MANKATO APARTMENTS
901 SOUTH VICTORY DRIVE
MANKATO, MN

GRADING, DRAINAGE, WETLAND DELINEATION & TRIP GENERATION REPORT

Blue Earth County, Mankato, MN

JHS
ENGINEERS
SURVEYORS
Established 1945
Albert Lea • Austin • Owatonna

Jones, Haugh
& Smith Inc.
515 SOUTH WASHINGTON AVE.
ALBERT LEA, MN. 56007
507-373-4876

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.

Brian J. Johnson

Date: 11/5/2025 License No. 42744

TABLE OF CONTENTS

Applicant:
APX Construction
3 Civic Center Plaza Suite 400
Mankato, MN 56001

Project Description
APX Construction is proposing to construct (2) 36 unit apartment buildings in the West ½ of the East ½ of Section S21-T108-26W near the roundabout at Victory Drive and Stadium Road in Mankato, MN. An existing street access off Victory Drive will be utilized for egress to the parcel.

Existing Conditions
The current condition of the site is a previously developed site which now appears vacant. Wetlands are present on the site and were recently delineated. An undisturbed buffer of 16.5' will be maintained from the wetland delineation lines as part of development. The site is relatively flat with a high point in the southern portion of the site with slope northerly and primarily westerly from the high point. The soils on site consist of silty clays and muck near the north as outlined by the attached NRCS soils report. Approximately 1.25 acres of existing gravel surfacing exists on the site.

Adjacent Areas
Victory Drive and Stadium Road front the property on the two sides while developed commercial parcels abut the south and east sides of the site.

The site is not located within a 100 year flood plain as defined by FEMA Flood Insurance Rate Maps.

Areas and Volumes
The parcel consists of approximately 3.9 acres and approximately 2.5 acres of new impervious surfaces consisting of parking lots and the buildings will be constructed.

Stormwater Management Considerations
Storm water treatment for the proposed construction is proposed via a filtration basin located in the northwest side of the development. Stormwater off the new roof and parking areas will be collected with curb inlets and be transported via underground storm sewer to the basin. The attached plans illustrate the locations and grades of proposed storm sewer utilities. The proposed bottom of the basin is proposed at elevation 987. The basin would have a control structure at the outlet with a 30 degree V-notch weir wall at elevation 988.25 and an overflow weir wall at elevation 989.00 with a basin emergency overflow elevation of 991.00 as outlined in the attached hydro cad calculations. The top of berm for the basin will be at elevation 992.00 in all other locations.

The basin will provide rate control for the 2,10 and 100 year rain events thereby keeping post development rates of runoff the same or less than pre-development rates. This basin will also serve to provide removal of total suspended solids, particulate phosphorus and to a lesser degree, dissolved phosphorus. Consideration was given to implementing infiltration practices,

however the onsite silty clay loams are not suitable for infiltration due to being HSG D soils with a shallow water table.

The basin should provide total suspended solids (TSS) on the order of 80% removal as well as particulate phosphorus as shown on the attached Minimal Impact Design Standards (MIDS) pre and post development calculations.

The proposed impervious surface tributary to the new basin will be approximately 4.25 acres. Storm water runoff will enter the basin via underground storm sewer piping and surface runoff. A dry storage volume of approximately 35,000 cubic feet will be provided via the basin. A WQV of 2.5 acres of new impervious surface * 3600 cu. ft = 0.2 acre ft will be retained. The 1.1” water quality volume (approximately water elevation 988.33) discharge rate will be approximately 1.77 cfs.

Predevelopment and post development rates discharging from the new basin are summarized attached hydraulic summary along with proposed pipe capacity calculations. Discharge for the new basin will occur via a 24” outlet pipe into an existing roadway ditch that is currently tributary to existing City storm sewer.

A summary of the Hydro Cad treatment calculations and rate calculations is also appended to this report.

Maintenance
Seasonal maintenance of the storm water basin will be required to remove accumulated sediment, removal of undesired vegetation and to ensure all upstream and downstream areas are stabilized.

Signatures and Acceptance
We hereby acknowledge we have prepared the grading plan associated with this report.

_____ _____

Brian J. Johnson, Jones Haugh & Smith, Inc. Date: 11/10/2025

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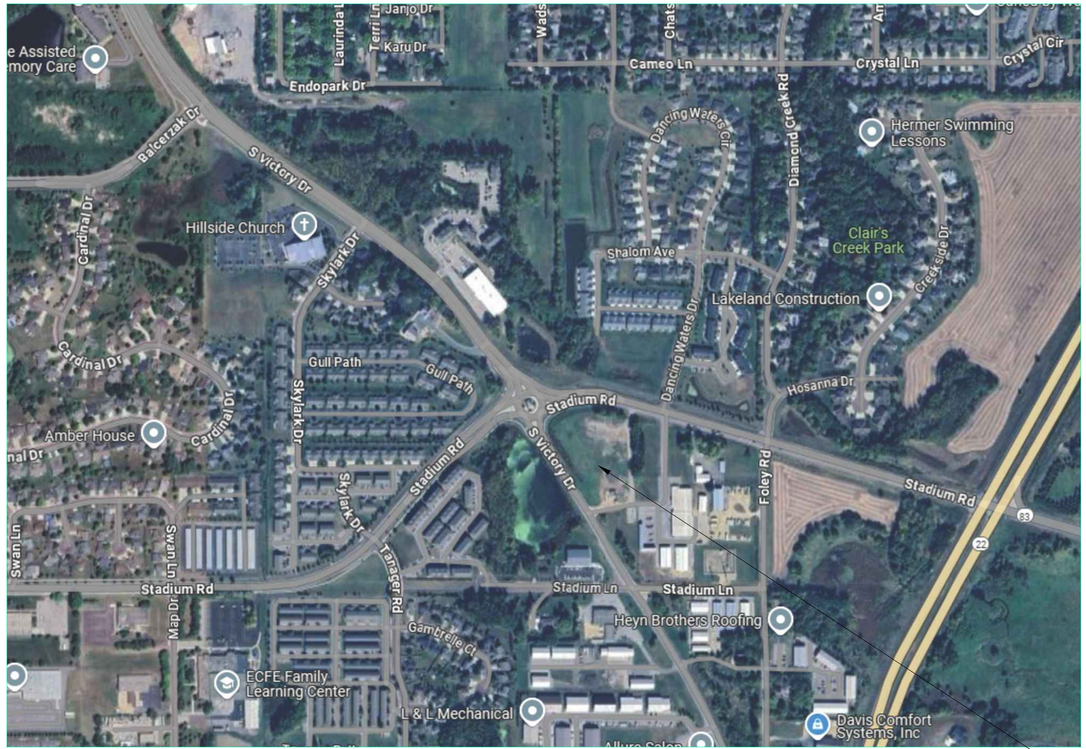
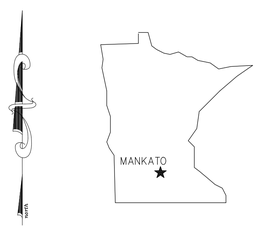
MANKATO APARTMENTS
MANKATO, MN





INDEX TO SHEETS

THIS PLAN CONTAINS 11 SHEETS

LEGEND

- = 5/8"Ø X 16" iron stake monument
- =Iron stake monument-Found
- W = Water Main
- S = Sanitary Sewer
- ST = Storm Sewer
- G = Gas Main
- UT = Underground Telephone
- OT = Overhead Telephone
- FO = Fiber-Optics
- UE = Underground Electric
- OE = Overhead Electric
- X = Chain Link Fence
- = Control Access
- = Gate Post
- = Bollards
- E = Electric Meter
- G = Gas Meter
- F = Fiber-Optics Box
- T = Telephone Pedestal
- = Light Tower
- = Silt Fence
- F&I = Furnish & Install
- 1272 = Existing Elevation Contour Line
- 1272 = Propsoed Elevation Contour Line

- = Sign
- = Sign-Handicap
- = Light Pole
- = Power Pole
- = Guy Anchor
- = Fire hydrant
- = Water Main Valve
- = Fire Sprinkler
- = Cleanout
- = Culvert
- = Gas Main Valve
- = Catch Basin
- W ST S = Manholes
- 1271.23 = Spot Elevation
- RM1270.89 = Rim Elevation
- FL1262.34 = Line Elevation
- =Concrete Surface
- =Bituminous Surface
- =Gravel Surface
- 27.00 =Proposed Pavement Elevation
- T28.0 B24.0 =Proposed Top/Bottom of Retaining Wall Elevation

APPLICABLE CONSTRUCTION PERMITS

ALL CONSTRUCTION WITHIN ROAD RIGHT–OF–WAY SHALL BE DONE IN ACCORDANCE WITH THE APPLICABLE PERMIT AS ISSUED BY THE ROAD AUTHORITY.

GENERAL NOTES

DEVELOPER, CONTRACTOR AND ALL SUBCONTRACTORS SHALL COMPLY WITH ALL APPLICABLE CODES AND ORDINANCES GOVERNED BY STATE AND LOCAL JURISDICTION.

SITE IRRIGATING, LIGHTING, LANDSCAPING, SIGNING ARE NOT A PART OF THIS PLAN.

PROVIDE EROSION CONTROL PER NPDES PERMIT REQUIREMENTS AND AS SHOWN.

PROVIDE HANDICAP CURB RAMPS & SIGNAGE. COMPLY WITH ALL AMERICAN DISABILITY ACT REQUIREMENTS.

ALL CONCRETE OR ASHPALTIC PAVEMENT CONSTRUCTION SHALL COMPLY WITH THE PROVISIONS OF MN/DOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, LATEST EDITION.

A ROCK CONSTRUCTION ENTRANCE IS REQUIRED AT ALL ENTRANCES FROM BITUMINOUS PAVEMENT.

ACCESS FOR LOCAL RESIDENTS/BUSINESSES SHALL ALWAYS BE MAINTAINED.

PROVIDE PAVEMENT STRIPING AS SHOWN

CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FOR CONSTRUCTION.

SEE BOUNDARY SURVEY BY OTHERS FOR SITE BOUNDARIES.

ANY ALTERATIONS OR REVISIONS TO THE SITE DEVELOPMENT PLAN AS SHOWN SHALL NOT BE THE RESPONSIBILITY OF JONES, HAUGH & SMITH INC. AND SHALL RELEASE JONES, HAUGH & SMITH INC. OF ANY LIABILITY FOR ANY DAMAGES CAUSED THEREFROM UNLESS WRITTEN AUTHORIZATION OR PLAN REVISION HAS BE APPROVED BY JONES, HAUGH & SMITH INC. PRIOR.

BENCHMARK 1
Top head of spike in power pole at southeast corner of property.
Elevation = 1001.49

BASIS OF BEARING SYSTEM
All bearings are based upon the MnDot Blue Earth County Coordinate System Nad 83 (96) Harn Adjustment Grid

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Brian J. Johnson
Reg. No. 42744
Date: 9/20/25

Consultant:
JONES HAUGH SMITH
Engineers • Surveyors
515 South Washington Ave. Albert Lea, MN 507-373-4876

Project:
MANKATO APARTMENTS

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Sheet Title:
TITLE SHEET

Sheet No.:
C1

STADIUM DRIVE

NORTHERLY-MOST CORNER OF PARCEL F

NORTHEASTERLY LINE OF PARCEL F

S74°25'06"E 229.24

NORTHWESTERLY LINE OF PARCEL F

(M)144.64
(P)144.78

N30°38'40"W

BLUE EARTH COUNTY HWY R/W PLAT NO. 29

R=388.00 Δ=30°01'57" CD=201.06 CB=S85°25'04"W L=203.38

S70°24'06"W 25.00

86.85

A CORNER OF PARCEL F

SOUTHWESTERLY R/W LINE OF STADIUM DRIVE

WET LAND

412.72

183.48

N78°37'02"W 39.03

S79°08'29"W 32.66

S33°56'00"W

WESTERLY-MOST CORNER OF PARCEL F

A CORNER OF PARCEL F

WEST WETLAND

EAST WETLAND

441.44

WEST LINE OF AUDITOR'S PLAT NO. 67

EAST LINE OF THE W1/2 E1/2 NW1/4 SECTION 21-T108N-R26W

W1/2 E1/2 NW1/4 SECTION 21-T108N-R26W

N31°58'23"W

NORTHEASTERLY R/W LINE OF VICTORY DRIVE

351.52

VICTORY DRIVE

S00°53'38"E

A CORNER OF STANLEY'S SUBDIVISION
Fd. SPINDLE

SW CORNER LOT 6
Fd. ½" PIPE CAPPED

NORTHWESTERLY LINE OF STANLEY'S SUBDIVISION

30' WIDE DRIVEWAY EASEMENT (DOC. #314081, Bk.242, Pg.425)

S81°02'14"W 201.51

NW CORNER OF STANLEY'S SUBDIVISION
Fd. 1/2" PIPE
POINT OF BEGINNING

EXISTING SEWER/WATER SERVICES-FIELD VERIFY LOCATION

REMOVE EXISTING DRIVEWAY APPROACH-GRADE TO MATCH EXISTING DITCH SLOPES
SEE GRADING PLAN-REMOVE EXISTING DRIVEWAY CULVERT

PROPERTY LINE TYP.

WETLAND DELINEATION LINE TYP.

EXISTING ELEVATION CONTOUR TYP.

EDGE OF TREES TYP.

EXISTING GROUND SPOT ELEVATION TYP.

16.5' WETLAND BUFFER LINE TYP.

REMOVE OR SALVAGE EXISTING GRAVEL SURFACING

REMOVE EXISTING CONCRETE SLABS & WALKS AS REQUIRED FOR CONSTRUCTION TYP.

1"=30'

30 0 30

HORIZ. SCALE FEET

North

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EXISTING CONDITIONS

Sheet No.:

C2

STADIUM DRIVE

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NORTHEASTERLY LINE OF PARCEL F

S74°25'06"E 229.24

NORTHWESTERLY LINE OF PARCEL F

(M)144.64
(P)144.78

N30°38'40"W

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North

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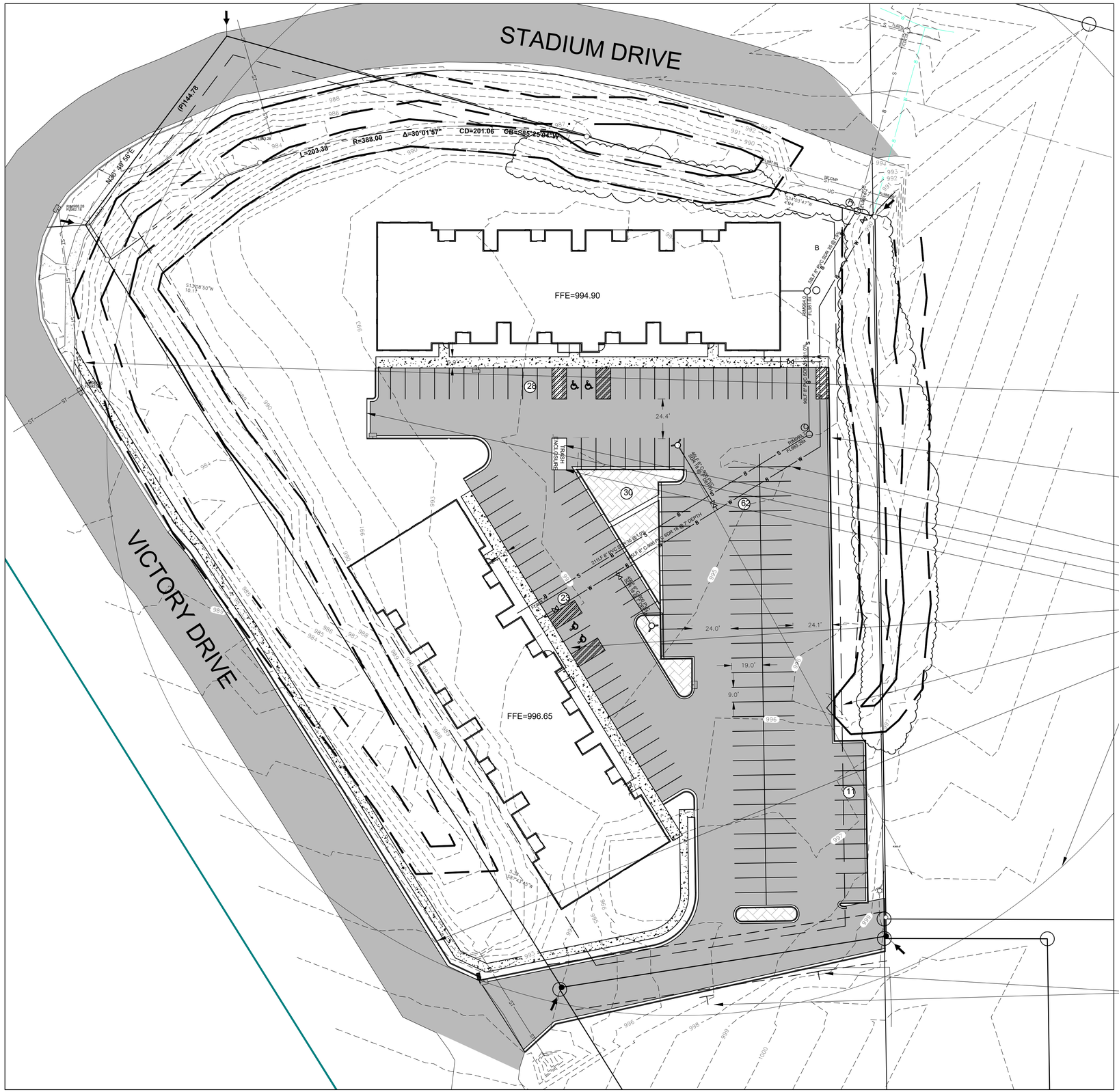
C2



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Bryan J. Johnson

Bryan J. Johnson
Reg. No. 42744
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Consultant

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HARDSCAPE PLAN

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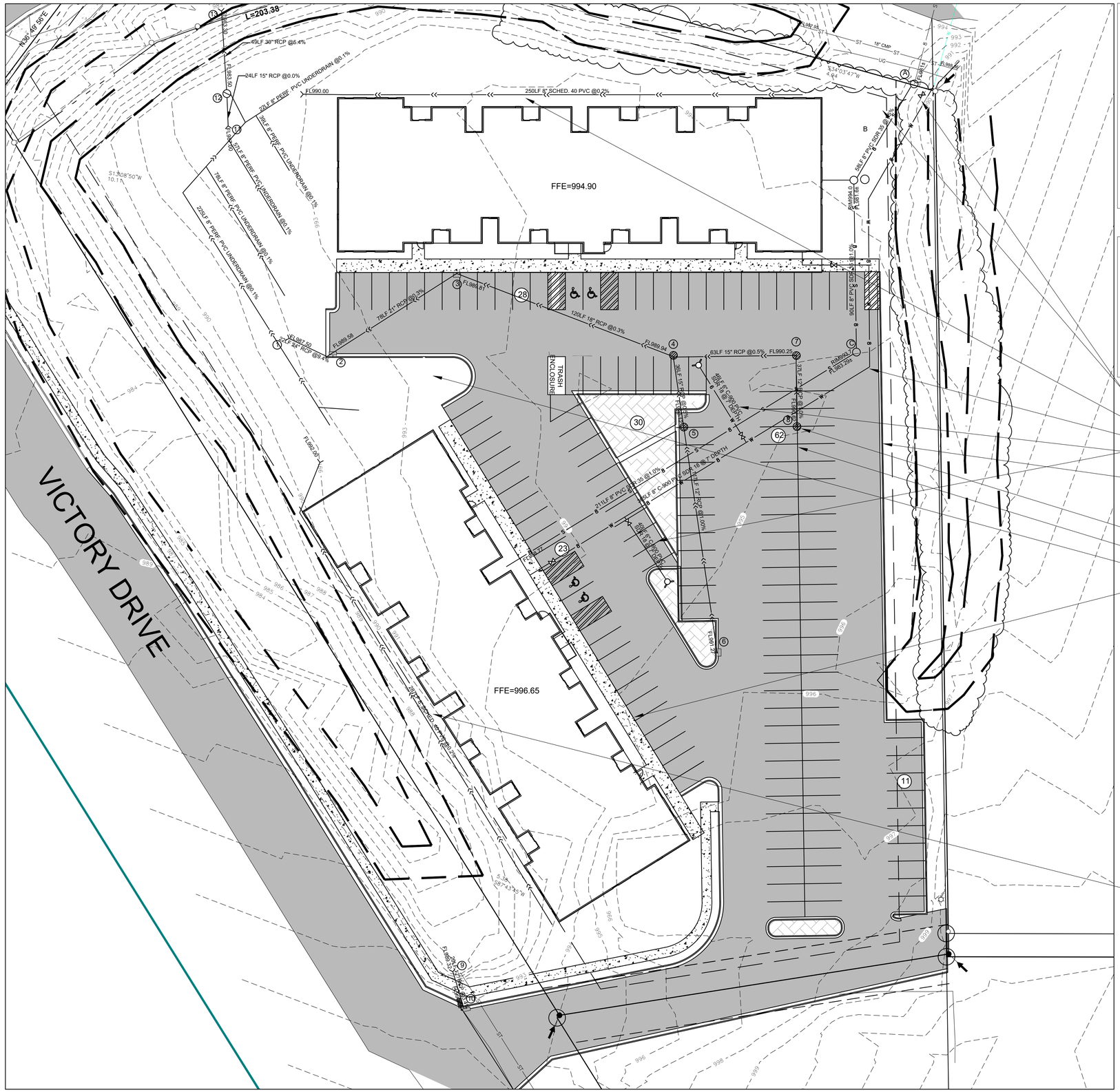
C3



STORM SEWER STRUCTURE SCHEDULE

NO.	RIM EL.	INVERT EL.	HEIGHT	CASTING	DESIGN	REMARKS
1	–	987.50	–	–	–	F&I 24" RC APRON & TRASH GUARD, 10 CY CL. III RIPRAP
2	993.00	988.58	5.58	R3067	48-4022	
3	993.80	989.81	3.99	R3067	48-4022	
4	993.00	989.94	3.06	R2532	48-4020	
5	993.75	990.12	3.63	R2532	G	
6	995.00	991.27	3.73	R3067	2X3	
7	993.40	990.25	3.15	R2532	G	
8	993.75	990.62	3.13	R2532	G	
9	–	989.32	–	–	–	F&I 12" RC APRON & TRASH GUARD, 5 CY CL. III RIPRAP
10	993.30	989.32	3.98	R3067	2X3	
11	–	987.00	–	–	–	F&I 15" RC APRON & TRASH GUARD
12	991.00	983.50	7.50	–	–	SEE OUTLET STRUCTURE DETAIL
13	–	983.30	–	–	–	F&I 30" RC APRON & TRASH GUARD, 10 CY CL. III RIPRAP

F&I CL. III RIPRAP AS NOTED WITHIN 24 HOURS OF OUTLET INSTALLATION

SANITARY SEWER STRUCTURE SCHEDULE

NO.	RIM EL.	INVERT EL.	HEIGHT	CASTING	DESIGN	REMARKS
A	992.50	981±	11.50	1772	4007C	FIELD VERIFY EXISTING PIPE INVERT
B	994.00	981.6	12.4	1772	4007C	
C	993.75	983.29	10.46	1772	4007C	

CONNECT TO EXISTING WATERMAIN-F&I 8X8 TEE, 45° BEND, (2) 8" GATE VALVES
CONNECT TO EXISTING SANITARY-F&I MANHOLES AS SHOWN-SEE STRUCTURE SCHEDULE

F&I 287LF 8" SCHED. 40 PVC @0.2%. CONNECT ROOF DRAIN DOWNSPOUTS TO
TO PVC AND OUTLET INTO PROPOSED POND. F&I AIR BREAKS BETWEEN RISERS & DOWNSPOUTS TYP.
F&I 8" 45° BEND

F&I (2) 8X6 TEES, 6" GATE VALVES, HYDRANT LEGS AND 6" HYDRANTS
CONNECT TO EXISTING SANITARY-F&I MANHOLES AS SHOWN-SEE STRUCTURE SCHEDULE

NEW CONCRETE B618 CURB & GUTTER TYP.

F&I STORM SEWER PIPING AND STRUCTURE TYP.-SEE STRUCTURE SCHEDULE FOR MORE INFO.

F&I LATEX PAVEMENT STRIPING/MESSAGES TYP.

F&I CONCRETE PAVEMENT SECTION WITHIN TRASH ENCLOSURE TYP.

F&I THICKENED EDGE WALK ALONG BUILDING EXCEPT AT ADA STALLS TYP.
SEE THICKENED EDGE WALK DETAIL AND RAISED PAVEMENT DETAIL

FILTRATION BASIN SUMMARY

TOTAL IMPERVIOUSE SURFACE=2.5 ACRES
1.1" WQV VOLUME REQUIRED: 0.2 AC.-FT.
WQV VOLUME PROVIDED: 0.2 AC.-FT.
WQV ELEVATION=988.33
DISCHARGE RATE AT WQV: 1.87 CFS
BASIN 100 YR. HWL=990.44
TOP OF BERM=992.00
EOF=991.00

DISCHARGE RATES (CFS):

	PRE-DEVELOPMENT	POST-DEVELOPMENT
2 YEAR	15.19	1.77
10 YEAR	27.26	10.88
100 YEAR	52.57	34.59

F&I 287LF 8" SCHED. 40 PVC @0.2%. CONNECT ROOF DRAIN DOWNSPOUTS TO
TO PVC AND OUTLET INTO PROPOSED POND. F&I AIR BREAKS BETWEEN RISERS
& DOWNSPOUTS TYP.

1"=25'
25 0 25
HORIZ. SCALE FEET

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Brandon J. Jensen
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Date: 9/20/25
Reg. No. 42744

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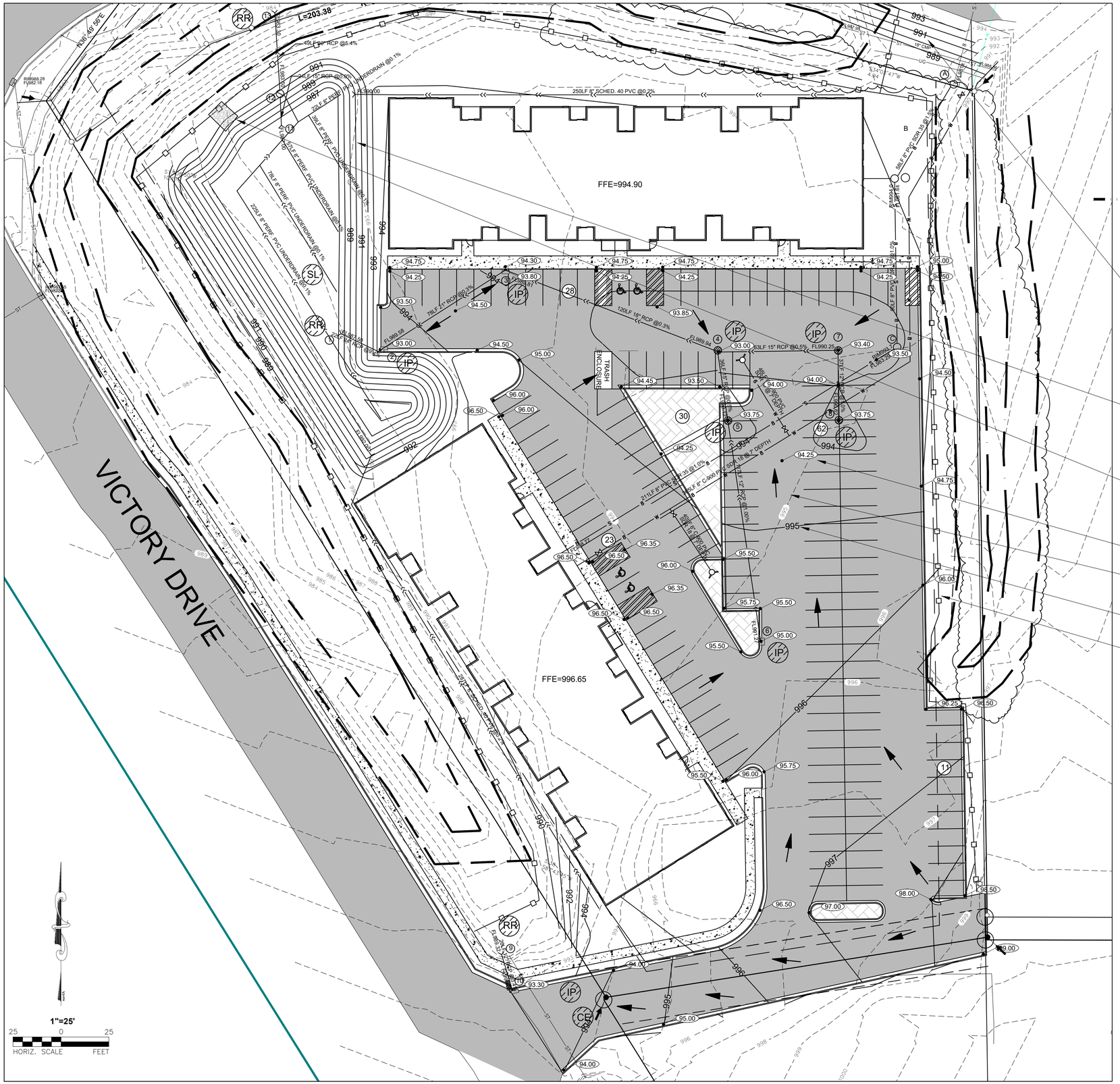
Sheet Title:
UTILITY PLAN

Sheet No.:
C4



SWPPP LEGEND

		QUANTITY
CE	= ROCK CONSTRUCTION ENTRANCE	1 EA
IP	= INLET PROTECTION-TYP. AT ALL DOWNGRADIENT INLETS	9 EA
	= SILT FENCE-FOR PERIMETER CONTROL	1400 LF
	= WOOD CHIP BIO-ROLL/SILT SOCK	
	= HYDRO-SEED TYPE LAWN OVER 6" MIN. BLACK DIRT TOPSOIL (TYP. TO ALL NON-PAVED DISTURBED AREAS WITHIN SITE)	1 ACRE
CW	= DESIGNATED CONCRETE WASHOUT AREA	1 EA
RR	= CL. III RIPRAP ENERGY DISSIPATION-PLACE WITHIN 24 HOURS	25 CY
	= RUNOFF FLOW DIRECTION	
	= DRAINAGE AREA BOUNDARY	
PG	= DESIGNATED POLLUTANT GENERATING AREA	1 EA
SL	= DESIGNATED STEEP SLOPE AREA (4:1 OR GREATER) F&I CATEGORY 3 BLANKET ON ALL 4:1 OR STEEPER SLOPES	1300 SY

ONSITE SOILS=SILTY CLAY, KLOSSNER MUCK PER NRCS SOIL SURVEY

REMOVE EXISTING ACCESS ROAD & CULVERT-GRADE TO MATCH EXISTING ROAD SLOPES

PROPOSED FILTRATION BASIN-SEE BASIN DETAILS FOR SAND MEDIA AND SEEDING REQUIREMENTS

F&I EMERFENCY OVERFLOW (EOF) AT THIS LOCATION AT ELEV. 1192.00 -INSTALL 10'X12'X12" THICK RIPRAP OVERFLOW WITH CL. III RIPRAP OVER GEO-FABRIC

PROPOSED PAVEMENT/GUTTER ELEVATION (NGVD LESS 900) TYP.

EXISTING ELEVATION CONTOUR TYP.

PROPOSED ELEVATION CONTOUR TYP.

PROPOSED SILT FENCE TYP.

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Brian J. Johnson
Date: 9/20/25
Reg. No. 42144

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GRADING PLAN

Sheet No.:
C5

LANDSCAPING NOTES

Sec. 10-1740 PERIMETER OFF STREET PARKING LOT
(1) SHADE TREE/ 50 LF OF FRONTAGE
(1) EVERGREEN TREE/ 25 LF OF FRONTAGE
80% OPAQUE ALONG ALL PARKING FRONTING STREET

PLANTING BEDS SHALL BE MULCHED WITH BARK CHIPS, ROCK MULCH, FEATHER ROCKS OR SIMILAR MATERIAL.

PERIMETER LANDSCAPING & TRANSITIONAL YARDS SHALL CONSIST OF A COMBINATION OF GROUND COVER, SHADE TREES OR EVERGREEN TREES, SHRUBS AND APPROPRIATE SCREENING DEVICES SUCH AS DECORATIVE WALLS, FENCES OR BERMS.

LANDSCAPING LEGEND

=DENOTES EVERGREEN TREE

=DENOTES SHRUB

=DENOTES ARBOVITAE HEDGE (4' MIN. - 8' MAX)
(80% OPAQUE ALONG ALL PARKING FRONTING PREMIER DR.)

=DENOTES SHADE TREE

=DENOTES PLANTING BED W/ MULCH

=DENOTES EXISTING TREELINE

1"=25'

25 0 25

HORIZ. SCALE FEET

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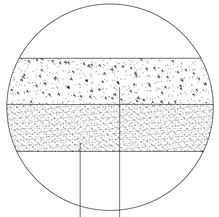
LANDSCAPE PLAN

Sheet No.:

C6



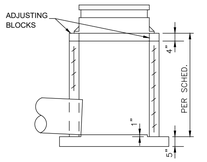
ALL JOINTS SHALL BE SEALED USING AN APPROVED MN/DOT HOT POUR ELASTIC SEALANT (3723) (INCIDENTAL)

7" CONCRETE PAVEMENT (MN/DOT 2301)

3" AGGREGATE BASE CLASS V (MN/DOT 2211)

ALL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE PAVEMENT WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, A 4" MAXIMUM SLUMP AND 5% – 7% ENTRAINED AIR.

CONCRETE PAVEMENT SECTION



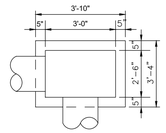
SECTIONAL VIEW
CATCH BASIN & BASE SLAB

NOTES:

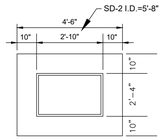
1. TO BE USED WITH NEENAH R3067 FRAMED COVER WITH 3" RAD. CURB BOX OR APPROVED EQUAL.
2. PIPE CUT-OUTS TO BE LOCATED WHERE REQUIRED.
3. ALTERNATE CAST-IN-PLACE BASE CAN BE USED.
4. MINIMUM REINFORCING SHALL BE WIRE FABRIC HAVING AN AREA OF NOT LESS THAN 0.12 SQ. IN. PER FOOT IN BOTH DIRECTIONS.

FOR USE WITH R3067 CASTING

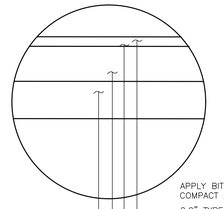
CATCH BASIN 2X3



CATCH BASIN PLAN



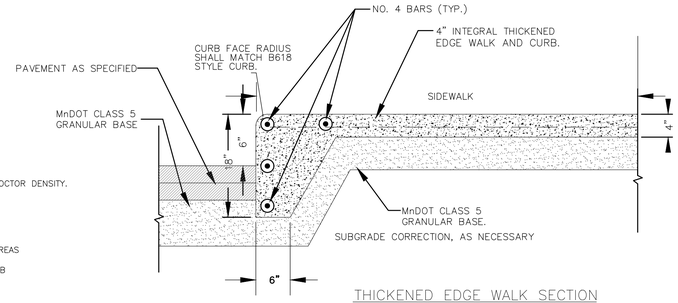
BASE SLAB PLAN



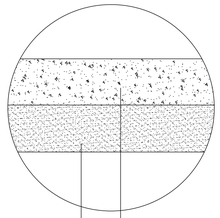
APPLY BITUMINOUS TACK COAT BETWEEN LIFTS
COMPACT ALL GRANULAR MATERIAL TO 100% OF PROCTOR DENSITY.
2.0" TYPE SPWEA240B WEAR COURSE
2.0" TYPE SPNWB230B BASE COURSE
12" CLASS V AGGREGATE BASE (2211)
SCARIFY THE UPPER 12" OF SUBGRADE IN "CUT" AREAS

ALL GRAVEL BASE SHALL EXTEND A MINIMUMN OF 1' BEHIND ALL CURB

PARKING LOT PAVEMENT SECTION



THICKENED EDGE WALK SECTION



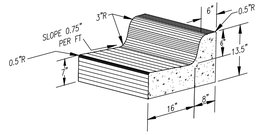
ALL JOINTS SHALL BE SEALED USING AN APPROVED MN/DOT HOT POUR ELASTIC SEALANT (3723) (INCIDENTAL)

4" CONCRETE PAVEMENT (MN/DOT 2301)

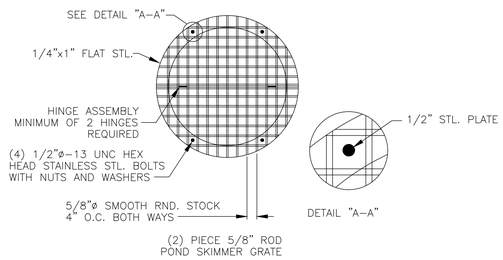
3" AGGREGATE BASE CLASS V (MN/DOT 2211)

ALL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE PAVEMENT WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, A 4" MAXIMUM SLUMP AND 5% – 7% ENTRAINED AIR.

