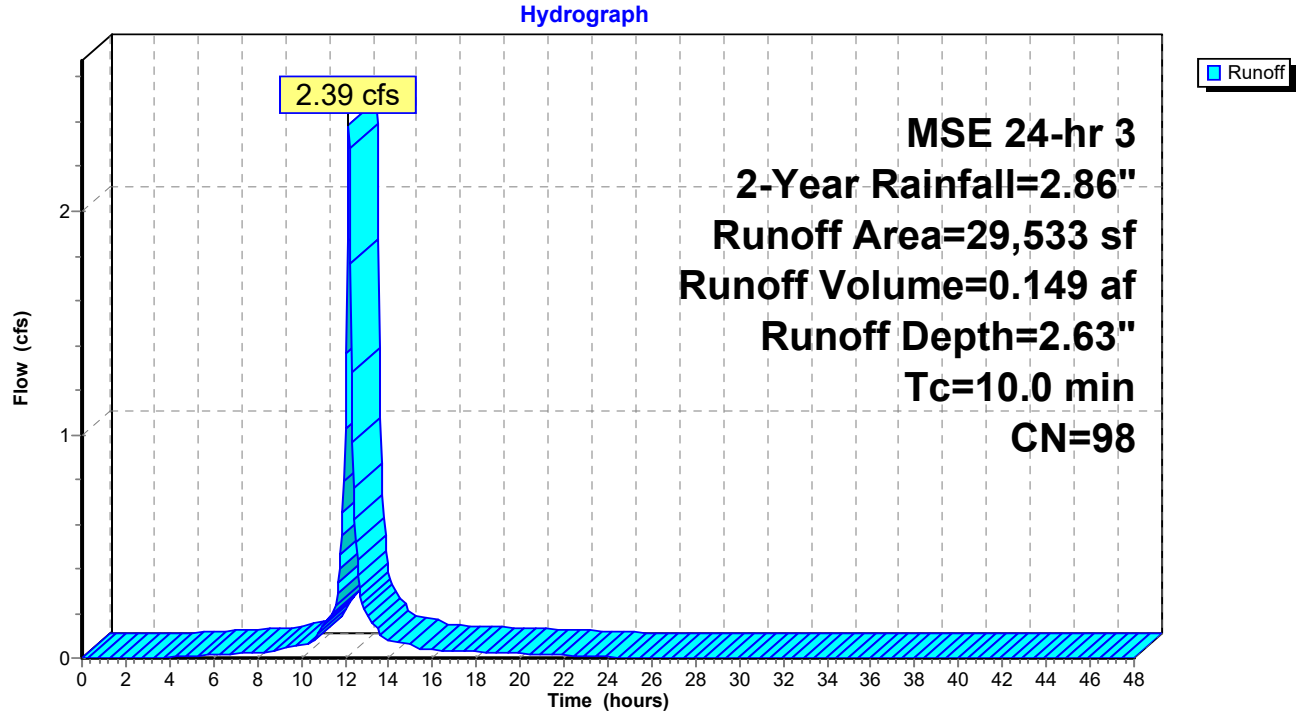
Runoff = 2.39 cfs @ 12.17 hrs, Volume= 0.149 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

	Area (sf)	CN	Description
*	29,533	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	29,533	98	Weighted Average
	29,533		100.00% Impervious Area

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

Subcatchment P2: TO EAST



Summary for Pond 1P: PROP POND

Inflow Area = 0.760 ac,100.00% Impervious, Inflow Depth = 2.63" for 2-Year event
Inflow = 2.68 cfs @ 12.17 hrs, Volume= 0.167 af
Outflow = 0.36 cfs @ 12.64 hrs, Volume= 0.154 af, Atten= 86%, Lag= 28.4 min
Primary = 0.36 cfs @ 12.64 hrs, Volume= 0.154 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 901.00' Surf.Area= 10,600 sf Storage= 9,395 cf
Peak Elev= 901.40' @ 12.64 hrs Surf.Area= 12,005 sf Storage= 13,932 cf (4,537 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 316.3 min (1,073.8 - 757.5)

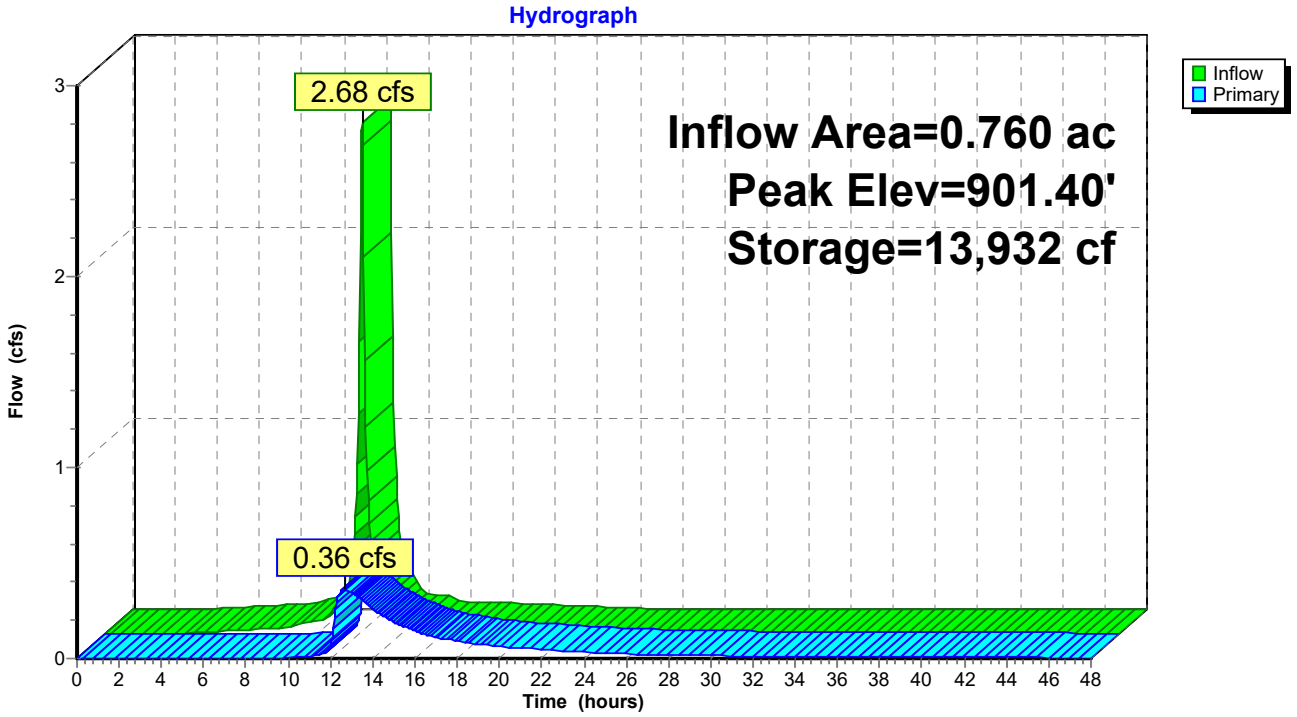
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	29,220 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	110	0	0
898.00	470	290	290
899.00	1,020	745	1,035
900.00	2,550	1,785	2,820
901.00	10,600	6,575	9,395
902.00	14,100	12,350	21,745
902.50	15,800	7,475	29,220

Device	Routing	Invert	Outlet Devices
#1	Primary	901.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 901.00' / 901.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	897.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 897.00' / 897.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=0.36 cfs @ 12.64 hrs HW=901.40' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.36 cfs @ 1.59 fps)
↑—**2=Culvert** (Passes 0.36 cfs of 3.30 cfs potential flow)

Pond 1P: PROP POND



Stage-Area-Storage for Pond 1P: PROP POND

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	110	0
897.10	146	13
897.20	182	29
897.30	218	49
897.40	254	73
897.50	290	100
897.60	326	131
897.70	362	165
897.80	398	203
897.90	434	245
898.00	470	290
898.10	525	340
898.20	580	395
898.30	635	456
898.40	690	522
898.50	745	594
898.60	800	671
898.70	855	754
898.80	910	842
898.90	965	936
899.00	1,020	1,035
899.10	1,173	1,145
899.20	1,326	1,270
899.30	1,479	1,410
899.40	1,632	1,565
899.50	1,785	1,736
899.60	1,938	1,922
899.70	2,091	2,124
899.80	2,244	2,341
899.90	2,397	2,573
900.00	2,550	2,820
900.10	3,355	3,115
900.20	4,160	3,491
900.30	4,965	3,947
900.40	5,770	4,484
900.50	6,575	5,101
900.60	7,380	5,799
900.70	8,185	6,577
900.80	8,990	7,436
900.90	9,795	8,375
901.00	10,600	9,395
901.10	10,950	10,473
901.20	11,300	11,585
901.30	11,650	12,732
901.40	12,000	13,915
901.50	12,350	15,133
901.60	12,700	16,385
901.70	13,050	17,673
901.80	13,400	18,995
901.90	13,750	20,352
902.00	14,100	21,745
902.10	14,440	23,172
902.20	14,780	24,633
902.30	15,120	26,128
902.40	15,460	27,657
902.50	**15,800**	**29,220**

Summary for Pond 2P: EXIST DEPRESSION

Inflow Area = 0.678 ac,100.00% Impervious, Inflow Depth = 2.63" for 2-Year event
Inflow = 2.39 cfs @ 12.17 hrs, Volume= 0.149 af
Outflow = 2.23 cfs @ 12.21 hrs, Volume= 0.114 af, Atten= 7%, Lag= 2.3 min
Primary = 2.23 cfs @ 12.21 hrs, Volume= 0.114 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.12' @ 12.21 hrs Surf.Area= 4,069 sf Storage= 1,933 cf

Plug-Flow detention time= 112.4 min calculated for 0.114 af (77% of inflow)
Center-of-Mass det. time= 50.8 min (808.3 - 757.5)

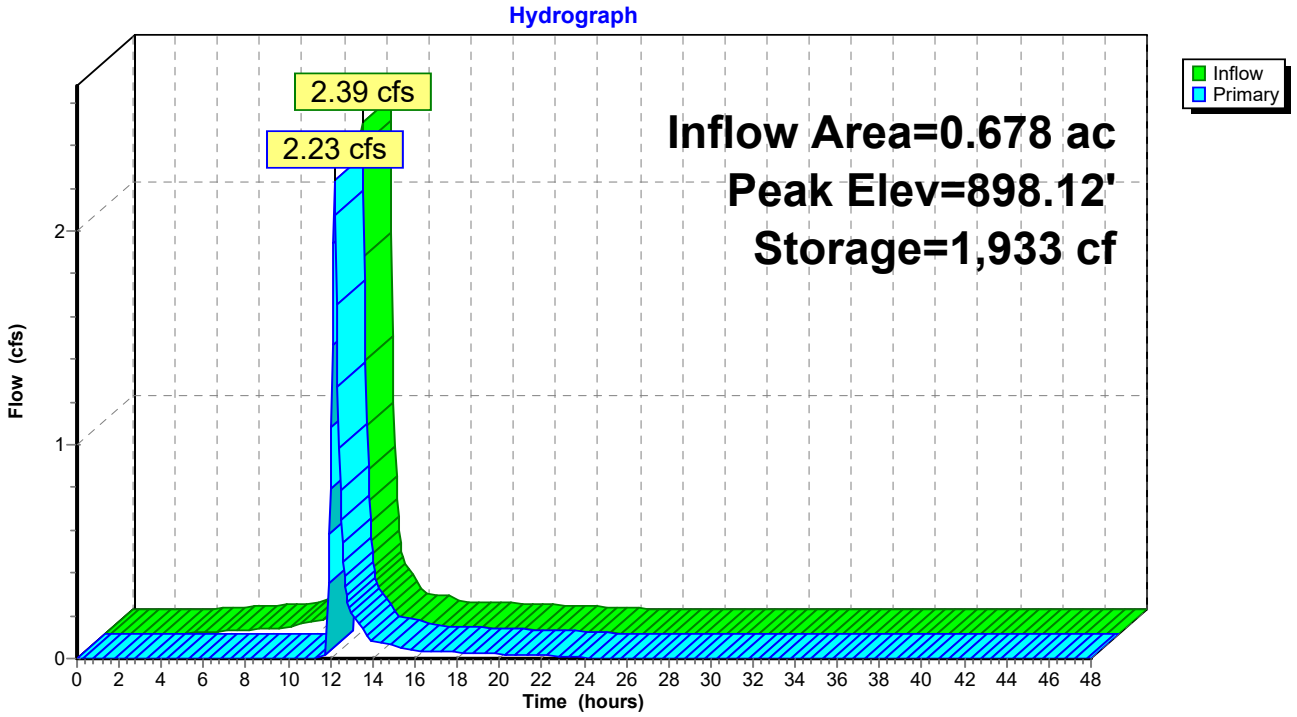
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.20 cfs @ 12.21 hrs HW=898.12' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 2.20 cfs @ 0.93 fps)

Pond 2P: EXIST DEPRESSION



Stage-Area-Storage for Pond 2P: EXIST DEPRESSION

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	140	0
897.02	195	3
897.04	250	8
897.06	305	13
897.08	360	20
897.10	415	28
897.12	470	37
897.14	525	47
897.16	580	58
897.18	635	70
897.20	690	83
897.22	745	97
897.24	800	113
897.26	855	129
897.28	910	147
897.30	965	166
897.32	1,020	186
897.34	1,075	207
897.36	1,130	229
897.38	1,185	252
897.40	1,240	276
897.42	1,295	301
897.44	1,350	328
897.46	1,405	355
897.48	1,460	384
897.50	1,515	414
897.52	1,570	445
897.54	1,625	477
897.56	1,680	510
897.58	1,735	544
897.60	1,790	579
897.62	1,845	615
897.64	1,900	653
897.66	1,955	691
897.68	2,010	731
897.70	2,065	772
897.72	2,120	814
897.74	2,175	857
897.76	2,230	901
897.78	2,285	946
897.80	2,340	992
897.82	2,395	1,039
897.84	2,450	1,088
897.86	2,505	1,137
897.88	2,560	1,188
897.90	2,615	1,240
897.92	2,670	1,293
897.94	2,725	1,347
897.96	2,780	1,402
897.98	2,835	1,458
898.00	2,890	1,515
898.02	3,086	1,575
898.04	3,282	1,638
898.06	3,479	1,706
898.08	3,675	1,778
898.10	3,871	1,853
898.12	4,067	1,932
898.14	4,263	2,016
898.16	4,460	2,103
898.18	4,656	2,194
898.20	4,852	2,289
898.22	5,048	2,388
898.24	5,244	2,491
898.26	5,441	2,598
898.28	5,637	2,709
898.30	5,833	2,823
898.32	6,029	2,942
898.34	6,225	3,065
898.36	6,422	3,191
898.38	6,618	3,321
898.40	6,814	3,456
898.42	7,010	3,594
898.44	7,206	3,736
898.46	7,403	3,882
898.48	7,599	4,032
898.50	7,795	4,186
898.52	7,991	4,344
898.54	8,187	4,506
898.56	8,384	4,672
898.58	8,580	4,841
898.60	8,776	5,015
898.62	8,972	5,192
898.64	9,168	5,374
898.66	9,365	5,559
898.68	9,561	5,748
898.70	9,757	5,941
898.72	9,953	6,139
898.74	10,149	6,340
898.76	10,346	6,545
898.78	10,542	6,753
898.80	10,738	6,966
898.82	10,934	7,183
898.84	11,130	7,404
898.86	11,327	7,628
898.88	11,523	7,857
898.90	11,719	8,089
898.92	11,915	8,325
898.94	12,111	8,566
898.96	12,308	8,810
898.98	12,504	9,058
899.00	**12,700**	**9,310**

Summary for Subcatchment P1: TO NORTH

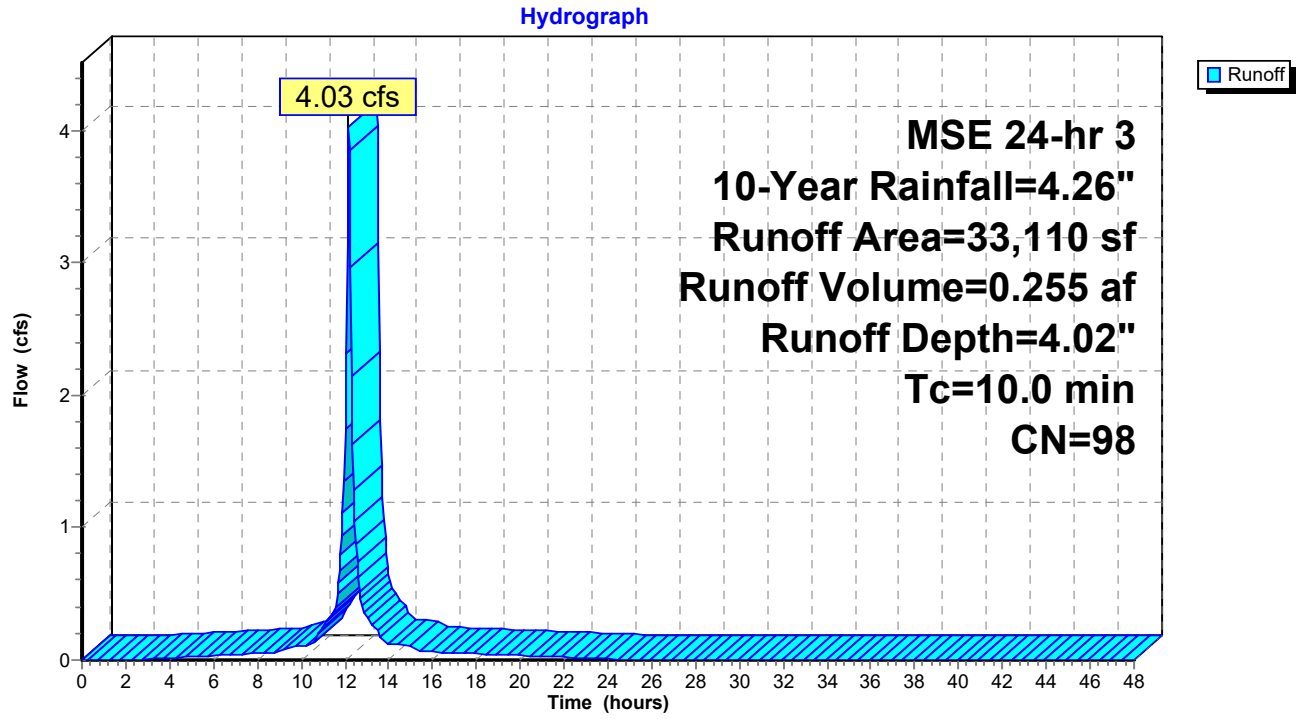
Runoff = 4.03 cfs @ 12.17 hrs, Volume= 0.255 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

	Area (sf)	CN	Description
*	33,110	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	33,110	98	Weighted Average
	33,110		100.00% Impervious Area