CONCRETE SIDEWALK SECTION



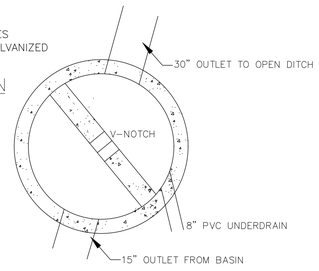
CONCRETE CURB & GUTTER DESIGN B618



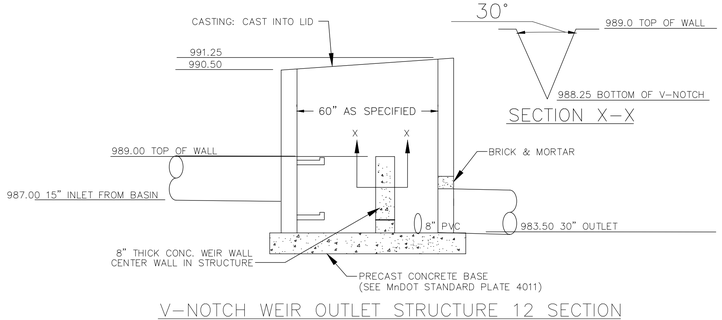
GRATE NOTES:

1) GRATE TO BE MADE IN TWO (2) PIECES
2) ALL METAL SHALL BE HOT–DIPPED GALVANIZED

STRUCTURE 12 GRATE PLAN

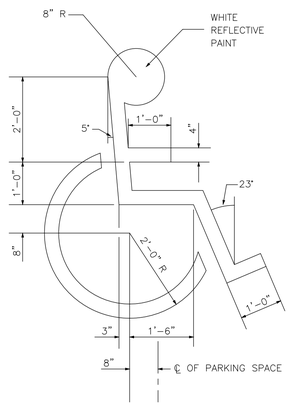


V–NOTCH WEIR OUTLET STRUCTURE PLAN



SECTION X–X

V–NOTCH WEIR OUTLET STRUCTURE 12 SECTION

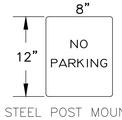


INTERNATIONAL HANDICAP SYMBOL

STEEL POST MOUNTED
(PERMANENT)

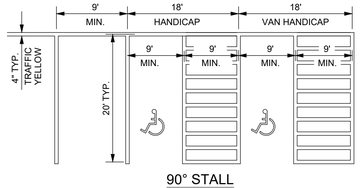
INSTALL AT ALL HANDICAP STALLS
60"–66" ABOVE FINISH GRADE
CENTERED AT THE HEAD OF THE STALL

SIGN PANEL DETAIL



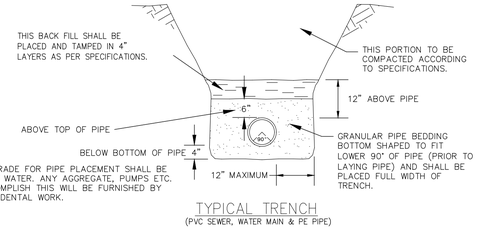
STEEL POST MOUNTED
(PERMANENT)
INSTALL AT ALL HANDICAP ACCESS
AILSES–60"–66" ABOVE FINISH GRADE
CENTERED AT THE HEAD OF THE STALL

SIGN PANEL DETAIL



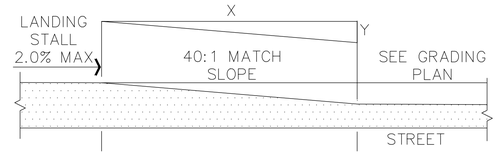
90° STALL

NOTE:
SHEETING, SHORING, BRACING AND SIDE SLOPES REQUIRED BY SAFETY CODES AND REGULATIONS, STATE INDUSTRIAL COMMISSION AND O.S.H.A. ARE NOT SHOWN. CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR THIS.

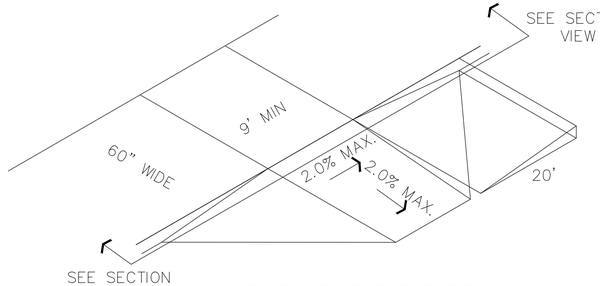


THE FINISHED SUB GRADE FOR PIPE PLACEMENT SHALL BE MAINTAINED FREE OF WATER. ANY AGGREGATE, PUMPS ETC. NECESSARY TO ACCOMPLISH THIS WILL BE FURNISHED BY CONTRACTOR AS INCIDENTAL WORK.

TYPICAL TRENCH
(PVC SEWER, WATER MAIN & PE PIPE)



CROSS SECTION



CURB RAMP – BUILT UP PAVEMENT

Consultant:
JONES HAUGH SMITH
Engineers • Surveyors
515 South Washington Ave. Albert Lea, MN 507-373-4876

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

Brian J. Johnson
Reg. No. 42744
Date: 9/20/25

Project:
MANKATO APARTMENTS

Revision:

No.:	Date: 9/20/2025
Drawn: bjj	Checked:

Project Manager:

Project Status: CD

Sheet Title:
DETAILS

Sheet No.:
C7

SWPPP NARRATIVE

CONSTRUCTION ACTIVITY INFORMATION

PROJECT NAME: MANKATO APARTMENTS
FACILITY IMPROVEMENT PROJECT

PROJECT LOCATION: MANKATO, MN

PROJECT SIZE: PARCEL SIZE: 4.25 DISTURBED ACRES

PROJECT TYPE: RESIDENTIAL BUILDING CONSTRUCTION

MAJOR SOIL TYPE: SILTY LOAM, KLOSSNER MUCK

CUMULATIVE IMPERVIOUS SUFACE:
EXISTING - 1.26 ACRES
POST CONSTRUCTION - 2.5 ACRES

DIRECT DISCHARGE FROM IMPERVIOUS SURFACE: 0.2 ACRES

RECEIVING WATERS:
CITY STORM SEWER

DATES OF CONSTRUCTION: 2025

OWNER: GROWTH HOLDINGS LLC

UNDERGROUND UTILITY/GRADING CONTRACTOR:

TO BE DETERMINED

PARTY RESPONSIBLE FOR LONG TERM O&M:
OWNER: GROWTH HOLDINGS LLC

GENERAL SITE INFORMATION

IMMEDIATELY FOLLOWING GRADING OF SLOPES OF 3:1 OR GREATER, SLOPES MUST BE STABILIZED WITH WOOD FIBER BLANKET (OR OTHER METHOD APPROVED BY THE ENGINEER) OVER APPROVED SEED MIXTURE AND A MINIMUM OF 4" OF TOPSOIL.

ALL EROSON CONTROL MEASURES SHALL REMAIN IN PLACE AND BE MAINTAINED IN GOOD CONDITION UNTIL THE SITE HAS BEEN RE-VEGETATED, AT WHICH TIME THE CONTRACTOR MAY REMOVE NECESSARY SILT FENCING TO CONSTRUCT ROADWAYS WHILE MAINTAINING ADEQUATE EROSION CONTROL IN ADJACENT AREAS. SUFFICIENT TOPSOIL SHALL BE STOCKPILED OR IMPORTED TO ALLOW FOR THE REPLACEMENT OF A MINIMUM OF 4" OF TOPSOIL FOR DISTURBED AREAS TO BE RE-VEGETATED.

CONTRACTOR SHALL SCHEDULE SITE GRADING, UTILITY INSTALLATION, AND ROADWAY CONSTRUCTION SO THAT THE GENERAL SITE CAN BE MULCHED AND RE-SEEDED SOON AFTER DISTURBANCE. DISTURBED AREAS SHALL BE SEEDED AND MULCHED OR SODDED WITHIN: 7 DAYS

INSPECT SILT FENCES AND BALE CHECKS AFTER EACH RAIN EVENT AND DAILY DURING A PROLONGED RAINFALL. IMMEDIATELY REPAIR FAILED OR FAILING MEASURES.

REMOVE SEDIMENT DEPOSITS FROM SILT FENCE AND BALE CHECKS WHEN SEDIMENT REACHES APPROXIMATELY 1/3 THE HEIGHT OF THE BARRIER.

BARRIERS WILL BE REPLACED WHEN THEY DECOMPOSE OR BECOME INEFFECTIVE BEFORE THE BARRIERS ARE NO LONGER NECESSARY. ANY SEDIMENT REMAINING IN-PLACE AFTER THE BARRIERS ARE NO LONGER NECESSARY WILL BE DRESSED TO CONFORM TO EXISTING GRADE, AND PREPARED AND SEEDED WITH THE APPROPRIATE SEED MIX, AS DIRECTED BY THE ENGINEER.

IN THOSE AREAS WHERE WOOD FIBER BLANKET OR OTHER SLOPE STABILIZATION METHODS HAVE FAILED, THE SLOPE SHALL BE RE-ESTABLISHED, SEED AND TOPSOIL REPLACED, AND ADDITIONAL SLOPE TREATMENT INSTALLED.

BARRIERS WILL BE REMOVED WHEN FINAL STABILIZATION OF THE SLOPES HAS BEEN COMPLETED AS DETERMINED BY THE ENGINEER.

NO STORMWATER MITIGATION MEASURES WERE REQUIRED AS A PART OF ENVIRONMENTAL, ARCHAELOGICAL OR OTHER REQUIRED LOCAL, STATE, OR FEDERAL REVIEW OF THIS PROJECT.

THIS PROJECT IS NOT LOCATED IN A KARST AREA NECESSITATING MEASURES TO PROTECT DRINKING WATER SUPPLY.

THIS PROJECT DOES DISCHARGE WATER TO AN IMPAIRED WATER.

PROVIDE SILT FENCE AROUND ALL SOIL STOCKPILES

SWPPP IMPLEMENTATION CHAIN OF RESPONSIBILITY

EACH CONTRACTOR ON-SITE WILL DESIGNATE AN EMPLOYEE AS ITS PROJECT SWPPP OFFICER. A LIST OF THESE OFFICERS WITH CONTACT INFORMATION WILL BE AVAILABLE ON-SITE. IT WILL BE SOLEY THE SWPPP OFFICERS' RESPONSIBILTY TO ENSURE THAT ALL ON-SITE ACTIVITIES PERFORMED BY ITS COMPANY COMPLY WITH THE SWPPP. THE GENERAL CONTRACTOR'S SWPPP OFFICER WILL HAVE AUTHORITY OVER ALL SUB-CONTRACTOR'S SWPPP OFFICERS FOR WORK PERTAINING TO COMPLIANCE.

SHOULD A SWPPP OFFICER FAIL TO ENSURE COMPLIANCE, THAT OFFICER'S FOREMAN OR DIRECT SUPERVISOR WILL ASSUME ALL RESPONSIBILITY.

SHOULD A SUB-CONTRACTOR FAIL TO COMPLY WITH THE SWPPP, THE GENERAL CONTRACTOR WILL ASSUME ALL RESPONSIBILITY FOR COMPLIANCE.

SHOULD THE GENERAL CONTRACTOR FAIL TO COMPLY WITH THE SWPPP, THE OWNER WILL ASSUME ALL RESPONSIBILITY FOR COMPLIANCE.

EROSION PREVENTION PRACTICES

CONTRACTOR SHALL PHASE CONSTRUCTION, MAINTAIN VEGETATIVE BUFFER STRIPS, AND PROVIDE HORIZONTAL SLOPE STAKING IN ORDER TO MINIMIZE EROSION.

SILT FENCE SHALL BE INSTALLED BEFORE WORK BEGINS. SILT FENCE LIMITS SHALL COINCIDE WITH DOWNGRADE GRADING LIMITS UNLESS OTHERWISE NOTED.

THIS PROJECT DOES NOT HAVE EXPOSED POSITIVE SLOPES WITHIN 200' OF SURFACE WATER.

THE WETTED PERIMETER OF DRAINAGE SWALES WILL BE STABILIZED WITH WOOD FIBER BLANKETS AND/OR DITCH CHECKS WITHIN 200' OF THE SITE BOUNDARY LINE OR WETTED PERIMETER OF DITCHES WITHIN 24 HOURS..

TEMPORARY OR PERMANENT DITCHES THAT ARE BEING USED AS A SEDIMENT CONTAINMENT SYSTEM DURING CONSTRUCTION MUST BE STABILIZED WITHIN 24 HOURS AFTER NON-USE

PIPE OUTLETS MUST HAVE ENERGY DISSIPATION IN PLACE WITHIN 24 HOURS OF INSTALLATION

MULCH, HYDROMULCH, TACKIFIER, POLYACRYLAMIDE EROSION PREVENT PRACTICES CANNOT BE BE USED WITHIN THE NORMAL WETTED PERIMETER OF OF DRAINAGE DITCHES OR SWALE SECTIONS WITH A CONTINUOUS SLOPE GREATER THAN 2%

SEDIMENT CONTROL PRACTICES

CONTRACTOR SHALL FURNISH, INSTALL, AND MAINTAIN:
SEDIMENT CONTROLS FOR TEMPORARY AND PERMANENT DRAINAGE BASINS AND DRAINAGE DITCHES THAT ARE A PART OF THIS DESIGN

CHECK DAMS AND/OR WOOD FIBER BLANKETS TO ENSURE SHEET FLOW AND PREVENT RILLS FOR SLOPE LENGTHS GREATER THAN 75' WITH A SLOPE OF 3:1 OR GREATER

SILT FENCE AT ALL DOWN GRADIENT PERIMETERS INSTALLED PRIOR TO ALL LAND DISTURBING ACTIVITIES

INLET PROTECTION AT ALL DRAIN INLETS

SILT FENCING AROUND TEMPORARY SOIL STOCKPILES

ROCK CONSTRUCTION SITE ENTRANCES

STREET SWEEPING OF TRACKED SEDIMENT ONTO PAVED SURFACES

SEDIMENT CONTROL PRACTICES MUST BE IN PLACE AT ALL DOWN GRADIENT PERIMETERS AND UPGRADIENT OF ANY BUFFER ZONES

SEDIMENT CONTROL PRACTICES ARE ESTABLISHED AT THE BASE OF STOCKPILES ON DOWN GRADIENT PERIMETER

STOCKPILES ARE LOCATED OUTSIDE OF NATURAL BUFFERS OR SURFACE WATER, INCLUDEING STORM WATER CONVEYANCES UNLESS THERE IS A BYPASS

THIS PROJECT DOES NOT INCLUDE DEWATERING OR BASIN DRAINING
PERMANENT SEDIMENT BASINS WILL BE USED AS TEMPORARY BASINS DURING CONSTRUCTION

ADDITIONAL BMP'S FOR SPECIAL WATERS

THIS PROJECT DOES NOT DISCHARGE TO SPECIAL WATERS OR HAVE SIGNIFICANT IMPACTS TO WETLANDS

INSPECTIONS AND MAINTAINANCE

CONTRACTOR SHALL INSPECT AND MAINTAIN MEASURES AT MINIMUM ONCE EVERY (7) DAYS DURING ACTIVE CONSTRUCTION, AND WITHIN 24 HOURS AFTER A RAINFALL EVENT OF 0.5" IN 24 HOURS.

INSPECTIONS WILL INCLUDE STABILIZED AREAS, EROSION PREVENTION AND SEDIMENT CONTROLS, AND INFILTRATION AREAS.

REFER TO MPCA'S COMPLIANCE GUIDE FOR EROSION AND SEDIMENT CONTROL FOR INSPECTION LOG REQUIREMENTS.

MAINTENANCE RECORDS SHOULD INCLUDE: DATES & TIMES IF INSPECTION, NAME OF PERSON CONDUCTING THE INSPECTION, FINDINGS & LOCATIONS OF CORRECTIVE ACTIONS, PARTY COMPLETING MAINTENANCE ACTIVITIES, DATES & AMOUNTS OF RAINFALL EVENTS GREATER THAN 0.5". RAINFALL AMOUNTS ARE TO BE RECORDED WITH RAIN GAUGE ON SITE OR WEATHER STATION WITHIN 1 MILE OF SITE. ANY DISCHARGES OBSERVED SHOULD BE DESCRIBED & PHOTOGRAPHED.

RECORDS RETENTION

CONTRACTOR SHALL MAINTAIN RECORDS OF THE SEDIMENT RETENTION PROCEDURES ON-SITE. RECORDS WILL INCLUDE:
COPY OF THE SWPPP AND ALL REVISIONS
INSPECTION AND MAINTAINANCE RECORDS
PERMANENT OPERATION AND MAINTAINANCE AGREEMENTS
CALCULATIONS FOR THE DESIGN OF TEMPORARY AND PERMANENT STORMWATER MANAGEMENT SYSTEMS
COPIES OF THE SWPPP MUST BE RETAINED ON SITE BY THE PERMITTEE

POLLUTION PREVENTION MEASURES

SOLID WASTE:
COLLECTED SEDIMENT, ASPHALT AND CONCRETE MILLINGS, FLOATING DEBRIS, PAPER, PLASTIC, FABRIC, CONSTRUCTION AND DEMOLITION DEBRIS AND OTHER WASTES MUST BE DISPOSED OF PROPERLY AND MUST COMPLY WITH MPCA DISPOSAL REQUIREMENTS.

CONCRETE AND OTHER WASHOUTS:
PERFORM ALL CONCRETE TRUCK WASHOUTS IN PROPER CONTAINMENT FACILITIES.
SOILID AND LIQUID WASHOUT WASTE FROM OTHER MATERIALS (STUCCO, PAINT, FORM RELEASE OILS CURING COMPOUNDS ETC.) WILL BE DISPOSED OF IN A PROPERLY DESIGNATED LANDFILL.

PERFORM ALL WASHOUTS INCLUDING HANDTOOLS IN A LEAKPROOF CONTAINMENT FACILITY OR IMPERMEABLE LINER THAT PREVENTS RUNOFF ONTO ADJACENT SOILS. DEBRIS/SEDIMENT WILL NOT CONTACT THE GROUND SURFACE.

A SIGNE REQUIRING USE OF PROPER WASHOUT FACILITIES WILL BE INSTALLED ADJACENT TO SAID FACILITIES.

HAZARDOUS MATERIALS:
OIL, GASOLINE, PAINT AND ANY HAZARDOUS SUBSTANCES MUST BE PROPERLY STORED, INCLUDING SECONDARY CONTAINMENT TO PREVENT SPILLS, LEAKS, OR OTHER DISCHARGE. RESTRICTED ACCESS TO STORAGE AREAS MUST BE PROVIDED TO PREVENT VANDALISM. STORAGE AND DISPOSAL OF HAZARDOUS WASTE MUST BE IN COMPLIANCE THE MPCA REGULATIONS.

EXTERNAL WASHING OF TRUCKS AND OTHER CONSTRUCTION VEHICLES MUST BE LIMITED TO A DEFINED AREA OF THE SITE. RUNOFF MUST BE CONTAINED OF AND WASTE PROPERLY DISPOSED OF. NO ENGINE DEGREASING IS ALLOWED ON SITE.

SWPPP AMENDMENTS

AMENDMENTS MADE IN THE FIELD TO THE SWPPP SHOULD BE UPDATED ON THE SWPPP. REFER TO PROCEDURES OUTLINED IN SECTION 6.1 OF THE PERMIT.

SWPPP IMPLEMENTATION CHAIN OF RESPOSIBILITY

THE GENERAL CONTRACTOR SHALL PROVIDE A TRAINED, CERTIFIED, KNOWLEDGEABLE PERSON WHO SHALL SERVE AS THE SITE'S EROSION CONTROL INSPECTOR. THIS PERSON SHALL BE RESPONSIBLE FOR INSTALLATION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROL BMP'S, AND SHALL MAINTAIN THE INSPECTION LOG AT THE PROJECT SITE.

EACH SUBCONTRACTOR ON-SITE WILL DESIGNATE AN EMPLOYEE AS ITS PROJECT SWPPP OFFICER. A LIST OF THESE OFFICERS WITH CONTACT INFORMATION WILL BE AVAILABLE ON-SITE. IT WILL BE SOLELY THE SWPPP OFFICERS' RESPONSIBILITY TO ENSURE THAT ALL ON-SITE ACTIVITIES PERFORMED BY ITS COMPANY COMPLY WITH THE SWPPP. THE GENERAL CONTRACTOR'S SWPPP INSPECTOR WILL HAVE AUTHORITY OVER ALL SUBCONTRACTOR'S SWPPP OFFICERS FOR WORK PERTAINING TO COMPLIANCE.

SHOULD A SWPPP OFFICER FAIL TO ENSURE COMPLIANCE, THAT OFFICER'S FOREMAN OR DIRECT SUPERVISOR WILL ASSUME ALL RESPONSIBILITY.

SHOULD A SUBCONTRACTOR FAIL TO COMPLY WITH THE SWPPP, THE GENERAL CONTRACTOR WILL ASSUME ALL RESPONSIBILITY FOR COMPLIANCE.

SHOULD THE GENERAL CONTRACTOR FAIL TO COMPLY WITH THE SWPPP, THE OWNER WILL ASSUME ALL RESPONSIBILITY FOR COMPLIANCE.

CHANGES IN PERMIT AND NOTICE OF TERMINATION

THE CONTRACTOR WILL BE A CO-PERMITEE DURING THE CONSTRUCTION OF THE PROJECT. AFTER GRAVEL SURFACING OF THE PROJECT HAS BEEN COMPLETED, AND 70% PERMANENT VEGETATIVE COVER HAS BEEN ESTABLISHED OVER THE PERVIOUS AREAS OF THE SITE, AND THE WARRANTY PERIOD HAS ELAPSED, THE CONTRACTOR MAY SUBMIT A MPCA (NOT)F ORM TO THE OWNER FOR SIGNATURE AND SUBMITTAL TO THE MPCA.

THE OWNER WILL SUBMIT THE NOTICE OF TERMINATION (NOT) AFTER ONE FINAL ESTABLISHMENT OF ALL PERVIOUS SURFACES ACCORDING TO THE MPCA GENERAL PERMIT REQUIREMENTS

NOTIFICATION OF THE MPCA IN CASE OF POLLUTION

IT IS THE DUTY OF THE CONTRACTOR TO NOTIFY THE MPCA IMMEDIATELY OF ANY DISCHARGE, ACCIDENTAL OR OTHERWISE, OF ANY SUBSTANCE OR MATERIAL UNDER HIS CONTROL WHICH, IF NOT RECOVERED, MAY CAUSE POLLUTION OF WATERS OF THE STATE, AND THE CONTRACTOR SHALL RECOVER AS RAPIDLY AND THOROUGHLY AS POSSIBLE SUCH SUBSTANCE OR MATERIAL AND TAKE IMMEDIATELY SUCH OTHER ACTION AS MAY BE REASONABLY POSSIBLE TO MINIMIZE OR ABATE POLLUTION OF WATERS OF THE STATE CAUSED THEREBY.

SEDIMENT LEAVING THE CONSTRUCTION SITE AND ENTERING A PUBLIC WATER IS CAUSE FOR NOTIFICATION.

MPCA DUTY OFFICER: 800-422-0798

QUALIFIED SWPPP PERSONNEL INFORMATION

SWPPP DESIGNER: BRIAN J. JOHNSON, PE
JONES HAUGH & SMITH, INC.
515 SOUTH WASHINGTON AVE
ALBERT LEA, MN 56007
(507) 373-4876

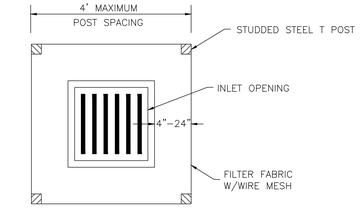
SWPPP INSTALLER:
NAME: _____
FIRM: _____
ADDRESS: _____
_____
PHONE: _____

SWPPP INSPECTOR:
NAME: _____
FIRM: _____
ADDRESS: _____
_____
PHONE: _____

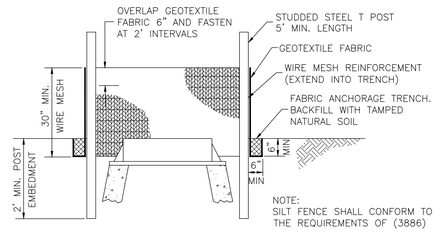
GRADING CONTRACTOR:
NAME: _____
FIRM: BCM CONTRACTING_____
ADDRESS: _____
_____
PHONE: _____

OTHER LAND DISTURBING CONTRACTOR:
NAME: _____
FIRM: _____
ADDRESS: _____
_____
PHONE: _____

OTHER LAND DISTURBING CONTRACTOR:
NAME: _____
FIRM: _____
ADDRESS: _____
_____
PHONE: _____

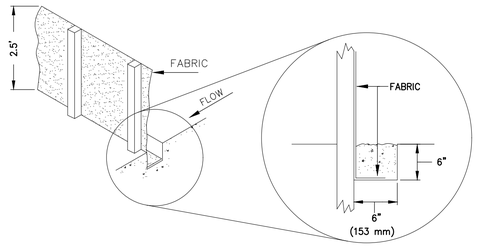


PLAN VIEW



SECTIONAL VIEW

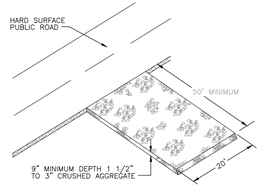
INLET PROTECTION - HEAVY DUTY



NOTES:
- PLACE BOTTOM EDGE OF FENCE INTO 6" (153 mm) DEEP
- POSTS SHALL BE:
  - 4' (1.22 m) ON CENTER
  - 2" (50.8 mm) X 2" (50.8 mm) HARDWOOD, PINE OR STANDARD STEEL FENCE POSTS
  - DRIVEN 2' (0.61 m) INTO THE GROUND.

EROSION CONTROL FENCE

(MACHINE SLICED)



EROSION CONTROL PROTECTION AT CONSTRUCTION ACCESS

Consultant:
JONES HAUGH SMITH
Engineers + Surveyors
515 South Washington Ave. Albert Lea, MN 507-373-4876

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.
Brian J. Johnson
Date: 9/20/25
Brian J. Johnson
Reg. No. 42744

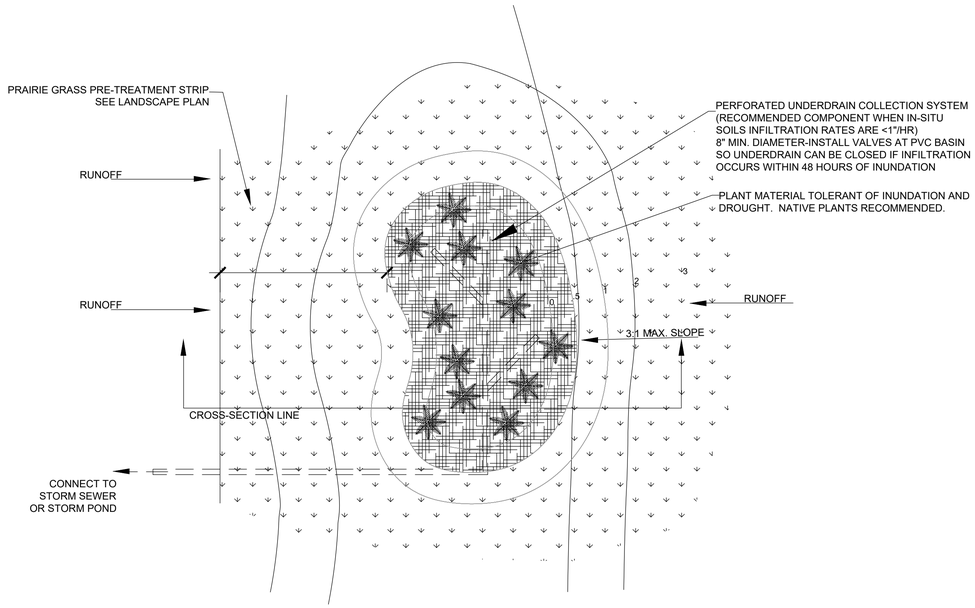
Project:
MANKATO APARTMENTS

Revision:

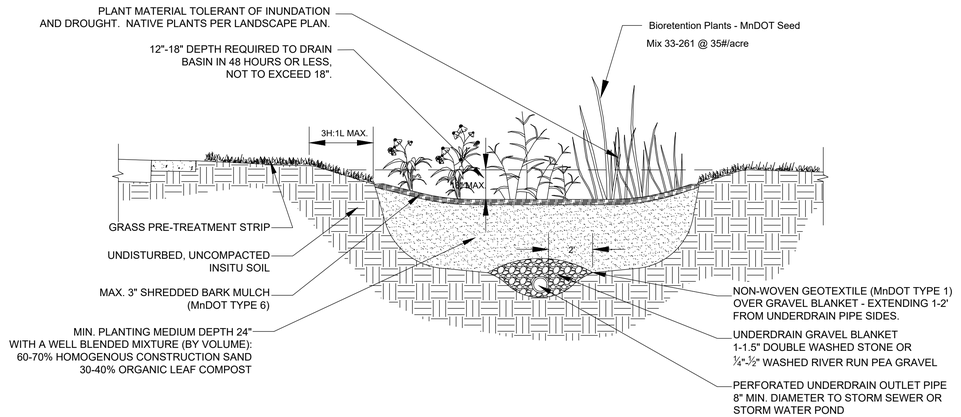
No.:	Date: 9/20/2025
Drawn: bjj	Checked:
Project Manager:	
Project Status: CD	

Sheet Title:
SWPPP NARRATIVE & DETAILS

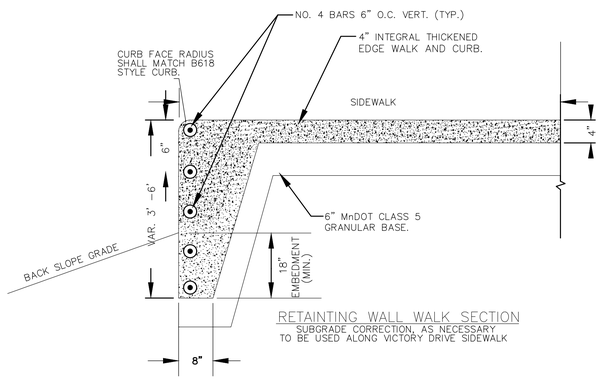
Sheet No.:
C8



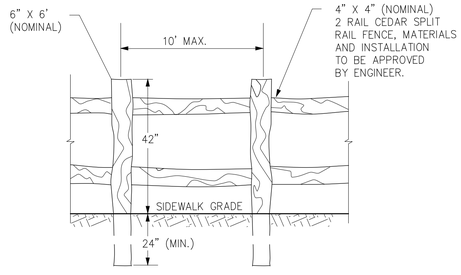
PLAN VIEW: BIO-RETENTION/FILTRATION BASIN



PROFILE VIEW: BIO-RETENTION/FILTRATION BASIN



RETAINTING WALL WALK SECTION
SUBGRADE CORRECTION, AS NECESSARY
TO BE USED ALONG VICTORY DRIVE SIDEWALK



SPLIT RAIL WOOD FENCE REQUIRED ALONGSIDE SIDEWALK INSTALLED WITH ADJACENT 4:1 OR GREATER SLOPES

SPLIT RAIL WOOD FENCE

BIO-RETENTION/FILTRATION BASIN CONSTRUCTION SEQUENCING

1. INSTALL SILT FENCE AND/OR OR OTHER APPROPRIATE TEMPORARY EROSION CONTROL DEVICES TO PREVENT SEDIMENT FROM LEAVING OR ENTERING THE PRACTICE DURING CONSTRUCTION.
2. ALL DOWN-GRADIENT PERIMETER SEDIMENT CONTROL BMP'S MUST BE IN PLACE BEFORE ANY UP GRADIENT LAND DISTURBING ACTIVITY BEGINS.
3. PERFORM CONTINUOUS INSPECTIONS OF EROSION CONTROL PRACTICES.
4. INSTALL UTILITIES (WATER, SANITARY SEWER, ELECTRIC, PHONE, FIBER OPTIC, ETC) PRIOR TO SETTING FINAL GRADE OF BIORETENTION DEVICE.
5. ROUGH GRADE THE SITE. IF BIORETENTION AREAS ARE BEING USED AS TEMPORARY SEDIMENT BASINS LEAVE A MINIMUM OF 3 FEET OF COVER OVER THE PRACTICE TO PROTECT THE UNDERLYING SOILS FROM CLOGGING.
6. PERFORM ALL OTHER SITE IMPROVEMENTS.
7. SEED AND MULCH ALL AREAS AFTER DISTURBANCE.
8. CONSTRUCT BIORETENTION DEVICE UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA.
9. IMPLEMENT TEMPORARY AND PERMENATE EROSION CONTROL PRACTICES.
10. PLANT AND MULCH BIORETENTION DEVICE.
11. REMOVE TEMPORARY EROSION CONTROL DEVICES AFTER THE CONTRIBUTING DRAINAGE AREA IS ADEQUATELY VEGETATED.

GENERAL NOTES

1. IN THE EVENT THAT SEDIMENT IS INTRODUCED INTO THE BMP DURING OR IMMEDIATELY FOLLOWING EXCAVATION, THIS MATERIAL SHALL BE REMOVED FROM THE PRACTICE PRIOR TO CONTINUING CONSTRUCTION.
2. GRADING OF BIORETENTION DEVICES SHALL BE ACCOMPLISHED USING LOW-COMPACTION EARTH-MOVING EQUIPMENT TO PREVENT COMPACTION OF UNDERLYING SOILS.
3. ALL SUB MATERIALS BELOW THE SPECIFIED BIORETENTION DEPTH (ELEVATION) SHALL BE UNDISTURBED, UNLESS OTHERWISE NOTED.
4. CONFIRM DURING CONSTRUCTION THAT THE EXISTING WATER TABLE OR BEDROCK DOES NOT EXCEED THE HEIGHT OF THE BOTTOM OF THE FILTRATION BASIN

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.

Brian J. Johnson
Reg. No. 42144
Date: 9/20/25

Consultant:
JONES HAUGH SMITH
Engineers + Surveyors
515 South Washington Ave. Albert Lea, MN 507-373-4876

Project:
MANKATO APARTMENTS

Revision:

No.:	Date: 9/20/2025
Drawn: bjj	Checked:

Project Manager:

Project Status: CD

Sheet Title:
DETAILS

Sheet No.:
C9

GOVERNING SPECIFICATIONS
The Minnesota Department of Transportation's "Standard Specifications for Construction" 2018 Edition, including the Mn/DOT Special Provisions modified for this project, Minnesota Plumbing Code and the City Engineers Association of Minnesota Standard Specification, 2018 Edition, will govern except as modified or altered in the Special Provisions. All references to "State of Minnesota" or "Commissioner of Transportation" or "Department" are hereby revised to mean "Owner."