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

Subcatchment P1: TO NORTH



Summary for Subcatchment P2: TO EAST

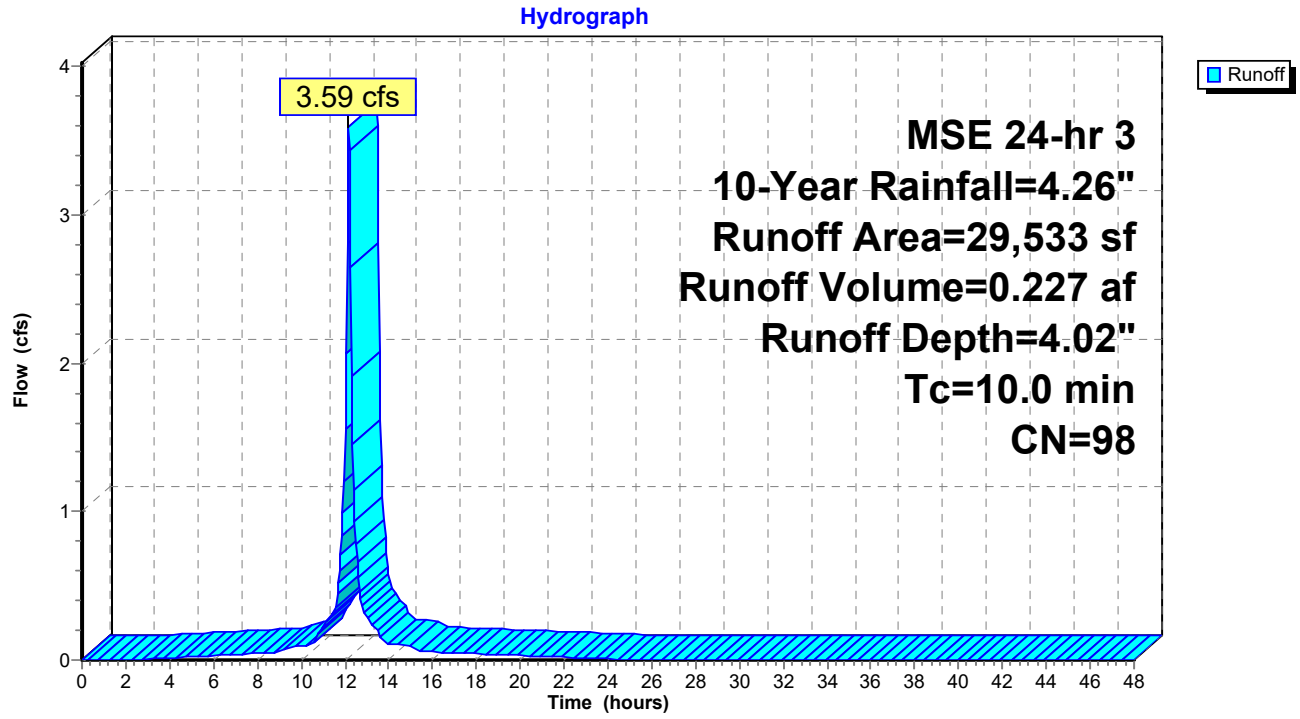
Runoff = 3.59 cfs @ 12.17 hrs, Volume= 0.227 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

	Area (sf)	CN	Description
*	29,533	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	29,533	98	Weighted Average
	29,533		100.00% Impervious Area

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

Subcatchment P2: TO EAST



Summary for Pond 1P: PROP POND

Inflow Area = 0.760 ac,100.00% Impervious, Inflow Depth = 4.02" for 10-Year event
Inflow = 4.03 cfs @ 12.17 hrs, Volume= 0.255 af
Outflow = 0.73 cfs @ 12.56 hrs, Volume= 0.242 af, Atten= 82%, Lag= 23.2 min
Primary = 0.73 cfs @ 12.56 hrs, Volume= 0.242 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 901.00' Surf.Area= 10,600 sf Storage= 9,395 cf
Peak Elev= 901.56' @ 12.56 hrs Surf.Area= 12,570 sf Storage= 15,914 cf (6,519 cf above start)

Plug-Flow detention time= 1,397.0 min calculated for 0.026 af (10% of inflow)
Center-of-Mass det. time= 258.2 min (1,009.4 - 751.1)

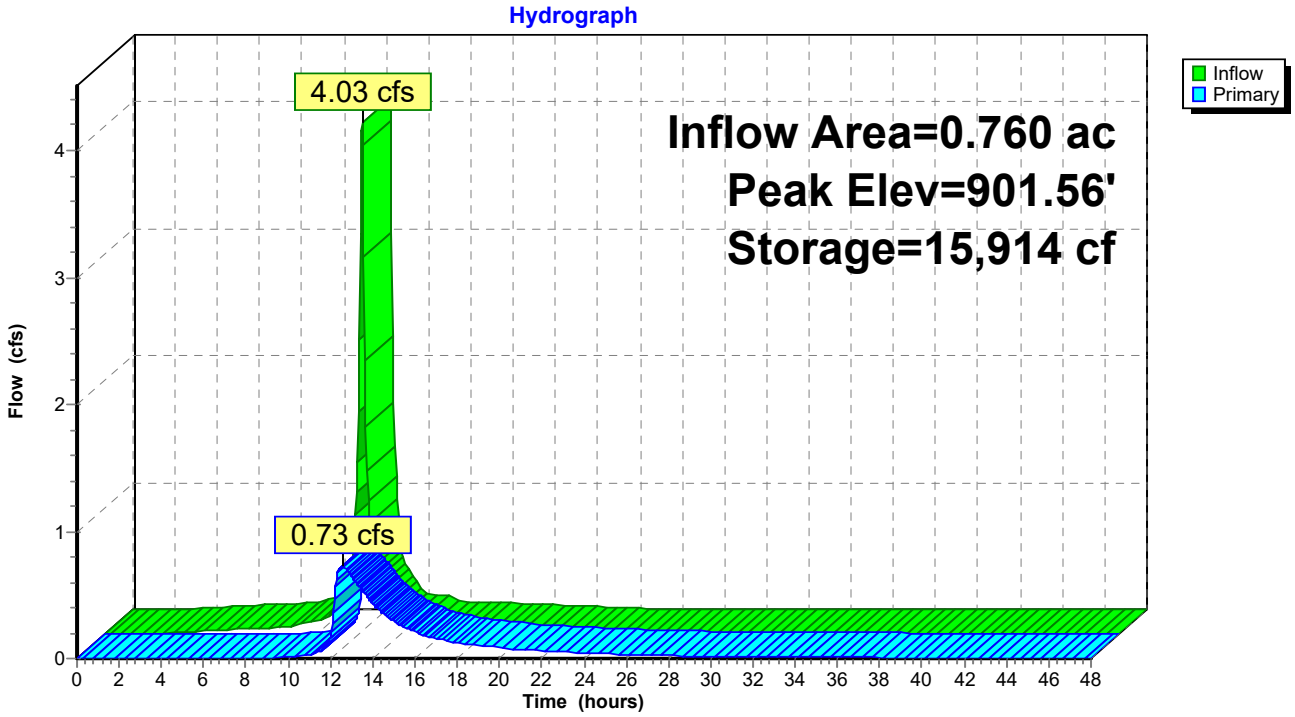
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	29,220 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	110	0	0
898.00	470	290	290
899.00	1,020	745	1,035
900.00	2,550	1,785	2,820
901.00	10,600	6,575	9,395
902.00	14,100	12,350	21,745
902.50	15,800	7,475	29,220

Device	Routing	Invert	Outlet Devices
#1	Primary	901.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 901.00' / 901.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	897.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 897.00' / 897.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=0.73 cfs @ 12.56 hrs HW=901.56' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.73 cfs @ 1.99 fps)
↑—**2=Culvert** (Passes 0.73 cfs of 3.91 cfs potential flow)

Pond 1P: PROP POND



Stage-Area-Storage for Pond 1P: PROP POND

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	110	0
897.10	146	13
897.20	182	29
897.30	218	49
897.40	254	73
897.50	290	100
897.60	326	131
897.70	362	165
897.80	398	203
897.90	434	245
898.00	470	290
898.10	525	340
898.20	580	395
898.30	635	456
898.40	690	522
898.50	745	594
898.60	800	671
898.70	855	754
898.80	910	842
898.90	965	936
899.00	1,020	1,035
899.10	1,173	1,145
899.20	1,326	1,270
899.30	1,479	1,410
899.40	1,632	1,565
899.50	1,785	1,736
899.60	1,938	1,922
899.70	2,091	2,124
899.80	2,244	2,341
899.90	2,397	2,573
900.00	2,550	2,820
900.10	3,355	3,115
900.20	4,160	3,491
900.30	4,965	3,947
900.40	5,770	4,484
900.50	6,575	5,101
900.60	7,380	5,799
900.70	8,185	6,577
900.80	8,990	7,436
900.90	9,795	8,375
901.00	10,600	9,395
901.10	10,950	10,473
901.20	11,300	11,585
901.30	11,650	12,732
901.40	12,000	13,915
901.50	12,350	15,133
901.60	12,700	16,385
901.70	13,050	17,673
901.80	13,400	18,995
901.90	13,750	20,352
902.00	14,100	21,745
902.10	14,440	23,172
902.20	14,780	24,633
902.30	15,120	26,128
902.40	15,460	27,657
902.50	**15,800**	**29,220**

Summary for Pond 2P: EXIST DEPRESSION

Inflow Area = 0.678 ac,100.00% Impervious, Inflow Depth = 4.02" for 10-Year event
Inflow = 3.59 cfs @ 12.17 hrs, Volume= 0.227 af
Outflow = 3.38 cfs @ 12.21 hrs, Volume= 0.193 af, Atten= 6%, Lag= 2.2 min
Primary = 3.38 cfs @ 12.21 hrs, Volume= 0.193 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.16' @ 12.21 hrs Surf.Area= 4,443 sf Storage= 2,095 cf

Plug-Flow detention time= 95.5 min calculated for 0.192 af (85% of inflow)
Center-of-Mass det. time= 44.0 min (795.1 - 751.1)

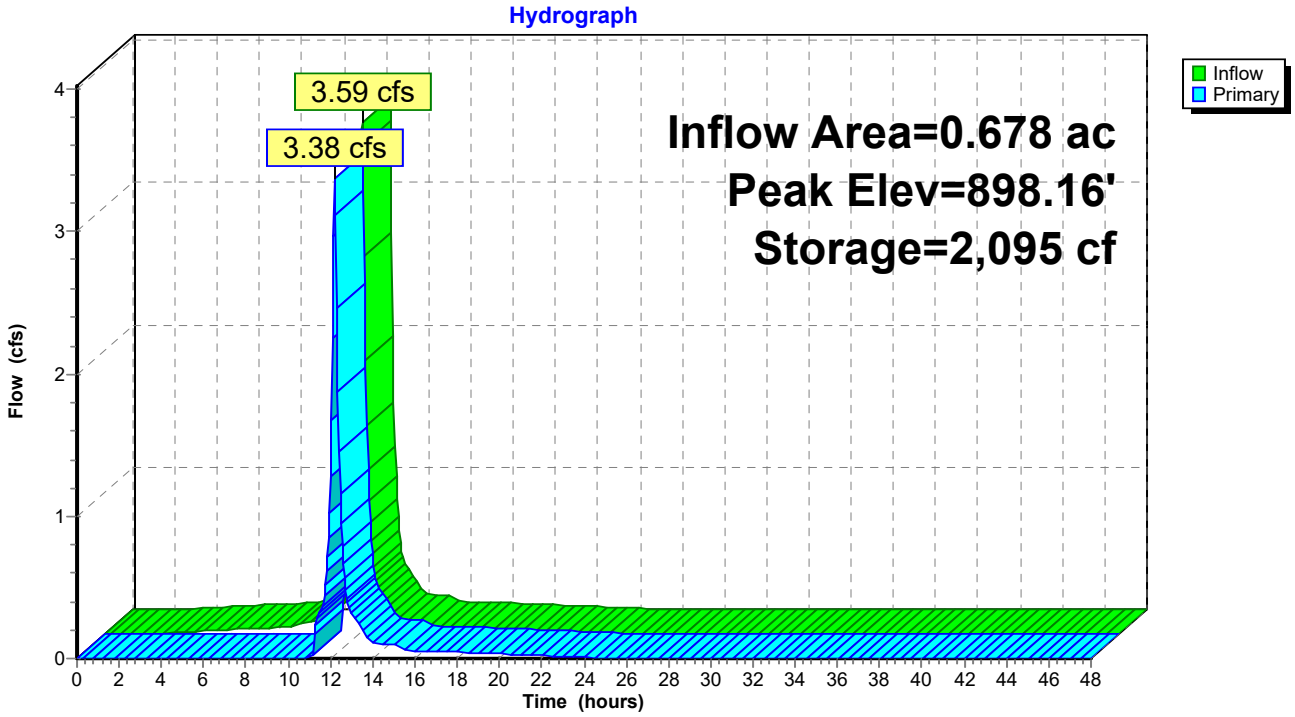
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.34 cfs @ 12.21 hrs HW=898.16' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 3.34 cfs @ 1.06 fps)

Pond 2P: EXIST DEPRESSION



Stage-Area-Storage for Pond 2P: EXIST DEPRESSION

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	140	0
897.02	195	3
897.04	250	8
897.06	305	13
897.08	360	20
897.10	415	28
897.12	470	37
897.14	525	47
897.16	580	58
897.18	635	70
897.20	690	83
897.22	745	97
897.24	800	113
897.26	855	129
897.28	910	147
897.30	965	166
897.32	1,020	186
897.34	1,075	207
897.36	1,130	229
897.38	1,185	252
897.40	1,240	276
897.42	1,295	301
897.44	1,350	328
897.46	1,405	355
897.48	1,460	384
897.50	1,515	414
897.52	1,570	445
897.54	1,625	477
897.56	1,680	510
897.58	1,735	544
897.60	1,790	579
897.62	1,845	615
897.64	1,900	653
897.66	1,955	691
897.68	2,010	731
897.70	2,065	772
897.72	2,120	814
897.74	2,175	857
897.76	2,230	901
897.78	2,285	946
897.80	2,340	992
897.82	2,395	1,039
897.84	2,450	1,088
897.86	2,505	1,137
897.88	2,560	1,188
897.90	2,615	1,240
897.92	2,670	1,293
897.94	2,725	1,347
897.96	2,780	1,402
897.98	2,835	1,458
898.00	2,890	1,515
898.02	3,086	1,575
898.04	3,282	1,638
898.06	3,479	1,706
898.08	3,675	1,778
898.10	3,871	1,853
898.12	4,067	1,932
898.14	4,263	2,016
898.16	4,460	2,103
898.18	4,656	2,194
898.20	4,852	2,289
898.22	5,048	2,388
898.24	5,244	2,491
898.26	5,441	2,598
898.28	5,637	2,709
898.30	5,833	2,823
898.32	6,029	2,942
898.34	6,225	3,065
898.36	6,422	3,191
898.38	6,618	3,321
898.40	6,814	3,456
898.42	7,010	3,594
898.44	7,206	3,736
898.46	7,403	3,882
898.48	7,599	4,032
898.50	7,795	4,186
898.52	7,991	4,344
898.54	8,187	4,506
898.56	8,384	4,672
898.58	8,580	4,841
898.60	8,776	5,015
898.62	8,972	5,192
898.64	9,168	5,374
898.66	9,365	5,559
898.68	9,561	5,748
898.70	9,757	5,941
898.72	9,953	6,139
898.74	10,149	6,340
898.76	10,346	6,545
898.78	10,542	6,753
898.80	10,738	6,966
898.82	10,934	7,183
898.84	11,130	7,404
898.86	11,327	7,628
898.88	11,523	7,857
898.90	11,719	8,089
898.92	11,915	8,325
898.94	12,111	8,566
898.96	12,308	8,810
898.98	12,504	9,058
899.00	**12,700**	**9,310**

Summary for Subcatchment P1: TO NORTH

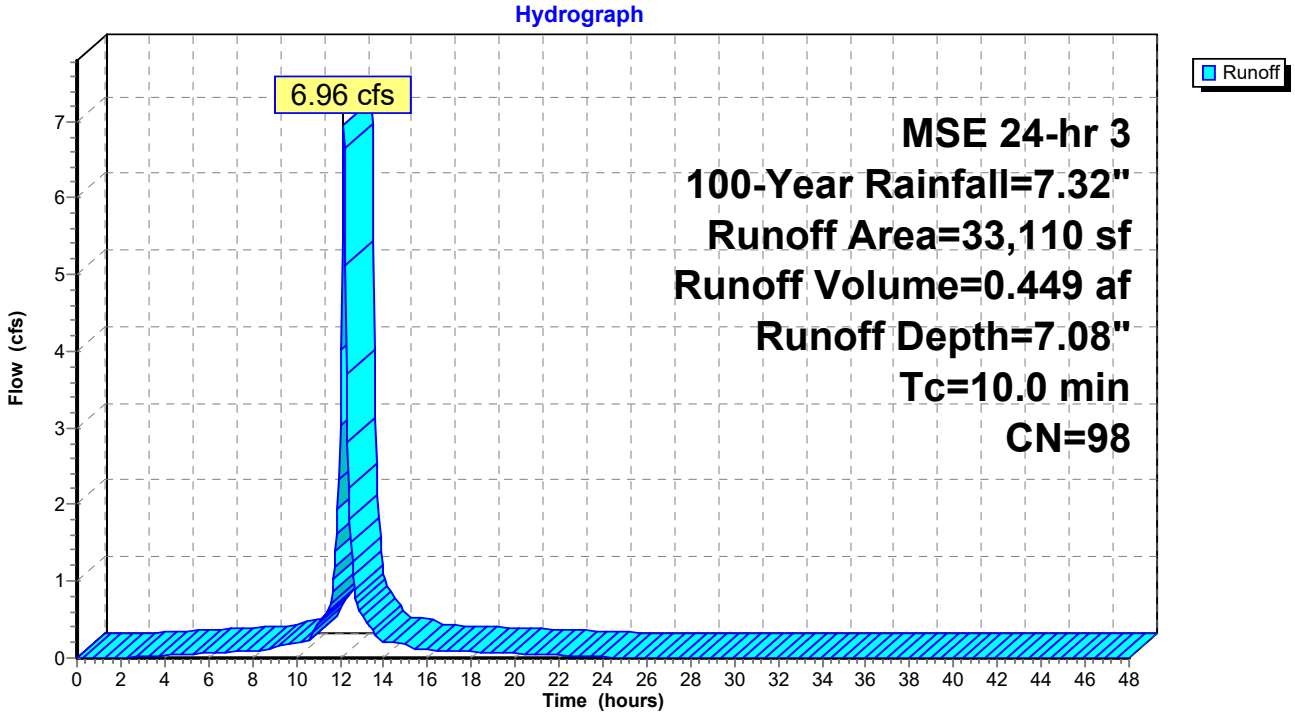
Runoff = 6.96 cfs @ 12.17 hrs, Volume= 0.449 af, Depth= 7.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

	Area (sf)	CN	Description
*	33,110	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	33,110	98	Weighted Average
	33,110		100.00% Impervious Area

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

Subcatchment P1: TO NORTH



Summary for Subcatchment P2: TO EAST

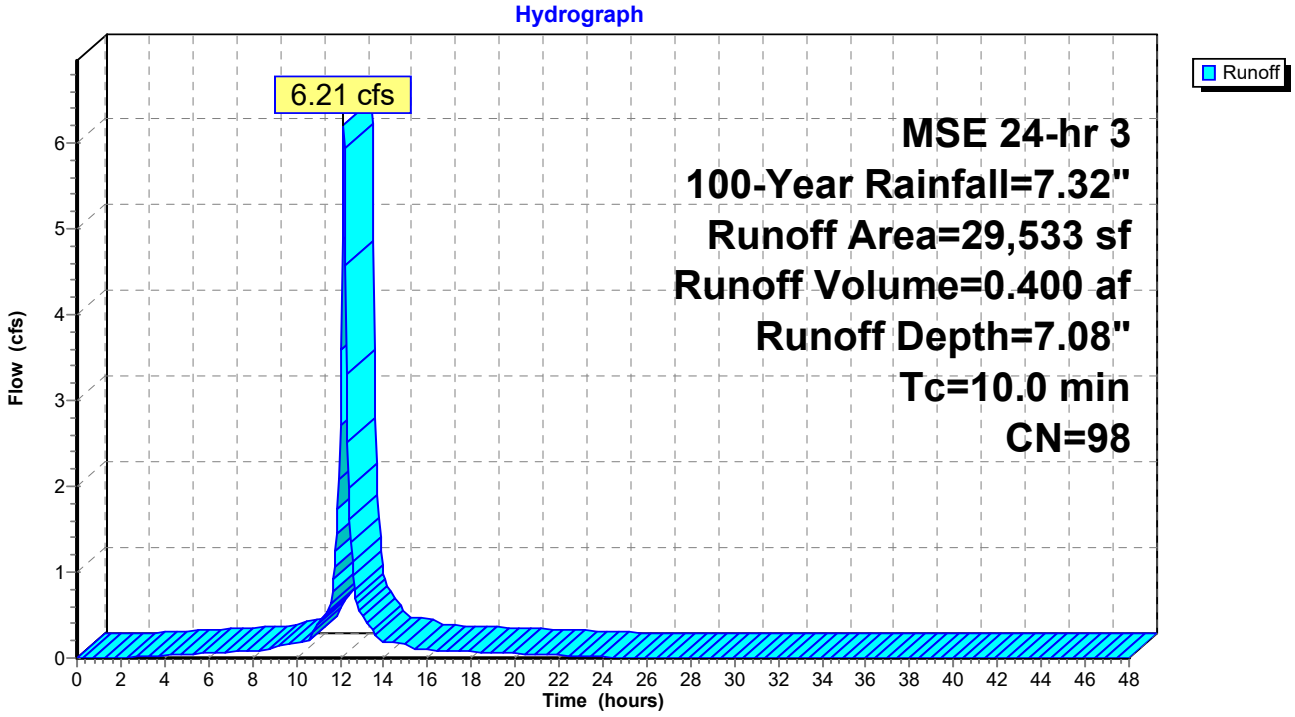
Runoff = 6.21 cfs @ 12.17 hrs, Volume= 0.400 af, Depth= 7.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