WORK WITHIN PROPERTY
The Contractor will work only in areas secured by the Owner, and will comply with all requirements of access agreements.

MATERIALS TESTING

Materials Testing will be by the Contractor. The Contractor will hire an independent testing consultant, approved by the Engineer, prior to the start of work to be tested.

1. The following materials tests will be provided by the Testing Company:

Work to be Tested	Method	Reference Spec.	Testing Rate
Sewer & Water Service Trenches	Specified Density	MnDOT 2105, 2451, 2501	1 test per 500 lf
Storm Sewer Trench Compaction	Specified Density	MnDOT 2105, 2451, 2501	1 test per 500 lf
Subgrade/Embankment Compaction	Specified Density	MnDOT 2105	1 test per 2500 cy placed (Clay, Sand, etc.)
Test Rolling	Fully Loaded Dump Truck		1 test per road
Select Granular Borrow	Specified Density	MnDOT 3149	1 per 5000 ton
	Gradation	MnDOT 3149	1 per Source
Aggregate Base (CL 3, CL 5)	Modified DCP	MnDOT 2211	2 tests per 1000 ton
	Gradation	MnDOT 2211	1 per 5000 ton
Bituminous Paving	Ordinary Comp.-Control Strip	MnDOT 2360	1 control strip per mobilization and/or per workday
Concrete Curb & Gutter	Air, Slump, Temp, Strength	MnDOT 2461	If non-integrant
Air, Temp. - 1 per day			
Slump, Strength - 1 per day; and each time water is added at the site			
Concrete Driveway or Sidewalk	Air, Slump, Temp, Strength	MnDOT 2461	
Air, Temp. - 1 per day			
Slump, Strength - 1 per day; and each time water is added at the site			
Concrete Paving		MnDOT 2301	
All Concrete Field testing or Concrete Pavement per 2012 MnDOT Schedule of Materials Control (page 32), except Pavement Texture and Smoothness.			

Table Notes:

- Specified Density also requires Moisture-Density and Relative Density
- The Engineer may omit duplicative trench compaction tests at his discretion

MAINTENANCE OF TRAFFIC (1404)
The Contractor will be responsible for traffic control on the Project, and will furnish, erect, and maintain all necessary traffic control devices required to provide safe movement of vehicular traffic through the Project. Any traffic control device installed will meet the requirements of the Minnesota Manual on Uniform Traffic Control Devices, Field Manual, latest edition, and the latest MnDOT specifications approved at the time of bid.

The Contractor will prepare and submit to the City Engineer and County Engineer for Approval a Traffic Control Plan for any work in or utilization of traveled Right-of-Way. The plan will be submitted a minimum of 48 hours prior to the commencement of work. No work in the Right-of-Way will commence without an Approved Traffic Control Plan.

Traffic control will be in accordance with the Traffic Control Layout Plan and the following:
Traffic control devices include, but are not limited to, barricades, warning signs, lane markings, trailers, flashers, cones, and drums, as required, and sufficient barricade weights to maintain barricade stability.
No material will be deposited on a traveled roadway.
Materials will not be placed on road right of way more than one week in advance of their use.
Contractor will notify the affected parties at least one week prior to commencement of disturbance of the private or business drives.
Coordination will be maintained with the Fire and Police Departments to ensure that passage is maintained for emergency vehicles at all times.
The Contractor will make one person responsible for the maintenance of all signs. The Contractor will check each intersection at the end of each day whether it is a working day or not. The name and telephone number of this person will be left with the Police, the City Engineer, and the Fire Departments.

UTILITY PROPERTY AND SERVICE (1507)
Construction operations in the proximity of utility properties will be performed in accordance with the Provisions of 1507, except as modified below:

The first paragraph of 1507 is deleted and the following substituted therefore:

It will be the Contractor's responsibility to contact all local utility companies and ascertain the location of all existing underground utilities, if any, prior to performing any excavation operations. The Contractor will conduct his/her operations in the vicinity of any such facilities, which may exist, in a manner that will prevent damage thereto.

It will be the Contractor's responsibility to utilize the One-Call Excavation Notice System at 'Gopher State One Call' (1-800-252-1166) required under Minnesota Statute Chapter 216D, 48 hours prior to performing any excavation adjacent to any underground facility, which may exist, in a manner that will prevent damage thereto.

CONSTRUCTION STAKES, LINES AND GRADES (1508)

All construction staking will be provided by the Contractor and performed by or under the direct supervision of a Land Surveyor licensed in the State of Minnesota.

Field Fit Adjustments to Grade Stakes
The Engineer may make minor adjustments (< 0.5') to the grade stakes after they have been placed, in order to adjust to actual conditions in the field or to ensure proper or better drainage. Any adjustments to proposed or in-place materials required due to minor adjustments made by the Engineer are incidental to the work.

CONTROL OF HAUL ROADS (1515), LAWS TO BE OBSERVED (1701)

In addition to the requirements of 1515 and 1701, the Contractor will abide by all weight restrictions implemented by the governing road authorities in the performance of the work and in delivering materials and equipment to the project site.

AIR LAND AND WATER POLLUTION (1717)

The provisions of Mn/DOT 1717 are hereby modified and supplemented as follows:

DEWATERING
Any dewatering necessary to construct the work will be done by the Contractor. The Contractor is responsible to determine the type and method of dewatering and to provide and implement all equipment and materials necessary to accomplish the work on this project. Discharged water from dewatering will be routed through a temporary sediment basin. Sediment trapped in the temporary basins will be removed and disposed of on-site.

PROTECTION OF SURFACE STRUCTURES
The Contractor will not trespass on any private property without the express written consent of the Owner thereof. Trees, shrubs, fences, poles and all other private property will be protected unless their removal is authorized. Any property damaged will be satisfactorily restored at the expense of the Contractor. Any land survey or property monuments destroyed, covered, moved, bent or disturbed will be replaced by a Licensed Land Surveyor at the expense of the Contractor.

Wherever construction is planned to cross private property, an easement for the construction has been acquired from the property owner. The Contractor will familiarize himself with the terms of such easements, which the Owner will have on file.

Ground surface, trees, shrubbery, fences and other private property will be restored to the same condition as existed prior to the beginning of construction. This will include consolidating backfill, graveling driveways and any other leveling and landscaping required to restore the premises to original condition. The topsoil will be piled separately from subsoil material and will be replaced in the trench above the subsoil material.

Except where sodding is required, all grassed areas disturbed during the construction will be seeded following landscaping.

The Contractor will restore at his own expense streets, roads, alleys, private or public structures such as water mains, water connections and appurtenances, culverts, drain tiles, sewers, manholes, catch basins, sewer connections, curb, gutter, sidewalk, street signs, or other structures designated to remain in place which are damaged or injured in any way by his acts, and will be responsible for all damages to other utilities he may encounter.

The Contractor will not claim, or be entitled to receive, compensation for any damages sustained by reason of the inaccuracy or omission of any of the information given on the drawings relative to surface, overhead, or underground structures, or by reason of his failure to properly protect such structures.

PROTECTION OF SIDE STREETS AND HAUL ROUTES

The Contractor will be responsible for any damage of the side streets in the area and any other streets that are used as haul routes. The Contractor will discuss all haul route possibilities with the City Engineer and County Engineer prior to their use. The City Engineer, County Engineer, and the Contractor together will inspect the condition of the proposed routes before, during and after their use. The Contractor will correct any damage that is caused by the hauling activities at no cost to the Owner.

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Any dewatering necessary to construct the work will be done by the Contractor. The Contractor is responsible to determine the type and method of dewatering and to provide and implement all equipment and materials necessary to accomplish the work on this project. Discharged water from dewatering will be routed through a temporary sediment basin. Sediment trapped in the temporary basins will be removed and disposed of on-site.

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INTERFERENCE OF UNDERGROUND STRUCTURES

Existing utilities crossed by the new construction will be protected against damage, and/or replaced to original grade. Protection, temporary support and maintenance of existing utilities will be furnished by the Contractor at his own expense. The final installation will provide permanent support to prevent any settlement or movement, which may result in damage to these utilities.

Whenever existing pipe is replaced, the material of replacement will be DIP or PVC pipe of the same diameter as the original, long enough to extend at least one foot into the solid bank on either side of the excavation. The backfill under and around such pipe will be thoroughly compacted by mechanical means to preclude settlement. All connections between different types or sizes of pipe or improperly matched joint types will be encased in concrete with a minimum thickness of 6 inches.

Should it become necessary during the progress of the work to remove or relocate existing utilities or structures, the Owner will cause the same to be done at no expense to the Contractor, except as otherwise provided herein. The Contractor will notify those who maintain utilities sufficiently in advance of construction so they may make the necessary location, disclosure, relocation or other preparation. Where necessary to locate existing underground utilities, the Contractor, upon order of the Engineer, will make any required subsurface explorations and excavation, and will be allowed compensation therefore. Where relocation or reconstruction of existing utilities is impracticable, a change in line and/or grade of the new construction will be ordered, and the change will be made as directed. No deviation from the line or grade set by the Engineer will be made without his approval.

CONNECT TO EXISTING SANITARY SEWER

The Contractor will connect to the existing sanitary sewer at the locations shown on the plan. Exploratory excavation for determining the location of existing utilities and the connection to the existing sanitary sewer are incidental to the work. The Contractor will verify the connection elevation at the main is reasonably close to the elevation shown on the plan prior to beginning work. If the elevation is substantially different, the Contractor will notify the Owner and Engineer.

Where new connections are made to existing sanitary sewer manholes, the contractor will core drill the manhole wall and invert to the existing flow line, construct and shape a new invert for the new pipe, and provide a waterproof boot through the wall of the manhole for the new pipe.

SANITARY SEWER CONSTRUCTION REQUIREMENTS

1. Noise -- The Contractor will insure all equipment is properly fitted with mufflers to reduce noise to the minimum attainable to avoid creating a nuisance in the residential and business area.
2. Trench Compaction -- All trenches will be tamped using the existing material that has been excavated. Tamping will not be paid as a bid item, therefore the cost of this work will be included in the price bid for furnishing and installing the pipe.
3. Piling Excavated Materials -- Excavated material will not be piled on private property without the express permission of the owner thereof, except where easements for the sewer construction or for related work have been obtained; nor will it be piled in any location that will require backfilling machinery to operate on private property. Where excavated material is piled on private property it will be placed to cause the least possible inconvenience to the property owner. Any damage caused thereby, including damage to buildings, walls, sidewalks, driveways, trees, shrubs, lawns, or any other property, will be repaired at the expense of the Contractor. Backcasting in order to minimize disturbance is incidental to the work.
4. It will be the Contractor's responsibility to protect adjacent pipes in and around manholes to be reconstructed, and will replace any pipes damaged, cracked, or broken by the Contractor at their expense.
5. All excavations, trenching and/or jacking and boring pits will be sheeted and/or shored as per OSHA requirements. No unsheeted trench will be left open overnight.
6. Backfilling of all trenches within the limits of street excavation will comply with the provisions of MN/DOT Specification 2112 including achieving 100% compacted density in the upper three feet of subgrade (below aggregate base) and 95% below the upper three feet. Density testing will be performed as directed by the Owner to verify compaction. Trench areas that are determined by the Owner to have yielded due to improper compaction will be deemed as Unacceptable Work and will be corrected by the contractor at no additional cost.
7. Removal of former service lines. -- Service lines no longer being utilized will be removed to the main, as directed by the City. Removal and restoration of street surfacing required for the service removal is incidental.
8. RECORDS OF LATERALS: The Contractor will maintain a complete and accurate record of the location and depth of each lateral. The Contractor will make measurements from the end of each service to prominent permanent features to facilitate its location in the future. The end of each lateral will be located in plan and elevation, and a sketch made to show the plan location. These records will be turned over to the Owner.
9. Contractor shall televise all sewer main to be owned by the City.

MATERIALS FOR SANITARY SEWER CONSTRUCTION:

The project calls for the use of Poly-Vinyl Chloride (PVC). Pipe and fittings should be properly bedded and encased in accordance with the Standard Detail Sheets and Standard Specifications for Sanitary Sewer Installation. All 8" and larger sanitary sewer shall be SDR 35, pipe smaller than 8" shall be SDR 26
Bedding and encasement beneath, along the sides, and above the pipe will be Select Granular material, tamped in place. The only deviation will be in poor soil conditions, as approved by the Engineer, where foundation rock will be substituted. Pipe bedding is incidental to pipe installation. Foundation rock is incidental to pipe installation.
Joints for PVC-SDR 35, and PVC-SDR 26 gravity sewer pipe will be made using Elastomeric gaskets conforming to the requirements of ASTM D3212.
Joints in precast concrete manholes will be made using a joint compound equal to Ram-Nek or rubber gasketed conforming to ASTM C443.
All manhole castings will be equipped with solid lid covers, self-sealing, with concealed pick holes. Manhole casting will be Neenah R1772, or equal and will be labeled 'SANITARY' on casting.

CONNECT TO EXISTING WATERMAIN

The Contractor will connect to existing watermain at the locations shown on the plan. All connections to existing water main are incidental to the work. All exploratory excavation in determining the location of existing water main is incidental to the work. The Contractor will coordinate with the utility owner and be responsible for any fees due for connections.

WATERMAIN CONSTRUCTION REQUIREMENTS

1. Noise -- The Contractor will insure all equipment is properly fitted with mufflers to reduce noise to the minimum attainable to avoid creating a nuisance in the residential and business area.
2. Bedding and encasement beneath, along the sides, and above the pipe will be Select Granular material, tamped in place. The only deviation will be in poor soil conditions, as approved by the Engineer, where foundation rock will be substituted. Pipe bedding is incidental to pipe installation. Foundation rock will be paid at the unit price per ton. No payment will be made for bedding materials which, in the opinion of the Engineer, was unnecessary for proper pipe installation.
3. Trench Compaction -- All trenches will be tamped using the existing material that has been excavated. Tamping will not be paid as a bid item, therefore the cost of this work will be included in the price bid for furnishing and installing the pipe.
4. Piling Excavated Materials -- Excavated material will not be piled on private property without the express permission of the owner thereof, except where easements for the sewer construction or for related work have been obtained; nor will it be piled in any location that will require backfilling machinery to operate on private property. Where excavated material is piled on private property it will be placed to cause the least possible inconvenience to the property owner. Any damage caused thereby, including damage to buildings, walls, sidewalks, driveways, trees, shrubs, lawns, or any other property, will be repaired at the expense of the Contractor.
5. It will be the Contractor's responsibility to protect adjacent pipes in and around manholes to be reconstructed, and will replace any pipes damaged, cracked, or broken by the Contractor at their expense.
6. All excavations, trenching and/or jacking and boring pits will be sheeted and/or shored as per OSHA requirements. No unsheeted trench will be left open overnight.
7. Backfilling of all trenches within the limits of street excavation will comply with the provisions of MN/DOT Specification 2112 including achieving 100% compacted density in the upper three feet of subgrade (below aggregate base) and 95% below the upper three feet. Density testing will be performed as directed by the Engineer to verify compaction. Trench areas that are determined by the Engineer to have yielded due to improper compaction will be deemed as Unacceptable Work and will be corrected by the contractor at no additional cost.
8. The Contractor will coordinate the construction of all private and municipal utilities.
9. The Contractor will be responsible for all tapping or other fees paid to public or private utilities as work incidental to the contract.
10. RECORDS OF LATERALS: The Contractor will maintain a complete and accurate record of the location and depth of each water lateral. The Contractor will make measurements from the end of each service to prominent features to facilitate its location in the future. The end of each lateral will be located in plan and elevation, and a sketch made to show the plan location. These records will be turned over to the Owner.

MATERIALS FOR WATERMAIN CONSTRUCTION- City standards shall govern over all material specs listed below if discrepancies exist.

1. Watermain shall be DIP meeting the requirements of AWWA C-900. Pipe and fittings should be properly bedded and encased in accordance with manufacturer's requirements. Foundation rock will be used in poor soil conditions.
2. Bedding and encasement for pipe, beneath, along the sides, and above the pipe will be Select Granular material, tamped in place. The only deviation will be in poor soil conditions, as approved by the Engineer, where foundation rock will be substituted. Pipe bedding is incidental to pipe installation. All joints between pipe, fittings, valves, and hydrants will be equipped to provide electrical conductivity.
3. Gaskets will be mechanical joint rubber gaskets, unless otherwise specified.
4. Hydrants shall be Waterous Pacer WB-67-250 with 6" mechanical joint inlet and valve boxes as manufactured by American Flow Control Series 2500 or US Metro Pipe Seal with the Top marked WATER.
5. The furnishing and installing of disinfection materials to disinfect the watermains will be the responsibility of the Contractor. The City Utilities Department will assist the Contractor in flushing and testing the watermains.
6. The Contractor will use restrained joint mechanical joint flanges with mega lug retainer glands or equal on all hydrants, watermain offsets, bends, or other mechanical fittings. STAINLESS STEEL BOLTS will be required on all mechanical joints and sleeves.
7. All exposed parts of the bolts and nuts will be completely coated with an approved asphaltic type rust preventive material. Any parts of the fittings that have been scraped will also be coated with an approved asphaltic type rust preventive material. Watermain fittings will conform to ANSI Standard A21.10. All watermain fittings, hydrants and retaining rods will be protected by using sacrificial zinc anode caps such as 175P190 Protecto Caps as manufactured by Ebba Iron or an approved equal. Two caps per mechanical joint will be used.

TESTING OF WATER MAIN

Hydrostatic pressure testing of water main and services will be conducted as follows:
After the pipe has been laid, including fittings and valves and blocking, all newly laid pipe or any valved section thereof, unless directed otherwise by the Engineer, will be subject to hydrostatic pressure of 150 pounds per square inch. The duration of each such test will be at least two hours.

Each section of pipe to be tested will be filled with water and all air expelled at the highest point. The required taps to expel air or to fill the water main will be supplied and installed by the Contractor and will be 3/4 inch and will include an approved service saddle when required.

The test apparatus will be applied at the lowest elevation on the section to be tested. The apparatus will be connected to the main at a service tap or special tap location.
The pressure gauge will be a standard pressure gauge. The dial will register from 0 - 200 psi and have a dial size of 4 1/2 inches with 1-psi increments.

The hydrostatic test, pressure requirement for an acceptable test will be a maximum pressure drop of 2 psi during the last hour of the two-hour pressure test.
If this test requirement cannot be met, the Contractor will investigate the cause, make corrections, and retest until the pressure drop requirement can be met.

Only if several consecutive tests indicate a consistent pressure drop and only after the Contractor has made numerous attempts to resolve the problem, acceptable to the Engineer, may the Contractor request in writing and the Engineer consider the use of the leakage test. The leakage test may be performed by the Contractor to determine the magnitude of the leak, however, meeting the leakage allowance will not automatically be considered acceptance, in lieu of the pressure test, for the section being tested. Final acceptance will be at the discretion of the Engineer.

When allowed, the leakage test will be performed in accordance with AWWA C-600, Section 4.1.5, 4.1.6 and the line will be accepted as per Section 4.1.7.

Operational Testing will be conducted as follows:
At the completion of the project and in the presence of the Engineer and the Contractor, representatives of the Owner will operate all valves, hydrants, and water services to ascertain that the entire facility is in good working order; that all valve boxes are centered and valves are opened; that all hydrants operate and drain properly; that all curb boxes are plumb and centered; and that water is available at all curb stops.

Disinfection Testing:
Before being placed in service, the completed water main will be disinfected. Disinfection materials and procedures, and the collection and testing of water samples, will be in accordance with the provisions of AWWA C-651. After the final flushing the water will be tested for bacteriologic quality and found to meet the standards prescribed by the Minnesota Department of Health.
Samples will be taken and tested after 24 and 48 hours of disinfection. Both tests must be returned with passing results prior to approval for service.

Where an existing water main is cut for the installation of any fitting, the pipe and fittings proposed to be installed will be disinfected prior to installation as follows:

The interior of the pipe and fittings will be cleaned of all dirt and foreign material.

The interior of the pipe and fittings will be thoroughly swabbed or sprayed with a 1 percent minimum hypochlorite solution.

Unless otherwise indicated in the Plans, Specifications, and Special Provisions, the Contractor will furnish all materials and perform the disinfecting, flushing, and testing as necessary for meeting the water quality requirements.

The flushing operations and the form of chlorine and method of application to be used will be subject to approval by the Engineer.

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.

Bryan J. Johnson
Reg. No. 42144
Date: 9/20/25

JONES HAUGH SMITH
Engineers + Surveyors
515 South Washington Ave. Albert Lea, MN 507-373-4876

Consultant

Project:
MANKATO APARTMENTS

Revision:

No.:	Date: 9/20/2025
Drawn: bjj	Checked:
Project Manager:	
Project Status: CD	

Sheet Title:
SPECIFICATIONS

Sheet No.:
C10

MATERIALS FOR STORM SEWER CONSTRUCTION

1. All drainage structures with a depth of greater than 5' from top of casting elevation to bottom of structure elevation will be provided with steps.
2. Reinforced Concrete Pipe will be bedded and encased in accordance with plans and with material meeting the requirements of 2503. All RCP storm sewer pipe 15" in diameter or less will be Class 5, all other RCP storm sewer pipe will be Class 3 unless otherwise noted.
3. All PVC storm sewer will be Schedule 40 PVC, unless otherwise noted.

STORM SEWER CONSTRUCTION REQUIREMENTS

1. Unless otherwise noted, all existing drain tile encountered during the course of the work will be repaired if damaged by the work, or if the existing outlet is known to be removed or made dysfunctional, hooked up to the new storm sewer improvements. This work is incidental to the contract.
2. Where existing tile lines, sump pump lines, or other existing drainage lines are tied into RCP storm sewer lines, a hole will be created in the upper 1/3 of the side of the new storm sewer, the existing line will be inserted into the side of the new RCP to a depth of not greater than 2", geotextile fabric will be blanketed around or stuffed into the opening around the new pipe, and cement grout will be formed around the connection, so as to ensure water tightness. A maximum of 3 rings shall be used per standard plate 5043.
3. Where existing tile lines, sump pump lines, or other existing drainage lines are tied into HPDE storm sewer, fittings specifically manufactured for the connection of these lines will be used.
4. All existing drainage structures receiving new pipe will be cemented water tight around all pipes entering or exiting the structure. In addition, the inverts of all structures will be cemented so that all water entering the structure has a direct line out of the structure.
5. All new drainage structures will have integrally cast rubber boots to accept pipes and to ensure water-tightness. Worm screw stainless steel bands will be affixed to the boots to secure the pipe to the structure.
6. HDPE pipe will be installed accordance with ASTM F230

CASTING ASSEMBLIES (2506)

Casting assemblies will be of size and design noted on the plans. The work will include the cost of installing to final street surface grade on the manhole or inlet, including pavement removal and replacement if installed after paving.

Contractor will use at least two and not more than six standard adjusting rings immediately below the casting assemble which will be set in a mortar bed. Each adjusting ring will also be set in mortar. All adjusting rings will be plastered with a minimum of ½" of mortar on the interior and exterior, such that the casting is water tight from both the interior and exterior.

When bituminous paving lifts are scheduled for sequential construction seasons, castings will be set to the elevation of the non-wear course for the winter season, and then adjusted to final grade the following year. This work is incidental to construction.

Chimney Seal

Chimney seal will be furnished and installed on all sanitary manhole and ring casting assemblies. Seals will consist of rubberized sleeves or collars specially designed for covering manhole frames, rings and castings. Seals will be exterior seals with mechanical restraint as manufactured by Cretex Products or equal.

Furnish and installation of Chimney Seal is incidental to manhole castings and no additional payment will be made therefore.

Chimney Seal will not be required until final adjustment of castings at the time the final lift of bituminous paving is constructed.

ADJUST WATER VALVE BOX

This work will consist of the adjustment of all water valve boxes to conform to each grade of the bituminous pavement. This work includes multiple adjustments and is incidental to construction. If any structures are damaged by the Contractor's operations, the cost of repairs and replacement will be at the Contractor's expense. Final valve box adjustment at the final lift of paving will be by the paving contractor.

REMOVALS (2104)

Saw-cut Bituminous and/or Saw-cut Concrete

The edges of paving at the locations shown on the plan or directed as directed by the Engineer in the field will be full-depth saw-cut, typically at right angles to the faces to remain, in order to produce a clean edge of which to match the replacement paving or other surface to. Saw-cutting is incidental to the removals.

Remove Bituminous and/or Concrete Surface

After removal of bituminous or concrete surfacing in the traveled way, an aggregate surface will be provided in the removal area to the elevation of the removed materials. A minimum thickness of 6" of aggregate at the surface will be provided. This work is incidental to removals.

Disposal of Removed Materials

The removed materials will become property of the Contractor and be removed from the project site at the Contractor's expense.

Remove Storm Sewer

When existing storm sewer is designated to be removed, the existing pipe will be removed in its entirety, or crushed in its entirety and backfilled over, if directed by the Engineer.

EXCAVATION AND EMBANKMENT (2105)

1. The area designated for excavation will be excavated to sufficient depth to allow construction of the typical section shown on the plans except as otherwise directed by the Owner. The Contractor will verify to the Owner that the subgrade has been constructed to the proper elevation before base construction proceeds. The subgrade must be within 0.10' plus or minus of plan elevation before the construction is allowed to proceed. A subgrade elevation consistently above or below plan elevation will not be considered acceptable work. On average, the subgrade will be at about plan elevation.
2. Excess excavated material will be disposed of by the Contractor. Excess topsoil material will be stockpiled separately or leveled, as directed by the Owner. Stockpiling and leveling will be considered incidental to the excavation, and will not be paid for directly.
3. The contractor will salvage and stockpile suitable topsoil and surface material to the satisfaction of the Owner as necessary to provide for final seed and turf establishment and restoration. Topsoil salvage will be considered incidental to excavation and no direct compensation will be made therefore.
4. Removal of rocks, boulders, masonry or concrete within the excavated area will be considered common excavation. All roots, stumps, rubbish, rocks and other waste materials will be hauled to the nearest landfill. This work will be considered incidental to the construction and will not be paid for directly.
5. Paving sections will be required to allow construction of the typical cross-section. Embankment will be constructed in accordance with the provisions of 2105. Suitable excess excavated materials will be utilized for embankment to the fullest extent practicable. The remaining embankment material will be granular borrow conforming to the provisions of 3149.2A.
6. Site grading will be performed as required to establish plan grade. All excess becomes property of the Contractor to be disposed of off-site.
7. The Contractor will be responsible for ensuring that all areas within the limits of lot grading have a minimum of 6" of salvaged topsoil material on the final grade. It will be the Contractor's responsibility to coordinate and designate topsoil salvaging operations and stockpiling to ensure adequate topsoil is available for a 12" cover. All existing topsoil will be removed in all areas which will be filled with any material other than topsoil except that topsoil depths will not exceed two feet.
8. All borrow or salvaged excavated material to be used as embankment within the limits of paving construction will be approved by the Owner prior to placement. Embankment will comply with the provisions of Minnesota Department of Transportation Spec. 2112 including achieving 100% compacted density in the upper 3 feet of subgrade and 95% below the upper 3 feet of subgrade.
9. All natural topsoils will be removed from below all paving construction areas.
10. Suitable excavated material will be used as backfill. Embankments and boulevards not being seeded or sodded will be dragged or raked smooth prior to completion of each project.
11. Excess excavated material, excluding rocks, boulders, debris and organic material, will be the property of the Owner and will be stockpiled on site as directed by the Owner. All other excess material will be disposed of by the Contractor offsite.
12. When embankment materials are placed on existing ground with an existing slope of greater than 4:1, the embankment will be placed in accordance with 2105.3.B.
13. Where excavation is performed to the subgrade without the placing of embankment materials, the contractor will work the upper 1' of the subgrade to within 2% of optimum moisture prior to the test-rolling stated below. When the existing moisture content is greater or less than 2% of optimum, the contractor will "farm" the material to dry it, or add water and mix the materials until the subgrade reaches the desired moisture content. This work will be incidental to construction.
14. Backfill construction of concrete curb and gutter in accordance with 2531.J is incidental. The contractor will note that when this work is complete, continuous positive drainage is provided to the curb & gutter, which is defined by the MPCA as a stormwater conveyance.

TOPSOIL SALVAGE

All areas to be seeded will be finished with no less than 6 inches of topsoil salvage. This topsoil will be raked to a smooth surface free of roots, rocks and soil clumps. Topsoil salvage will be incidental to the project. All areas to receive fill material are subject to topsoil salvage. Topsoil may be placed over existing topsoil.

SUBGRADE PREPARATION (2112)

1. The provisions of 2112 will be follows and as outlined in 2112.
2. The final shaping and compacting of the subgrade will be done just prior to placing any base or surface course.
3. At the time the subgrade preparation operations have been completed, the prepared surface will be in reasonably close conformity with the cross sections shown in the Plans and the lines and grades shown on the plan.
4. Where excavation is performed to the subgrade with or without the placing of embankment materials, the contractor will work the subgrade to within 2% of optimum moisture. When the existing moisture content is greater or less than 2% of optimum, the contractor will "farm" the material to a minimum depth of 12" to dry it, or add water and mix the materials until the subgrade reaches the desired moisture content. This work will be incidental to construction.
5. The required stability will be such that when any material for base or surface courses is deposited on the subgrade, no rutting or displacement will occur.
6. The subgrade preparation prior to construction of underground utilities will not be subject to elevation tolerances.
7. Subgrade preparation is incidental to the contract

S-7 SUBGRADE COMPACTION

The subgrade when exposed will be compacted with a tamping roller, compactor or other means to not less than 100% Maximum Density and 2% Optimum Moisture. The Contractor will work the upper 1' of the subgrade to within 2% of optimum moisture during compaction. When the existing moisture content is greater or less than 2% of optimum, the contractor will "farm" the material to dry it, or add water and mix the materials until the subgrade reaches the desired moisture content. This work will be incidental to construction. Prior to placement of any stabilized base, a fully loaded dual axel dump truck will be driven over the completed sub-grade in the presence of the Contractor and Engineer present. The subgrade will be found suitable for placement when no rutting or displacment occurs. The test-rolling will be incidental to stabilized base and no specific payment will be made therefore.

S-8 SUBGRADE CORRECTION

If after substantial efforts by the contractor to correct the moisture content of the subgrade and re-compact the materials, the subgrade displays evidence of rutting or yielding prior to, during, or after this compactive effort, additional material will be excavated as directed by the Owner to the depth required to provide a stable foundation for the base material. Suitable material removed during excavation will be utilized for subgrade correction. This work will not be paid as Extra Work if it was or would have been, or could have been performed as part of any other grading activity.

STABILIZED BASE CONSTRUCTION (2211)

This work will consist of the excavation and embankment of existing subgrade and surface materials, and the construction of aggregate base.

1. Aggregate base will be either MnDOT Class 2 or Class 5, at the Contractor's option. Class 7 recycled base is acceptable where alllowed in the MnDOT standard specifictations.
2. Any damage by the Contractor's operations to any existing improvements which have not been designated for removal or disturbance will be repaired at the expense of the Contractor.
3. AGGREGATE: Aggregate for the purposes required by this contract will be furnished by the Contractor from sources selected by him.
4. AGGREGATE BASE: Aggregate base, will be constructed in accordance with the provisions of 2211. Aggregate will conform to the requirements of 3138.
5. Compaction will be obtained by the Modified Penetration Index Method modified as follows: The Owner will hire an independent testing laboratory to perform density and moisture testing. Moisture tests will be performed with each density test. Tests will be performed in accordance with the Materials Testing Section above. Penetration and moisture content testing will be performed along with to the density tests. No payment will be made for work tested that fail to meet the specified density. The Contractor will be responsible for any additional tests due to the failure of work. Water will be applied to the base material during mixing, spreading and compaction operations for proper compaction and will be considered incidental work.
6. Test rolling will be performed on the aggregate base in the presence of the Owner's testing subconsultant. Test rolling will be as specified in Mn/DOT specification 2111 except that the test will be performed with a fully loaded tandem axel dump truck in lieu of the test roller. The Owner may delete the requirement for test-rolling on all or portions of the stabilized base, at his discretion, after consultation with the Contractor.
7. Furnish and install Aggregate Base, Class 5 meeting MN/DOT Specification No. 3138 under all concrete or bituminous pavements and a minimum of 2 inches of Aggregate Base, Class 5 under all curb and curb and gutter.

MAINTENANCE OF COMPLETED BASE

After completion of any part of the base, such base will be maintained in a dust free condition. It will be the Contractor's responsibility to repair at his expense all prepared and shaped surfaces until project is complete. Any water applied to keep the base dampened or reshaped will be at the Contractor's expense. The Contractor will maintain the completed aggregate base after rain events, and replace and recompact any eroded aggregate as work incidental to the contract. Maintenance of completed base is incidental to construction.

APPLICATION OF WATER (2130)

Application of water will be in accordance with the provisions of 2130 except as herein modified. No direct compensation will be made for water used in conjunction with the mixing, placing and compacting operations for base construction. The contractor is responsible for application of water for dust control in accordance with Mn/DOT 1717 and with the NPDES permit. Application of water for dust control is incidental to the work and no additional payment will be made therefore.

CONCRETE PAVEMENT (2301)

Jointed Type 3 Grade A Plain Concrete Pavement will be placed in accordance with the Mn/DOT standard specifications except as modified herein. Loading dock pavement will be reinforced.

The mix designs for concrete paving for this project are:
- Standard Paving - 3A41
- High Early Strength (if directed by Owner) - 3A41HE
- Flexural strength at 28 days will be 750 psi.
- Compressive strength at 28 days will be per the mix designations above.

High Early concrete areas will remain closed to traffic for 3 days or until they have achieved a flexural strength of 450 psi, whichever is shorter.

Concrete will be supplied from a Mn/DOT certified producer. The Contractor will be responsible for supplying the mix designs. The Contractor will provide the Engineer with the mix designs a minimum of 24 hours prior to the first pour.

Concrete will be cured by the use of membrane curing compound meeting the requirements of MnDOT 3754 AMS.

All joint sealant will conform to 3723, Concrete Joint and Crack Sealer (Hot-Poured Elastic Type) sealant.

Transverse metal-tine finishing will not be required.

The location of transverse joints may be adjusted in the field by the Engineer. An increase in the number of transverse joints of up to five percent (5%) compared to the number shown on the plans will be incidental.

All coarse aggregate for concrete pavement will meet the gradation requirements of MnDOT 3137 CA-50.

BITUMINOUS TACK COAT (2357)

Treating existing bituminous or concrete surfaces preparatory to placing a bituminous course thereon will be performed in accordance with the provisions of MN/DOT 2357 and the following:

A bituminous tack coat consisting of emulsified asphalt will be applied between all bituminous surfaces. A tack coat will be placed on the existing pavement prior to placing the next layer of bituminous and the edges of concrete pavement and curb and gutter that will come into contact with the new bituminous will be tacked. All surfaces will be cleaned of all dirt, debris and loose material prior to the application of the bituminous tack coat.

PLANT MIXED ASPHALT PAVEMENT (2350/2360)

Plant mixed asphalt pavement density will be constructed in accordance with Mn/DOT specification 2360, as published by Mn/DOT at the time of bid.After placement of the base course of bituminous paving at the bus parking area and car parking area, the Contractor will flood the work area with water to identify possible "bird bath" locations where the pavement has not been placed at enough grade to ensure proper drainage. Prior to or during placment of the wear course, the Contractor will ensure that these areas are graded to properly drain.

CONCRETE MIX FOR CURB & GUTTER, WALKS, & DRIVEWAYS (2461)

Concrete for this Contract will be as follows and as outlined in 2461:
The concrete mix number to be used for slip form curb and gutter will be 3A22. The concrete mix number for hand formed curb and gutter, sidewalks, and driveways will be 3A32.

	Minnesota Highway Designation	Minnesota Highway Designation
Mix Number	3A32B	3A22B
Type of Concrete	Type 3 (Air Entrained)	Type 3 (Air Entrained)
Grade	Grade A	Grade A
28 Day Strength	27 Mpa (3900 psi)	27 Mpa (3900 psi)
Slump	50 mm to 75 mm (2" to 3")	25 mm to 50 mm (1" to 2")
Coarse Aggregate Composition	100% Class "B"	100% Class "B"
Gradation of Coarse Aggregate	CA25 or CA50 For Structural Concrete	CA25 or CA50 For Structural Concrete

Concrete will be supplied from a Mn/DOT certified producer. The Contractor will supply the mix designs. The Contractor will provide the Engineer with the mix design a minimum of 24 hours prior to the first pour.

WALKS (2521)

Concrete sidewalks will be constructed in accordance with 2521 and Standard Plate 7035M. Preformed joint filler material will be placed in accordance with Standard Plate 7035M. Concrete sidewalks will be mix design 3A32 with a maximum slump of 3". No water will be added to the mix to reduce the slump beyond 3" for temporary workability, as stated in 2461.B3. Colored concrete shall be as manufactured by Scofield with coloring as determined by the Landscape Plan.

CONCRETE CURING AND PROTECTION (2521, 2531)

All sidewalk, driveway, curb and gutter will be cured using a membrane curing compound conforming to the requirement of Minnesota Highway Department #3754. For concrete curb and gutter poured after October 1st, blanket or extreme service membrane methods of curing will be substituted for membrane curing, in accordance with 2531.

EXTREME TEMPERATURE CONCRETE

The following additional measures will be required for extreme temperature concrete construction, as work incidental to the contract:

Hot Weather Concrete Construction
1. Do not place concrete with a placing temperature that will cause difficulty from loss of slump, flash set, or cold joints.
2. Maintain a concrete temperature during placement of less than 90 degrees F.
3. Use all means necessary to avoid drying the concrete prior to the completion of finishing operations.
4. Provide and use windbreaks, sunshades, fog sprays, and other devices to protect the concrete.

Cold Weather Concrete Construction
1. Provide adequate protection when temperatures are 40 degrees F or lower occur durin ghte placing and early curing periods.
2. Comply with all pertinent recommendations of ACI 306 (Recommended Practice for Cold Weather Concreting).
3. Type IIIA cement may be used.
4. The use of Calcium Chloride or other accelerators will not be permitted.
5. Maintain a concrete temperature during placement of more than 60 degrees F.
6. Use all means necessary to avoid exposure of concrete to freezing temperatures during placement, finishing, and curing.
7. Concrete will not be placed on a frozen subgrade.
8. Provide and maintain heated enclosures, insulating blankets, tarpaulins, heaters, fuel, and all other protective equipment required.
9. Maintain favorable curing temperature at all times until the concrete gains sufficient strength to withstand exposure to low temperature and applied loads.

CONCRETE CURBING & GUTTER (2531)

Concrete curb and gutter will be constructed in accordance with the provisions of 2531 and the following: Curing will be by the Membrane Curing Method as specified in 2531.3G (2). The sealing of joints in concrete curb and gutter will not be required.

Construction joints in curb and gutter will be installed at 10-foot intervals. Preformed joint filler material (1/2-inch) will be place at the ends of all street returns, at the ends of concrete driveway approaches, and in accordance with MN/Dot Standard Plate 7035N.

Concrete curb and gutter will be the style shown on the plans.

PEDESTRIAN CURB RAMPS (2531)

Unless otherwise dome sections will be red.

STORM WATER MANAGEMENT (2573)

The Stormwater Pollution Prevention Plan (SWPPP) required by the NPDES permit has been provided by the Owner and is incorporated into the plans and specifications.

The Minnesota Department of Transportation's Specification 2573 - Stormwater Management is hereby modified as follows:

1. The Contractor will apply for and comply with the provisions of the NPDES permit and the SWPPP (Stormwater Pollution Prevention Plan).
2. The Stormwater Pollution Prevention Plan provided by the Owner is meant and provided as a guide in the provision of Erosion and Sediment Control (ESC) Best Management Practices (BMP's) as required by the NPDES permit. The SWPPP is based on finish grade contours. Additional ESC measures, although not shown by the plan, may be required to comply with the provisions of the NPDES permit. Provision and maintenance of the ESC BMP's in accordance with the NPDES permit is the responsibility of the contractor, regardless of what is shown on the SWPPP. Interim ESC BMP's and updating of the SWPPP are the responsibility of the contractor. Maintenance of the ESC BMP's is incidental to the work and will be performed in accordance with 2573.M.
3. When updates to the SWPPP are required, the Contractor will provide the Engineer with sketches of the updated areas, so that the Engineer can update the SWPPP.
4. No additional payment will be made for additional ESC BMP's required by the NPDES permit but not shown on the SWPPP.
5. The contractor will obtain the NPDES permit from the MPCA and pay any applicable fees as work incidental to the contract. The contractor will remain named on the NPDES permit until the warranty period expires, at which time he/she may submit an NPDES Permit Modification/Transfer Form to the Owner for completion and submission to the MPCA.
6. The contractor will maintain the NPDES site inspection log.
7. The contractor will be responsible for all fines imposed by regulating agencies for failure to comply with the provisions of the NPDES permit.
8. If the Engineer determines that ESC BMP's have failed or require maintenance, the Contractor will correct the cause of failure, maintain the BMP's, and alleviate all sediment deposition outside the construction limits, to the fullest extent possible. If the Contractor fails to install or maintain erosion or sediment control measures required by the NPDES permit, fails to conduct required inspections, or fails to take action ordered by the Engineer to correct ESC problems, the Engineer will issue a written order to the Contractor. The Contractor will respond within 24 hours with sufficient personnel, equipment, and/or materials and conduct the required work or be subject to a $500 per calendar day penalty for noncompliance. In addition, the Engineer may recommend that the Owner withhold payment from all work until the ESC BMP's are constructed or maintained.
9. The Engineer may require the Contractor to submit a site plan for certain portions of the work detailing proposed ESC BMP's, and a schedule indicating start and completion dates. The Contractor will not start work within these areas until the Engineer has accepted the site plan and schedule. No additional payment will be made for preparation of site plans required by the Engineer, or reasonable delays or production losses caused by this requirement.
10. Sediment removal required due to the failures to implement or maintain ESC BMP's will not be considered Extra Work. The Contractor will remove all sediment from areas accrued due to actions or inactions by the Contractor, at no cost to the Owner
11. The Contractor will designate a concrete washout area on-site and inform the Engineer of the chosen location at the pre-construction meeting. This area must be constructed so that it drains towards itself. Concrete debris will be removed from the concrete washout and removed from the site prior to final acceptance.

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

Brian J. Johnson
Reg. No. 42744
Date: 9/20/25

Consultant:
JONES HAUGH SMITH
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515 South Washington Ave. Albert Lea, MN 507-373-4876

Project:
MANKATO APARTMENTS

Revision:

No.: | Date: 9/20/2025
Drawn: bjj | Checked:
Project Manager:
Project Status: CD

Sheet Title:
SPECIFICATIONS

Sheet No.:
C11

STADIUM DRIVE

NORTHERLY-MOST CORNER OF PARCEL F

NORTHWESTERLY LINE OF PARCEL F

(M)144.64
(P)144.78

NORTHEASTERLY LINE OF PARCEL F

S74°25'06"E
229.24

PARCEL F

BLUE EARTH COUNTY HWY R/W PLAT NO. 29

R=388.00
Δ=30°01'57"
CD=201.06
CB=S85°25'04"W
L=203.38

S70°24'06"W
66.00

A CORNER OF PARCEL F

SOUTHWESTERLY R/W LINE OF STADIUM DRIVE

WET LAND

412.72

183.48

AREA B=1.12 ACRES

AREA C=0.66 ACRES

AREA A=1.80 ACRES

AREA D=0.68 ACRES

WEST WETLAND

EAST WETLAND

WESTERLY-MOST CORNER OF PARCEL F

N31°58'23"W

NORTHEASTERLY R/W LINE OF VICTORY DRIVE

VICTORY DRIVE

W1/2 E1/2 NW1/4 SECTION 21-T108N-R26W

WEST LINE OF AUDITOR'S PLAT NO. 67

EAST LINE OF THE W1/2 E1/2 NW1/4 SECTION 21-T108N-R26W

S00°53'28"E

EXISTING WATERSHED DIVIDE LINE TYP.

A CORNER OF STANLEY'S SUBDIVISION
Fd. SPINDLE

SW CORNER LOT 6
Fd. ½" PIPE CAPPED

NORTHWESTERLY LINE OF STANLEY'S SUBDIVISION

30' WIDE DRIVEWAY EASEMENT (DOC. #314081, Bk.246, Pg.425)

S81°02'14"W
201.51

NW CORNER OF STANLEY'S SUBDIVISION
Fd. 1/2" PIPE
POINT OF BEGINNING

1"=30'
30 0 30
HORIZ. SCALE FEET

Consultant:

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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.

Brian J. Johnson
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Date: 9/20/25

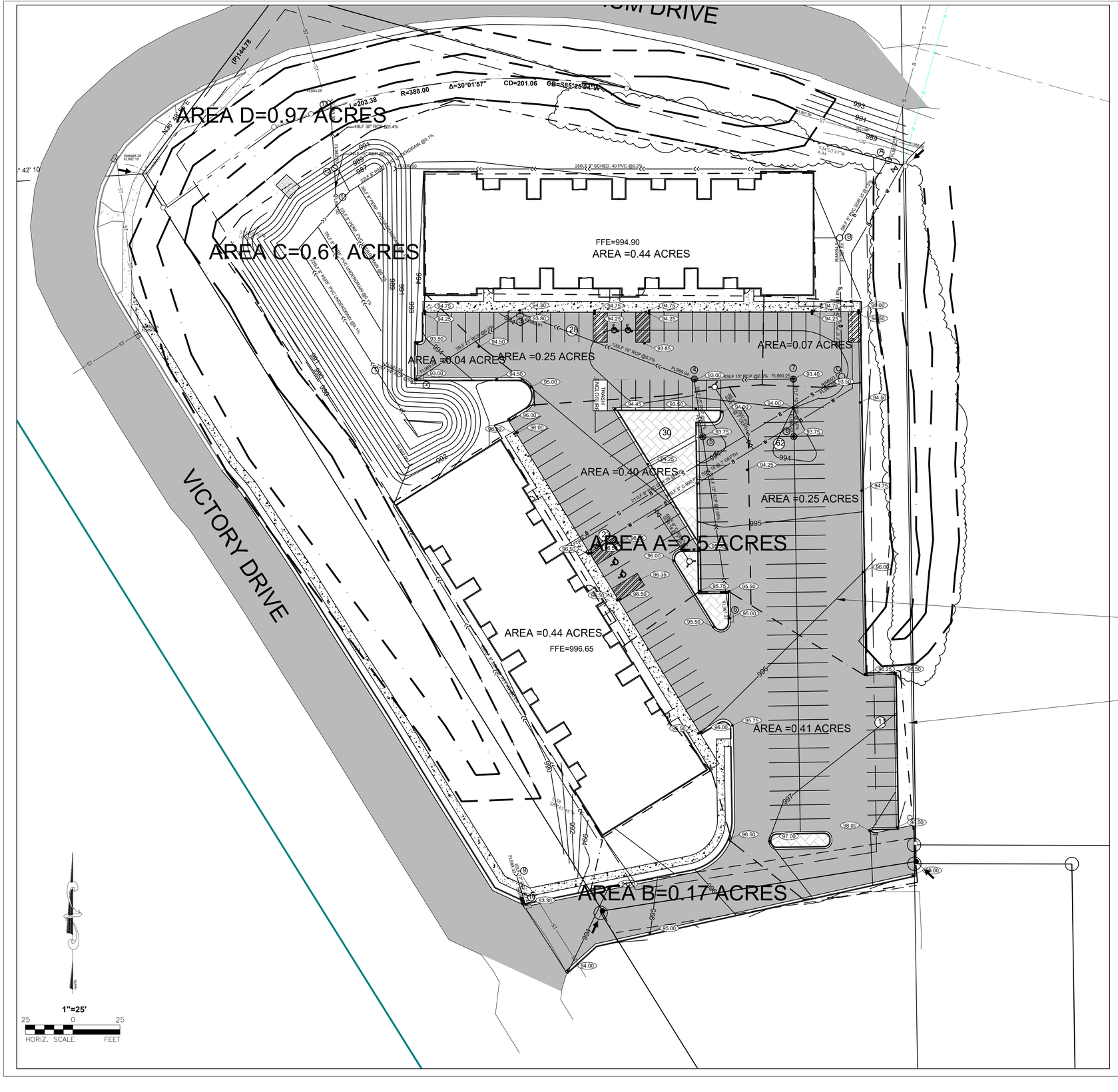
Project:
MANKATO APARTMENTS

Revision:

No.: 25-188 Date: 9/20/2025
Drawn: bjj Checked:
Project Manager:
Project Status: CD

Sheet Title:
EXISTING WATERSHED DRAINAGE MAP

Sheet No.:
EX 1



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

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MANKATO APARTMENTS

Revision:

No.:	Date: 9/20/2025
Drawn: bjj	Checked:

Project Manager:

Project Status: CD

Sheet Title:

PROPOSED WATERSHED DRAINAGE MAP

Sheet No.:

EX 2

Mankato Apartments
901 Victory Drive
Hydrologic Summary Table

TABLE 1.2.A - HYDROLOGIC SUMMARY - OFF SITE RUN OFF

OFF SITE DISCHARGE	AREA (ac)		CN/C VALUES		Tc (min.)	2 YEAR (cfs)		10 YEAR (cfs)		100 YEAR (cfs)	
	EXISTING	PROPOSED	EXISTING	PROPOSED	Existing/Proposed	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
VICTORY DRIVE DITCH	4.25	4.25	84.35	91.34	4.4/4.4	15.19	4.36	27.26	11.71	52.57	37.63
Total Offsite Discharge	4.25	4.25				15.19	2.27	27.26	12.80	52.57	38.73

TABLE 1.2.B - HYDROLOGIC SUMMARY - ON SITE RUN OFF

ON SITE DISCHARGE	AREA (ac)		CN/C VALUES		Tc (min.)	2 YEAR (cfs)		10 YEAR (cfs)		100 YEAR (cfs)	
	EXISTING	PROPOSED	EXISTING	PROPOSED	Existing/Proposed	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
SUBCATCHMENT A	1.8	2.5	81	98	4.4/3.5	5.31	14.37	10.26	21.64	20.93	36.48
SUBCATCHMENT B	1.12	0.17	90	93	4.4/1.5	4.93	0.91	8.19	1.44	14.81	2.52
SUBCATCHMENT C	0.66	0.61	84	80	1.5/1.2	2.92	1.95	5.03	3.71	9.18	7.65
SUBCATCHMENT D	0.68	0.97	83	81	1.5/1.2	2.47	3.26	4.53	6.09	8.67	12.38

MANKATO APARTMENTS
PROPOSED PIPE CAPACITIES
MANKATO, MN

RATIONAL METHOD DESIGN

DESIGN FREQUENCY = 10 YR STORM

STRUCTURE LOCATION		RUNOFF COMPUTATION							SEWER DESIGN							
FROM	TO	AREA (acres)	C	AxC	SUM of AxC	Tc (min)	I (in/hr)	Q (cfs)	SIZE (in)	LENGTH (ft)	SLOPE (%)	CAPACITY (cfs)	Full Vel. (fps)	Pipe Time (min)	CONCLUSION	% CAPACITY
6	5	0.41	0.95	0.41	0.41	2.00	4.20	1.72	12	117	*1.00*	3.85	4.90	0.40	OKAY	44.7
5	4	0.40	0.95	0.38	0.79	2.40	4.20	3.32	15	36	*0.50*	4.94	4.03	0.15	OKAY	67.1
8	7	0.27	0.95	0.26	0.26	2.00	4.20	1.08	12	37	*1.00*	3.85	4.90	0.13	OKAY	28.0
7	4	0.07	0.95	0.07	0.32	2.13	4.20	1.36	15	63	*0.50*	4.94	4.03	0.26	OKAY	27.4
4	3	1.39	0.95	1.32	1.32	5.00	4.20	5.55	18	120	*0.30*	6.23	3.53	0.57	OKAY	89.0
3	2	0.04	0.95	0.04	1.36	5.57	4.20	5.71	21	78	*0.30*	9.40	3.91	0.33	OKAY	60.7
2	1	0.00	0.95	0.00	1.36	5.90	4.20	5.71	24	27	9.40	75.18	23.93	0.02	OKAY	7.6

Project Information

Calculator Version:	Version 4: July 2020
Project Name:	Mankato Apartments Existing
User Name / Company Name:	Jones, Haugh & Smith Inc
Date:	6/25/2025
Project Description:	Mankato Apartments
Construction Permit?:	Yes

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	56001
Annual Rainfall (inches):	30.7
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land				0	0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed				2.74	2.74
			Impervious Area (acres)		1.26
				Total Area (acres)	4

Site Areas Routed to BMPs

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

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	5031	ft3
Volume removed by BMPs towards performance goal:		ft³
Percent volume removed towards performance goal		**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	4.3333	acre-ft
Annual runoff volume removed by BMPs:		acre-ft
Percent annual runoff volume removed:		**%**
Post development annual particulate P load:	1.9448	lbs
Annual particulate P removed by BMPs:		lbs
Post development annual dissolved P load:	1.591	lbs
Annual dissolved P removed by BMPs:	0	lbs
Total P removed by BMPs	0	lbs
Percent annual total phosphorus removed:		**%**
Post development annual TSS load:	642.4	lbs
Annual TSS removed by BMPs:		lbs
Percent annual TSS removed:		**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained

Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained

BMP Schematic

Project Information

Calculator Version:	Version 4: July 2020
Project Name:	901 Victory Drive Apartments
User Name / Company Name:	JHS
Date:	11 9 2025
Project Description:	Mankato Apartments
Construction Permit?:	Yes

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	56001
Annual Rainfall (inches):	30.7
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed				1.74	1.74
				Impervious Area (acres)	2.62
				Total Area (acres)	4.36

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed				0.61	0.61
				Impervious Area (acres)	2.5
				Total Area (acres)	3.11

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	10462	ft3
Volume removed by BMPs towards performance goal:	230	ft³
Percent volume removed towards performance goal	**2**	**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	6.7325	acre-ft
Annual runoff volume removed by BMPs:	0.1429	acre-ft
Percent annual runoff volume removed:	**2**	**%**
Post development annual particulate P load:	3.0216	lbs
Annual particulate P removed by BMPs:	2.102	lbs
Post development annual dissolved P load:	2.472	lbs
Annual dissolved P removed by BMPs:	1.303	lbs
Total P removed by BMPs	3.405	lbs
Percent annual total phosphorus removed:	**62**	**%**
Post development annual TSS load:	998	lbs
Annual TSS removed by BMPs:	694.4	lbs
Percent annual TSS removed:	**70**	**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained
1 - Bioretention basin (with underdrain)	230	9982	230	9752	2

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
1 - Bioretention basin (with underdrain)	5.8196	0	0.1429	5.6767	2

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained
1 - Bioretention basin (with underdrain)	2.6118	0	2.1023	0.5095	80

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained
1 - Bioretention basin (with underdrain)	2.1369	0	1.3031	0.8338	61

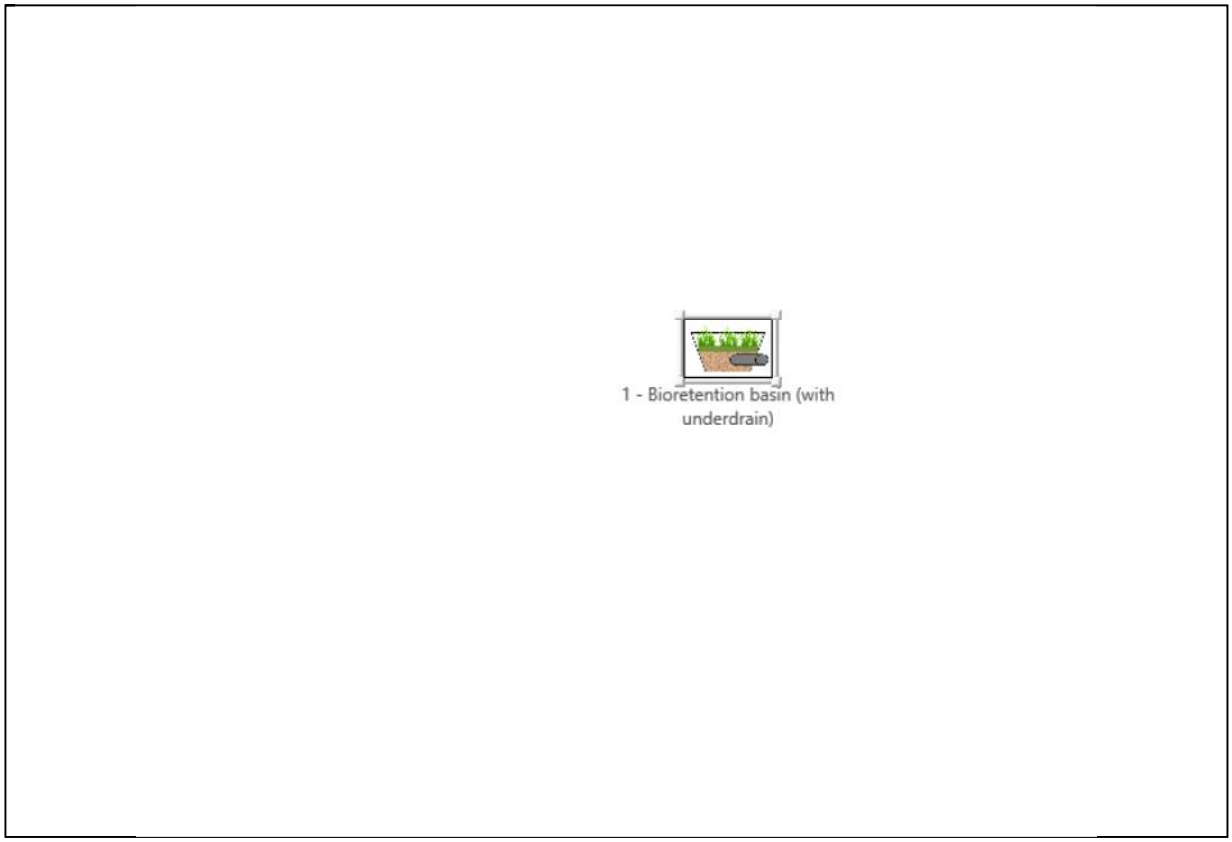
Total Phosphorus Summary

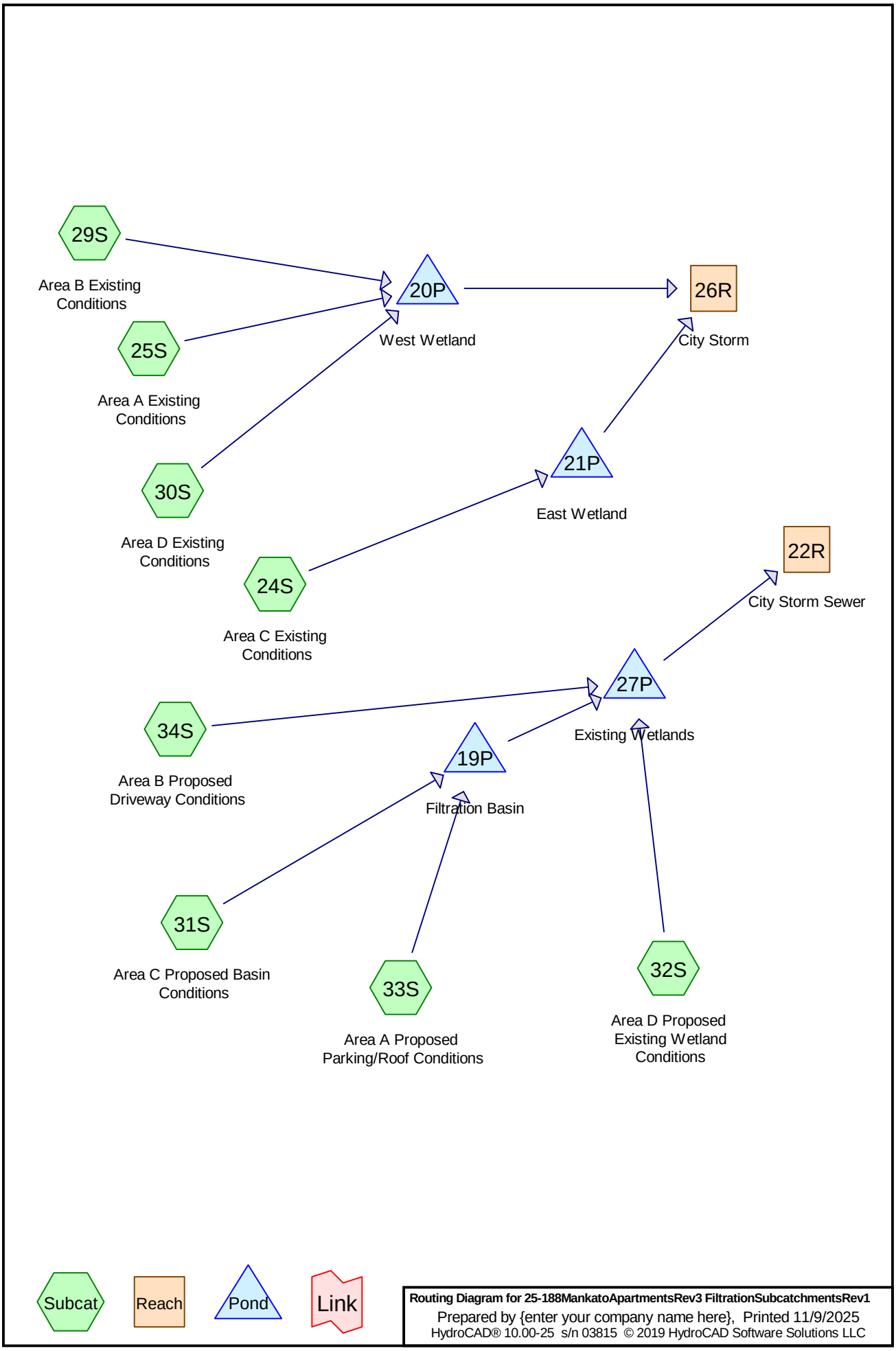
BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained
1 - Bioretention basin (with underdrain)	4.7487	0	3.4054	1.3433	70

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained
1 - Bioretention basin (with underdrain)	862.69	0	694.39	168.3	80

BMP Schematic





Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.550	80	>75% Grass cover, Good, HSG D (24S, 25S, 29S, 30S, 31S, 32S, 34S)
1.010	96	Gravel surface, HSG D (24S, 29S)
2.930	98	Paved parking, HSG D (25S, 30S, 32S, 33S, 34S)
8.490	**88**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
8.490	HSG D	24S, 25S, 29S, 30S, 31S, 32S, 33S, 34S
0.000	Other	
8.490		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	4.550	0.000	4.550	>75% Grass cover, Good	24S, 25S, 29S, 30S, 31S, 32S, 34S
0.000	0.000	0.000	1.010	0.000	1.010	Gravel surface	24S, 29S
0.000	0.000	0.000	2.930	0.000	2.930	Paved parking	25S, 30S, 32S, 33S, 34S
0.000	**0.000**	**0.000**	**8.490**	**0.000**	**8.490**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	19P	983.50	983.30	49.0	0.0041	0.012	30.0	0.0	0.0
2	19P	987.50	987.00	20.0	0.0250	0.013	15.0	0.0	0.0

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 24S: Area C Existing Runoff Area=0.660 ac 0.00% Impervious Runoff Depth=1.63"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=87 Runoff=2.92 cfs 0.089 af

Subcatchment 25S: Area A Existing Runoff Area=1.800 ac 7.78% Impervious Runoff Depth=1.21"
Flow Length=600' Slope=0.0200 '/' Tc=4.4 min CN=81 Runoff=5.31 cfs 0.182 af

Subcatchment 29S: Area B Existing Runoff Area=1.120 ac 0.00% Impervious Runoff Depth=1.87"
Flow Length=600' Slope=0.0200 '/' Tc=4.4 min CN=90 Runoff=4.93 cfs 0.174 af

Subcatchment 30S: Area D Existing Runoff Area=0.660 ac 15.15% Impervious Runoff Depth=1.34"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=83 Runoff=2.47 cfs 0.074 af

Subcatchment 31S: Area C Proposed Basin Runoff Area=0.610 ac 0.00% Impervious Runoff Depth=1.15"
Flow Length=200' Slope=0.0200 '/' Tc=1.2 min CN=80 Runoff=1.95 cfs 0.059 af

Subcatchment 32S: Area D Proposed Runoff Area=0.970 ac 7.22% Impervious Runoff Depth=1.21"
Flow Length=200' Slope=0.0200 '/' Tc=1.2 min CN=81 Runoff=3.26 cfs 0.098 af

Subcatchment 33S: Area A Proposed Runoff Area=2.500 ac 100.00% Impervious Runoff Depth=2.64"
Flow Length=600' Slope=0.0200 '/' Tc=3.5 min CN=98 Runoff=14.37 cfs 0.550 af

Subcatchment 34S: Area B Proposed Runoff Area=0.170 ac 70.59% Impervious Runoff Depth=2.13"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=93 Runoff=0.91 cfs 0.030 af

Reach 22R: City Storm Sewer Inflow=4.36 cfs 0.436 af
Outflow=4.36 cfs 0.436 af

Reach 26R: City Storm Inflow=15.19 cfs 0.520 af
Outflow=15.19 cfs 0.520 af

Pond 19P: Filtration Basin Peak Elev=989.01' Storage=0.397 af Inflow=16.25 cfs 0.608 af
Discarded=0.07 cfs 0.170 af Primary=1.88 cfs 0.308 af Outflow=1.95 cfs 0.477 af

Pond 20P: West Wetland Inflow=12.46 cfs 0.430 af
Primary=12.46 cfs 0.430 af

Pond 21P: East Wetland Inflow=2.92 cfs 0.089 af
Primary=2.92 cfs 0.089 af

Pond 27P: Existing Wetlands Inflow=4.36 cfs 0.436 af
Primary=4.36 cfs 0.436 af

Total Runoff Area = 8.490 ac Runoff Volume = 1.256 af Average Runoff Depth = 1.78"
65.49% Pervious = 5.560 ac 34.51% Impervious = 2.930 ac

Summary for Subcatchment 24S: Area C Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

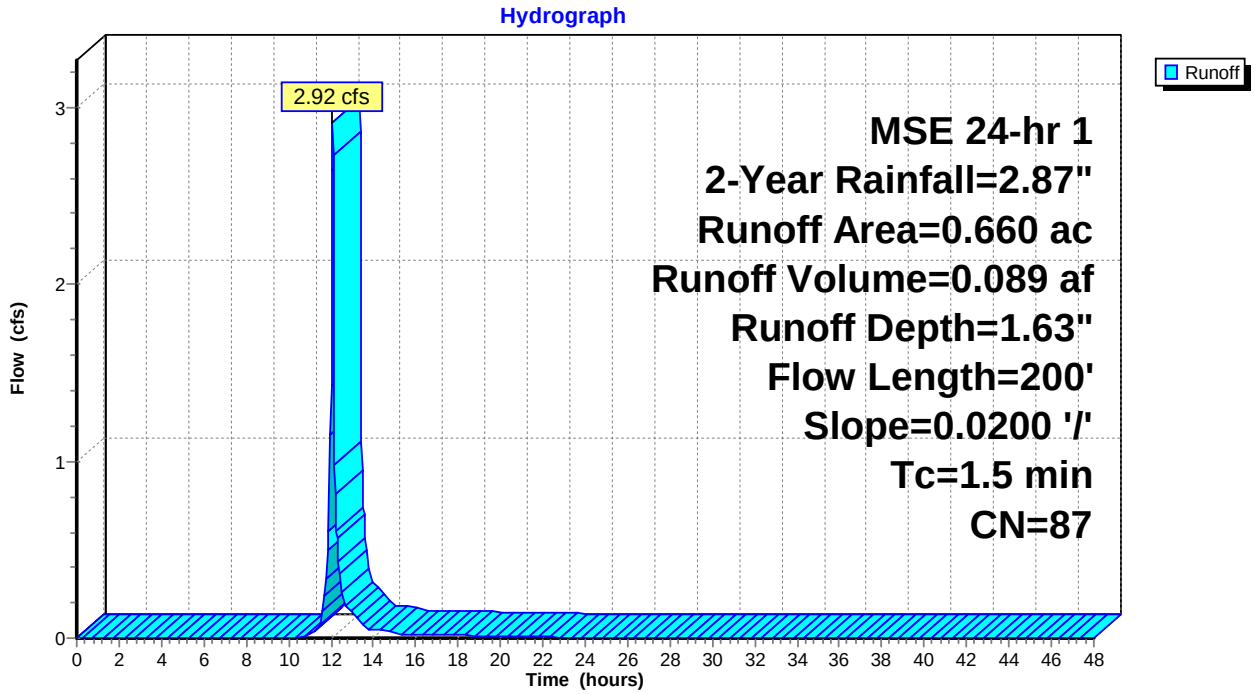
Runoff = 2.92 cfs @ 12.08 hrs, Volume= 0.089 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 2-Year Rainfall=2.87"

Area (ac)	CN	Description
0.360	80	>75% Grass cover, Good, HSG D
0.300	96	Gravel surface, HSG D
0.660	87	Weighted Average
0.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 24S: Area C Existing Conditions



Summary for Subcatchment 25S: Area A Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

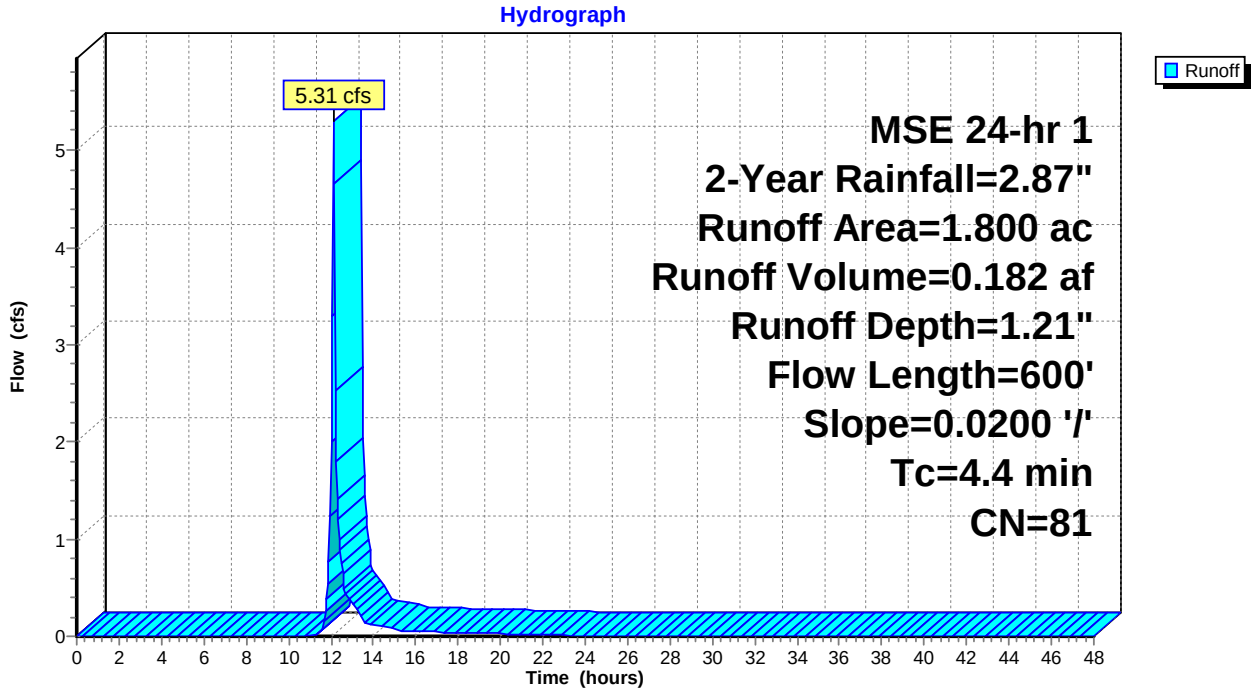
Runoff = 5.31 cfs @ 12.11 hrs, Volume= 0.182 af, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 2-Year Rainfall=2.87"