	Area (sf)	CN	Description
*	29,533	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	29,533	98	Weighted Average
	29,533		100.00% Impervious Area

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

Subcatchment P2: TO EAST



Summary for Pond 1P: PROP POND

Inflow Area = 0.760 ac,100.00% Impervious, Inflow Depth = 7.08" for 100-Year event
Inflow = 6.96 cfs @ 12.17 hrs, Volume= 0.449 af
Outflow = 1.64 cfs @ 12.48 hrs, Volume= 0.435 af, Atten= 76%, Lag= 18.6 min
Primary = 1.64 cfs @ 12.48 hrs, Volume= 0.435 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 901.00' Surf.Area= 10,600 sf Storage= 9,395 cf
Peak Elev= 901.86' @ 12.48 hrs Surf.Area= 13,600 sf Storage= 19,767 cf (10,372 cf above start)

Plug-Flow detention time= 484.2 min calculated for 0.219 af (49% of inflow)
Center-of-Mass det. time= 199.6 min (943.9 - 744.3)

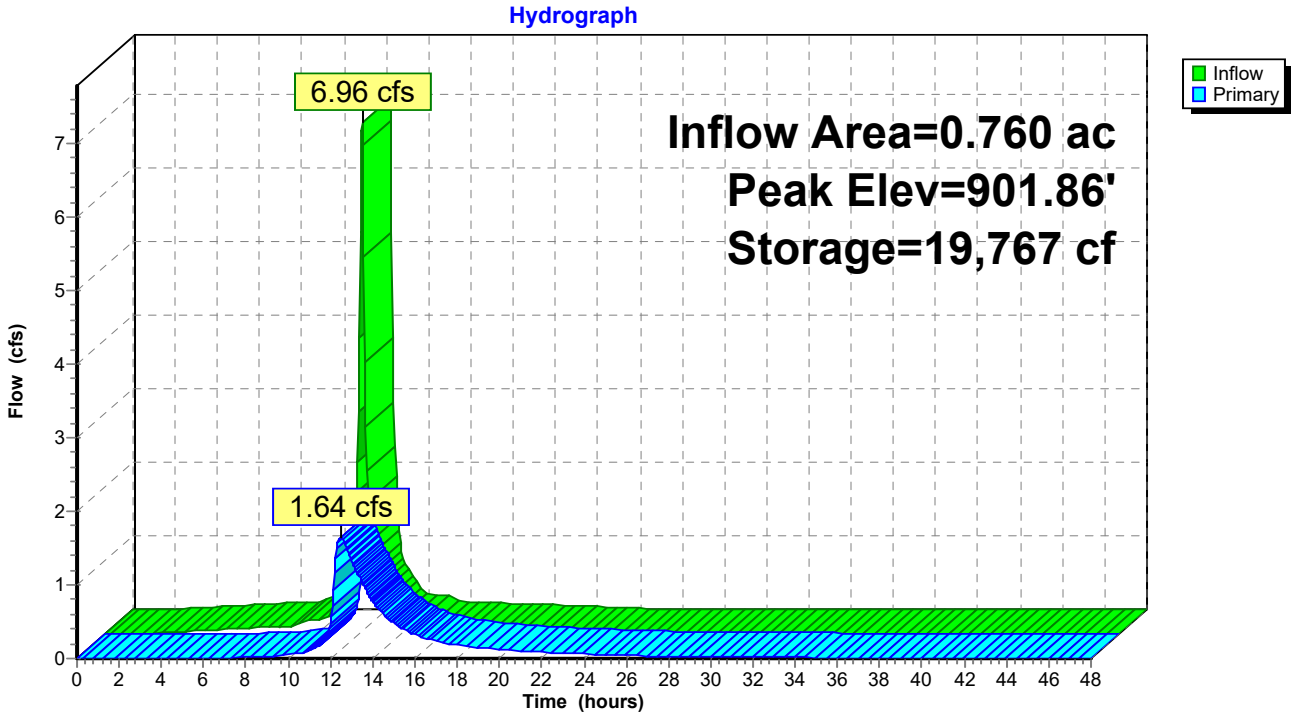
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	29,220 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	110	0	0
898.00	470	290	290
899.00	1,020	745	1,035
900.00	2,550	1,785	2,820
901.00	10,600	6,575	9,395
902.00	14,100	12,350	21,745
902.50	15,800	7,475	29,220

Device	Routing	Invert	Outlet Devices
#1	Primary	901.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 901.00' / 901.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	897.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 897.00' / 897.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=1.63 cfs @ 12.48 hrs HW=901.86' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.63 cfs @ 2.57 fps)
↑—**2=Culvert** (Passes 1.63 cfs of 4.83 cfs potential flow)

Pond 1P: PROP POND



Stage-Area-Storage for Pond 1P: PROP POND

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	110	0
897.10	146	13
897.20	182	29
897.30	218	49
897.40	254	73
897.50	290	100
897.60	326	131
897.70	362	165
897.80	398	203
897.90	434	245
898.00	470	290
898.10	525	340
898.20	580	395
898.30	635	456
898.40	690	522
898.50	745	594
898.60	800	671
898.70	855	754
898.80	910	842
898.90	965	936
899.00	1,020	1,035
899.10	1,173	1,145
899.20	1,326	1,270
899.30	1,479	1,410
899.40	1,632	1,565
899.50	1,785	1,736
899.60	1,938	1,922
899.70	2,091	2,124
899.80	2,244	2,341
899.90	2,397	2,573
900.00	2,550	2,820
900.10	3,355	3,115
900.20	4,160	3,491
900.30	4,965	3,947
900.40	5,770	4,484
900.50	6,575	5,101
900.60	7,380	5,799
900.70	8,185	6,577
900.80	8,990	7,436
900.90	9,795	8,375
901.00	10,600	9,395
901.10	10,950	10,473
901.20	11,300	11,585
901.30	11,650	12,732
901.40	12,000	13,915
901.50	12,350	15,133
901.60	12,700	16,385
901.70	13,050	17,673
901.80	13,400	18,995
901.90	13,750	20,352
902.00	14,100	21,745
902.10	14,440	23,172
902.20	14,780	24,633
902.30	15,120	26,128
902.40	15,460	27,657
902.50	**15,800**	**29,220**

Summary for Pond 2P: EXIST DEPRESSION

Inflow Area = 0.678 ac,100.00% Impervious, Inflow Depth = 7.08" for 100-Year event
Inflow = 6.21 cfs @ 12.17 hrs, Volume= 0.400 af
Outflow = 5.86 cfs @ 12.20 hrs, Volume= 0.365 af, Atten= 6%, Lag= 2.1 min
Primary = 5.86 cfs @ 12.20 hrs, Volume= 0.365 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.23' @ 12.20 hrs Surf.Area= 5,131 sf Storage= 2,431 cf

Plug-Flow detention time= 73.5 min calculated for 0.365 af (91% of inflow)
Center-of-Mass det. time= 35.7 min (780.0 - 744.3)

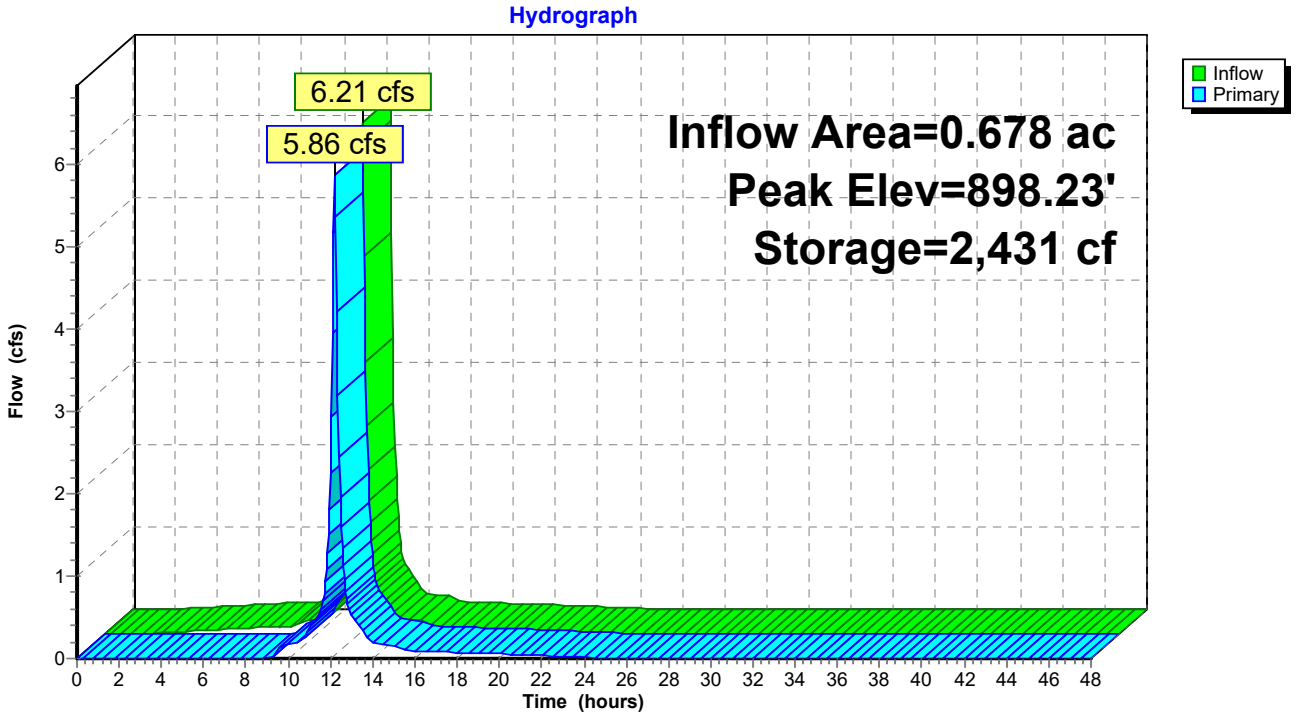
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.81 cfs @ 12.20 hrs HW=898.23' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 5.81 cfs @ 1.28 fps)

Pond 2P: EXIST DEPRESSION



Stage-Area-Storage for Pond 2P: EXIST DEPRESSION

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	140	0
897.02	195	3
897.04	250	8
897.06	305	13
897.08	360	20
897.10	415	28
897.12	470	37
897.14	525	47
897.16	580	58
897.18	635	70
897.20	690	83
897.22	745	97
897.24	800	113
897.26	855	129
897.28	910	147
897.30	965	166
897.32	1,020	186
897.34	1,075	207
897.36	1,130	229
897.38	1,185	252
897.40	1,240	276
897.42	1,295	301
897.44	1,350	328
897.46	1,405	355
897.48	1,460	384
897.50	1,515	414
897.52	1,570	445
897.54	1,625	477
897.56	1,680	510
897.58	1,735	544
897.60	1,790	579
897.62	1,845	615
897.64	1,900	653
897.66	1,955	691
897.68	2,010	731
897.70	2,065	772
897.72	2,120	814
897.74	2,175	857
897.76	2,230	901
897.78	2,285	946
897.80	2,340	992
897.82	2,395	1,039
897.84	2,450	1,088
897.86	2,505	1,137
897.88	2,560	1,188
897.90	2,615	1,240
897.92	2,670	1,293
897.94	2,725	1,347
897.96	2,780	1,402
897.98	2,835	1,458
898.00	2,890	1,515
898.02	3,086	1,575
898.04	3,282	1,638
898.06	3,479	1,706
898.08	3,675	1,778
898.10	3,871	1,853
898.12	4,067	1,932
898.14	4,263	2,016
898.16	4,460	2,103
898.18	4,656	2,194
898.20	4,852	2,289
898.22	5,048	2,388
898.24	5,244	2,491
898.26	5,441	2,598
898.28	5,637	2,709
898.30	5,833	2,823
898.32	6,029	2,942
898.34	6,225	3,065
898.36	6,422	3,191
898.38	6,618	3,321
898.40	6,814	3,456
898.42	7,010	3,594
898.44	7,206	3,736
898.46	7,403	3,882
898.48	7,599	4,032
898.50	7,795	4,186
898.52	7,991	4,344
898.54	8,187	4,506
898.56	8,384	4,672
898.58	8,580	4,841
898.60	8,776	5,015
898.62	8,972	5,192
898.64	9,168	5,374
898.66	9,365	5,559
898.68	9,561	5,748
898.70	9,757	5,941
898.72	9,953	6,139
898.74	10,149	6,340
898.76	10,346	6,545
898.78	10,542	6,753
898.80	10,738	6,966
898.82	10,934	7,183
898.84	11,130	7,404
898.86	11,327	7,628
898.88	11,523	7,857
898.90	11,719	8,089
898.92	11,915	8,325
898.94	12,111	8,566
898.96	12,308	8,810
898.98	12,504	9,058
899.00	**12,700**	**9,310**

Map Scale: 1:1,400 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hennepin County, Minnesota
Survey Area Data: Version 18, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 30, 2020—Jul 3, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
L2B	Malardi-Hawick complex, 1 to 6 percent slopes	A	0.2	4.2%
M-W	Water, miscellaneous		0.0	0.7%
U1A	Urban land-Udorthents, wet substratum, complex, 0 to 2 percent slopes		3.5	95.1%
Totals for Area of Interest			**3.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

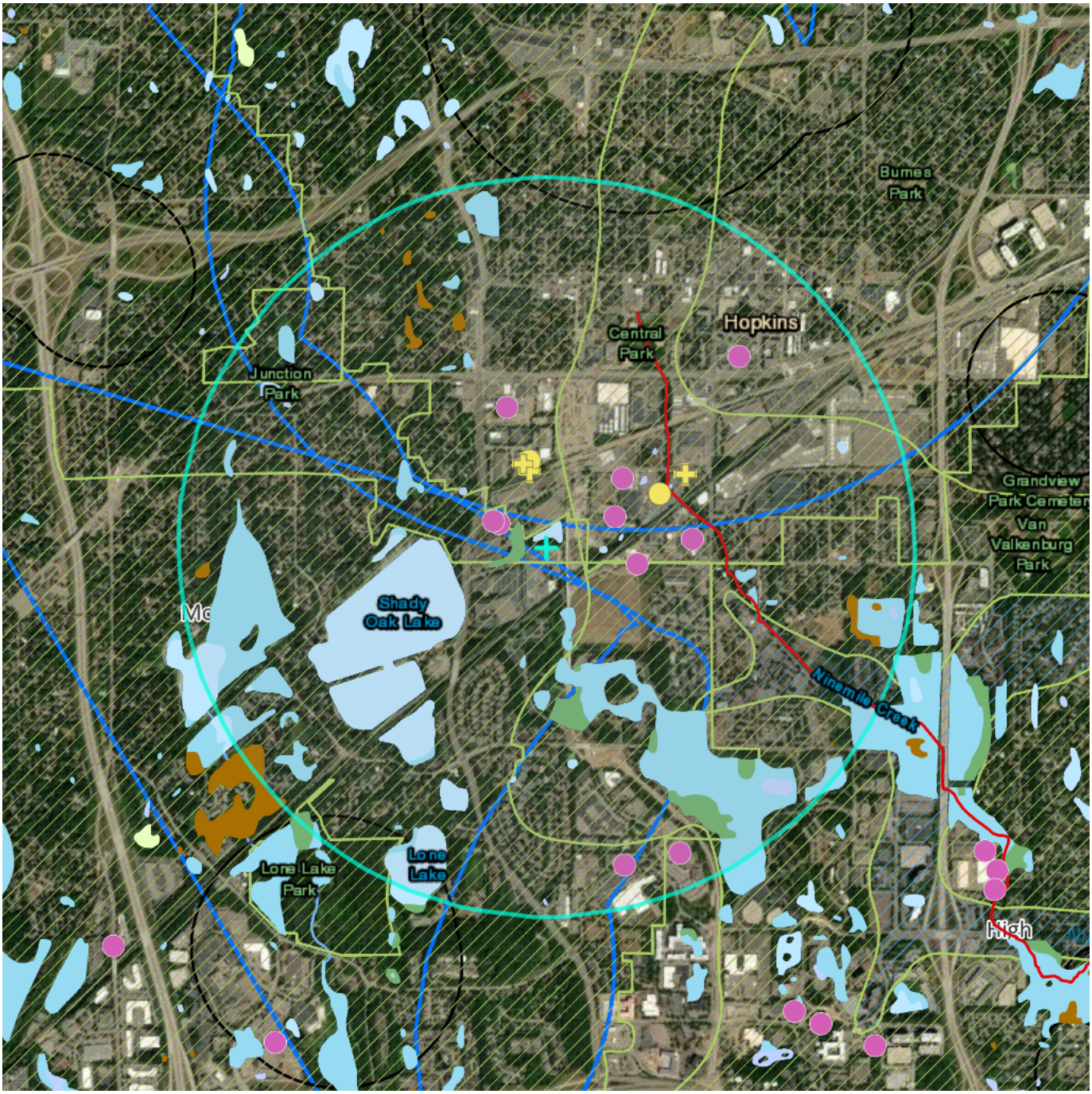
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

MINNESOTA POLLUTION CONTROL AGENCY

Industrial Stormwater

Special and Impaired Waters within 1 Mile of User Specified Location



Industrial Stormwater
- Monitoring Location
- General Permit Holder
- No Exposure Certified Facility
- Impaired Streams w/ add'l Industrial stormwater reqs
- Impaired Wetlands/Lakes w/ add'l Industrial stormwater reqs
- Mississippi River
- Lake Trout Lake
- Trout Lake & Lake Trout Lake
- Trout Lake
- Trout Stream Tributary
- Trout Stream

Lake Superior ORVW
- Restricted Discharge
- Prohibited Discharge

National Wetlands Inventory
- Seasonally Flooded Basin or Flat
- Wet Meadow
- Shallow Marsh
- Deep Marsh
- Shallow Open Water
- Shrub Swamp
- Wooded Swamp
- Bogs

Calcareous Fens
- MPCA Listed
- DNR Listed

Karsts
- Stream Sink
- Sinkhole
- Tile Outlet
- Tile Inlet
- Misc.

- Wilderness Area
- Streams
- Lakes

- Scenic and Recreational River Segment
- Impaired Lakes w/o additional reqs
- Impaired Streams w/o additional reqs
- Wellhead Protection Area
- MDH - Emergency Response Area

MDH - Drinking Water Supply Management Areas
- Very High Vulnerability
- High Vulnerability
- Medium Vulnerability

This report was generated on 8/17/2023 using the Industrial Stormwater Special and Impaired Waters Search Tool: https://pca-gis02.pca.state.mn.us/ISW/

MINNESOTA POLLUTION CONTROL AGENCY

Industrial Stormwater

Special and Impaired Waters within 1 Mile of User Specified Location

Monitoring Location Description: User Specified Location (44.914096, -93.423425)

Impaired streams with additional Industrial Stormwater requirements

Name	WID	Impairments
Nine Mile Creek	07020012-807	Fish bioassessments

Please refer to permit items 32.2 and 48.3 in the general permit for requirements.