Area (ac)	CN	Description
1.660	80	>75% Grass cover, Good, HSG D
0.140	98	Paved parking, HSG D
1.800	81	Weighted Average
1.660		92.22% Pervious Area
0.140		7.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	600	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 25S: Area A Existing Conditions



Summary for Subcatchment 29S: Area B Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

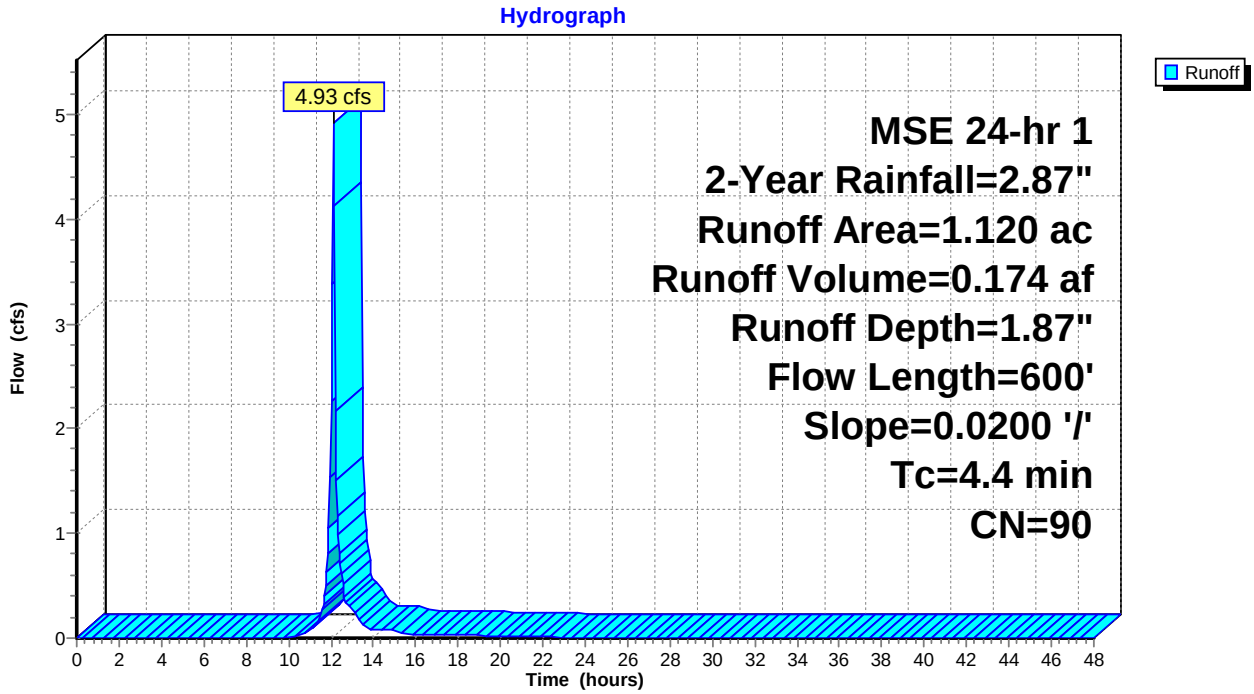
Runoff = 4.93 cfs @ 12.11 hrs, Volume= 0.174 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 2-Year Rainfall=2.87"

Area (ac)	CN	Description
0.410	80	>75% Grass cover, Good, HSG D
0.710	96	Gravel surface, HSG D
1.120	90	Weighted Average
1.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	600	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 29S: Area B Existing Conditions



Summary for Subcatchment 30S: Area D Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

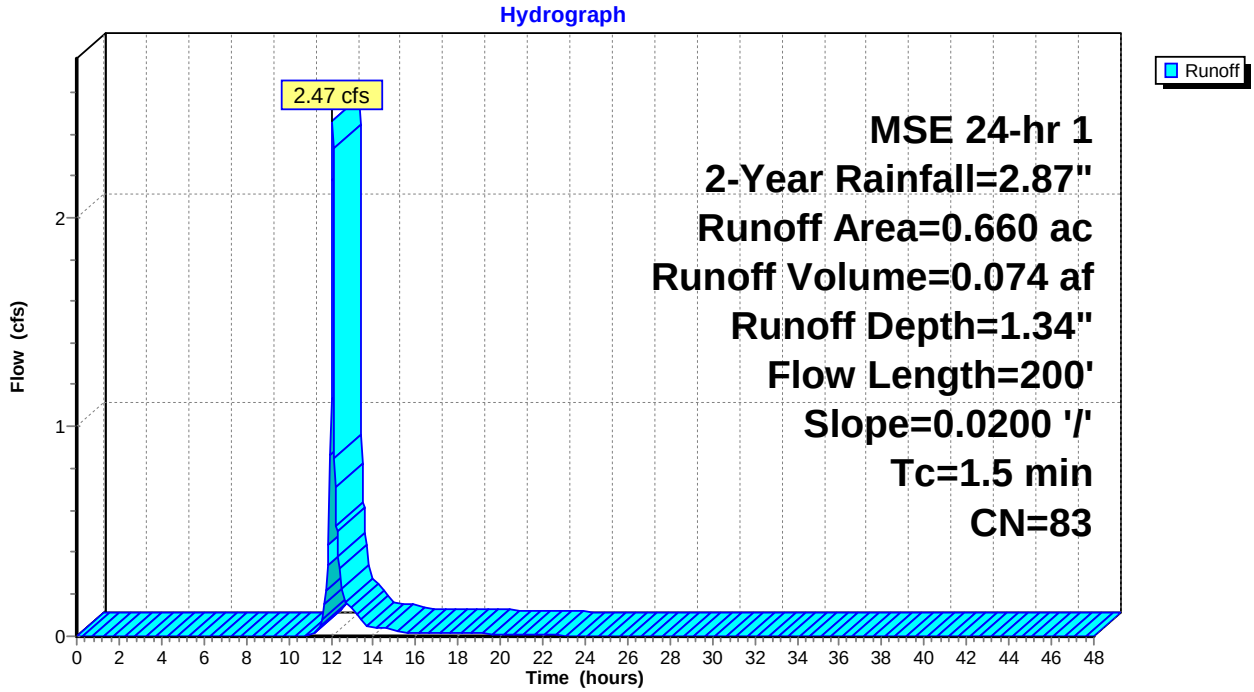
Runoff = 2.47 cfs @ 12.08 hrs, Volume= 0.074 af, Depth= 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 2-Year Rainfall=2.87"

Area (ac)	CN	Description
0.560	80	>75% Grass cover, Good, HSG D
0.100	98	Paved parking, HSG D
0.660	83	Weighted Average
0.560		84.85% Pervious Area
0.100		15.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 30S: Area D Existing Conditions



Summary for Subcatchment 31S: Area C Proposed Basin Conditions

[49] Hint: Tc<2dt may require smaller dt

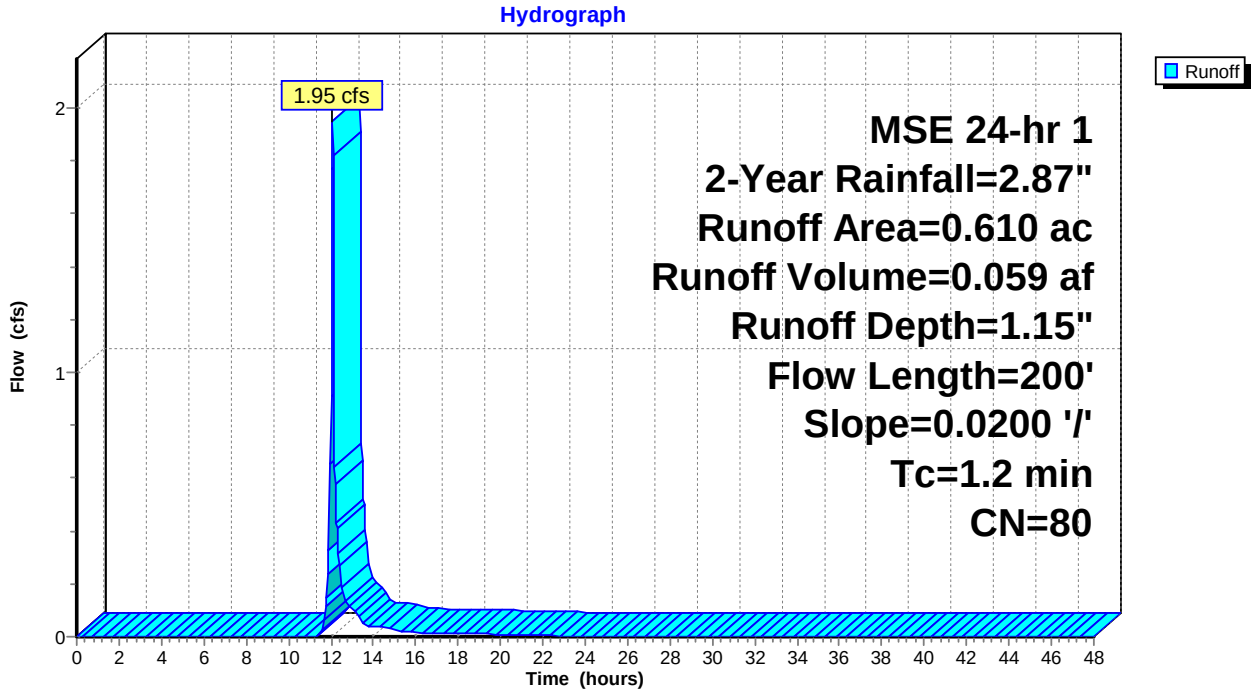
Runoff = 1.95 cfs @ 12.08 hrs, Volume= 0.059 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 2-Year Rainfall=2.87"

Area (ac)	CN	Description
0.610	80	>75% Grass cover, Good, HSG D
0.610		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	200	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 31S: Area C Proposed Basin Conditions



Summary for Subcatchment 32S: Area D Proposed Existing Wetland Conditions

[49] Hint: Tc<2dt may require smaller dt

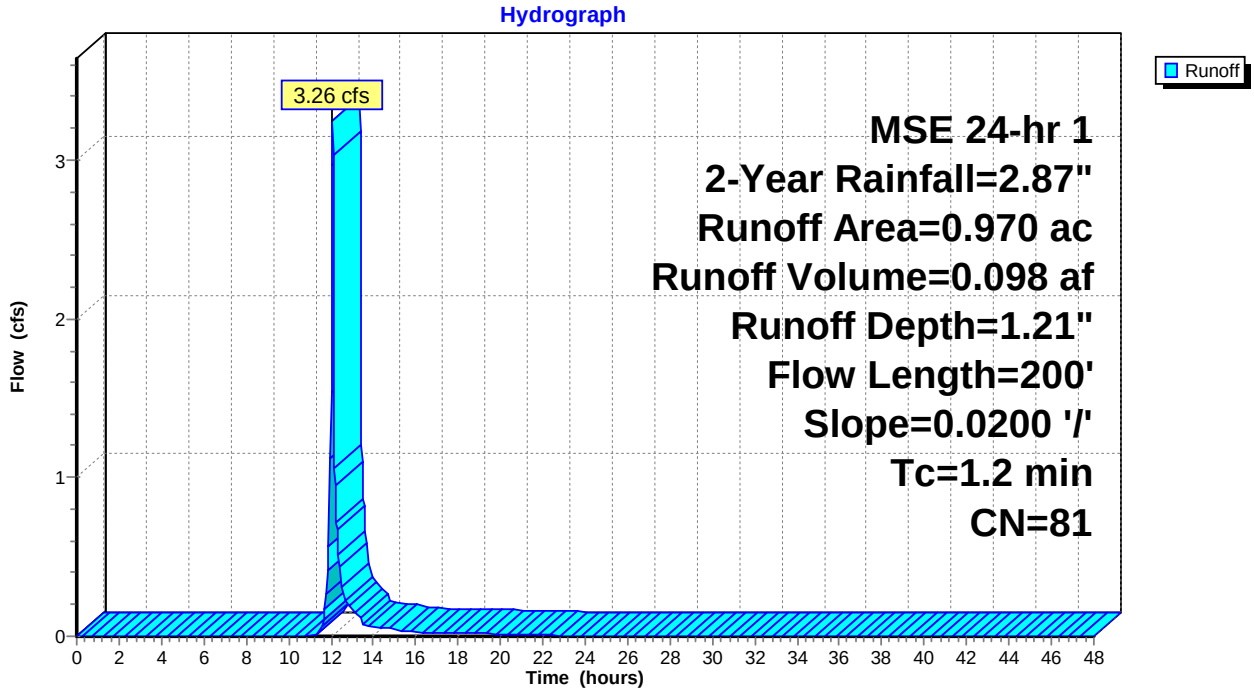
Runoff = 3.26 cfs @ 12.08 hrs, Volume= 0.098 af, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 2-Year Rainfall=2.87"

Area (ac)	CN	Description
0.900	80	>75% Grass cover, Good, HSG D
0.070	98	Paved parking, HSG D
0.970	81	Weighted Average
0.900		92.78% Pervious Area
0.070		7.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	200	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 32S: Area D Proposed Existing Wetland Conditions



Summary for Subcatchment 33S: Area A Proposed Parking/Roof Conditions

[49] Hint: Tc<2dt may require smaller dt

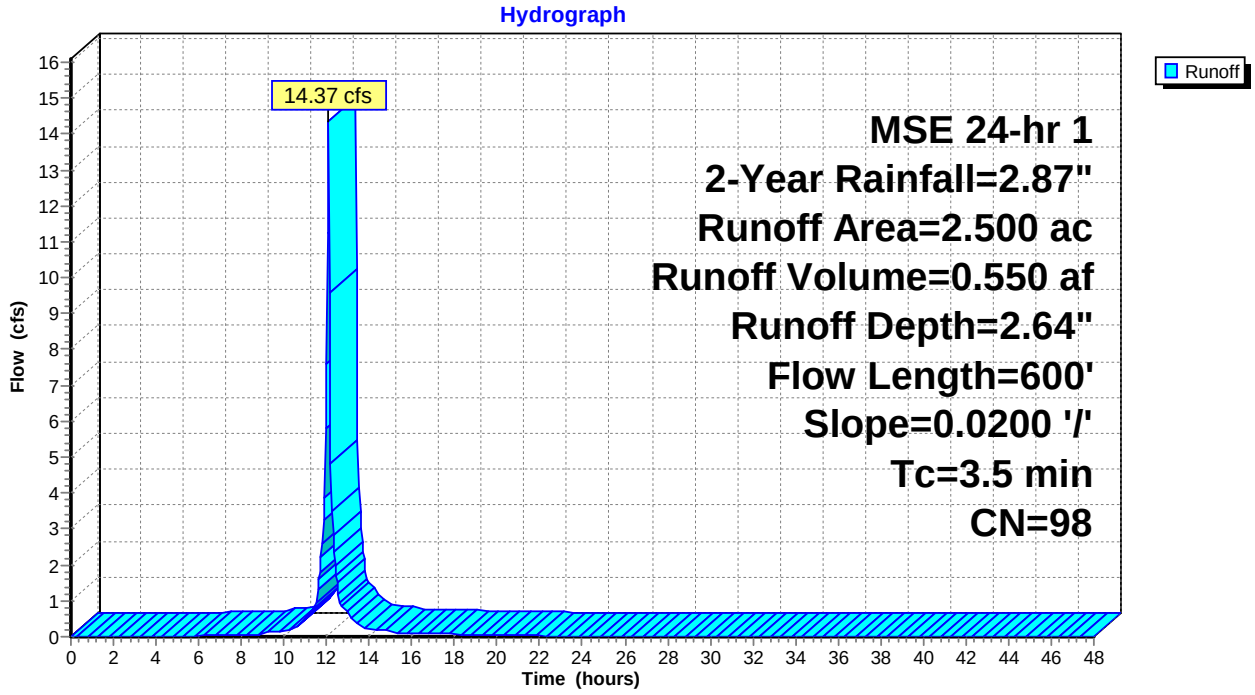
Runoff = 14.37 cfs @ 12.09 hrs, Volume= 0.550 af, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 2-Year Rainfall=2.87"

Area (ac)	CN	Description
2.500	98	Paved parking, HSG D
2.500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	600	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 33S: Area A Proposed Parking/Roof Conditions



Summary for Subcatchment 34S: Area B Proposed Driveway Conditions

[49] Hint: Tc<2dt may require smaller dt

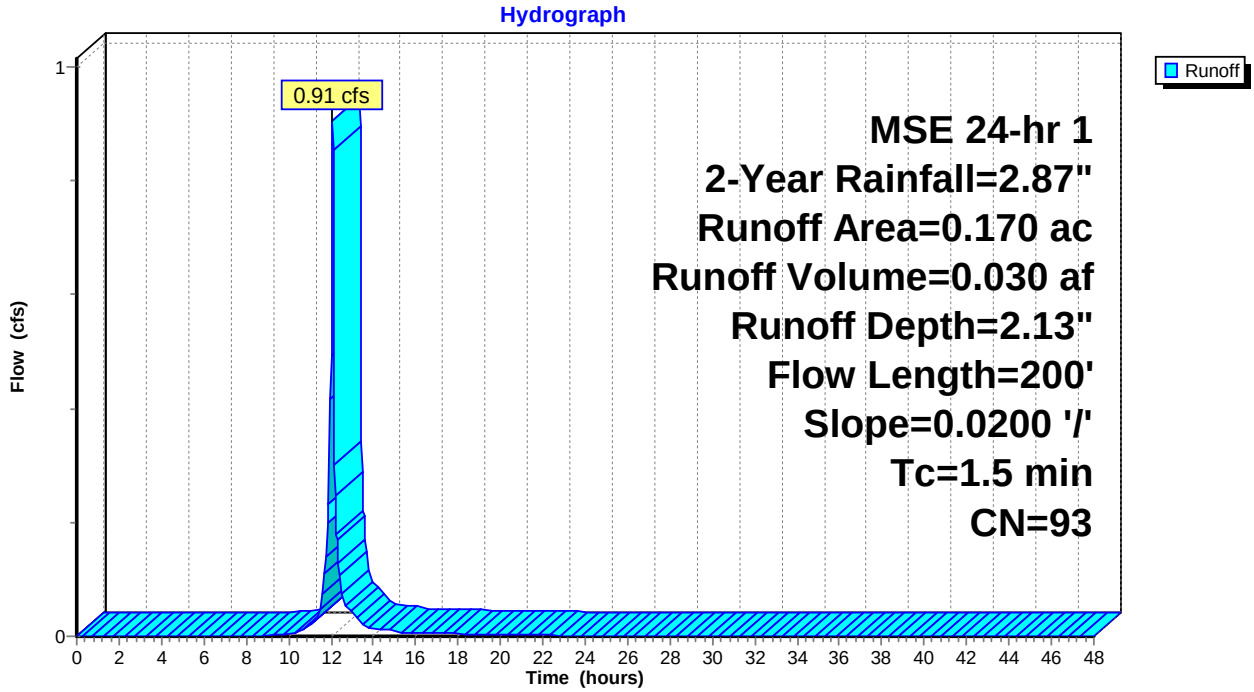
Runoff = 0.91 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 2-Year Rainfall=2.87"

Area (ac)	CN	Description
0.050	80	>75% Grass cover, Good, HSG D
0.120	98	Paved parking, HSG D
0.170	93	Weighted Average
0.050		29.41% Pervious Area
0.120		70.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 34S: Area B Proposed Driveway Conditions



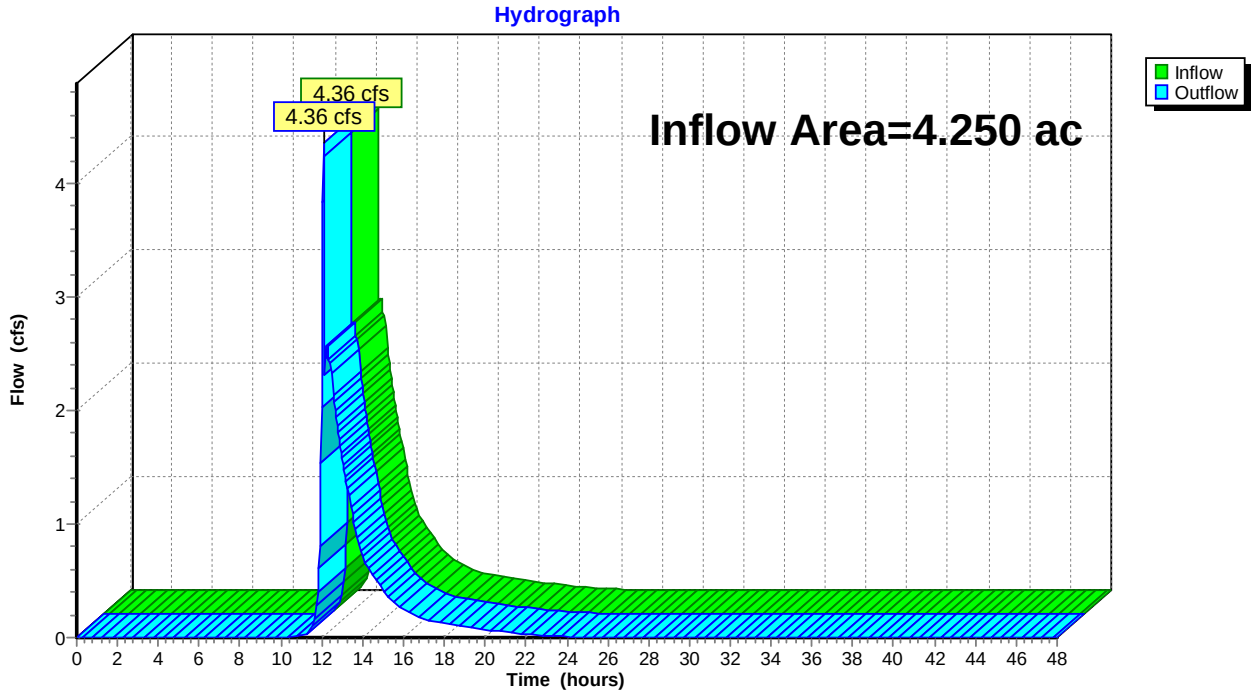
Summary for Reach 22R: City Storm Sewer

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

Inflow Area = 4.250 ac, 63.29% Impervious, Inflow Depth = 1.23" for 2-Year event
Inflow = 4.36 cfs @ 12.08 hrs, Volume= 0.436 af
Outflow = 4.36 cfs @ 12.08 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 22R: City Storm Sewer



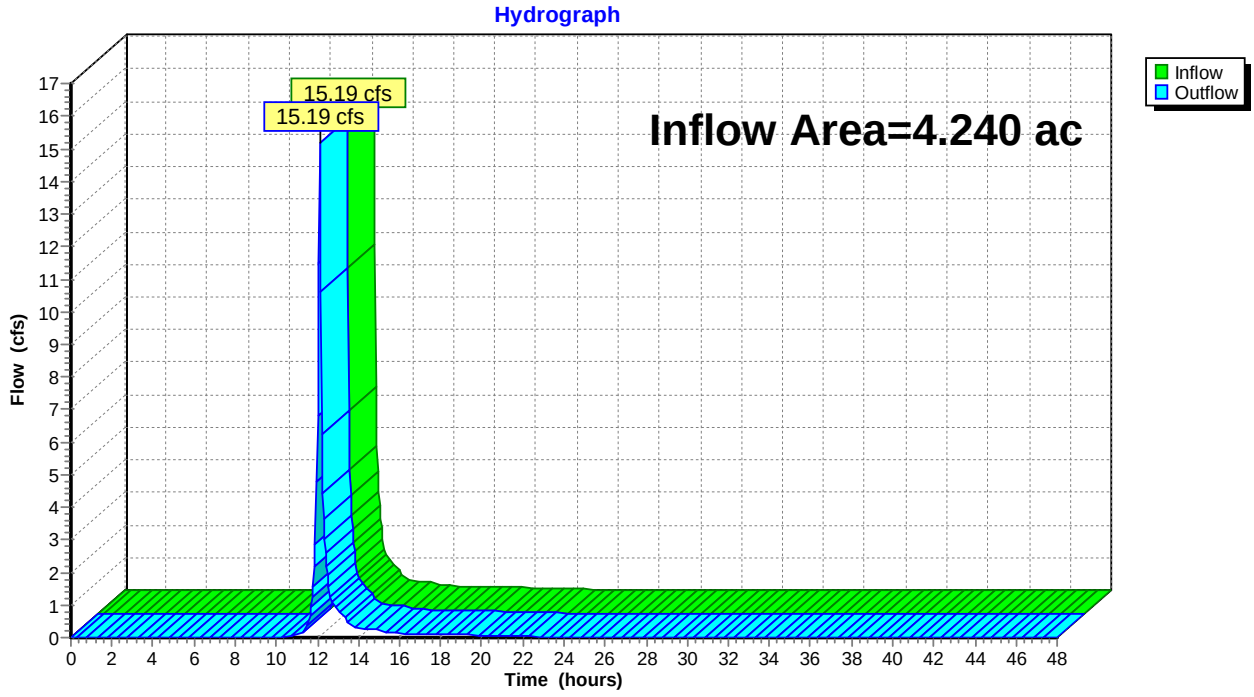
Summary for Reach 26R: City Storm

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

Inflow Area = 4.240 ac, 5.66% Impervious, Inflow Depth = 1.47" for 2-Year event
Inflow = 15.19 cfs @ 12.10 hrs, Volume= 0.520 af
Outflow = 15.19 cfs @ 12.10 hrs, Volume= 0.520 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 26R: City Storm



Summary for Pond 19P: Filtration Basin

Inflow Area = 3.110 ac, 80.39% Impervious, Inflow Depth = 2.35" for 2-Year event
Inflow = 16.25 cfs @ 12.09 hrs, Volume= 0.608 af
Outflow = 1.95 cfs @ 12.46 hrs, Volume= 0.477 af, Atten= 88%, Lag= 21.8 min
Discarded = 0.07 cfs @ 12.46 hrs, Volume= 0.170 af
Primary = 1.88 cfs @ 12.46 hrs, Volume= 0.308 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 989.01' @ 12.46 hrs Surf.Area= 0.230 ac Storage= 0.397 af

Plug-Flow detention time= 430.5 min calculated for 0.477 af (78% of inflow)
Center-of-Mass det. time= 386.3 min (1,136.3 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	987.00'	1.275 af	**Custom Stage Data (Prismatic)** Listed below

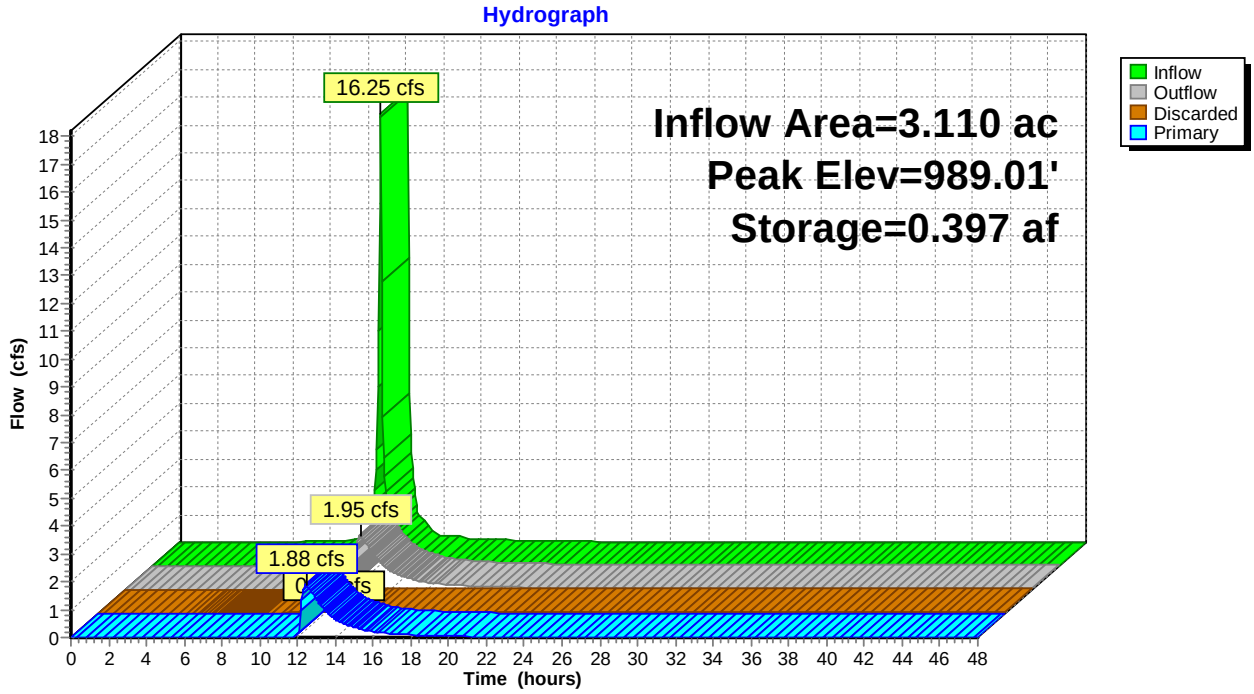
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
987.00	0.140	0.000	0.000
988.00	0.210	0.175	0.175
989.00	0.230	0.220	0.395
990.00	0.280	0.255	0.650
991.00	0.300	0.290	0.940
992.00	0.370	0.335	1.275

Device	Routing	Invert	Outlet Devices
#1	Device 2	988.25'	**30.0 deg x 0.7' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.61 (C= 3.26)
#2	Primary	983.50'	**30.0" Round Culvert** L= 49.0' Ke= 1.000 Inlet / Outlet Invert= 983.50' / 983.30' S= 0.0041 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#3	Device 2	989.00'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	987.50'	**15.0" Round Culvert** L= 20.0' Ke= 1.000 Inlet / Outlet Invert= 987.50' / 987.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#5	Discarded	987.00'	**0.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 983.00'

Discarded OutFlow Max=0.07 cfs @ 12.46 hrs HW=989.01' (Free Discharge)
└**5=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=1.87 cfs @ 12.46 hrs HW=989.01' (Free Discharge)
└**2=Culvert** (Passes 1.87 cfs of 36.58 cfs potential flow)
  ├**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 1.86 cfs @ 2.71 fps)
  │ └**4=Culvert** (Passes 1.86 cfs of 3.86 cfs potential flow)
  └**3=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.25 fps)

Pond 19P: Filtration Basin



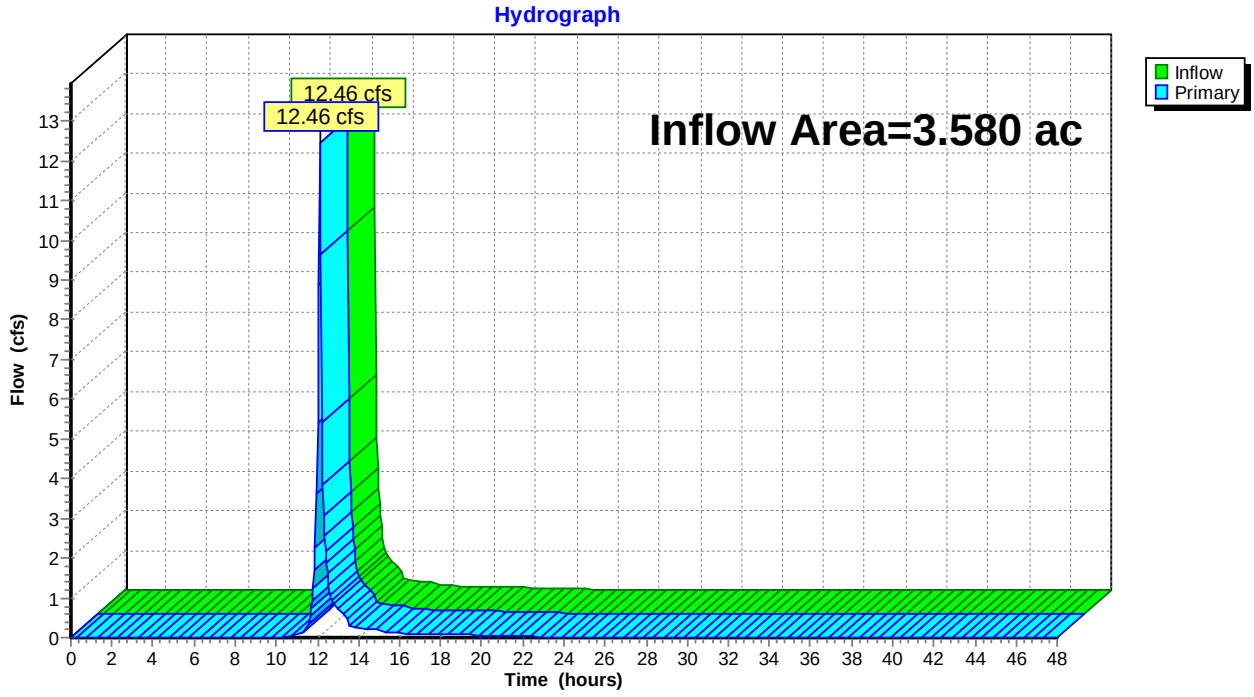
Summary for Pond 20P: West Wetland

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

Inflow Area = 3.580 ac, 6.70% Impervious, Inflow Depth = 1.44" for 2-Year event
Inflow = 12.46 cfs @ 12.10 hrs, Volume= 0.430 af
Primary = 12.46 cfs @ 12.10 hrs, Volume= 0.430 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 20P: West Wetland



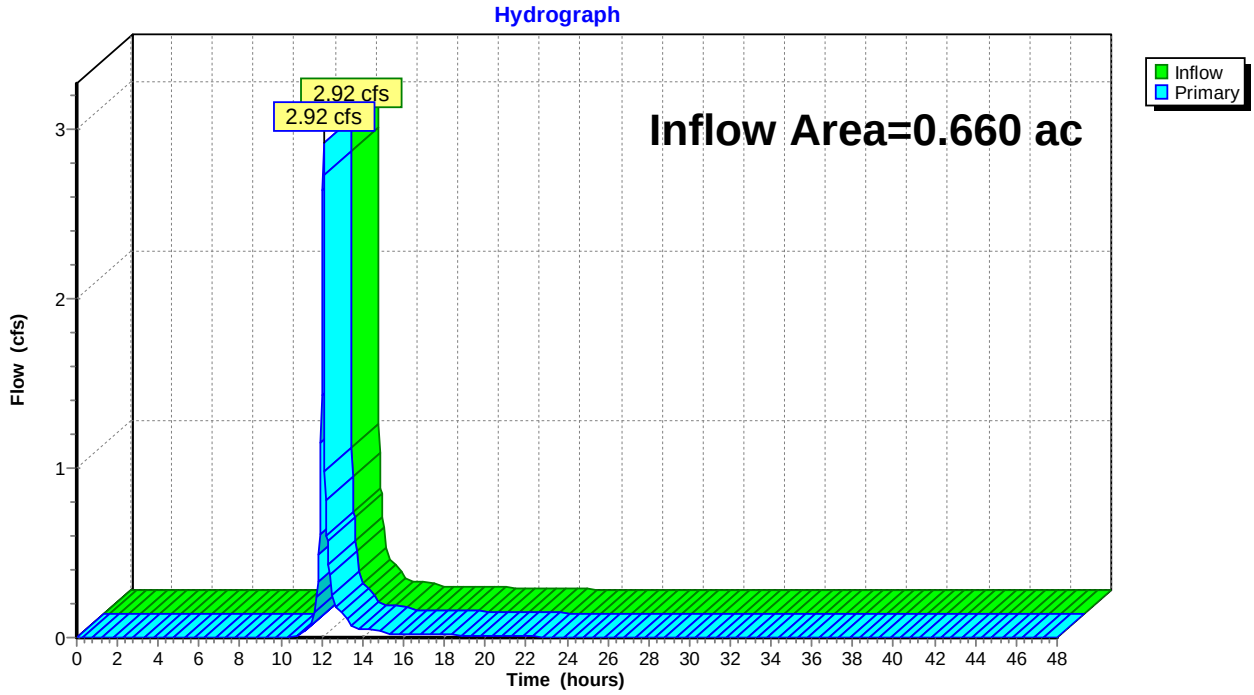
Summary for Pond 21P: East Wetland

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

Inflow Area = 0.660 ac, 0.00% Impervious, Inflow Depth = 1.63" for 2-Year event
Inflow = 2.92 cfs @ 12.08 hrs, Volume= 0.089 af
Primary = 2.92 cfs @ 12.08 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 21P: East Wetland



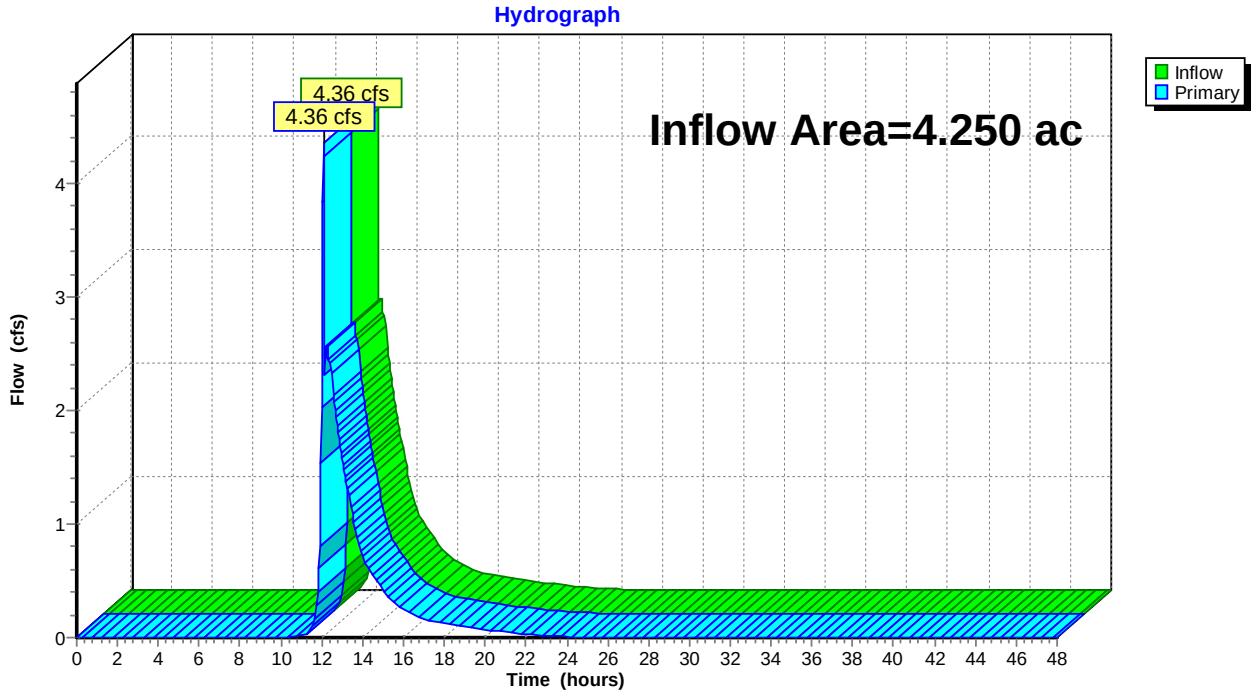
Summary for Pond 27P: Existing Wetlands

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

Inflow Area = 4.250 ac, 63.29% Impervious, Inflow Depth = 1.23" for 2-Year event
Inflow = 4.36 cfs @ 12.08 hrs, Volume= 0.436 af
Primary = 4.36 cfs @ 12.08 hrs, Volume= 0.436 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 27P: Existing Wetlands



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 24S: Area C Existing Runoff Area=0.660 ac 0.00% Impervious Runoff Depth=2.90"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=87 Runoff=5.03 cfs 0.160 af

Subcatchment 25S: Area A Existing Runoff Area=1.800 ac 7.78% Impervious Runoff Depth=2.37"
Flow Length=600' Slope=0.0200 '/' Tc=4.4 min CN=81 Runoff=10.26 cfs 0.355 af

Subcatchment 29S: Area B Existing Runoff Area=1.120 ac 0.00% Impervious Runoff Depth=3.20"
Flow Length=600' Slope=0.0200 '/' Tc=4.4 min CN=90 Runoff=8.19 cfs 0.298 af

Subcatchment 30S: Area D Existing Runoff Area=0.660 ac 15.15% Impervious Runoff Depth=2.54"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=83 Runoff=4.53 cfs 0.140 af

Subcatchment 31S: Area C Proposed Basin Runoff Area=0.610 ac 0.00% Impervious Runoff Depth=2.28"
Flow Length=200' Slope=0.0200 '/' Tc=1.2 min CN=80 Runoff=3.71 cfs 0.116 af

Subcatchment 32S: Area D Proposed Runoff Area=0.970 ac 7.22% Impervious Runoff Depth=2.37"
Flow Length=200' Slope=0.0200 '/' Tc=1.2 min CN=81 Runoff=6.09 cfs 0.191 af

Subcatchment 33S: Area A Proposed Runoff Area=2.500 ac 100.00% Impervious Runoff Depth=4.05"
Flow Length=600' Slope=0.0200 '/' Tc=3.5 min CN=98 Runoff=21.64 cfs 0.845 af

Subcatchment 34S: Area B Proposed Runoff Area=0.170 ac 70.59% Impervious Runoff Depth=3.50"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=93 Runoff=1.44 cfs 0.050 af

Reach 22R: City Storm Sewer Inflow=11.71 cfs 0.891 af
Outflow=11.71 cfs 0.891 af

Reach 26R: City Storm Inflow=27.26 cfs 0.953 af
Outflow=27.26 cfs 0.953 af

Pond 19P: Filtration Basin Peak Elev=989.51' Storage=0.525 af Inflow=25.25 cfs 0.961 af
Discarded=0.08 cfs 0.176 af Primary=9.40 cfs 0.650 af Outflow=9.47 cfs 0.826 af

Pond 20P: West Wetland Inflow=22.54 cfs 0.793 af
Primary=22.54 cfs 0.793 af

Pond 21P: East Wetland Inflow=5.03 cfs 0.160 af
Primary=5.03 cfs 0.160 af

Pond 27P: Existing Wetlands Inflow=11.71 cfs 0.891 af
Primary=11.71 cfs 0.891 af

Total Runoff Area = 8.490 ac Runoff Volume = 2.154 af Average Runoff Depth = 3.05"
65.49% Pervious = 5.560 ac 34.51% Impervious = 2.930 ac

Summary for Subcatchment 24S: Area C Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

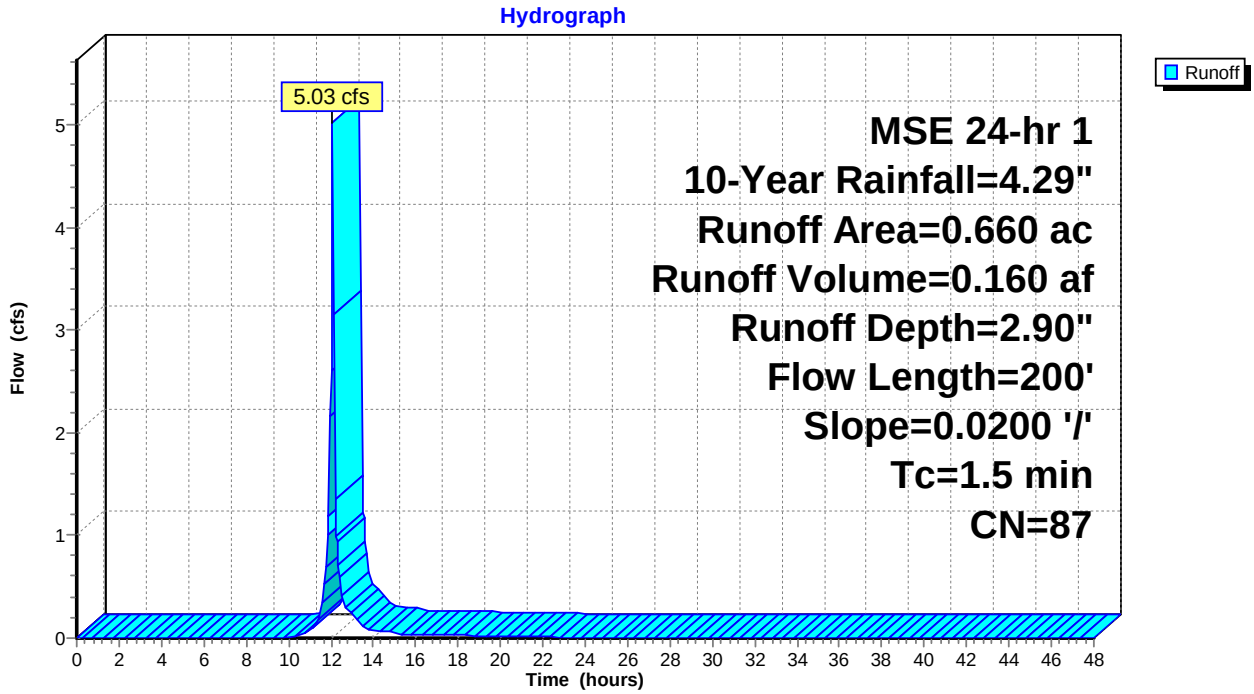
Runoff = 5.03 cfs @ 12.08 hrs, Volume= 0.160 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 10-Year Rainfall=4.29"

Area (ac)	CN	Description
0.360	80	>75% Grass cover, Good, HSG D
0.300	96	Gravel surface, HSG D
0.660	87	Weighted Average
0.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 24S: Area C Existing Conditions



Summary for Subcatchment 25S: Area A Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

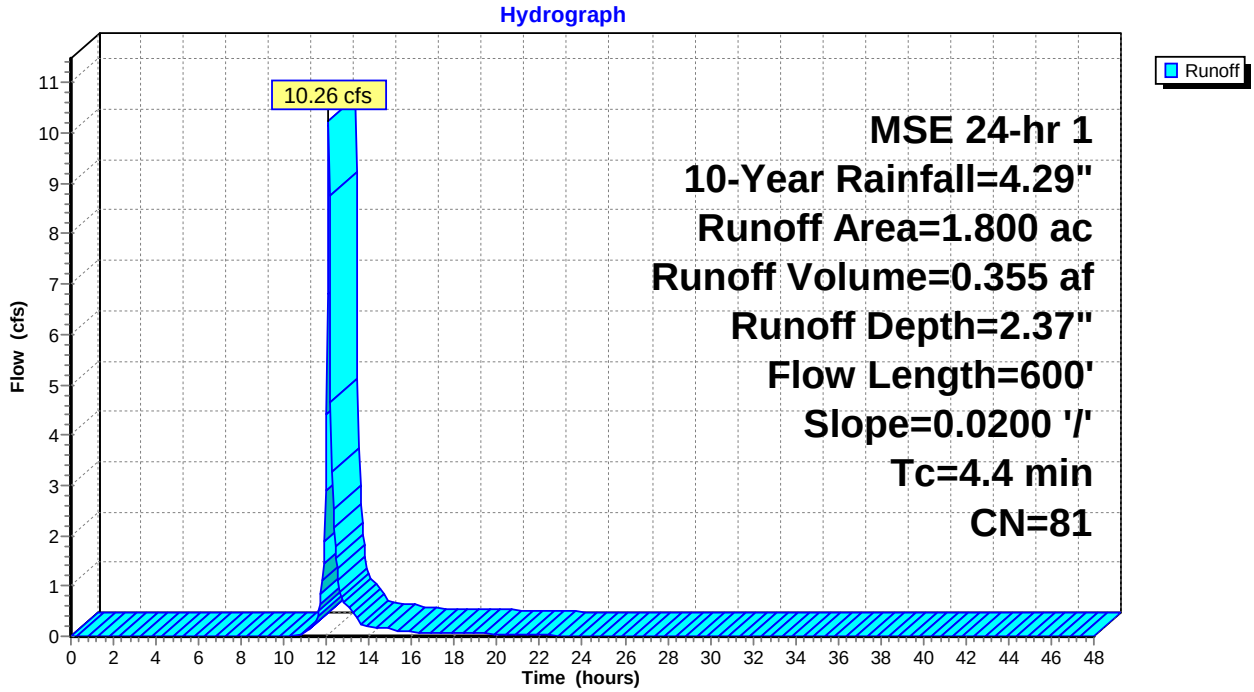
Runoff = 10.26 cfs @ 12.11 hrs, Volume= 0.355 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 10-Year Rainfall=4.29"

Area (ac)	CN	Description
1.660	80	>75% Grass cover, Good, HSG D
0.140	98	Paved parking, HSG D
1.800	81	Weighted Average
1.660		92.22% Pervious Area
0.140		7.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	600	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 25S: Area A Existing Conditions



Summary for Subcatchment 29S: Area B Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

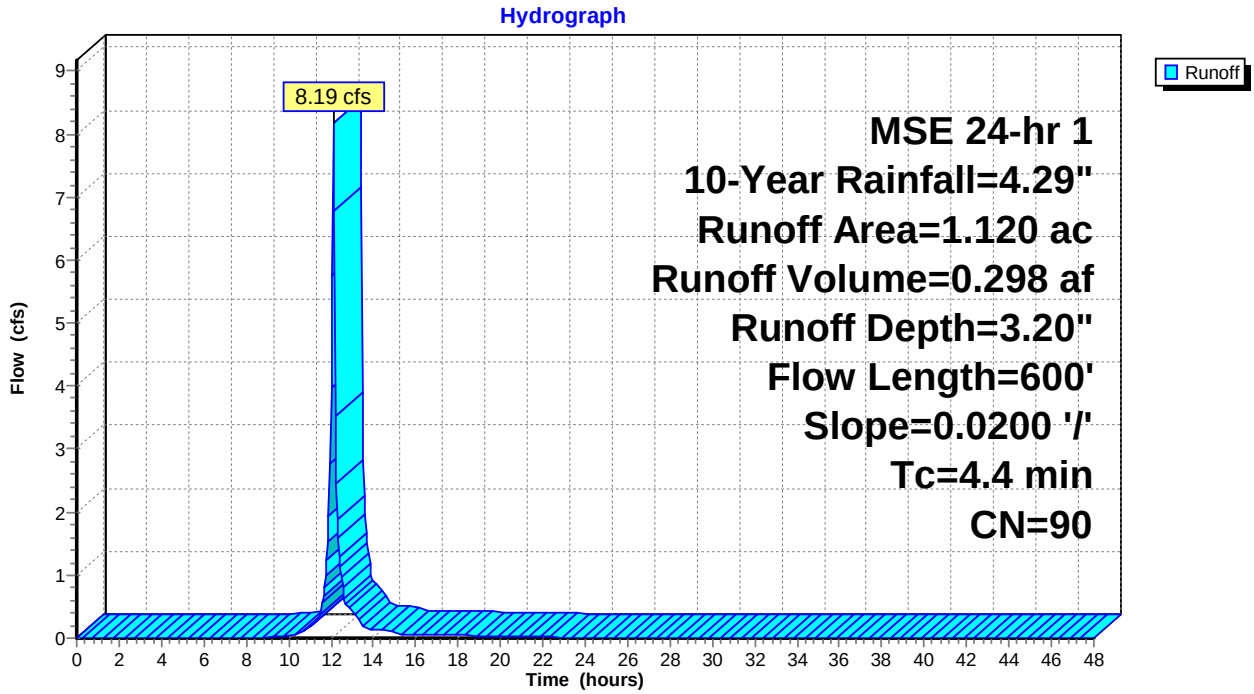
Runoff = 8.19 cfs @ 12.11 hrs, Volume= 0.298 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 10-Year Rainfall=4.29"

Area (ac)	CN	Description
0.410	80	>75% Grass cover, Good, HSG D
0.710	96	Gravel surface, HSG D
1.120	90	Weighted Average
1.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	600	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 29S: Area B Existing Conditions



Summary for Subcatchment 30S: Area D Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

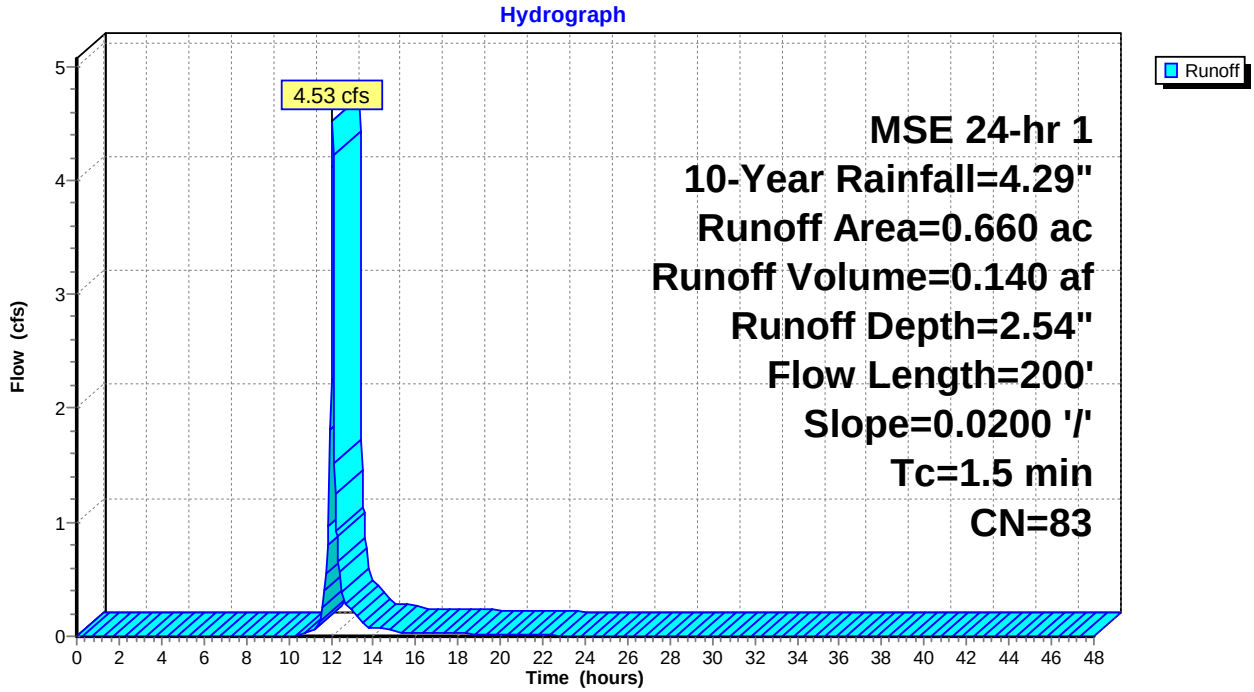
Runoff = 4.53 cfs @ 12.08 hrs, Volume= 0.140 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 10-Year Rainfall=4.29"

Area (ac)	CN	Description
0.560	80	>75% Grass cover, Good, HSG D
0.100	98	Paved parking, HSG D
0.660	83	Weighted Average
0.560		84.85% Pervious Area
0.100		15.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 30S: Area D Existing Conditions



Summary for Subcatchment 31S: Area C Proposed Basin Conditions

[49] Hint: Tc<2dt may require smaller dt

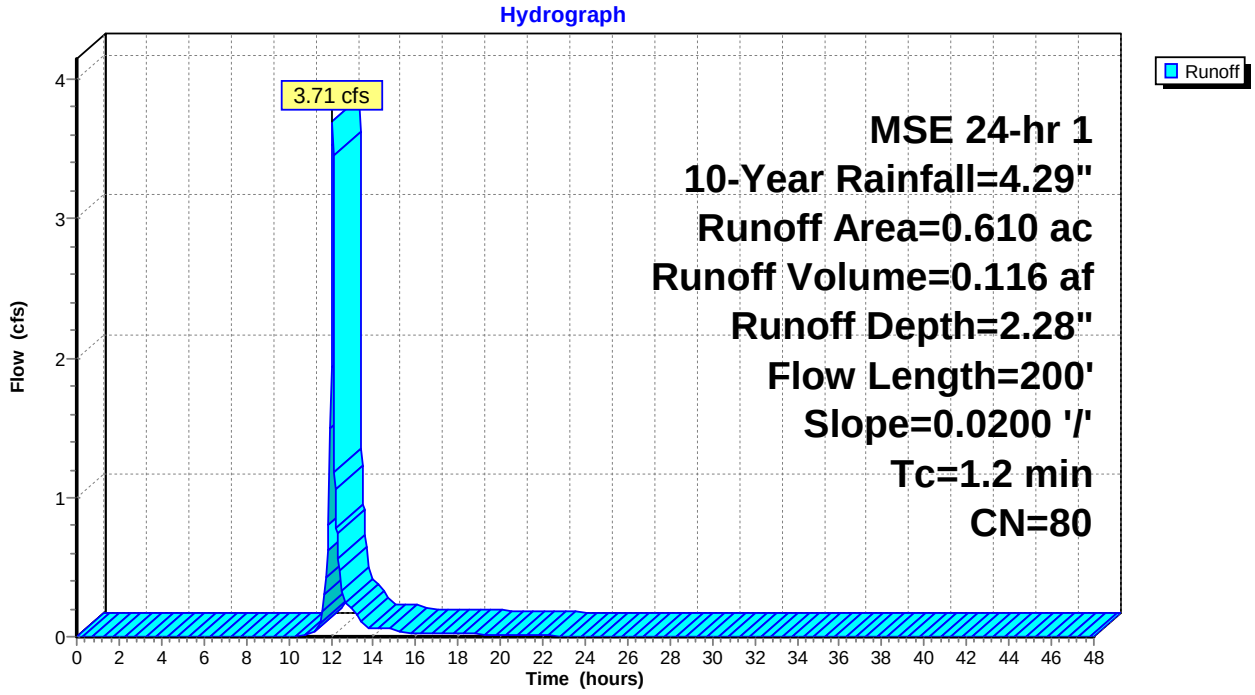
Runoff = 3.71 cfs @ 12.07 hrs, Volume= 0.116 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 10-Year Rainfall=4.29"

Area (ac)	CN	Description
0.610	80	>75% Grass cover, Good, HSG D
0.610		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	200	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 31S: Area C Proposed Basin Conditions



Summary for Subcatchment 32S: Area D Proposed Existing Wetland Conditions

[49] Hint: Tc<2dt may require smaller dt

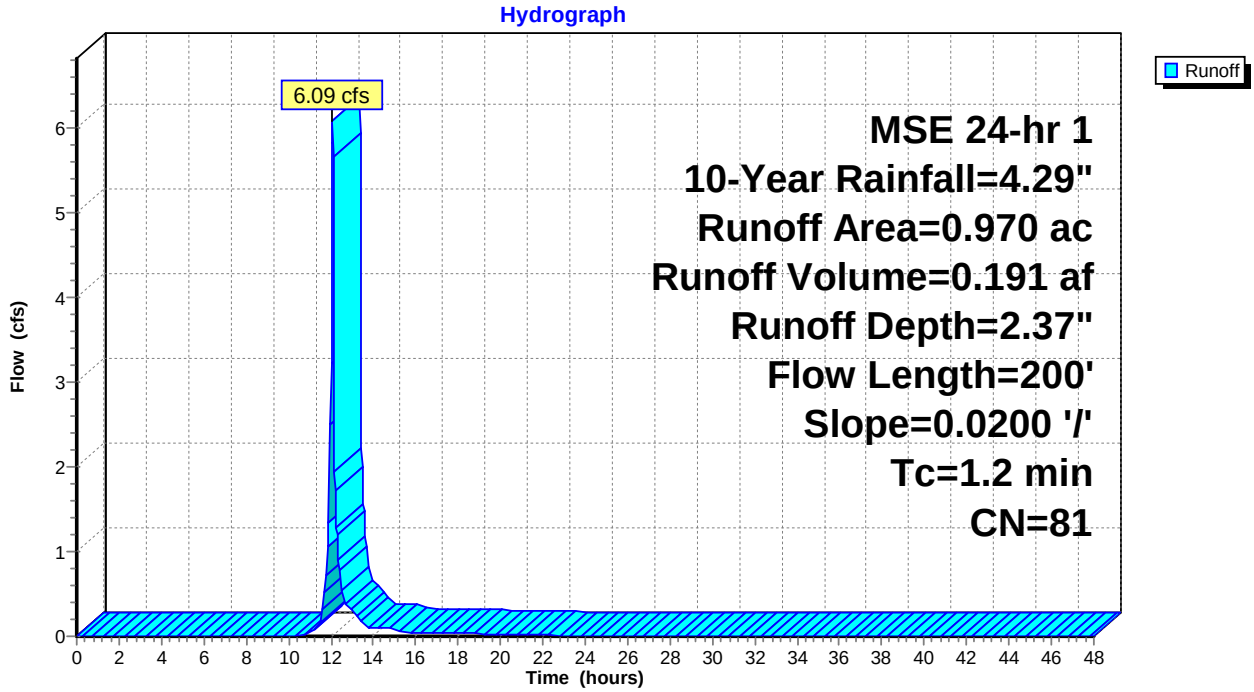
Runoff = 6.09 cfs @ 12.07 hrs, Volume= 0.191 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 10-Year Rainfall=4.29"

Area (ac)	CN	Description
0.900	80	>75% Grass cover, Good, HSG D
0.070	98	Paved parking, HSG D
0.970	81	Weighted Average
0.900		92.78% Pervious Area
0.070		7.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	200	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 32S: Area D Proposed Existing Wetland Conditions



Summary for Subcatchment 33S: Area A Proposed Parking/Roof Conditions

[49] Hint: Tc<2dt may require smaller dt

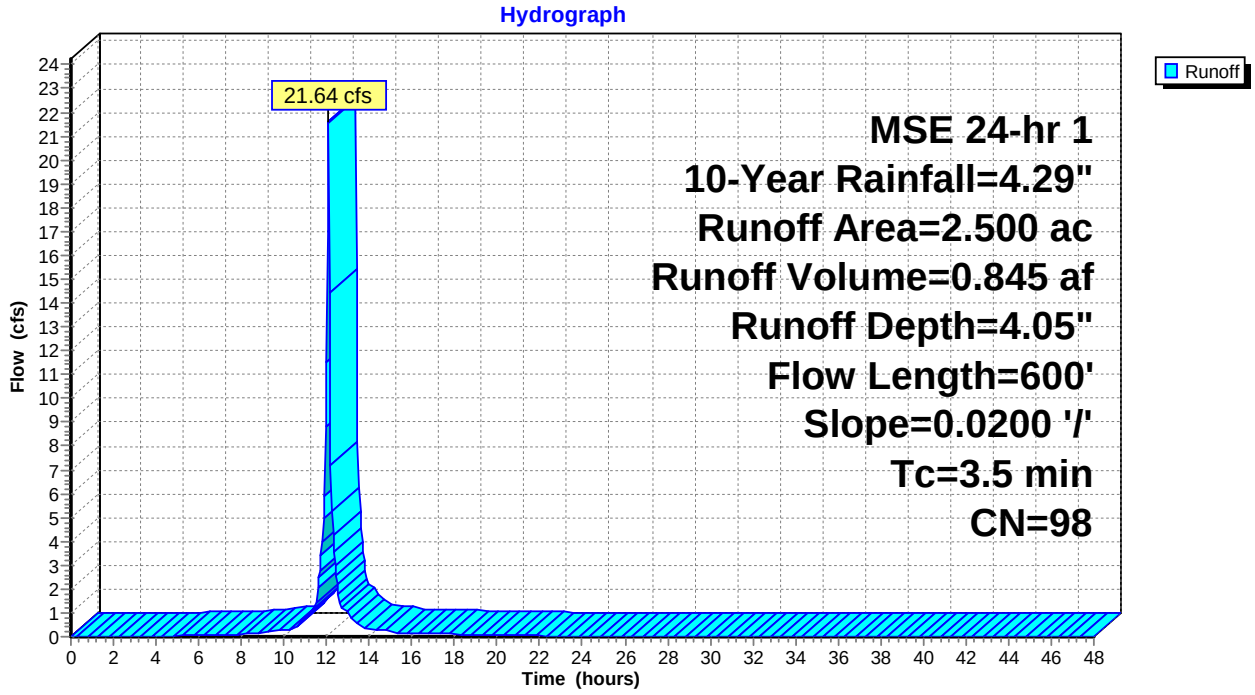
Runoff = 21.64 cfs @ 12.09 hrs, Volume= 0.845 af, Depth= 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 10-Year Rainfall=4.29"

Area (ac)	CN	Description
2.500	98	Paved parking, HSG D
2.500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	600	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 33S: Area A Proposed Parking/Roof Conditions



Summary for Subcatchment 34S: Area B Proposed Driveway Conditions

[49] Hint: Tc<2dt may require smaller dt

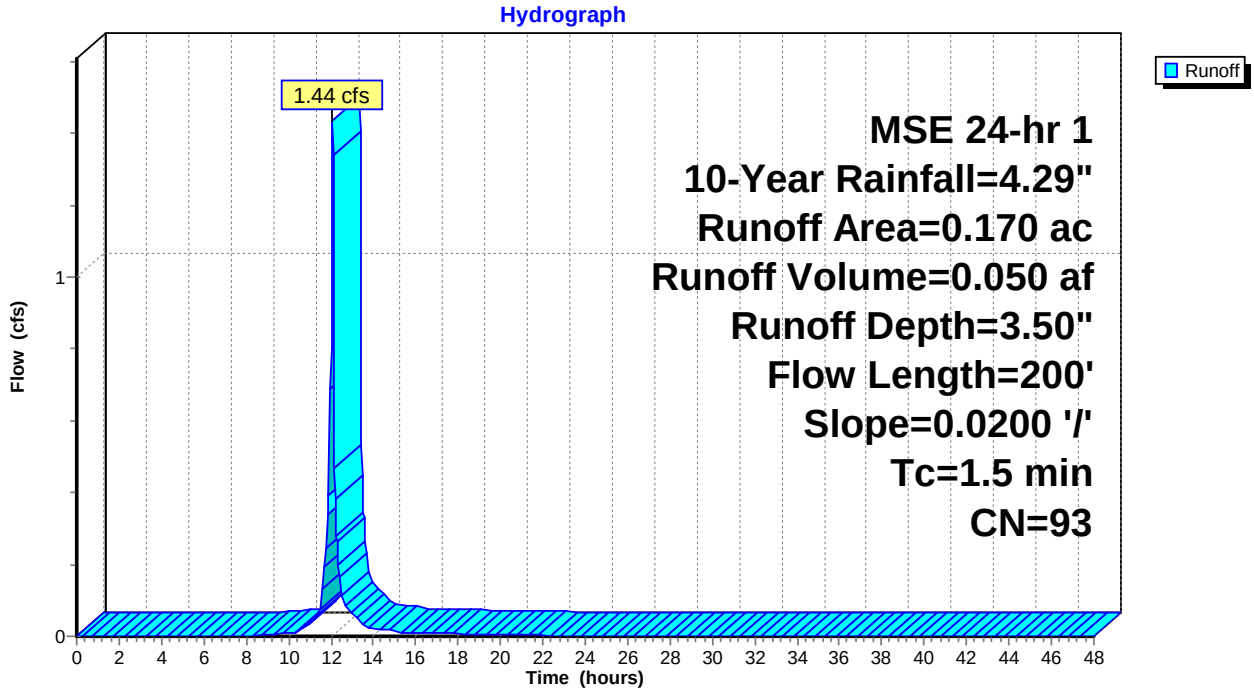
Runoff = 1.44 cfs @ 12.07 hrs, Volume= 0.050 af, Depth= 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 10-Year Rainfall=4.29"

Area (ac)	CN	Description
0.050	80	>75% Grass cover, Good, HSG D
0.120	98	Paved parking, HSG D
0.170	93	Weighted Average
0.050		29.41% Pervious Area
0.120		70.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 34S: Area B Proposed Driveway Conditions



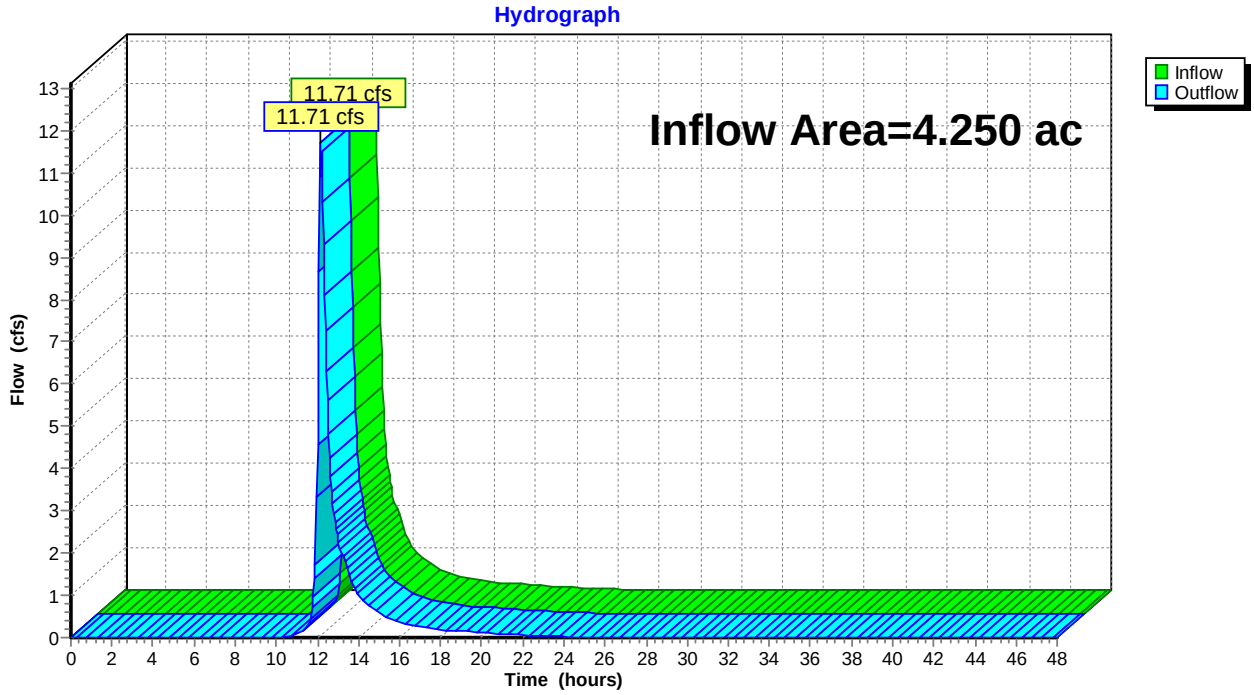
Summary for Reach 22R: City Storm Sewer

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

Inflow Area = 4.250 ac, 63.29% Impervious, Inflow Depth = 2.52" for 10-Year event
Inflow = 11.71 cfs @ 12.10 hrs, Volume= 0.891 af
Outflow = 11.71 cfs @ 12.10 hrs, Volume= 0.891 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 22R: City Storm Sewer