Wetland

Wetland Types Present

Shallow Open Water

Shallow Marsh

Wooded Swamp

Shrub Swamp

Deep Marsh

The user shall comply with the requirements of Minn. R. Ch. 7050.0186, WETLANDS STANDARDS AND MITIGATION if the industrial facility has a monitoring location from which a discharge flows to and is within one mile of a wetland as defined by Minn. R. Ch. 7050.0186, subp. 1a. B.

Wellhead protection areas

The monitoring location is within one mile of a Wellhead Protection area. Please refer to section 20.8 in the general permit.

Drinking Water Supply Management Area – high vulnerability

The monitoring location is within one mile of a high vulnerability Drinking Water Supply Management Area.

Drinking Water Supply Management Area – medium vulnerability

The monitoring location is within one mile of a medium vulnerability Drinking Water Supply Management Area.

MDH - Emergency Response Area

The monitoring location is within one mile of a MDH Emergency Response Area.

MS4- Municipal Separate Storm Sewer System.

Name

Hopkins City MS4

Minnetonka City MS4

MNDOT Metro District MS4

MINNESOTA POLLUTION CONTROL AGENCY

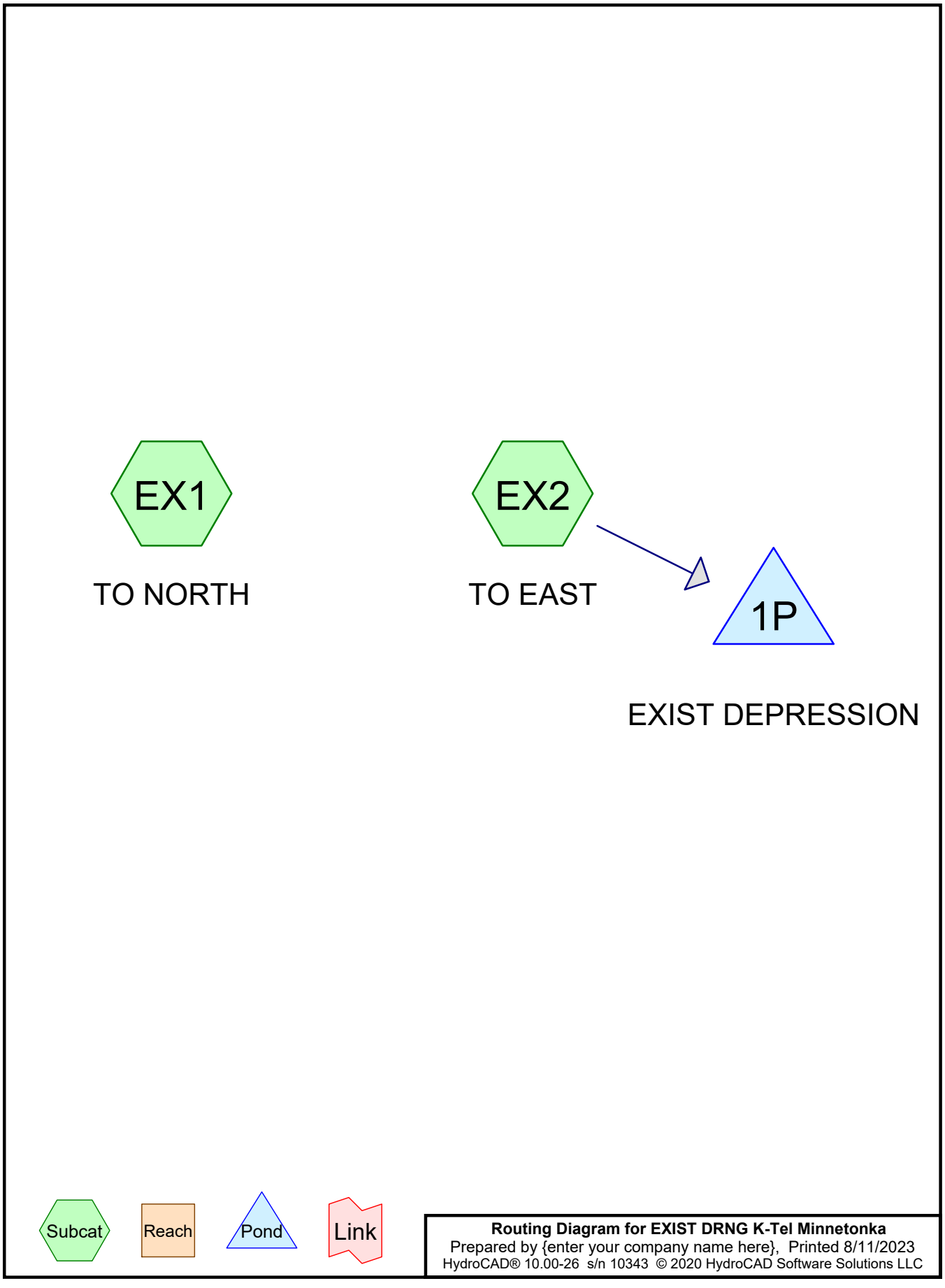
Industrial Stormwater

Special and Impaired Waters within 1 Mile of User Specified Location

Hennepin County MS4

Minnehaha Creek WD MS4

This monitoring location is within a municipality that is required by rule to permit a Municipal Separate Storm Sewer System or MS4. 6.2: If the Permittee has an industrial stormwater discharge and directly discharges into a regulated Municipal Separate Storm Sewer System (MS4), the Permittee shall notify the MS4 operator that they are discharging industrial stormwater into their storm sewer system. [Minn. R. 7090]



Routing Diagram for EXIST DRNG K-Tel Minnetonka
Prepared by {enter your company name here}, Printed 8/11/2023
HydroCAD® 10.00-26 s/n 10343 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment EX1: TO NORTH

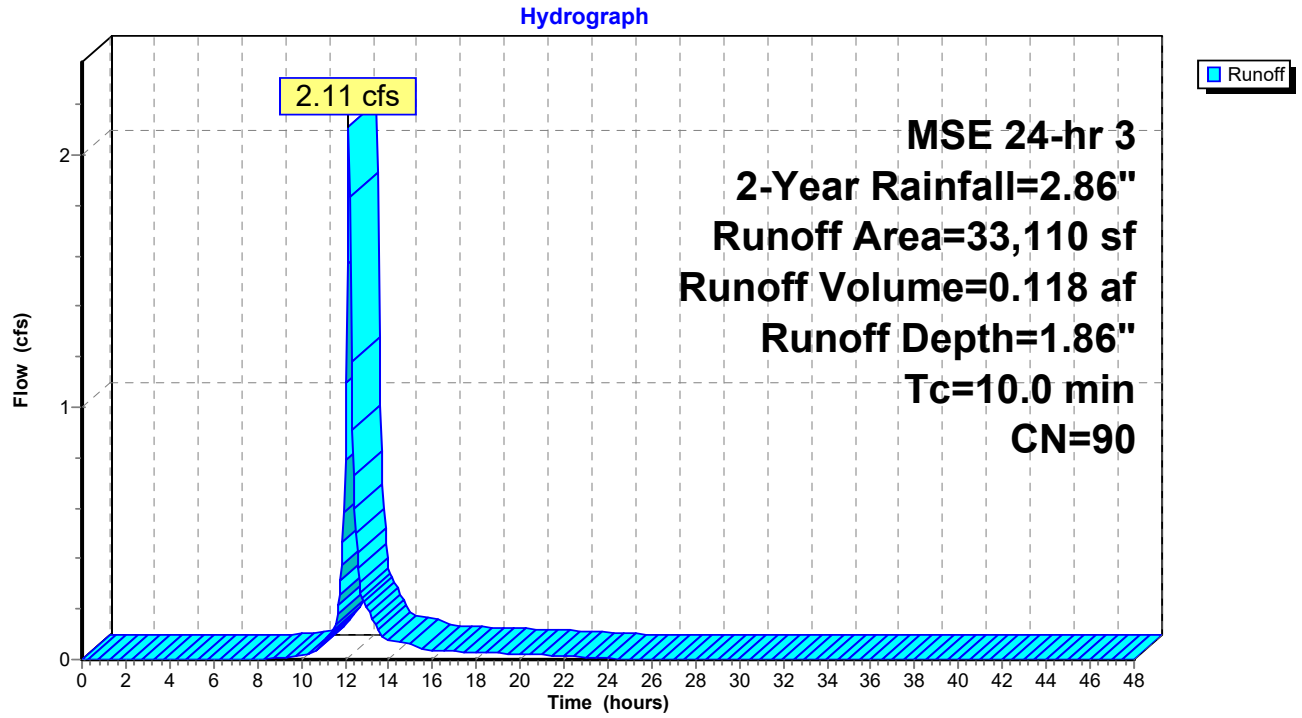
Runoff = 2.11 cfs @ 12.17 hrs, Volume= 0.118 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

	Area (sf)	CN	Description
*	22,450	98	Impervious Bldg, Gravel
	10,660	74	>75% Grass cover, Good, HSG C
	33,110	90	Weighted Average
	10,660		32.20% Pervious Area
	22,450		67.80% Impervious Area

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

Subcatchment EX1: TO NORTH



Summary for Subcatchment EX2: TO EAST

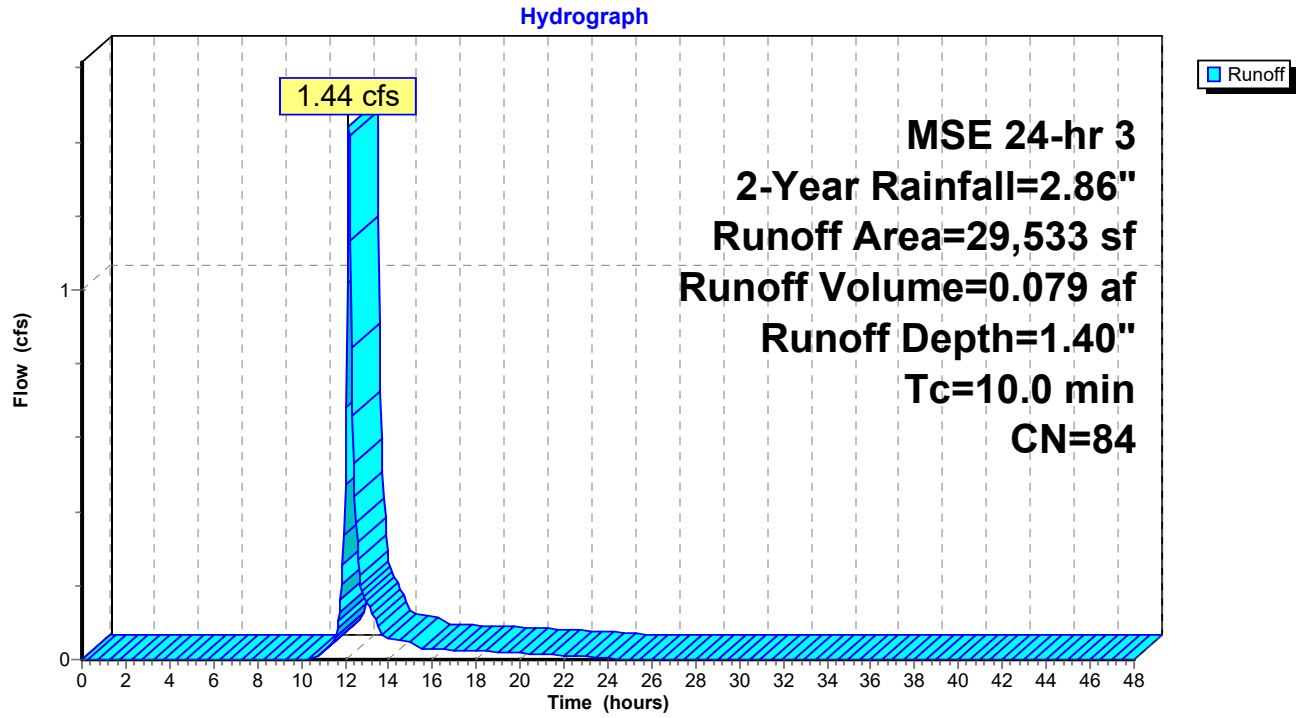
Runoff = 1.44 cfs @ 12.18 hrs, Volume= 0.079 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

	Area (sf)	CN	Description
*	12,100	98	Impervious Bldg, Gravel
	17,433	74	>75% Grass cover, Good, HSG C
	29,533	84	Weighted Average
	17,433		59.03% Pervious Area
	12,100		40.97% Impervious Area

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

Subcatchment EX2: TO EAST



Summary for Pond 1P: EXIST DEPRESSION

Inflow Area = 0.678 ac, 40.97% Impervious, Inflow Depth = 1.40" for 2-Year event
Inflow = 1.44 cfs @ 12.18 hrs, Volume= 0.079 af
Outflow = 0.51 cfs @ 12.42 hrs, Volume= 0.044 af, Atten= 64%, Lag= 14.5 min
Primary = 0.51 cfs @ 12.42 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.04' @ 12.42 hrs Surf.Area= 3,331 sf Storage= 1,655 cf

Plug-Flow detention time= 161.2 min calculated for 0.044 af (56% of inflow)
Center-of-Mass det. time= 76.4 min (888.8 - 812.4)

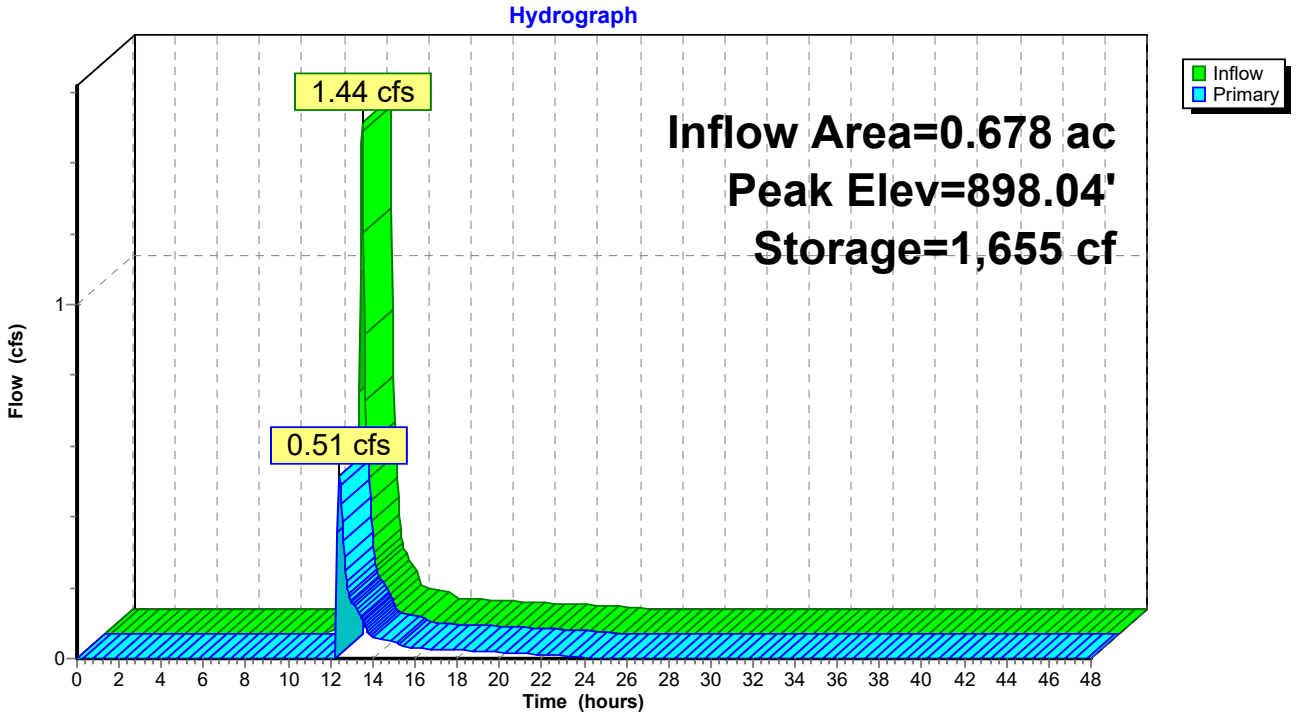
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.49 cfs @ 12.42 hrs HW=898.04' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.49 cfs @ 0.56 fps)

Pond 1P: EXIST DEPRESSION



Summary for Subcatchment EX1: TO NORTH

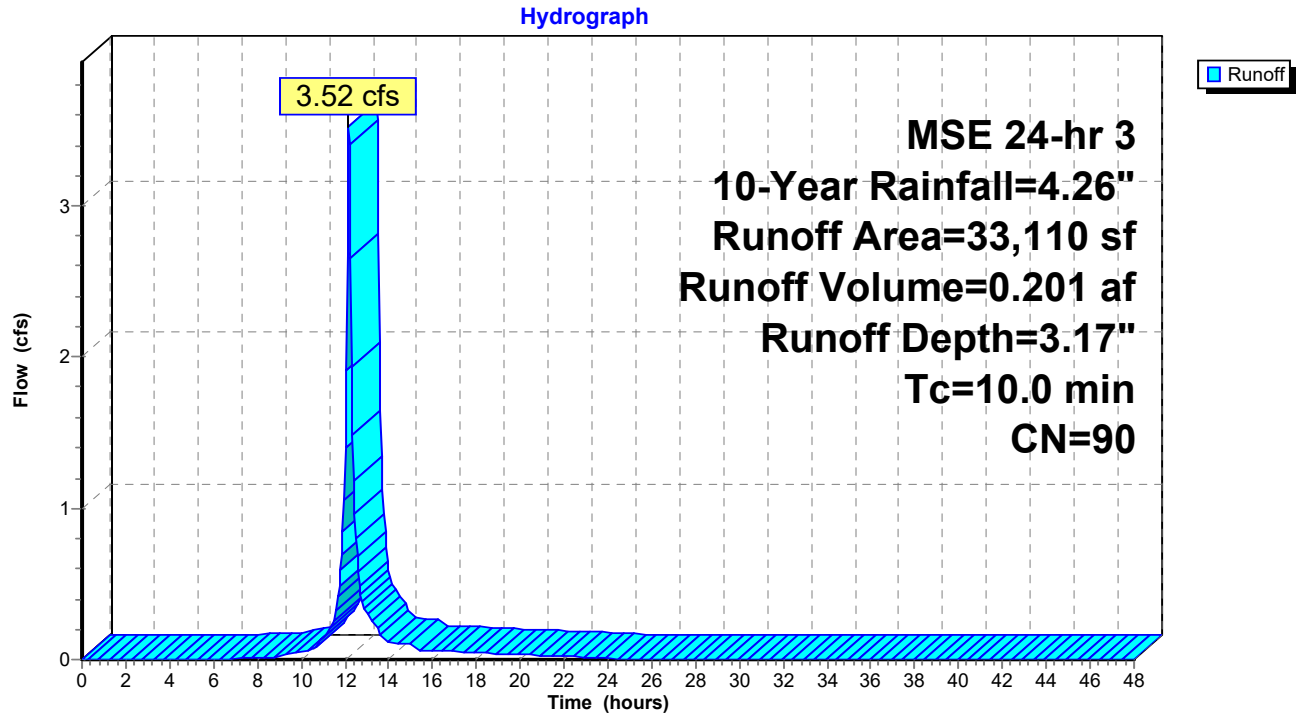
Runoff = 3.52 cfs @ 12.17 hrs, Volume= 0.201 af, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

	Area (sf)	CN	Description
*	22,450	98	Impervious Bldg, Gravel
	10,660	74	>75% Grass cover, Good, HSG C
	33,110	90	Weighted Average
	10,660		32.20% Pervious Area
	22,450		67.80% Impervious Area

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

Subcatchment EX1: TO NORTH



Summary for Subcatchment EX2: TO EAST

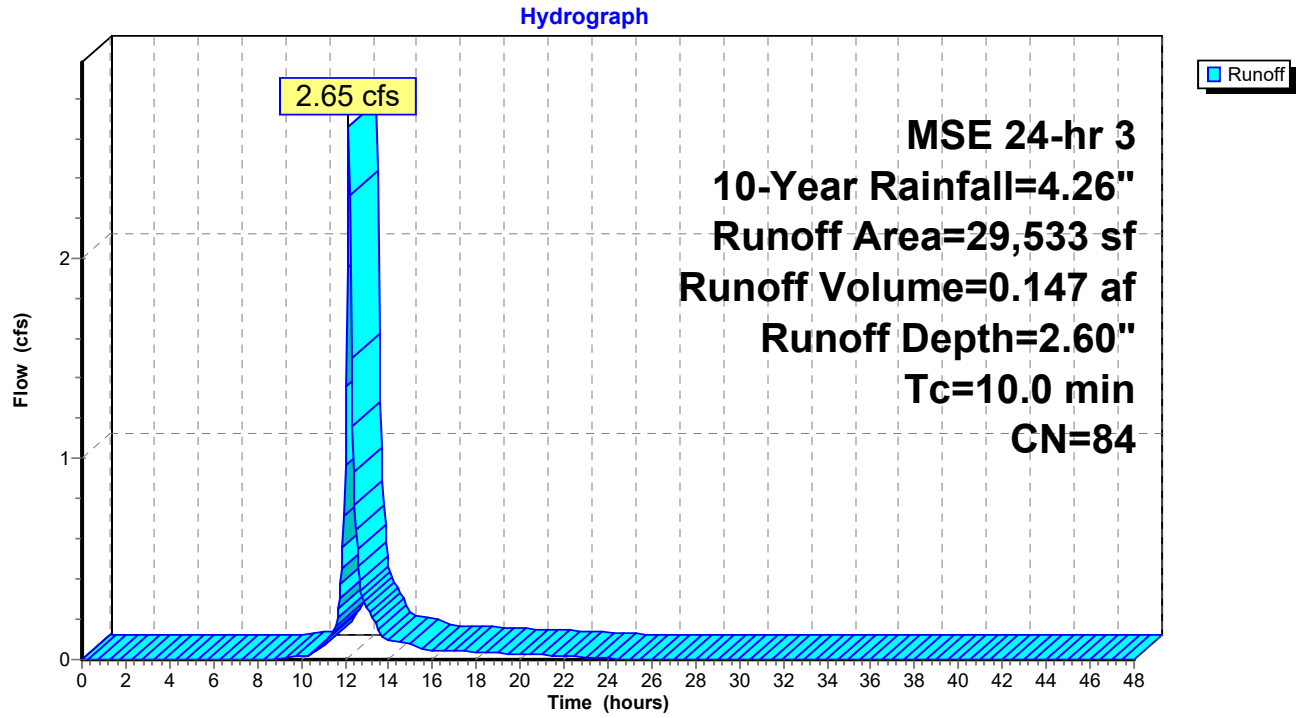
Runoff = 2.65 cfs @ 12.18 hrs, Volume= 0.147 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

	Area (sf)	CN	Description
*	12,100	98	Impervious Bldg, Gravel
	17,433	74	>75% Grass cover, Good, HSG C
	29,533	84	Weighted Average
	17,433		59.03% Pervious Area
	12,100		40.97% Impervious Area

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

Subcatchment EX2: TO EAST



Summary for Pond 1P: EXIST DEPRESSION

Inflow Area = 0.678 ac, 40.97% Impervious, Inflow Depth = 2.60" for 10-Year event
Inflow = 2.65 cfs @ 12.18 hrs, Volume= 0.147 af
Outflow = 2.35 cfs @ 12.23 hrs, Volume= 0.112 af, Atten= 11%, Lag= 3.1 min
Primary = 2.35 cfs @ 12.23 hrs, Volume= 0.112 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.12' @ 12.23 hrs Surf.Area= 4,110 sf Storage= 1,950 cf

Plug-Flow detention time= 102.6 min calculated for 0.112 af (76% of inflow)
Center-of-Mass det. time= 35.6 min (835.5 - 799.9)

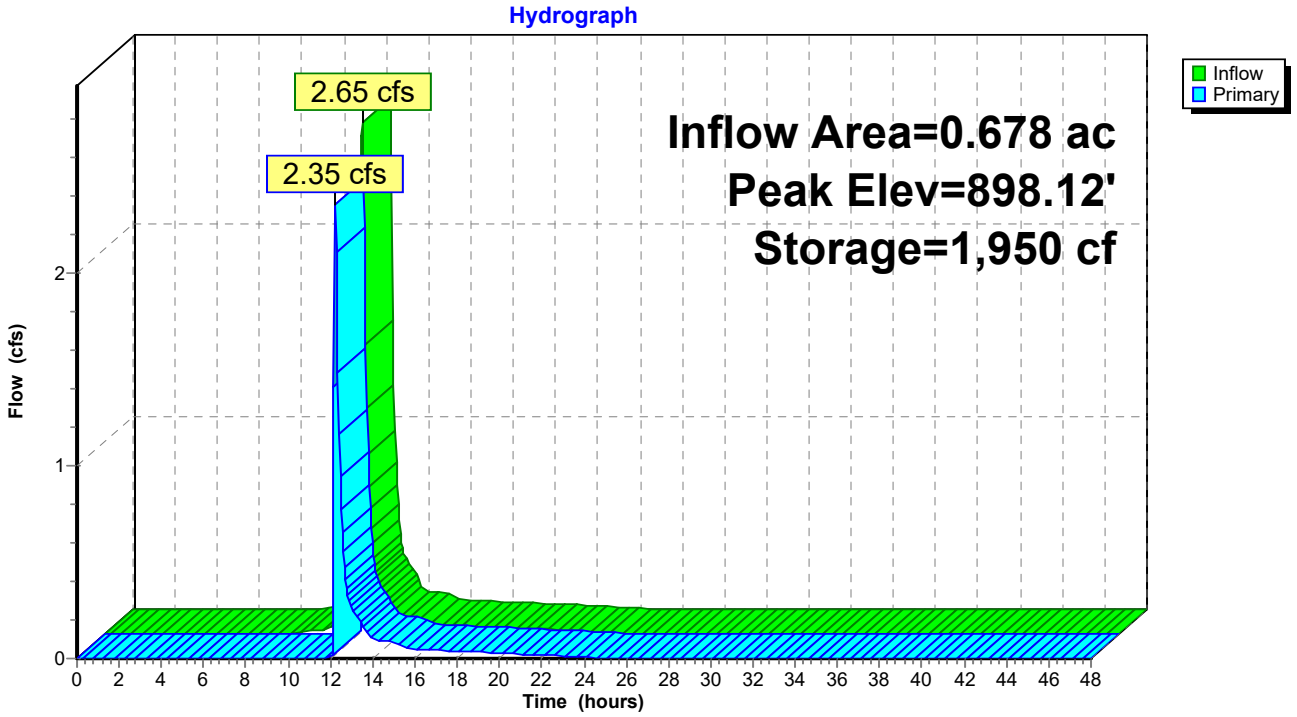
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.29 cfs @ 12.23 hrs HW=898.12' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 2.29 cfs @ 0.94 fps)

Pond 1P: EXIST DEPRESSION



Summary for Subcatchment EX1: TO NORTH

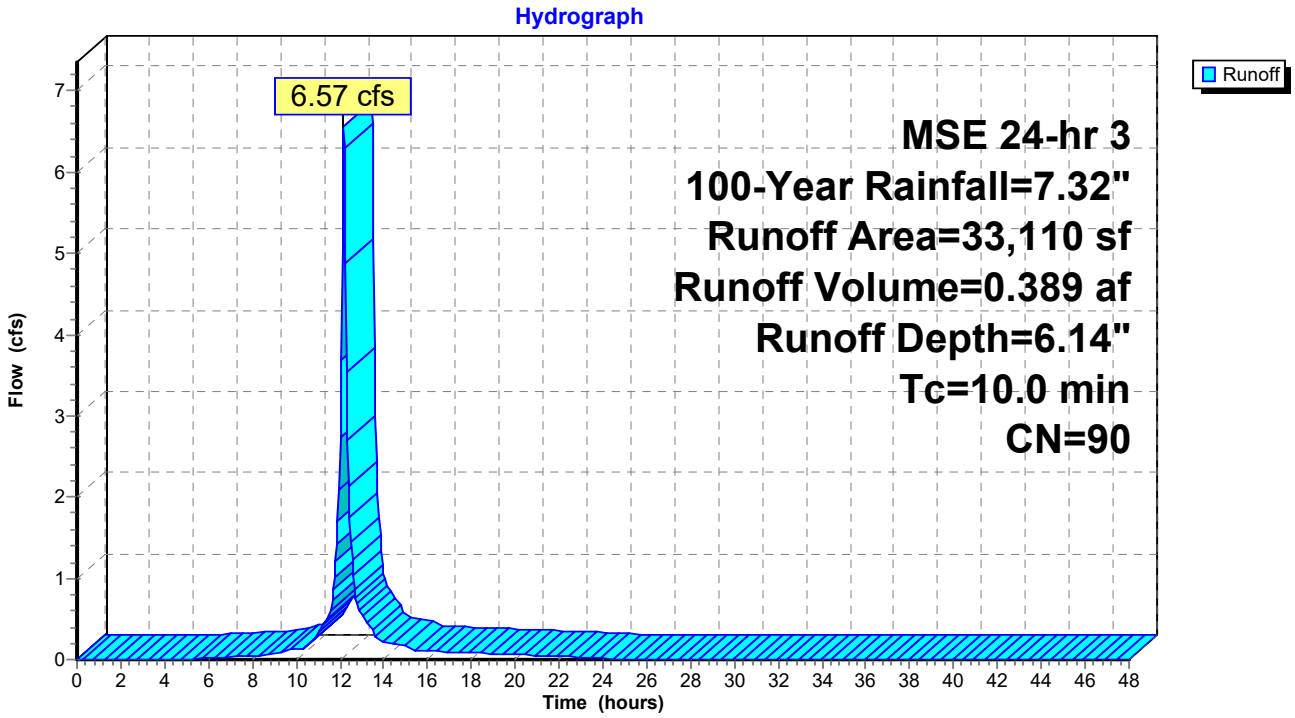
Runoff = 6.57 cfs @ 12.17 hrs, Volume= 0.389 af, Depth= 6.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

	Area (sf)	CN	Description
*	22,450	98	Impervious Bldg, Gravel
	10,660	74	>75% Grass cover, Good, HSG C
	33,110	90	Weighted Average
	10,660		32.20% Pervious Area
	22,450		67.80% Impervious Area

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

Subcatchment EX1: TO NORTH



Summary for Subcatchment EX2: TO EAST

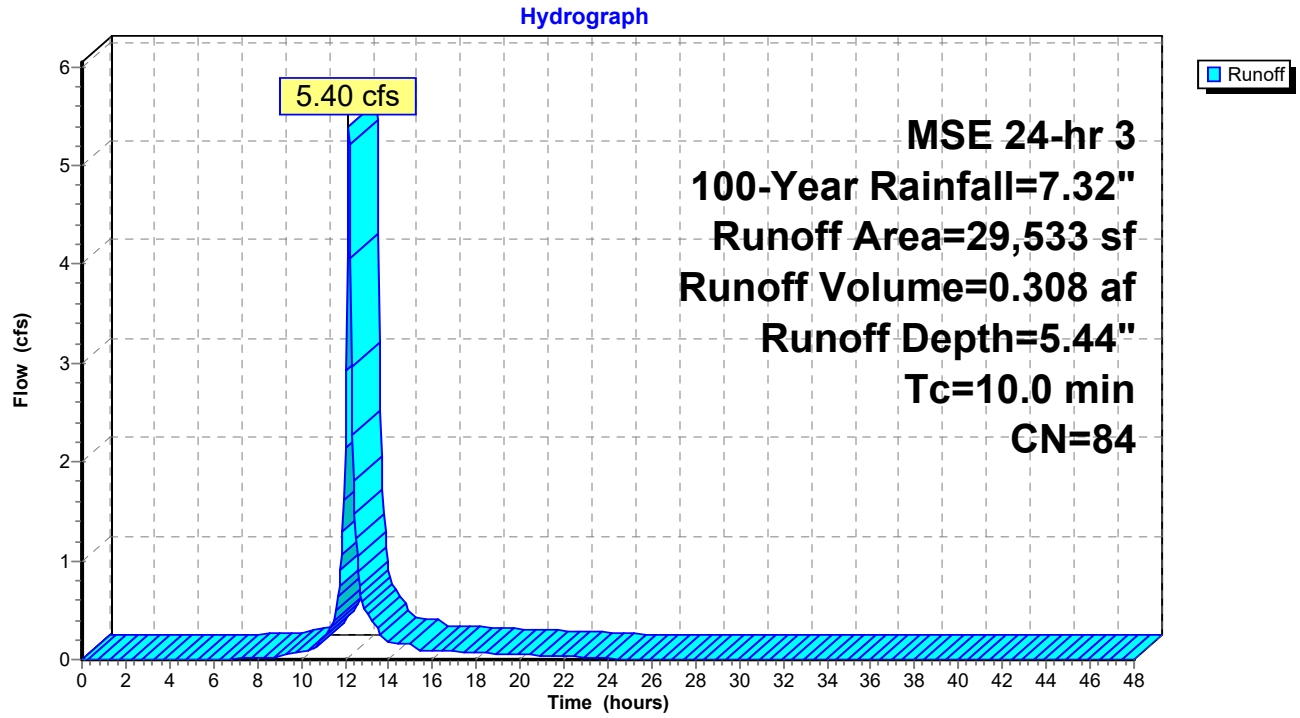
Runoff = 5.40 cfs @ 12.17 hrs, Volume= 0.308 af, Depth= 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

	Area (sf)	CN	Description
*	12,100	98	Impervious Bldg, Gravel
	17,433	74	>75% Grass cover, Good, HSG C
	29,533	84	Weighted Average
	17,433		59.03% Pervious Area
	12,100		40.97% Impervious Area

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

Subcatchment EX2: TO EAST



Summary for Pond 1P: EXIST DEPRESSION

Inflow Area = 0.678 ac, 40.97% Impervious, Inflow Depth = 5.44" for 100-Year event
Inflow = 5.40 cfs @ 12.17 hrs, Volume= 0.308 af
Outflow = 5.09 cfs @ 12.21 hrs, Volume= 0.273 af, Atten= 6%, Lag= 2.1 min
Primary = 5.09 cfs @ 12.21 hrs, Volume= 0.273 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.21' @ 12.21 hrs Surf.Area= 4,929 sf Storage= 2,328 cf

Plug-Flow detention time= 68.0 min calculated for 0.273 af (89% of inflow)
Center-of-Mass det. time= 22.9 min (808.1 - 785.2)

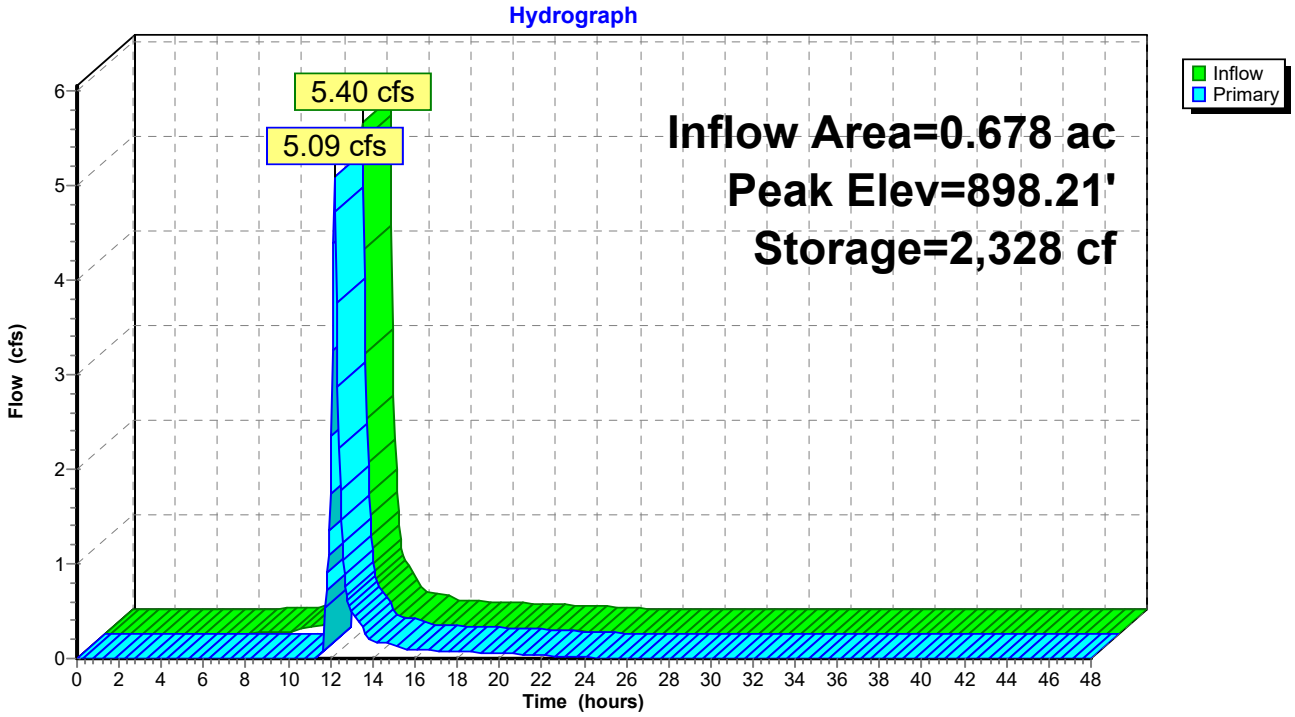
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

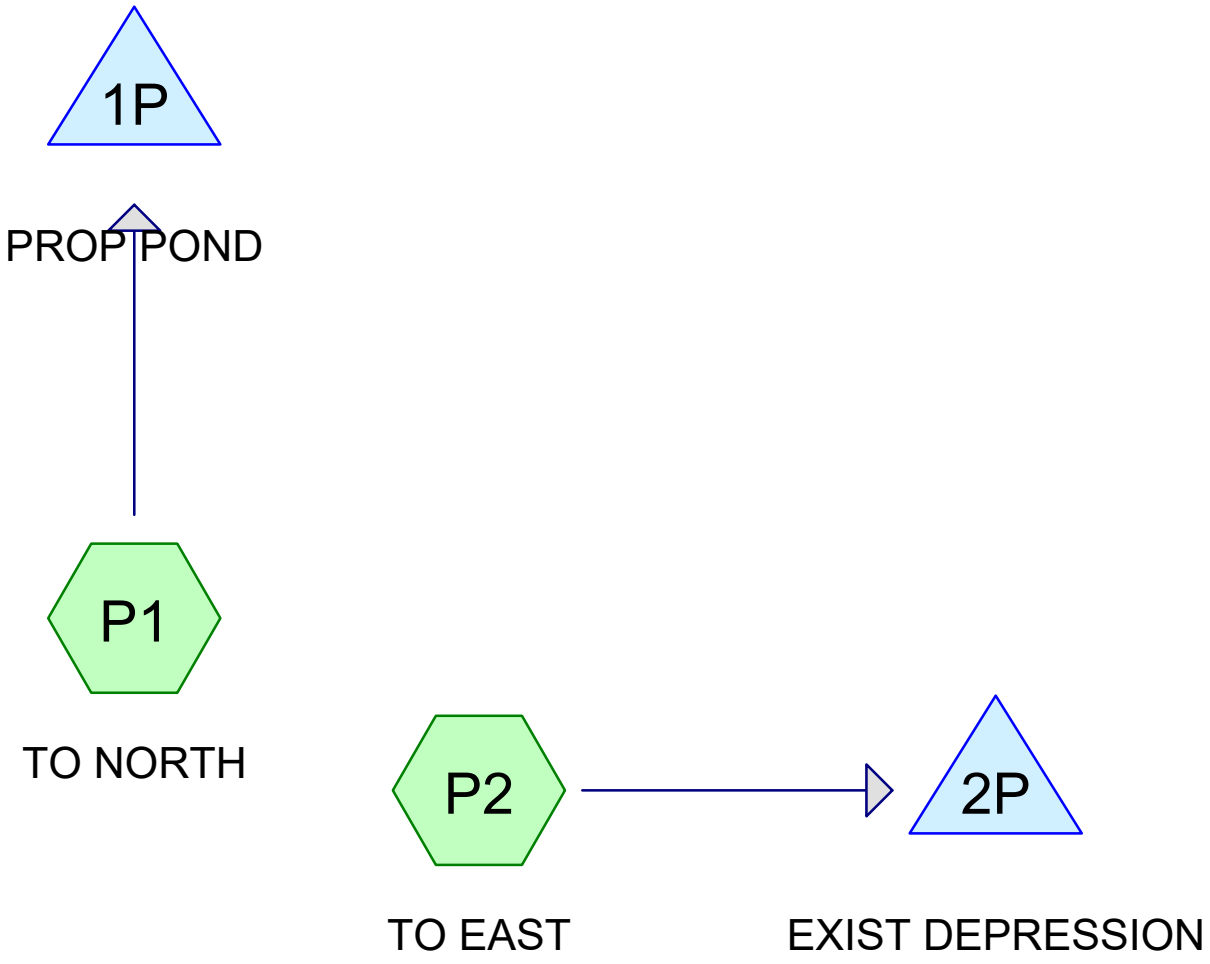
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.01 cfs @ 12.21 hrs HW=898.21' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 5.01 cfs @ 1.22 fps)