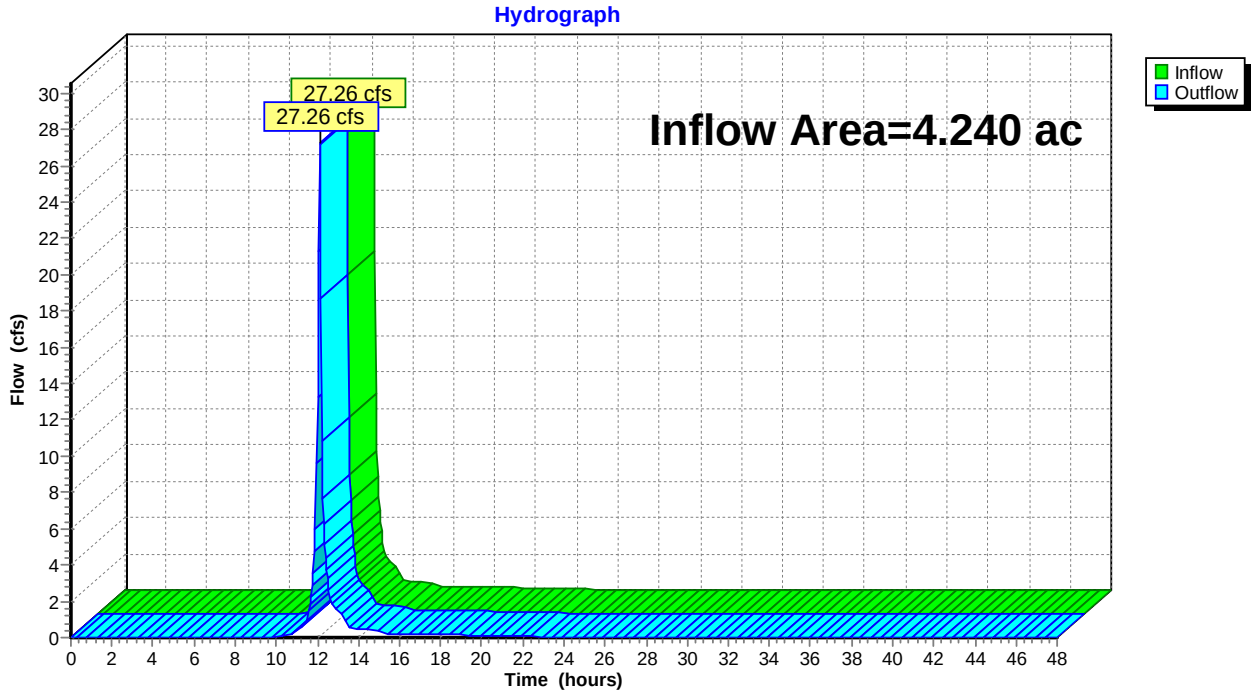
Summary for Reach 26R: City Storm

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

Inflow Area = 4.240 ac, 5.66% Impervious, Inflow Depth = 2.70" for 10-Year event
Inflow = 27.26 cfs @ 12.10 hrs, Volume= 0.953 af
Outflow = 27.26 cfs @ 12.10 hrs, Volume= 0.953 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 26R: City Storm



Summary for Pond 19P: Filtration Basin

[95] Warning: Outlet Device #1 rise exceeded

Inflow Area = 3.110 ac, 80.39% Impervious, Inflow Depth = 3.71" for 10-Year event
Inflow = 25.25 cfs @ 12.09 hrs, Volume= 0.961 af
Outflow = 9.47 cfs @ 12.20 hrs, Volume= 0.826 af, Atten= 62%, Lag= 6.8 min
Discarded = 0.08 cfs @ 12.20 hrs, Volume= 0.176 af
Primary = 9.40 cfs @ 12.20 hrs, Volume= 0.650 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 989.51' @ 12.20 hrs Surf.Area= 0.255 ac Storage= 0.525 af

Plug-Flow detention time= 280.8 min calculated for 0.826 af (86% of inflow)
Center-of-Mass det. time= 243.1 min (988.7 - 745.7)

Volume	Invert	Avail.Storage	Storage Description
#1	987.00'	1.275 af	**Custom Stage Data (Prismatic)** Listed below

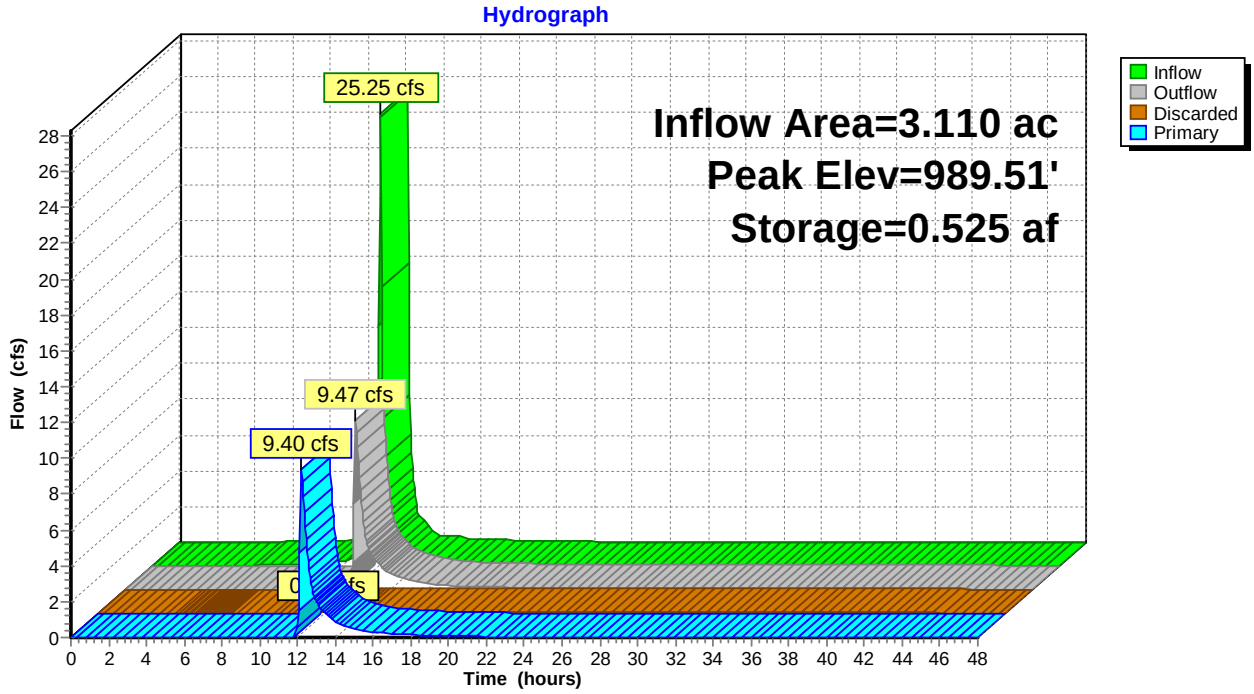
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
987.00	0.140	0.000	0.000
988.00	0.210	0.175	0.175
989.00	0.230	0.220	0.395
990.00	0.280	0.255	0.650
991.00	0.300	0.290	0.940
992.00	0.370	0.335	1.275

Device	Routing	Invert	Outlet Devices
#1	Device 2	988.25'	**30.0 deg x 0.7' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.61 (C= 3.26)
#2	Primary	983.50'	**30.0" Round Culvert** L= 49.0' Ke= 1.000 Inlet / Outlet Invert= 983.50' / 983.30' S= 0.0041 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#3	Device 2	989.00'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	987.50'	**15.0" Round Culvert** L= 20.0' Ke= 1.000 Inlet / Outlet Invert= 987.50' / 987.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#5	Discarded	987.00'	**0.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 983.00'

Discarded OutFlow Max=0.08 cfs @ 12.20 hrs HW=989.51' (Free Discharge)
└**5=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=9.34 cfs @ 12.20 hrs HW=989.51' (Free Discharge)
└**2=Culvert** (Passes 9.34 cfs of 38.66 cfs potential flow)
  └**1=Sharp-Crested Vee/Trap Weir** (Orifice Controls 3.91 cfs @ 4.04 fps)
    └**4=Culvert** (Passes 3.91 cfs of 4.97 cfs potential flow)
  └**3=Broad-Crested Rectangular Weir** (Weir Controls 5.43 cfs @ 2.14 fps)

Pond 19P: Filtration Basin



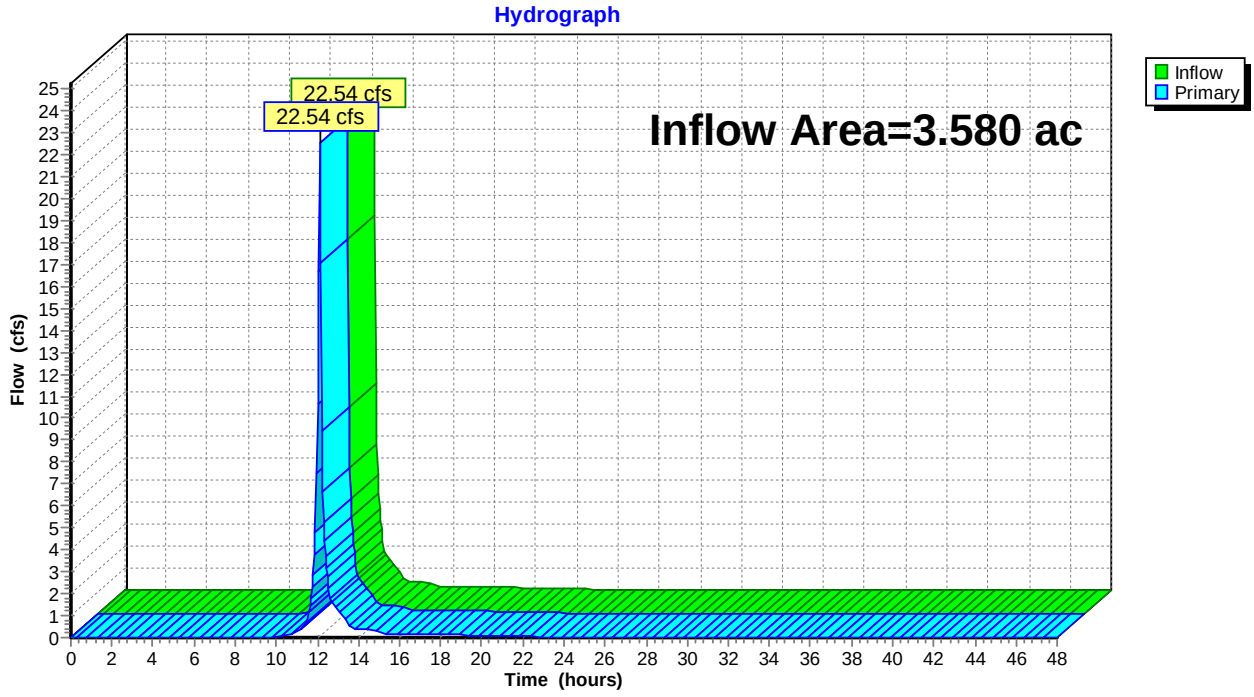
Summary for Pond 20P: West Wetland

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

Inflow Area = 3.580 ac, 6.70% Impervious, Inflow Depth = 2.66" for 10-Year event
Inflow = 22.54 cfs @ 12.10 hrs, Volume= 0.793 af
Primary = 22.54 cfs @ 12.10 hrs, Volume= 0.793 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 20P: West Wetland



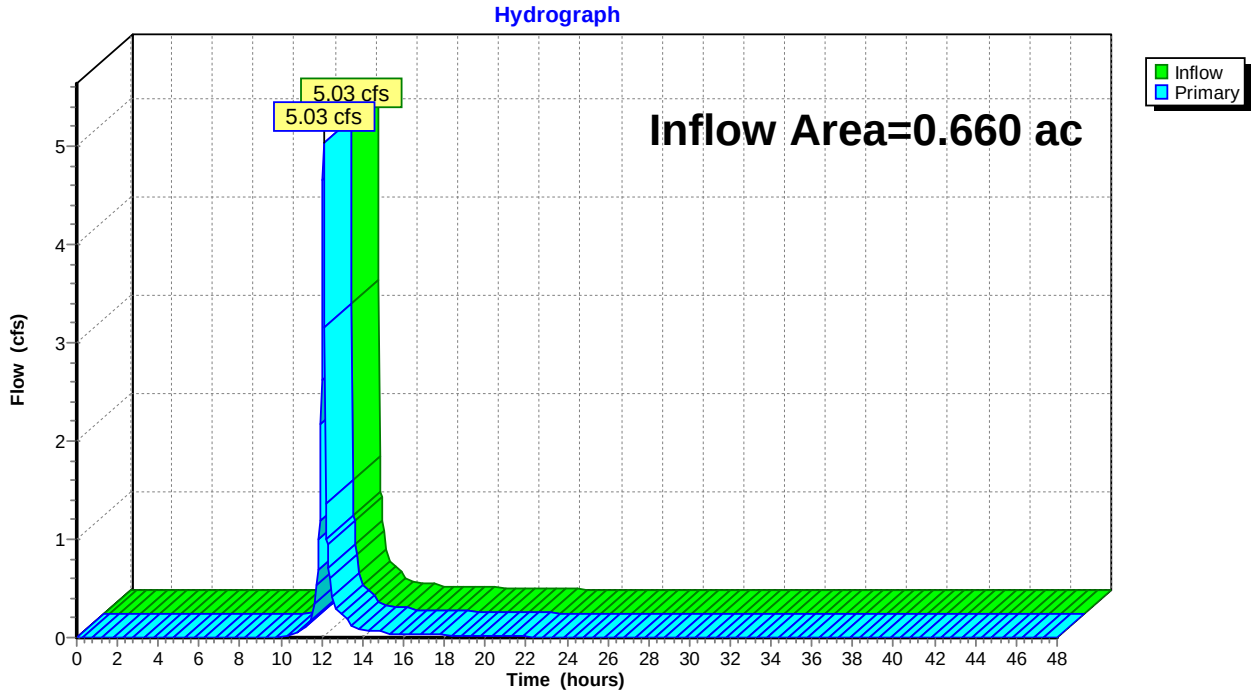
Summary for Pond 21P: East Wetland

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

Inflow Area = 0.660 ac, 0.00% Impervious, Inflow Depth = 2.90" for 10-Year event
Inflow = 5.03 cfs @ 12.08 hrs, Volume= 0.160 af
Primary = 5.03 cfs @ 12.08 hrs, Volume= 0.160 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 21P: East Wetland



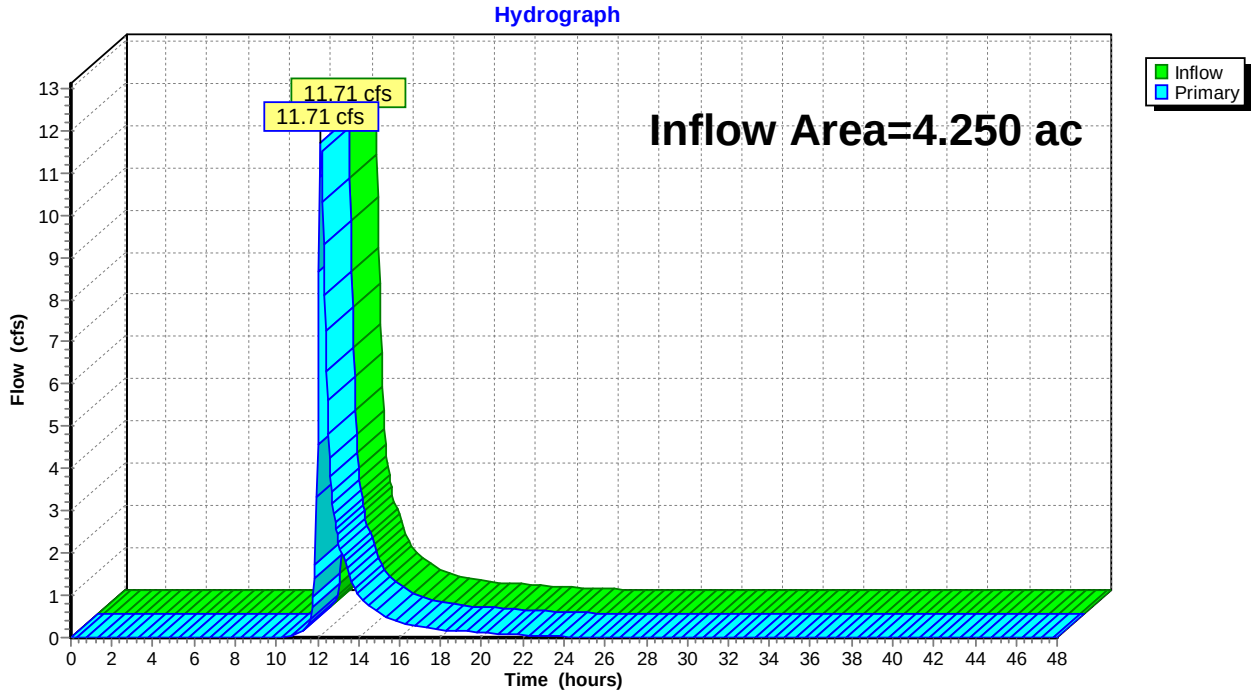
Summary for Pond 27P: Existing Wetlands

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

Inflow Area = 4.250 ac, 63.29% Impervious, Inflow Depth = 2.52" for 10-Year event
Inflow = 11.71 cfs @ 12.10 hrs, Volume= 0.891 af
Primary = 11.71 cfs @ 12.10 hrs, Volume= 0.891 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 27P: Existing Wetlands



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 24S: Area C Existing Runoff Area=0.660 ac 0.00% Impervious Runoff Depth=5.67"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=87 Runoff=9.18 cfs 0.312 af

Subcatchment 25S: Area A Existing Runoff Area=1.800 ac 7.78% Impervious Runoff Depth=4.99"
Flow Length=600' Slope=0.0200 '/' Tc=4.4 min CN=81 Runoff=20.93 cfs 0.749 af

Subcatchment 29S: Area B Existing Runoff Area=1.120 ac 0.00% Impervious Runoff Depth=6.02"
Flow Length=600' Slope=0.0200 '/' Tc=4.4 min CN=90 Runoff=14.81 cfs 0.562 af

Subcatchment 30S: Area D Existing Runoff Area=0.660 ac 15.15% Impervious Runoff Depth=5.22"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=83 Runoff=8.67 cfs 0.287 af

Subcatchment 31S: Area C Proposed Basin Runoff Area=0.610 ac 0.00% Impervious Runoff Depth=4.88"
Flow Length=200' Slope=0.0200 '/' Tc=1.2 min CN=80 Runoff=7.65 cfs 0.248 af

Subcatchment 32S: Area D Proposed Runoff Area=0.970 ac 7.22% Impervious Runoff Depth=4.99"
Flow Length=200' Slope=0.0200 '/' Tc=1.2 min CN=81 Runoff=12.38 cfs 0.403 af

Subcatchment 33S: Area A Proposed Runoff Area=2.500 ac 100.00% Impervious Runoff Depth=6.96"
Flow Length=600' Slope=0.0200 '/' Tc=3.5 min CN=98 Runoff=36.48 cfs 1.450 af

Subcatchment 34S: Area B Proposed Runoff Area=0.170 ac 70.59% Impervious Runoff Depth=6.37"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=93 Runoff=2.52 cfs 0.090 af

Reach 22R: City Storm Sewer Inflow=37.63 cfs 1.869 af
Outflow=37.63 cfs 1.869 af

Reach 26R: City Storm Inflow=52.57 cfs 1.909 af
Outflow=52.57 cfs 1.909 af

Pond 19P: Filtration Basin Peak Elev=990.21' Storage=0.710 af Inflow=43.77 cfs 1.698 af
Discarded=0.09 cfs 0.185 af Primary=27.57 cfs 1.375 af Outflow=27.66 cfs 1.560 af

Pond 20P: West Wetland Inflow=43.78 cfs 1.597 af
Primary=43.78 cfs 1.597 af

Pond 21P: East Wetland Inflow=9.18 cfs 0.312 af
Primary=9.18 cfs 0.312 af

Pond 27P: Existing Wetlands Inflow=37.63 cfs 1.869 af
Primary=37.63 cfs 1.869 af

Total Runoff Area = 8.490 ac Runoff Volume = 4.101 af Average Runoff Depth = 5.80"
65.49% Pervious = 5.560 ac 34.51% Impervious = 2.930 ac

Summary for Subcatchment 24S: Area C Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

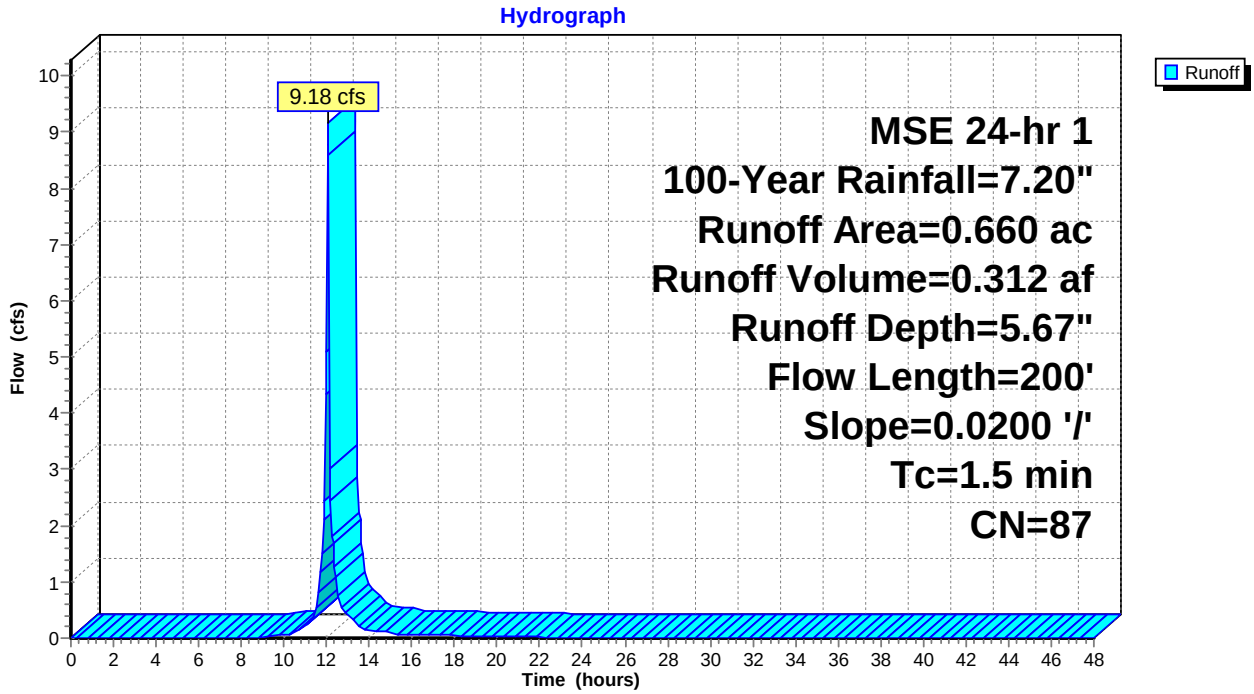
Runoff = 9.18 cfs @ 12.07 hrs, Volume= 0.312 af, Depth= 5.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 100-Year Rainfall=7.20"

Area (ac)	CN	Description
0.360	80	>75% Grass cover, Good, HSG D
0.300	96	Gravel surface, HSG D
0.660	87	Weighted Average
0.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 24S: Area C Existing Conditions



Summary for Subcatchment 25S: Area A Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

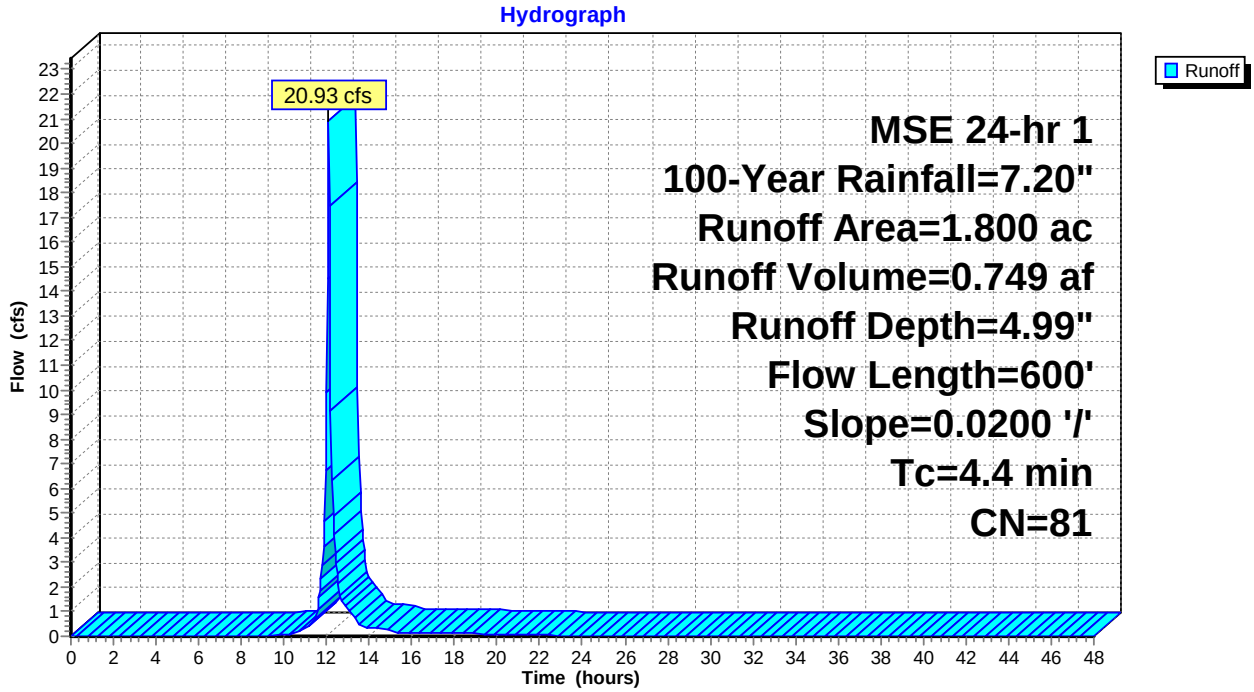
Runoff = 20.93 cfs @ 12.11 hrs, Volume= 0.749 af, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 100-Year Rainfall=7.20"

Area (ac)	CN	Description
1.660	80	>75% Grass cover, Good, HSG D
0.140	98	Paved parking, HSG D
1.800	81	Weighted Average
1.660		92.22% Pervious Area
0.140		7.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	600	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 25S: Area A Existing Conditions



Summary for Subcatchment 29S: Area B Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

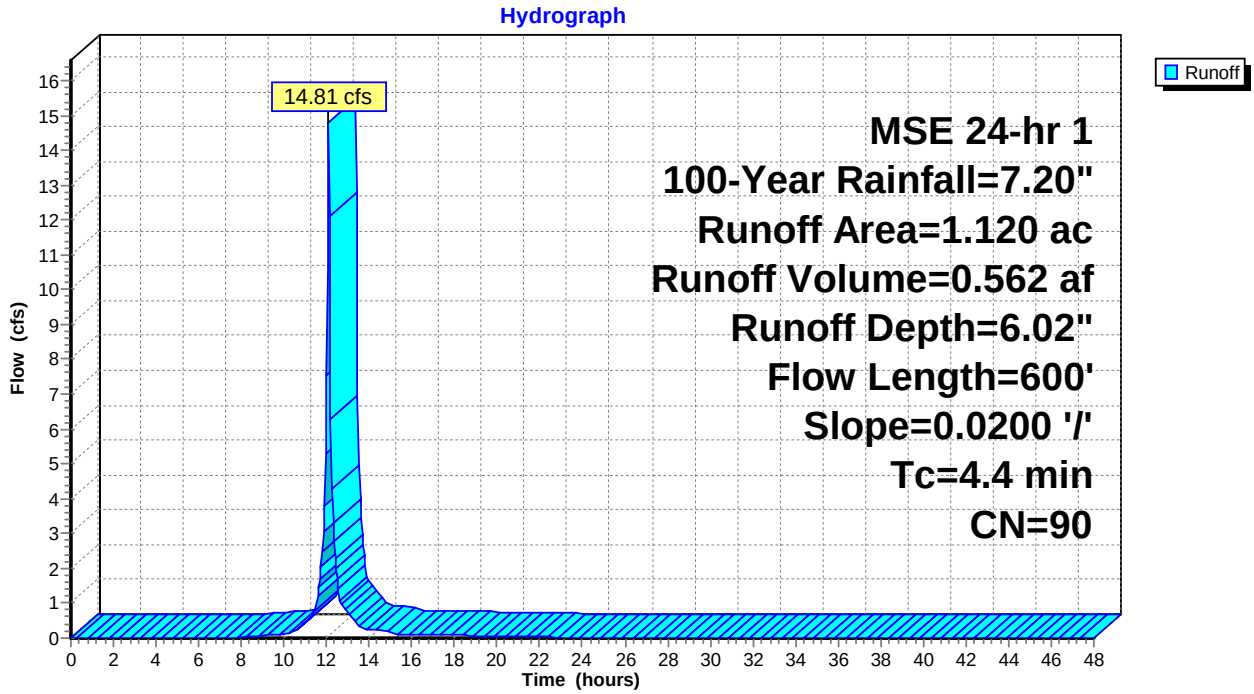
Runoff = 14.81 cfs @ 12.11 hrs, Volume= 0.562 af, Depth= 6.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 100-Year Rainfall=7.20"

Area (ac)	CN	Description
0.410	80	>75% Grass cover, Good, HSG D
0.710	96	Gravel surface, HSG D
1.120	90	Weighted Average
1.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	600	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 29S: Area B Existing Conditions



Summary for Subcatchment 30S: Area D Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

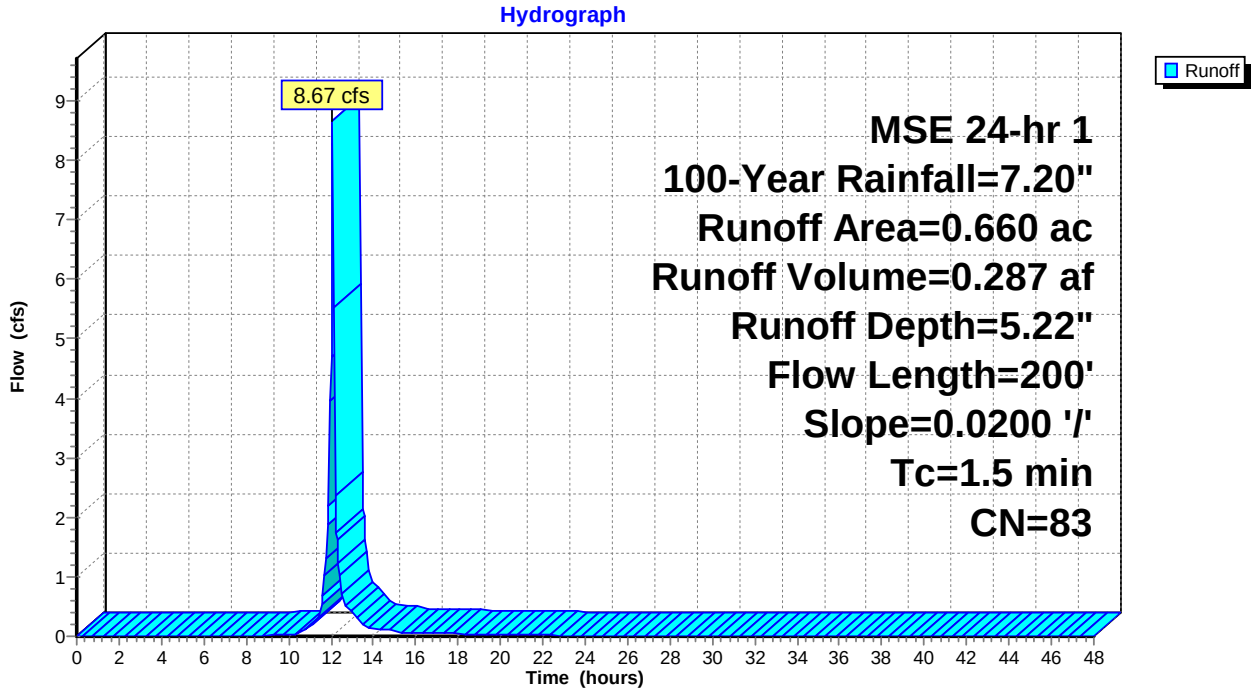
Runoff = 8.67 cfs @ 12.07 hrs, Volume= 0.287 af, Depth= 5.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 100-Year Rainfall=7.20"

Area (ac)	CN	Description
0.560	80	>75% Grass cover, Good, HSG D
0.100	98	Paved parking, HSG D
0.660	83	Weighted Average
0.560		84.85% Pervious Area
0.100		15.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 30S: Area D Existing Conditions



Summary for Subcatchment 31S: Area C Proposed Basin Conditions

[49] Hint: Tc<2dt may require smaller dt

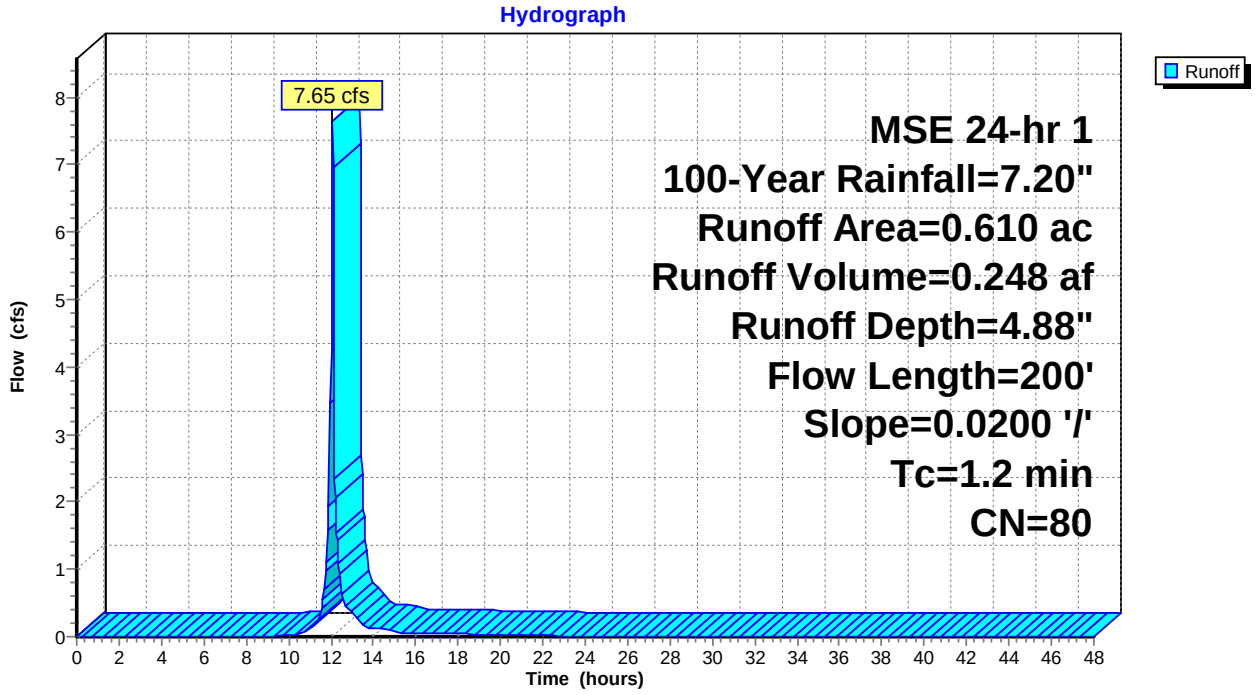
Runoff = 7.65 cfs @ 12.07 hrs, Volume= 0.248 af, Depth= 4.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 100-Year Rainfall=7.20"

Area (ac)	CN	Description
0.610	80	>75% Grass cover, Good, HSG D
0.610		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	200	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 31S: Area C Proposed Basin Conditions