Pond 1P: EXIST DEPRESSION





Subcat Reach Pond Link

Routing Diagram for PROPOSED DRNG K-Tel Minnetonka
Prepared by {enter your company name here}, Printed 8/11/2023

Summary for Subcatchment P1: TO NORTH

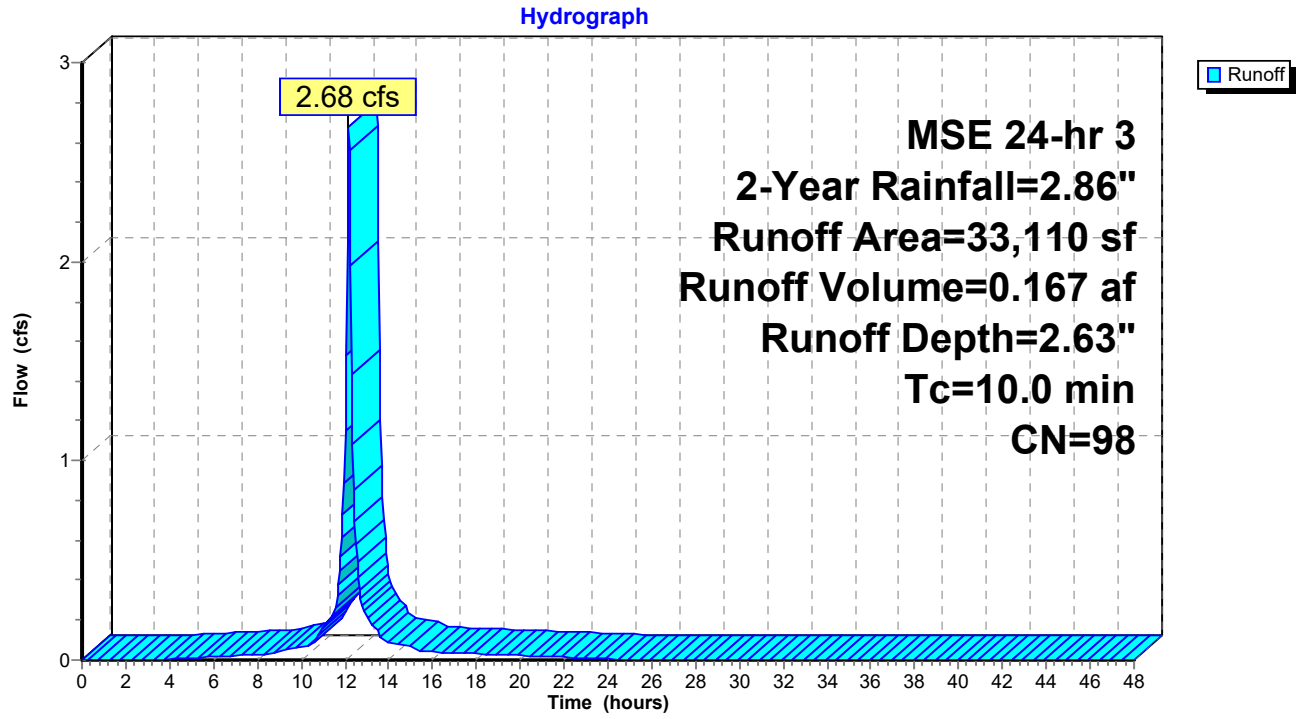
Runoff = 2.68 cfs @ 12.17 hrs, Volume= 0.167 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

	Area (sf)	CN	Description
*	33,110	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	33,110	98	Weighted Average
	33,110		100.00% Impervious Area

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

Subcatchment P1: TO NORTH



Summary for Subcatchment P2: TO EAST

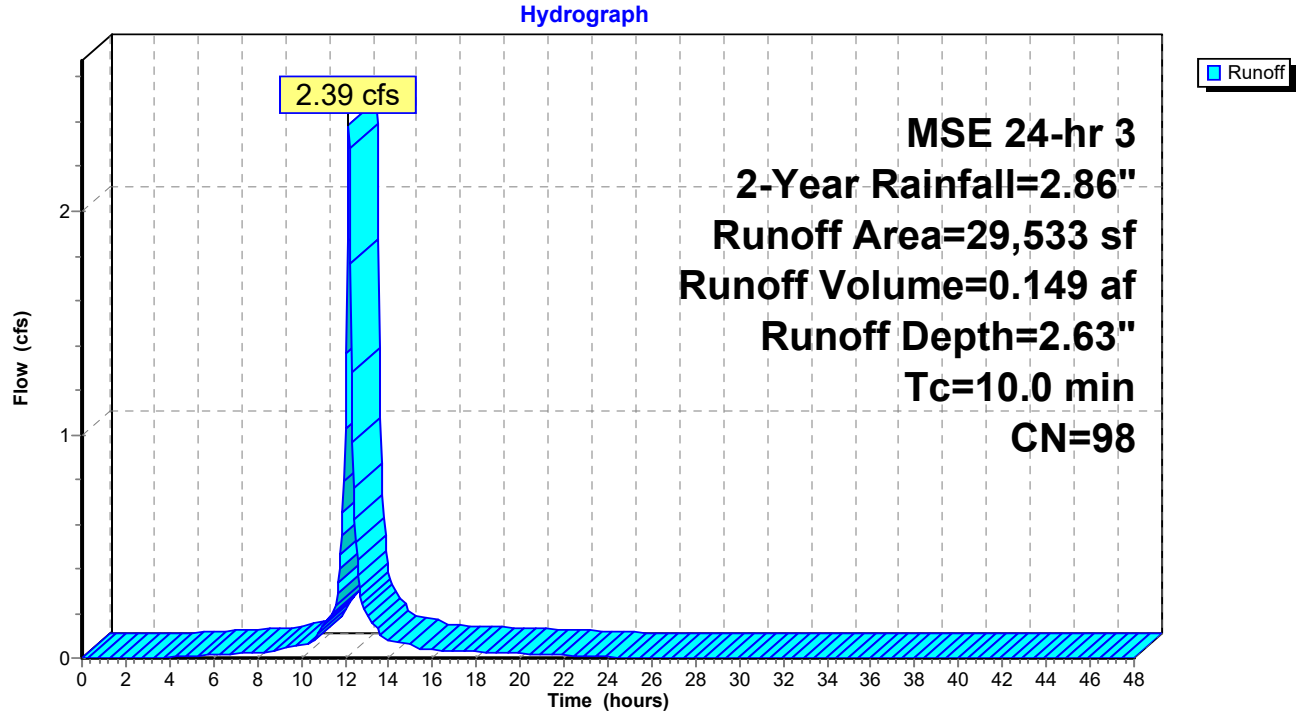
Runoff = 2.39 cfs @ 12.17 hrs, Volume= 0.149 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

	Area (sf)	CN	Description
*	29,533	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	29,533	98	Weighted Average
	29,533		100.00% Impervious Area

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

Subcatchment P2: TO EAST



Summary for Pond 1P: PROP POND

Inflow Area = 0.760 ac,100.00% Impervious, Inflow Depth = 2.63" for 2-Year event
Inflow = 2.68 cfs @ 12.17 hrs, Volume= 0.167 af
Outflow = 0.36 cfs @ 12.64 hrs, Volume= 0.154 af, Atten= 86%, Lag= 28.4 min
Primary = 0.36 cfs @ 12.64 hrs, Volume= 0.154 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 901.00' Surf.Area= 10,600 sf Storage= 9,395 cf
Peak Elev= 901.40' @ 12.64 hrs Surf.Area= 12,005 sf Storage= 13,932 cf (4,537 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 316.3 min (1,073.8 - 757.5)

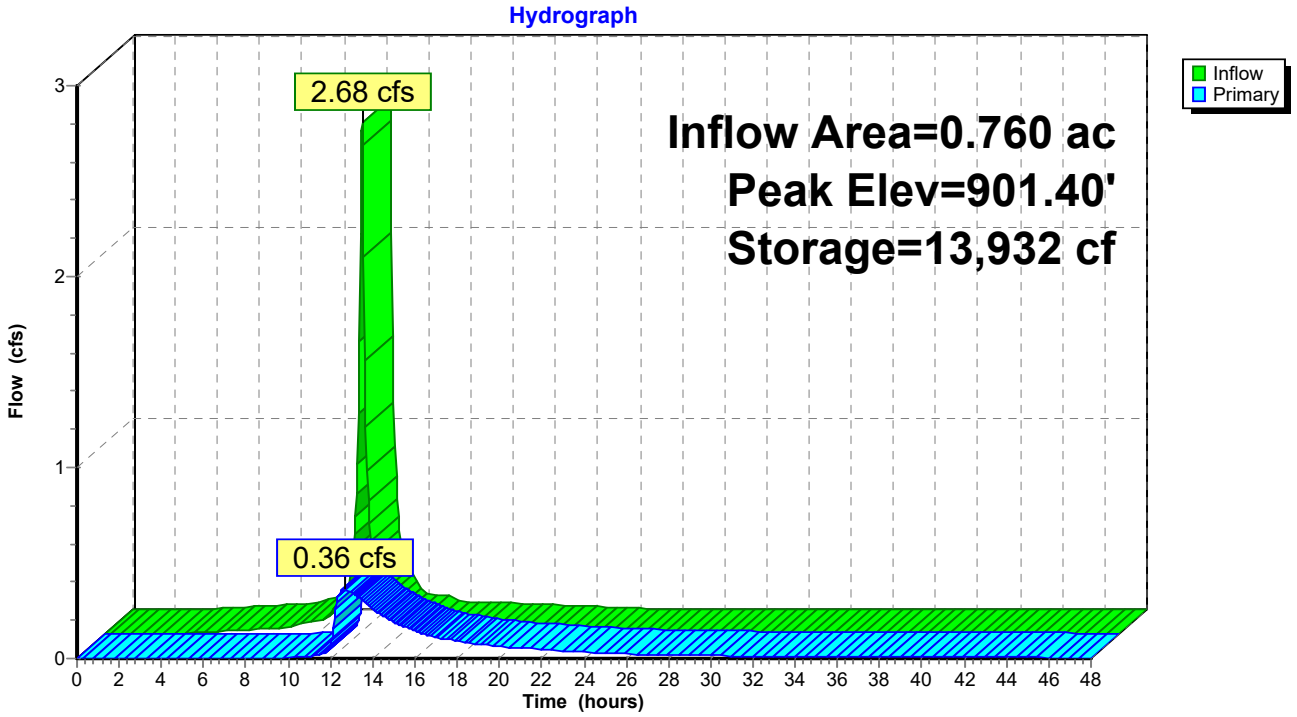
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	29,220 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	110	0	0
898.00	470	290	290
899.00	1,020	745	1,035
900.00	2,550	1,785	2,820
901.00	10,600	6,575	9,395
902.00	14,100	12,350	21,745
902.50	15,800	7,475	29,220

Device	Routing	Invert	Outlet Devices
#1	Primary	901.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 901.00' / 901.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	897.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 897.00' / 897.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=0.36 cfs @ 12.64 hrs HW=901.40' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.36 cfs @ 1.59 fps)
↑—**2=Culvert** (Passes 0.36 cfs of 3.30 cfs potential flow)

Pond 1P: PROP POND



Stage-Area-Storage for Pond 1P: PROP POND

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	110	0
897.10	146	13
897.20	182	29
897.30	218	49
897.40	254	73
897.50	290	100
897.60	326	131
897.70	362	165
897.80	398	203
897.90	434	245
898.00	470	290
898.10	525	340
898.20	580	395
898.30	635	456
898.40	690	522
898.50	745	594
898.60	800	671
898.70	855	754
898.80	910	842
898.90	965	936
899.00	1,020	1,035
899.10	1,173	1,145
899.20	1,326	1,270
899.30	1,479	1,410
899.40	1,632	1,565
899.50	1,785	1,736
899.60	1,938	1,922
899.70	2,091	2,124
899.80	2,244	2,341
899.90	2,397	2,573
900.00	2,550	2,820
900.10	3,355	3,115
900.20	4,160	3,491
900.30	4,965	3,947
900.40	5,770	4,484
900.50	6,575	5,101
900.60	7,380	5,799
900.70	8,185	6,577
900.80	8,990	7,436
900.90	9,795	8,375
901.00	10,600	9,395
901.10	10,950	10,473
901.20	11,300	11,585
901.30	11,650	12,732
901.40	12,000	13,915
901.50	12,350	15,133
901.60	12,700	16,385
901.70	13,050	17,673
901.80	13,400	18,995
901.90	13,750	20,352
902.00	14,100	21,745
902.10	14,440	23,172
902.20	14,780	24,633
902.30	15,120	26,128
902.40	15,460	27,657
902.50	**15,800**	**29,220**

Summary for Pond 2P: EXIST DEPRESSION

Inflow Area = 0.678 ac,100.00% Impervious, Inflow Depth = 2.63" for 2-Year event
Inflow = 2.39 cfs @ 12.17 hrs, Volume= 0.149 af
Outflow = 2.23 cfs @ 12.21 hrs, Volume= 0.114 af, Atten= 7%, Lag= 2.3 min
Primary = 2.23 cfs @ 12.21 hrs, Volume= 0.114 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.12' @ 12.21 hrs Surf.Area= 4,069 sf Storage= 1,933 cf

Plug-Flow detention time= 112.4 min calculated for 0.114 af (77% of inflow)
Center-of-Mass det. time= 50.8 min (808.3 - 757.5)

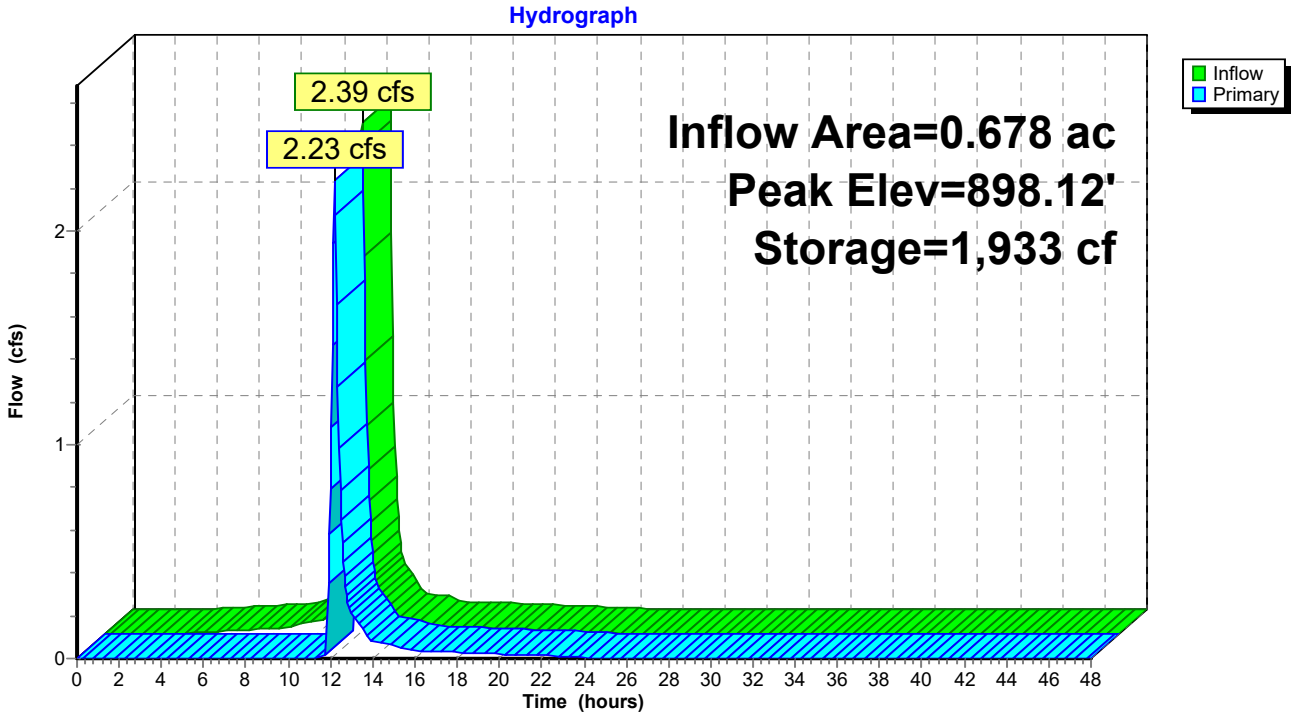
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.20 cfs @ 12.21 hrs HW=898.12' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 2.20 cfs @ 0.93 fps)

Pond 2P: EXIST DEPRESSION



Stage-Area-Storage for Pond 2P: EXIST DEPRESSION

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	140	0
897.02	195	3
897.04	250	8
897.06	305	13
897.08	360	20
897.10	415	28
897.12	470	37
897.14	525	47
897.16	580	58
897.18	635	70
897.20	690	83
897.22	745	97
897.24	800	113
897.26	855	129
897.28	910	147
897.30	965	166
897.32	1,020	186
897.34	1,075	207
897.36	1,130	229
897.38	1,185	252
897.40	1,240	276
897.42	1,295	301
897.44	1,350	328
897.46	1,405	355
897.48	1,460	384
897.50	1,515	414
897.52	1,570	445
897.54	1,625	477
897.56	1,680	510
897.58	1,735	544
897.60	1,790	579
897.62	1,845	615
897.64	1,900	653
897.66	1,955	691
897.68	2,010	731
897.70	2,065	772
897.72	2,120	814
897.74	2,175	857
897.76	2,230	901
897.78	2,285	946
897.80	2,340	992
897.82	2,395	1,039
897.84	2,450	1,088
897.86	2,505	1,137
897.88	2,560	1,188
897.90	2,615	1,240
897.92	2,670	1,293
897.94	2,725	1,347
897.96	2,780	1,402
897.98	2,835	1,458
898.00	2,890	1,515
898.02	3,086	1,575
898.04	3,282	1,638
898.06	3,479	1,706
898.08	3,675	1,778
898.10	3,871	1,853
898.12	4,067	1,932
898.14	4,263	2,016
898.16	4,460	2,103
898.18	4,656	2,194
898.20	4,852	2,289
898.22	5,048	2,388
898.24	5,244	2,491
898.26	5,441	2,598
898.28	5,637	2,709
898.30	5,833	2,823
898.32	6,029	2,942
898.34	6,225	3,065
898.36	6,422	3,191
898.38	6,618	3,321
898.40	6,814	3,456
898.42	7,010	3,594
898.44	7,206	3,736
898.46	7,403	3,882
898.48	7,599	4,032
898.50	7,795	4,186
898.52	7,991	4,344
898.54	8,187	4,506
898.56	8,384	4,672
898.58	8,580	4,841
898.60	8,776	5,015
898.62	8,972	5,192
898.64	9,168	5,374
898.66	9,365	5,559
898.68	9,561	5,748
898.70	9,757	5,941
898.72	9,953	6,139
898.74	10,149	6,340
898.76	10,346	6,545
898.78	10,542	6,753
898.80	10,738	6,966
898.82	10,934	7,183
898.84	11,130	7,404
898.86	11,327	7,628
898.88	11,523	7,857
898.90	11,719	8,089
898.92	11,915	8,325
898.94	12,111	8,566
898.96	12,308	8,810
898.98	12,504	9,058
899.00	**12,700**	**9,310**

Summary for Subcatchment P1: TO NORTH

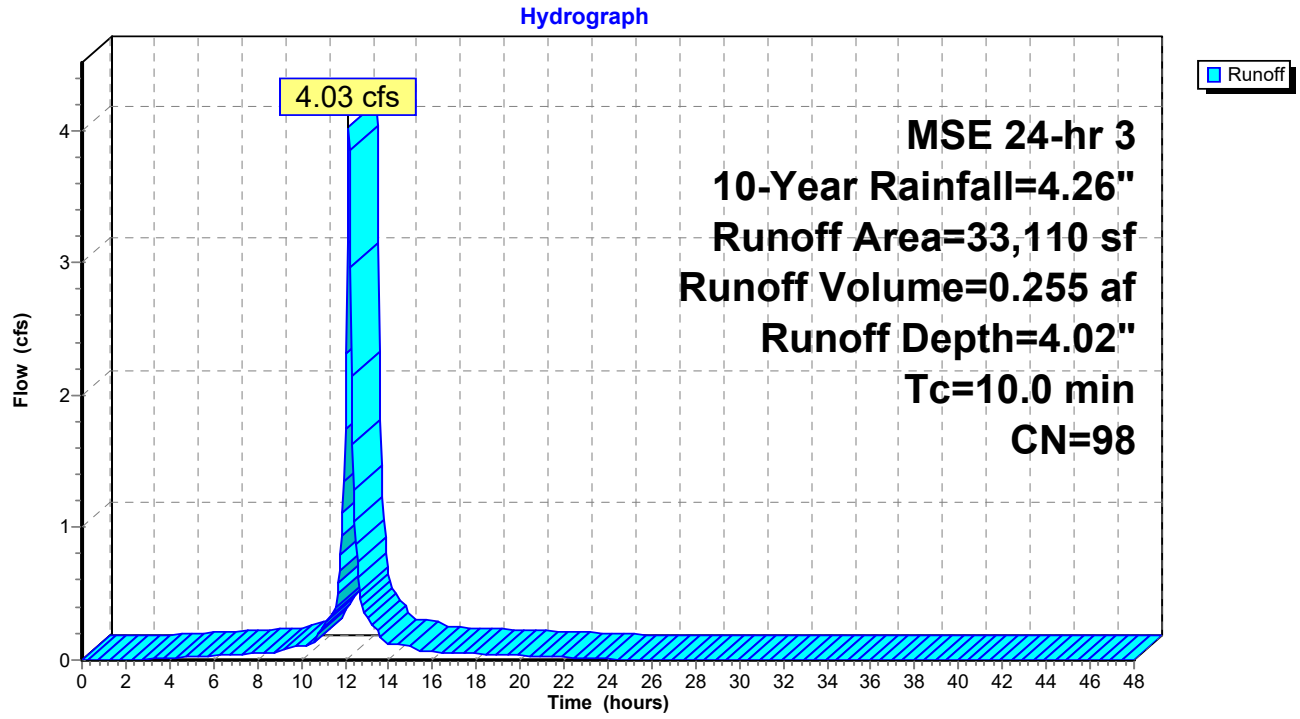
Runoff = 4.03 cfs @ 12.17 hrs, Volume= 0.255 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

	Area (sf)	CN	Description
*	33,110	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	33,110	98	Weighted Average
	33,110		100.00% Impervious Area

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

Subcatchment P1: TO NORTH



Summary for Subcatchment P2: TO EAST

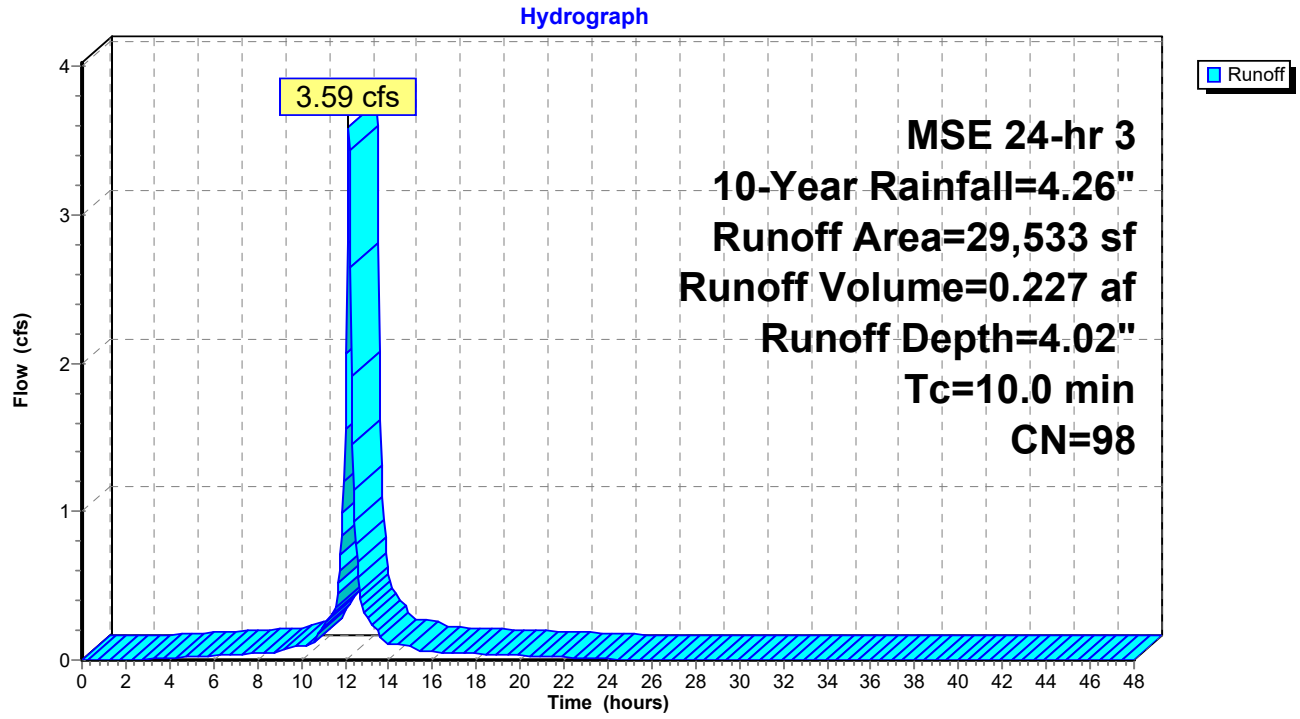
Runoff = 3.59 cfs @ 12.17 hrs, Volume= 0.227 af, Depth= 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

	Area (sf)	CN	Description
*	29,533	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	29,533	98	Weighted Average
	29,533		100.00% Impervious Area

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

Subcatchment P2: TO EAST



Summary for Pond 1P: PROP POND

Inflow Area = 0.760 ac,100.00% Impervious, Inflow Depth = 4.02" for 10-Year event
Inflow = 4.03 cfs @ 12.17 hrs, Volume= 0.255 af
Outflow = 0.73 cfs @ 12.56 hrs, Volume= 0.242 af, Atten= 82%, Lag= 23.2 min
Primary = 0.73 cfs @ 12.56 hrs, Volume= 0.242 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 901.00' Surf.Area= 10,600 sf Storage= 9,395 cf
Peak Elev= 901.56' @ 12.56 hrs Surf.Area= 12,570 sf Storage= 15,914 cf (6,519 cf above start)

Plug-Flow detention time= 1,397.0 min calculated for 0.026 af (10% of inflow)
Center-of-Mass det. time= 258.2 min (1,009.4 - 751.1)

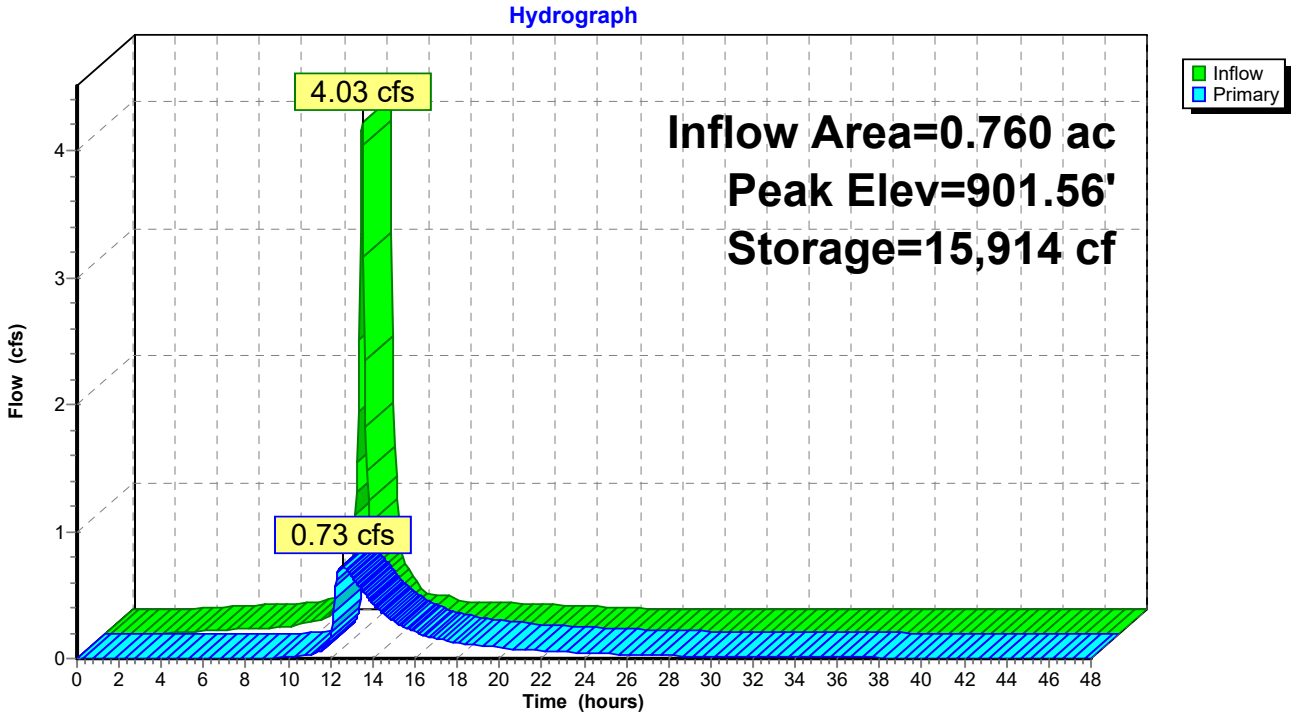
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	29,220 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	110	0	0
898.00	470	290	290
899.00	1,020	745	1,035
900.00	2,550	1,785	2,820
901.00	10,600	6,575	9,395
902.00	14,100	12,350	21,745
902.50	15,800	7,475	29,220

Device	Routing	Invert	Outlet Devices
#1	Primary	901.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 901.00' / 901.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	897.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 897.00' / 897.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=0.73 cfs @ 12.56 hrs HW=901.56' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.73 cfs @ 1.99 fps)
↑—**2=Culvert** (Passes 0.73 cfs of 3.91 cfs potential flow)

Pond 1P: PROP POND



Stage-Area-Storage for Pond 1P: PROP POND

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	110	0
897.10	146	13
897.20	182	29
897.30	218	49
897.40	254	73
897.50	290	100
897.60	326	131
897.70	362	165
897.80	398	203
897.90	434	245
898.00	470	290
898.10	525	340
898.20	580	395
898.30	635	456
898.40	690	522
898.50	745	594
898.60	800	671
898.70	855	754
898.80	910	842
898.90	965	936
899.00	1,020	1,035
899.10	1,173	1,145
899.20	1,326	1,270
899.30	1,479	1,410
899.40	1,632	1,565
899.50	1,785	1,736
899.60	1,938	1,922
899.70	2,091	2,124
899.80	2,244	2,341
899.90	2,397	2,573
900.00	2,550	2,820
900.10	3,355	3,115
900.20	4,160	3,491
900.30	4,965	3,947
900.40	5,770	4,484
900.50	6,575	5,101
900.60	7,380	5,799
900.70	8,185	6,577
900.80	8,990	7,436
900.90	9,795	8,375
901.00	10,600	9,395
901.10	10,950	10,473
901.20	11,300	11,585
901.30	11,650	12,732
901.40	12,000	13,915
901.50	12,350	15,133
901.60	12,700	16,385
901.70	13,050	17,673
901.80	13,400	18,995
901.90	13,750	20,352
902.00	14,100	21,745
902.10	14,440	23,172
902.20	14,780	24,633
902.30	15,120	26,128
902.40	15,460	27,657
902.50	**15,800**	**29,220**

Summary for Pond 2P: EXIST DEPRESSION

Inflow Area = 0.678 ac,100.00% Impervious, Inflow Depth = 4.02" for 10-Year event
Inflow = 3.59 cfs @ 12.17 hrs, Volume= 0.227 af
Outflow = 3.38 cfs @ 12.21 hrs, Volume= 0.193 af, Atten= 6%, Lag= 2.2 min
Primary = 3.38 cfs @ 12.21 hrs, Volume= 0.193 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.16' @ 12.21 hrs Surf.Area= 4,443 sf Storage= 2,095 cf

Plug-Flow detention time= 95.5 min calculated for 0.192 af (85% of inflow)
Center-of-Mass det. time= 44.0 min (795.1 - 751.1)

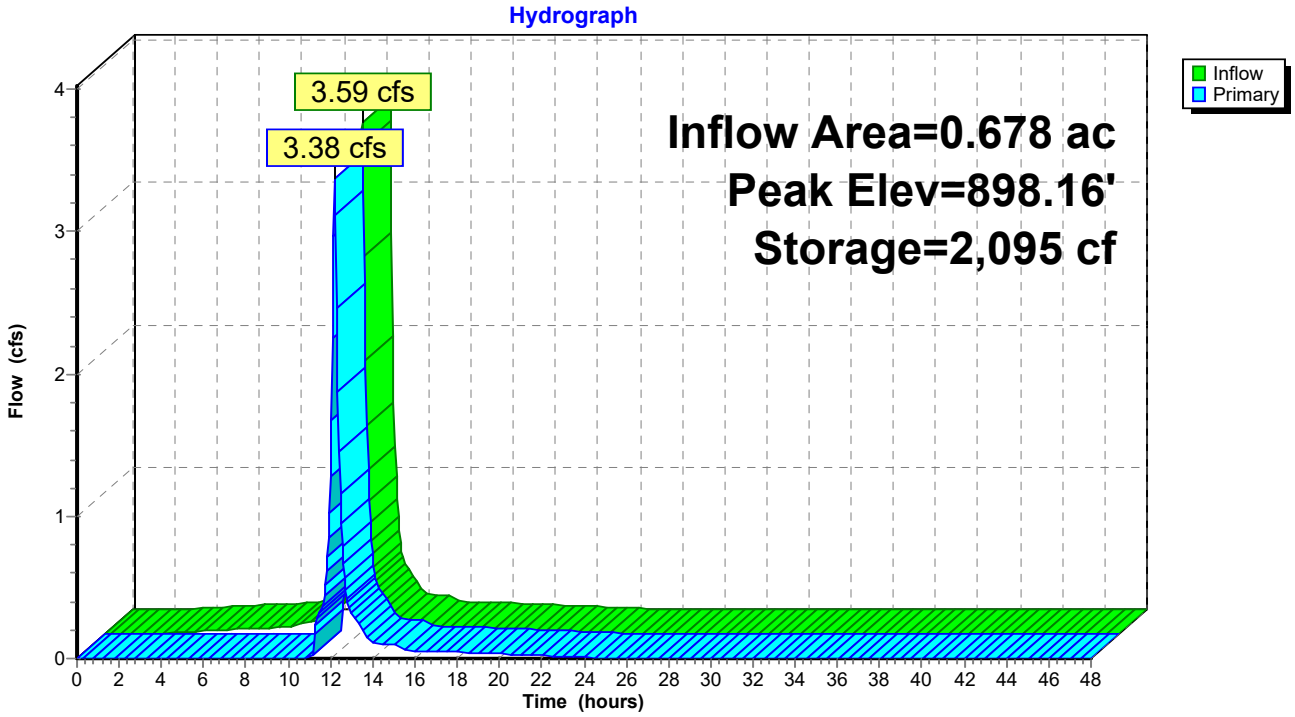
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.34 cfs @ 12.21 hrs HW=898.16' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 3.34 cfs @ 1.06 fps)

Pond 2P: EXIST DEPRESSION



Stage-Area-Storage for Pond 2P: EXIST DEPRESSION

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	140	0
897.02	195	3
897.04	250	8
897.06	305	13
897.08	360	20
897.10	415	28
897.12	470	37
897.14	525	47
897.16	580	58
897.18	635	70
897.20	690	83
897.22	745	97
897.24	800	113
897.26	855	129
897.28	910	147
897.30	965	166
897.32	1,020	186
897.34	1,075	207
897.36	1,130	229
897.38	1,185	252
897.40	1,240	276
897.42	1,295	301
897.44	1,350	328
897.46	1,405	355
897.48	1,460	384
897.50	1,515	414
897.52	1,570	445
897.54	1,625	477
897.56	1,680	510
897.58	1,735	544
897.60	1,790	579
897.62	1,845	615
897.64	1,900	653
897.66	1,955	691
897.68	2,010	731
897.70	2,065	772
897.72	2,120	814
897.74	2,175	857
897.76	2,230	901
897.78	2,285	946
897.80	2,340	992
897.82	2,395	1,039
897.84	2,450	1,088
897.86	2,505	1,137
897.88	2,560	1,188
897.90	2,615	1,240
897.92	2,670	1,293
897.94	2,725	1,347
897.96	2,780	1,402
897.98	2,835	1,458
898.00	2,890	1,515
898.02	3,086	1,575
898.04	3,282	1,638
898.06	3,479	1,706
898.08	3,675	1,778
898.10	3,871	1,853
898.12	4,067	1,932
898.14	4,263	2,016
898.16	4,460	2,103
898.18	4,656	2,194
898.20	4,852	2,289
898.22	5,048	2,388
898.24	5,244	2,491
898.26	5,441	2,598
898.28	5,637	2,709
898.30	5,833	2,823
898.32	6,029	2,942
898.34	6,225	3,065
898.36	6,422	3,191
898.38	6,618	3,321
898.40	6,814	3,456
898.42	7,010	3,594
898.44	7,206	3,736
898.46	7,403	3,882
898.48	7,599	4,032
898.50	7,795	4,186
898.52	7,991	4,344
898.54	8,187	4,506
898.56	8,384	4,672
898.58	8,580	4,841
898.60	8,776	5,015
898.62	8,972	5,192
898.64	9,168	5,374
898.66	9,365	5,559
898.68	9,561	5,748
898.70	9,757	5,941
898.72	9,953	6,139
898.74	10,149	6,340
898.76	10,346	6,545
898.78	10,542	6,753
898.80	10,738	6,966
898.82	10,934	7,183
898.84	11,130	7,404
898.86	11,327	7,628
898.88	11,523	7,857
898.90	11,719	8,089
898.92	11,915	8,325
898.94	12,111	8,566
898.96	12,308	8,810
898.98	12,504	9,058
899.00	**12,700**	**9,310**

Summary for Subcatchment P1: TO NORTH

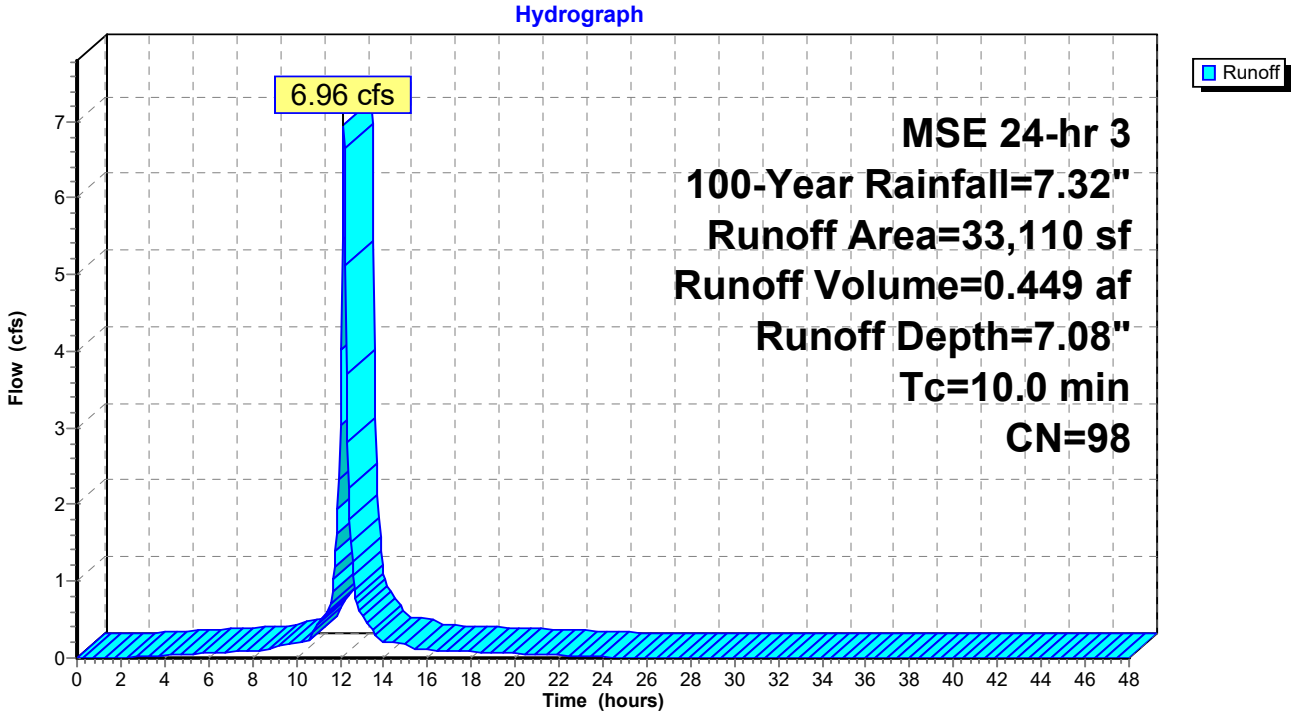
Runoff = 6.96 cfs @ 12.17 hrs, Volume= 0.449 af, Depth= 7.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

	Area (sf)	CN	Description
*	33,110	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	33,110	98	Weighted Average
	33,110		100.00% Impervious Area

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

Subcatchment P1: TO NORTH



Summary for Subcatchment P2: TO EAST

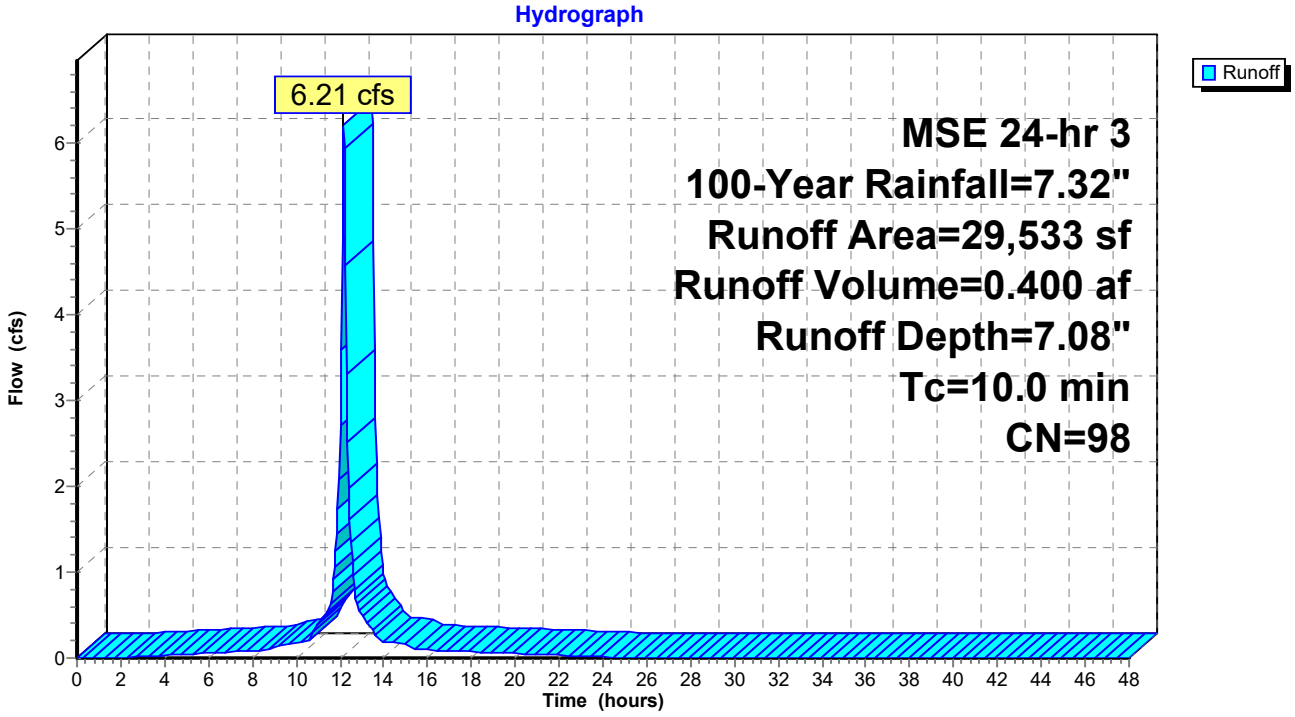
Runoff = 6.21 cfs @ 12.17 hrs, Volume= 0.400 af, Depth= 7.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

	Area (sf)	CN	Description
*	29,533	98	Impervious Bldg, Gravel
	0	74	>75% Grass cover, Good, HSG C
	29,533	98	Weighted Average
	29,533		100.00% Impervious Area

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

Subcatchment P2: TO EAST



Summary for Pond 1P: PROP POND

Inflow Area = 0.760 ac,100.00% Impervious, Inflow Depth = 7.08" for 100-Year event
Inflow = 6.96 cfs @ 12.17 hrs, Volume= 0.449 af
Outflow = 1.64 cfs @ 12.48 hrs, Volume= 0.435 af, Atten= 76%, Lag= 18.6 min
Primary = 1.64 cfs @ 12.48 hrs, Volume= 0.435 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 901.00' Surf.Area= 10,600 sf Storage= 9,395 cf
Peak Elev= 901.86' @ 12.48 hrs Surf.Area= 13,600 sf Storage= 19,767 cf (10,372 cf above start)

Plug-Flow detention time= 484.2 min calculated for 0.219 af (49% of inflow)
Center-of-Mass det. time= 199.6 min (943.9 - 744.3)

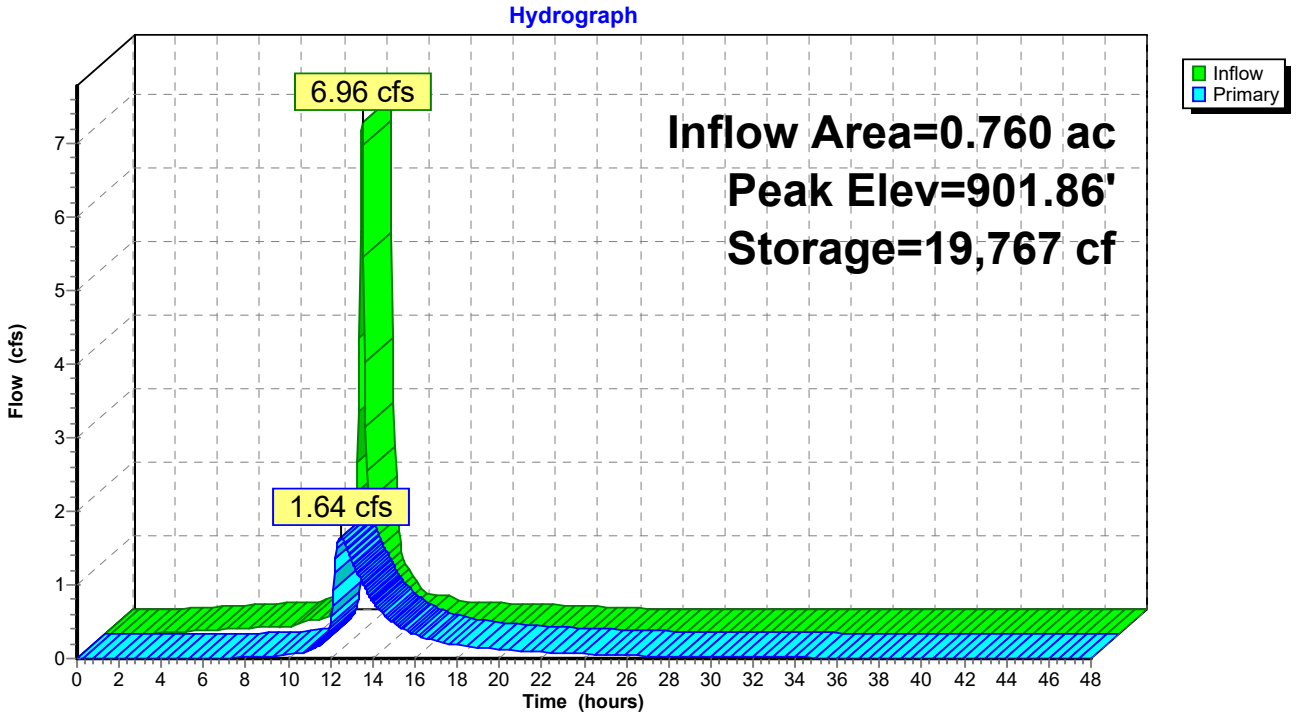
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	29,220 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	110	0	0
898.00	470	290	290
899.00	1,020	745	1,035
900.00	2,550	1,785	2,820
901.00	10,600	6,575	9,395
902.00	14,100	12,350	21,745
902.50	15,800	7,475	29,220

Device	Routing	Invert	Outlet Devices
#1	Primary	901.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 901.00' / 901.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	897.00'	**15.0" Round Culvert** L= 20.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 897.00' / 897.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=1.63 cfs @ 12.48 hrs HW=901.86' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.63 cfs @ 2.57 fps)
↑—**2=Culvert** (Passes 1.63 cfs of 4.83 cfs potential flow)

Pond 1P: PROP POND



Stage-Area-Storage for Pond 1P: PROP POND

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	110	0
897.10	146	13
897.20	182	29
897.30	218	49
897.40	254	73
897.50	290	100
897.60	326	131
897.70	362	165
897.80	398	203
897.90	434	245
898.00	470	290
898.10	525	340
898.20	580	395
898.30	635	456
898.40	690	522
898.50	745	594
898.60	800	671
898.70	855	754
898.80	910	842
898.90	965	936
899.00	1,020	1,035
899.10	1,173	1,145
899.20	1,326	1,270
899.30	1,479	1,410
899.40	1,632	1,565
899.50	1,785	1,736
899.60	1,938	1,922
899.70	2,091	2,124
899.80	2,244	2,341
899.90	2,397	2,573
900.00	2,550	2,820
900.10	3,355	3,115
900.20	4,160	3,491
900.30	4,965	3,947
900.40	5,770	4,484
900.50	6,575	5,101
900.60	7,380	5,799
900.70	8,185	6,577
900.80	8,990	7,436
900.90	9,795	8,375
901.00	10,600	9,395
901.10	10,950	10,473
901.20	11,300	11,585
901.30	11,650	12,732
901.40	12,000	13,915
901.50	12,350	15,133
901.60	12,700	16,385
901.70	13,050	17,673
901.80	13,400	18,995
901.90	13,750	20,352
902.00	14,100	21,745
902.10	14,440	23,172
902.20	14,780	24,633
902.30	15,120	26,128
902.40	15,460	27,657
902.50	**15,800**	**29,220**

Summary for Pond 2P: EXIST DEPRESSION

Inflow Area = 0.678 ac,100.00% Impervious, Inflow Depth = 7.08" for 100-Year event
Inflow = 6.21 cfs @ 12.17 hrs, Volume= 0.400 af
Outflow = 5.86 cfs @ 12.20 hrs, Volume= 0.365 af, Atten= 6%, Lag= 2.1 min
Primary = 5.86 cfs @ 12.20 hrs, Volume= 0.365 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 898.23' @ 12.20 hrs Surf.Area= 5,131 sf Storage= 2,431 cf

Plug-Flow detention time= 73.5 min calculated for 0.365 af (91% of inflow)
Center-of-Mass det. time= 35.7 min (780.0 - 744.3)

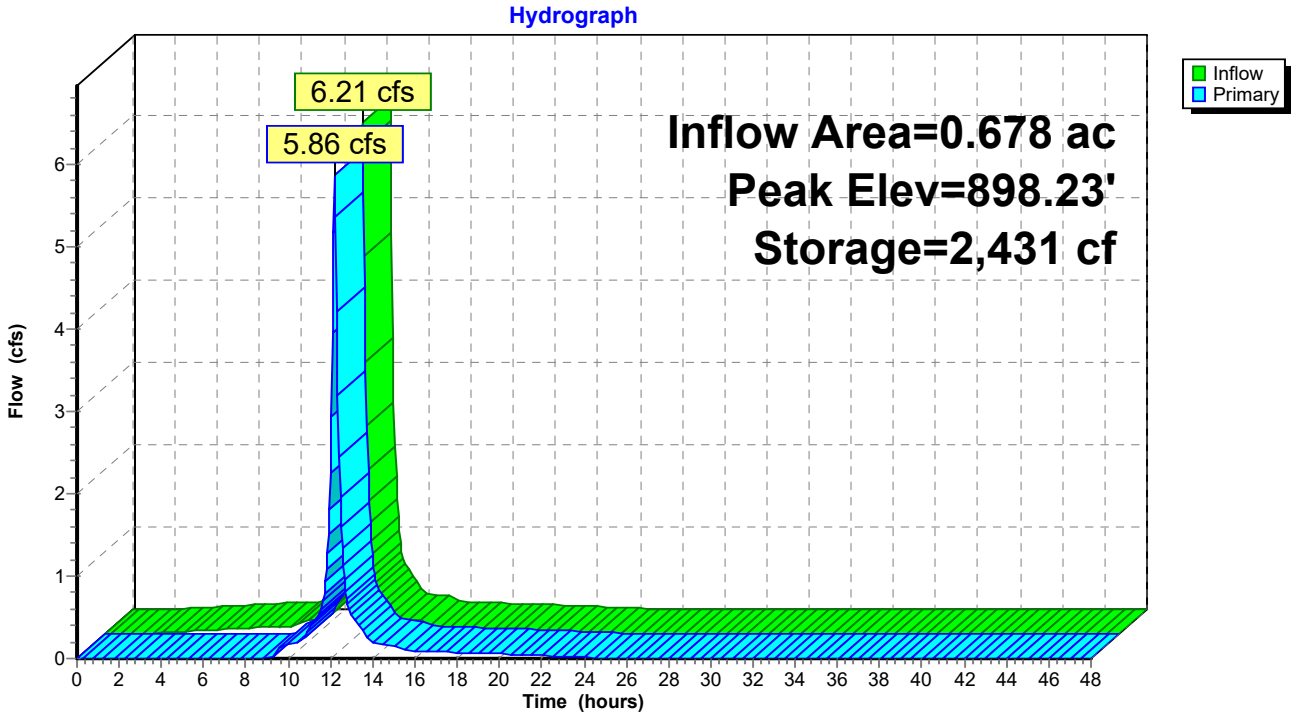
Volume	Invert	Avail.Storage	Storage Description
#1	897.00'	9,310 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
897.00	140	0	0
898.00	2,890	1,515	1,515
899.00	12,700	7,795	9,310

Device	Routing	Invert	Outlet Devices
#1	Primary	898.00'	**20.0' long x 30.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.81 cfs @ 12.20 hrs HW=898.23' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 5.81 cfs @ 1.28 fps)

Pond 2P: EXIST DEPRESSION



Stage-Area-Storage for Pond 2P: EXIST DEPRESSION

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
897.00	140	0
897.02	195	3
897.04	250	8
897.06	305	13
897.08	360	20
897.10	415	28
897.12	470	37
897.14	525	47
897.16	580	58
897.18	635	70
897.20	690	83
897.22	745	97
897.24	800	113
897.26	855	129
897.28	910	147
897.30	965	166
897.32	1,020	186
897.34	1,075	207
897.36	1,130	229
897.38	1,185	252
897.40	1,240	276
897.42	1,295	301
897.44	1,350	328
897.46	1,405	355
897.48	1,460	384
897.50	1,515	414
897.52	1,570	445
897.54	1,625	477
897.56	1,680	510
897.58	1,735	544
897.60	1,790	579
897.62	1,845	615
897.64	1,900	653
897.66	1,955	691
897.68	2,010	731
897.70	2,065	772
897.72	2,120	814
897.74	2,175	857
897.76	2,230	901
897.78	2,285	946
897.80	2,340	992
897.82	2,395	1,039
897.84	2,450	1,088
897.86	2,505	1,137
897.88	2,560	1,188
897.90	2,615	1,240
897.92	2,670	1,293
897.94	2,725	1,347
897.96	2,780	1,402
897.98	2,835	1,458
898.00	2,890	1,515
898.02	3,086	1,575
898.04	3,282	1,638
898.06	3,479	1,706
898.08	3,675	1,778
898.10	3,871	1,853
898.12	4,067	1,932
898.14	4,263	2,016
898.16	4,460	2,103
898.18	4,656	2,194
898.20	4,852	2,289
898.22	5,048	2,388
898.24	5,244	2,491
898.26	5,441	2,598
898.28	5,637	2,709
898.30	5,833	2,823
898.32	6,029	2,942
898.34	6,225	3,065
898.36	6,422	3,191
898.38	6,618	3,321
898.40	6,814	3,456
898.42	7,010	3,594
898.44	7,206	3,736
898.46	7,403	3,882
898.48	7,599	4,032
898.50	7,795	4,186
898.52	7,991	4,344
898.54	8,187	4,506
898.56	8,384	4,672
898.58	8,580	4,841
898.60	8,776	5,015
898.62	8,972	5,192
898.64	9,168	5,374
898.66	9,365	5,559
898.68	9,561	5,748
898.70	9,757	5,941
898.72	9,953	6,139
898.74	10,149	6,340
898.76	10,346	6,545
898.78	10,542	6,753
898.80	10,738	6,966
898.82	10,934	7,183
898.84	11,130	7,404
898.86	11,327	7,628
898.88	11,523	7,857
898.90	11,719	8,089
898.92	11,915	8,325
898.94	12,111	8,566
898.96	12,308	8,810
898.98	12,504	9,058
899.00	**12,700**	**9,310**