Summary for Subcatchment 32S: Area D Proposed Existing Wetland Conditions

[49] Hint: Tc<2dt may require smaller dt

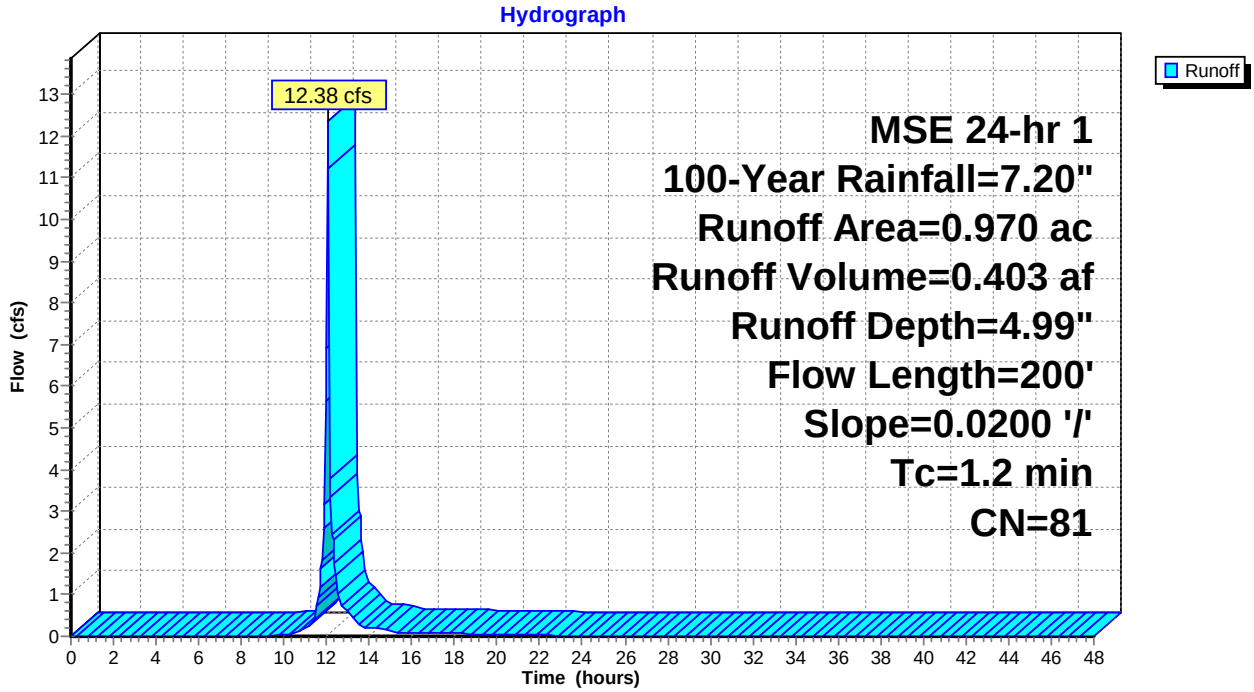
Runoff = 12.38 cfs @ 12.07 hrs, Volume= 0.403 af, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 100-Year Rainfall=7.20"

Area (ac)	CN	Description
0.900	80	>75% Grass cover, Good, HSG D
0.070	98	Paved parking, HSG D
0.970	81	Weighted Average
0.900		92.78% Pervious Area
0.070		7.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	200	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 32S: Area D Proposed Existing Wetland Conditions



Summary for Subcatchment 33S: Area A Proposed Parking/Roof Conditions

[49] Hint: Tc<2dt may require smaller dt

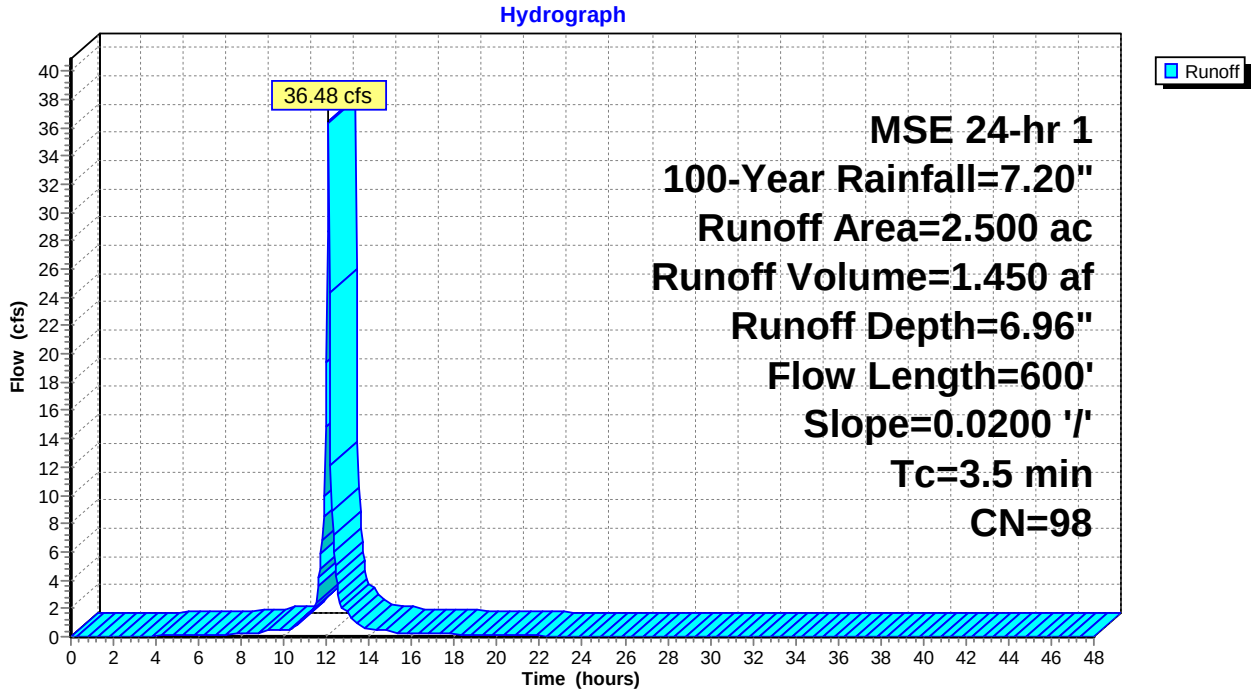
Runoff = 36.48 cfs @ 12.09 hrs, Volume= 1.450 af, Depth= 6.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 100-Year Rainfall=7.20"

Area (ac)	CN	Description
2.500	98	Paved parking, HSG D
2.500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	600	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 33S: Area A Proposed Parking/Roof Conditions



Summary for Subcatchment 34S: Area B Proposed Driveway Conditions

[49] Hint: Tc<2dt may require smaller dt

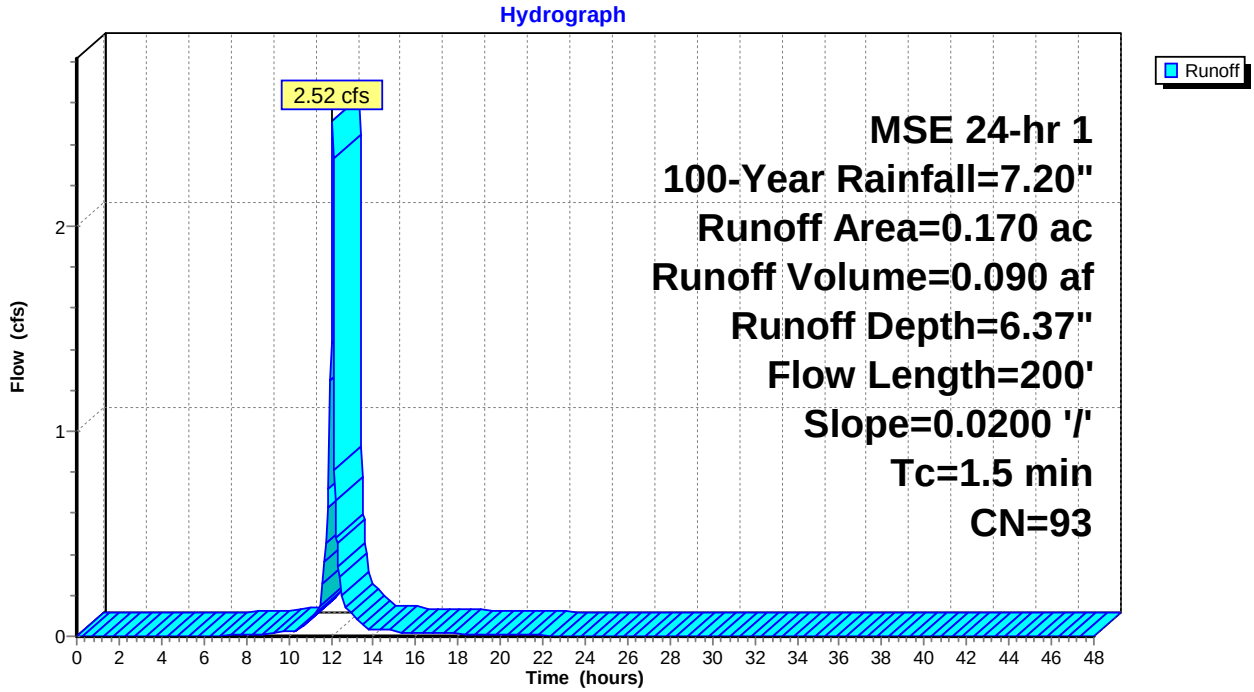
Runoff = 2.52 cfs @ 12.07 hrs, Volume= 0.090 af, Depth= 6.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 1 100-Year Rainfall=7.20"

Area (ac)	CN	Description
0.050	80	>75% Grass cover, Good, HSG D
0.120	98	Paved parking, HSG D
0.170	93	Weighted Average
0.050		29.41% Pervious Area
0.120		70.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 34S: Area B Proposed Driveway Conditions



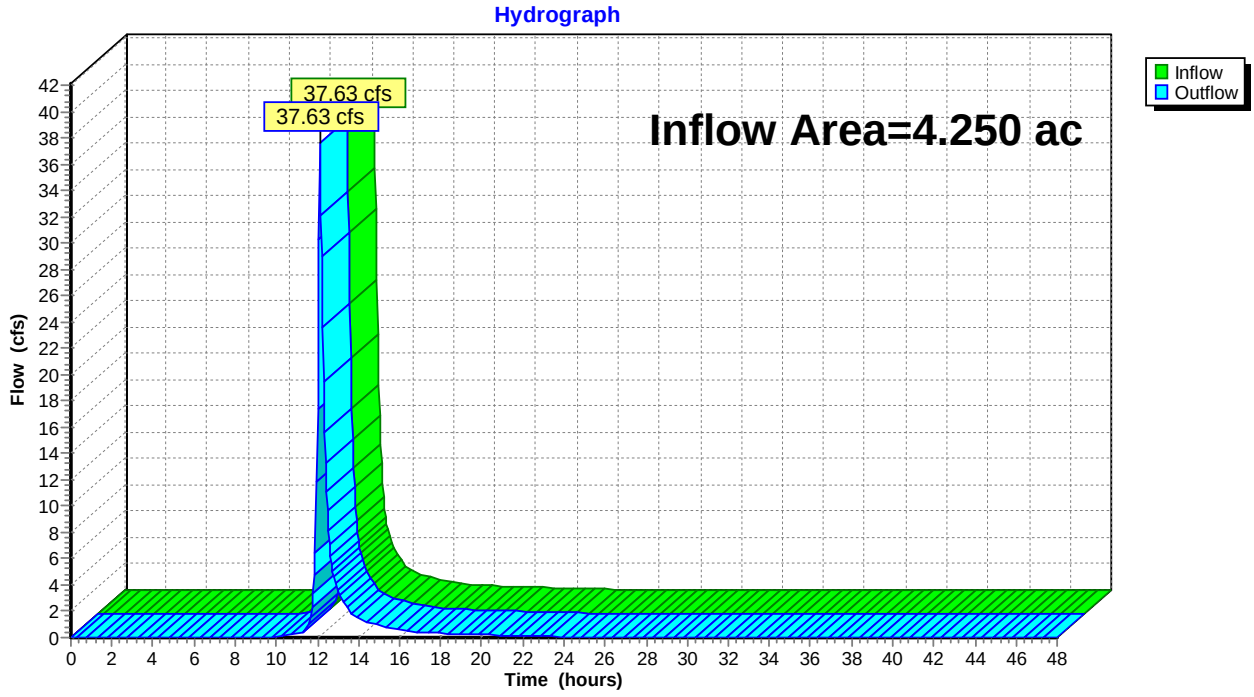
Summary for Reach 22R: City Storm Sewer

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

Inflow Area = 4.250 ac, 63.29% Impervious, Inflow Depth = 5.28" for 100-Year event
Inflow = 37.63 cfs @ 12.10 hrs, Volume= 1.869 af
Outflow = 37.63 cfs @ 12.10 hrs, Volume= 1.869 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 22R: City Storm Sewer



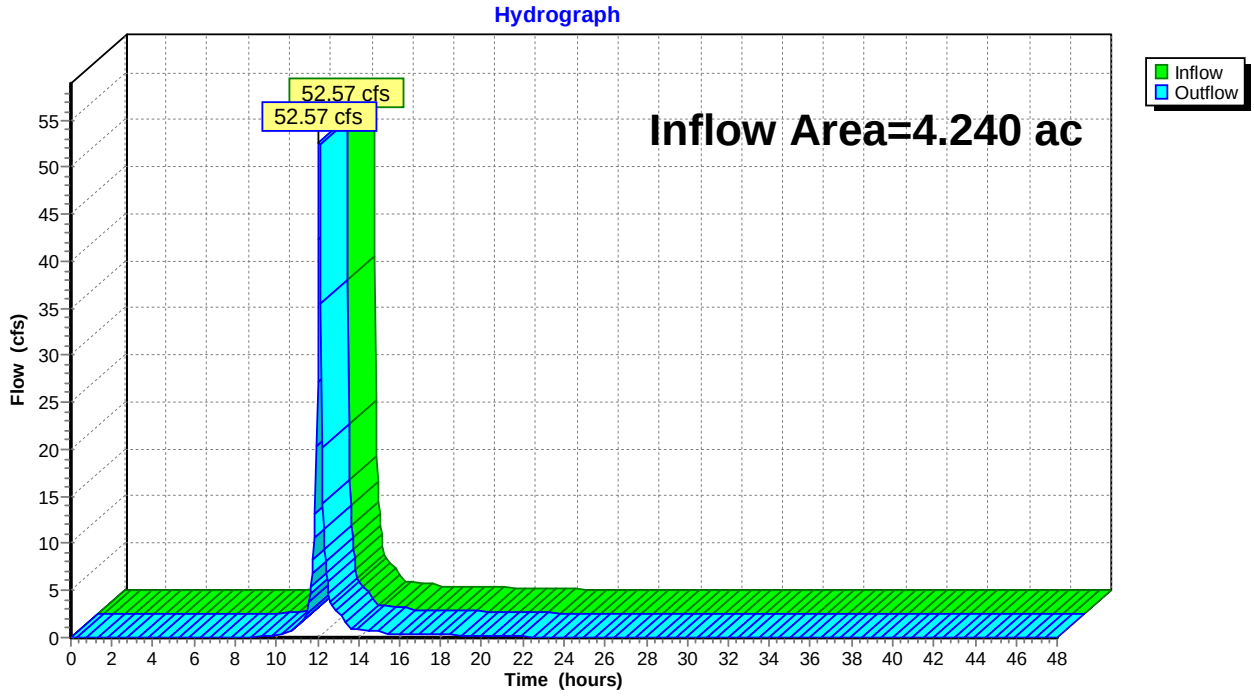
Summary for Reach 26R: City Storm

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

Inflow Area = 4.240 ac, 5.66% Impervious, Inflow Depth = 5.40" for 100-Year event
Inflow = 52.57 cfs @ 12.09 hrs, Volume= 1.909 af
Outflow = 52.57 cfs @ 12.09 hrs, Volume= 1.909 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 26R: City Storm



Summary for Pond 19P: Filtration Basin

[95] Warning: Outlet Device #1 rise exceeded

Inflow Area = 3.110 ac, 80.39% Impervious, Inflow Depth = 6.55" for 100-Year event
Inflow = 43.77 cfs @ 12.09 hrs, Volume= 1.698 af
Outflow = 27.66 cfs @ 12.15 hrs, Volume= 1.560 af, Atten= 37%, Lag= 3.8 min
Discarded = 0.09 cfs @ 12.15 hrs, Volume= 0.185 af
Primary = 27.57 cfs @ 12.15 hrs, Volume= 1.375 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 990.21' @ 12.15 hrs Surf.Area= 0.284 ac Storage= 0.710 af

Plug-Flow detention time= 175.0 min calculated for 1.558 af (92% of inflow)
Center-of-Mass det. time= 147.6 min (888.4 - 740.8)

Volume	Invert	Avail.Storage	Storage Description
#1	987.00'	1.275 af	**Custom Stage Data (Prismatic)** Listed below

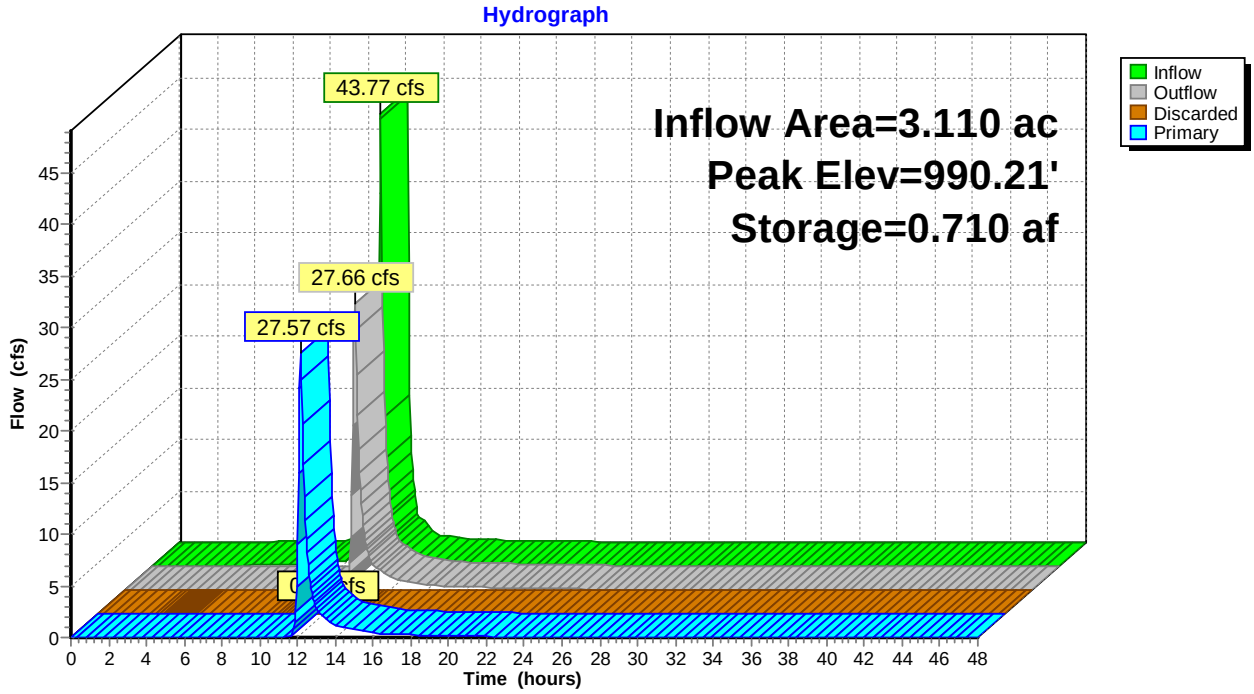
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
987.00	0.140	0.000	0.000
988.00	0.210	0.175	0.175
989.00	0.230	0.220	0.395
990.00	0.280	0.255	0.650
991.00	0.300	0.290	0.940
992.00	0.370	0.335	1.275

Device	Routing	Invert	Outlet Devices
#1	Device 2	988.25'	**30.0 deg x 0.7' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.61 (C= 3.26)
#2	Primary	983.50'	**30.0" Round Culvert** L= 49.0' Ke= 1.000 Inlet / Outlet Invert= 983.50' / 983.30' S= 0.0041 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#3	Device 2	989.00'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	987.50'	**15.0" Round Culvert** L= 20.0' Ke= 1.000 Inlet / Outlet Invert= 987.50' / 987.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#5	Discarded	987.00'	**0.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 983.00'

Discarded OutFlow Max=0.09 cfs @ 12.15 hrs HW=990.20' (Free Discharge)
└**5=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=27.35 cfs @ 12.15 hrs HW=990.20' (Free Discharge)
└**2=Culvert** (Passes 27.35 cfs of 41.38 cfs potential flow)
  └**1=Sharp-Crested Vee/Trap Weir** (Orifice Controls 5.58 cfs @ 5.76 fps)
    └**4=Culvert** (Passes 5.58 cfs of 6.19 cfs potential flow)
  └**3=Broad-Crested Rectangular Weir** (Weir Controls 21.77 cfs @ 3.63 fps)

Pond 19P: Filtration Basin



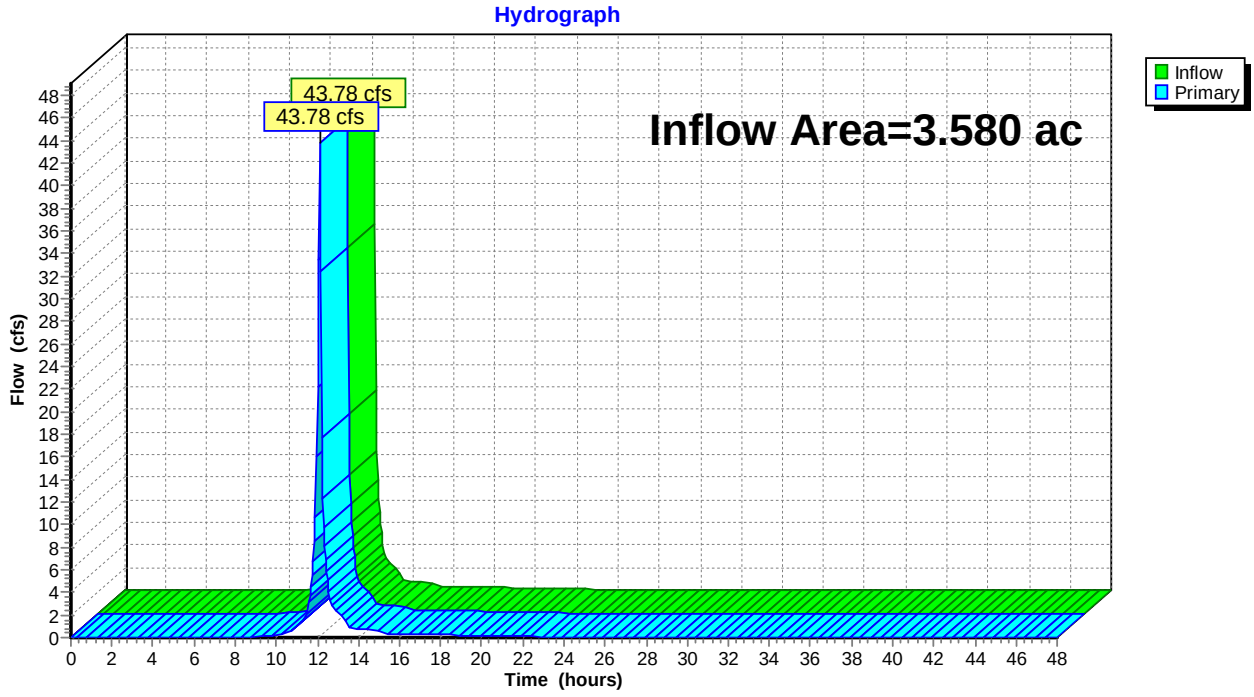
Summary for Pond 20P: West Wetland

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

Inflow Area = 3.580 ac, 6.70% Impervious, Inflow Depth = 5.35" for 100-Year event
Inflow = 43.78 cfs @ 12.10 hrs, Volume= 1.597 af
Primary = 43.78 cfs @ 12.10 hrs, Volume= 1.597 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 20P: West Wetland



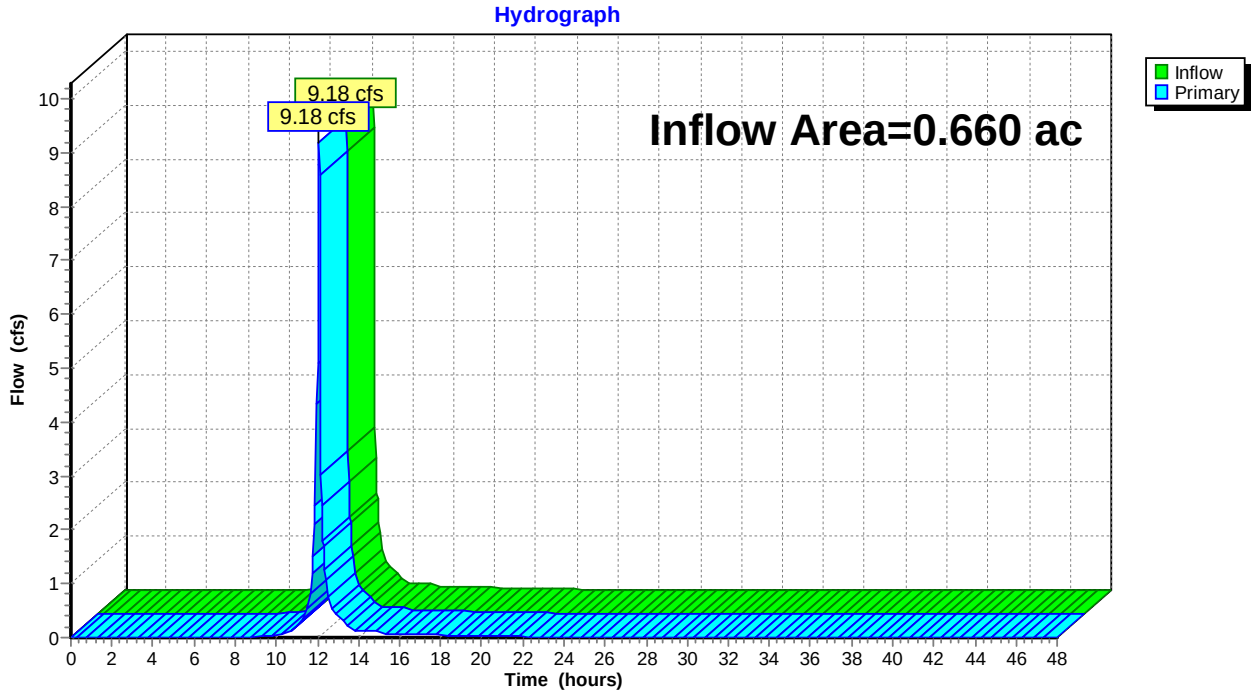
Summary for Pond 21P: East Wetland

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

Inflow Area = 0.660 ac, 0.00% Impervious, Inflow Depth = 5.67" for 100-Year event
Inflow = 9.18 cfs @ 12.07 hrs, Volume= 0.312 af
Primary = 9.18 cfs @ 12.07 hrs, Volume= 0.312 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 21P: East Wetland



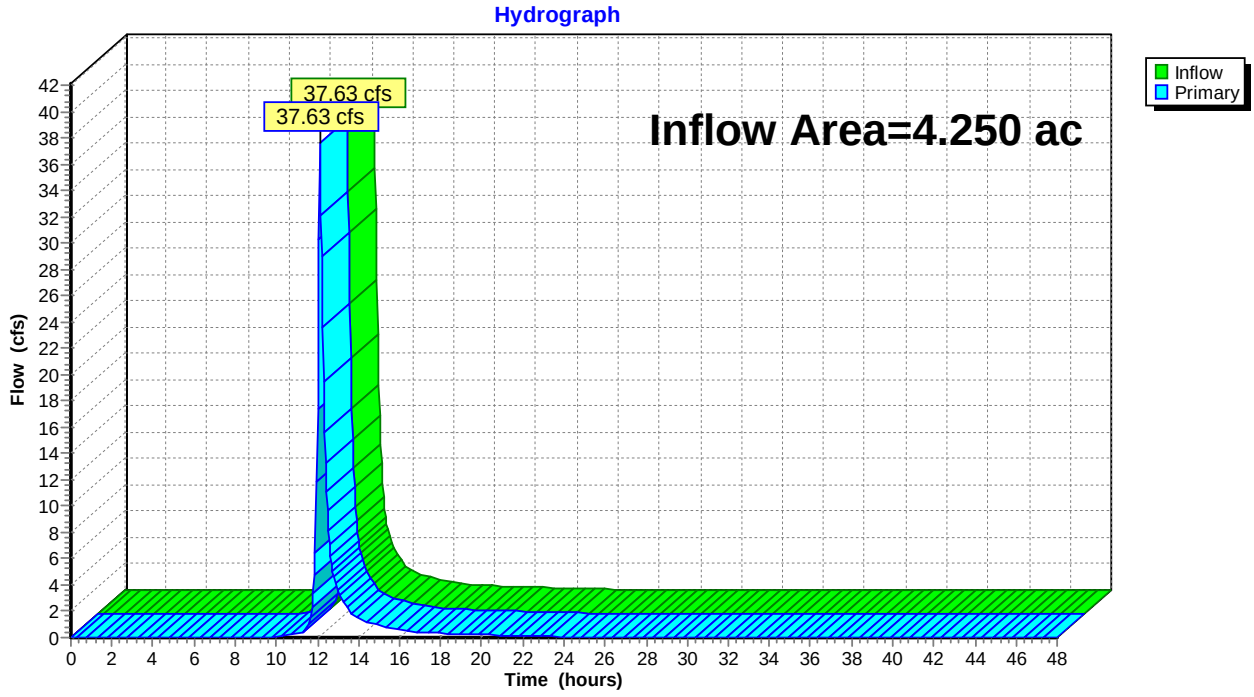
Summary for Pond 27P: Existing Wetlands

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

Inflow Area = 4.250 ac, 63.29% Impervious, Inflow Depth = 5.28" for 100-Year event
Inflow = 37.63 cfs @ 12.10 hrs, Volume= 1.869 af
Primary = 37.63 cfs @ 12.10 hrs, Volume= 1.869 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 27P: Existing Wetlands



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 24S: Area C Existing Runoff Area=0.660 ac 0.00% Impervious Runoff Depth=2.90"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=87 Runoff=3.59 cfs 0.160 af

Subcatchment 25S: Area A Existing Runoff Area=1.800 ac 7.78% Impervious Runoff Depth=2.37"
Flow Length=600' Slope=0.0200 '/' Tc=4.4 min CN=81 Runoff=7.82 cfs 0.355 af

Subcatchment 29S: Area B Existing Runoff Area=1.120 ac 0.00% Impervious Runoff Depth=3.20"
Flow Length=600' Slope=0.0200 '/' Tc=4.4 min CN=90 Runoff=6.23 cfs 0.298 af

Subcatchment 30S: Area D Existing Runoff Area=0.660 ac 15.15% Impervious Runoff Depth=2.54"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=83 Runoff=3.21 cfs 0.140 af

Subcatchment 31S: Area C Proposed Basin Runoff Area=0.610 ac 0.00% Impervious Runoff Depth=2.28"
Flow Length=200' Slope=0.0200 '/' Tc=1.2 min CN=80 Runoff=2.74 cfs 0.116 af

Subcatchment 32S: Area D Proposed Runoff Area=0.970 ac 7.22% Impervious Runoff Depth=2.37"
Flow Length=200' Slope=0.0200 '/' Tc=1.2 min CN=81 Runoff=4.50 cfs 0.191 af

Subcatchment 33S: Area A Proposed Runoff Area=2.500 ac 100.00% Impervious Runoff Depth=4.05"
Flow Length=600' Slope=0.0200 '/' Tc=3.5 min CN=98 Runoff=16.11 cfs 0.845 af

Subcatchment 34S: Area B Proposed Runoff Area=0.170 ac 70.59% Impervious Runoff Depth=3.50"
Flow Length=200' Slope=0.0200 '/' Tc=1.5 min CN=93 Runoff=1.05 cfs 0.050 af

Reach 22R: City Storm Sewer Inflow=9.14 cfs 0.868 af
Outflow=9.14 cfs 0.868 af

Reach 26R: City Storm Inflow=20.25 cfs 0.953 af
Outflow=20.25 cfs 0.953 af

Pond 19P: Filtration Basin Peak Elev=989.39' Storage=0.495 af Inflow=18.64 cfs 0.961 af
Discarded=0.07 cfs 0.190 af Primary=7.09 cfs 0.627 af Outflow=7.17 cfs 0.817 af

Pond 20P: West Wetland Inflow=16.94 cfs 0.793 af
Primary=16.94 cfs 0.793 af

Pond 21P: East Wetland Inflow=3.59 cfs 0.160 af
Primary=3.59 cfs 0.160 af

Pond 27P: Existing Wetlands Inflow=9.14 cfs 0.868 af
Primary=9.14 cfs 0.868 af

Total Runoff Area = 8.490 ac Runoff Volume = 2.154 af Average Runoff Depth = 3.05"
65.49% Pervious = 5.560 ac 34.51% Impervious = 2.930 ac

Summary for Subcatchment 24S: Area C Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

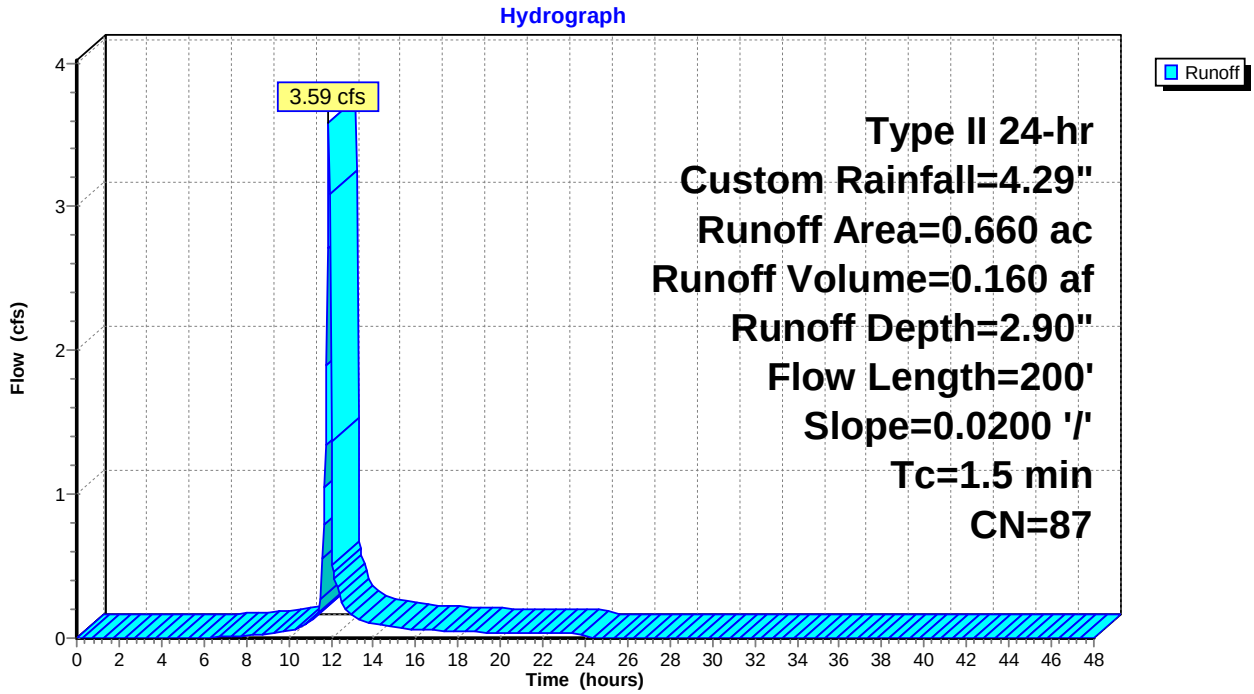
Runoff = 3.59 cfs @ 11.91 hrs, Volume= 0.160 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Custom Rainfall=4.29"

Area (ac)	CN	Description
0.360	80	>75% Grass cover, Good, HSG D
0.300	96	Gravel surface, HSG D
0.660	87	Weighted Average
0.660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 24S: Area C Existing Conditions



Summary for Subcatchment 25S: Area A Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

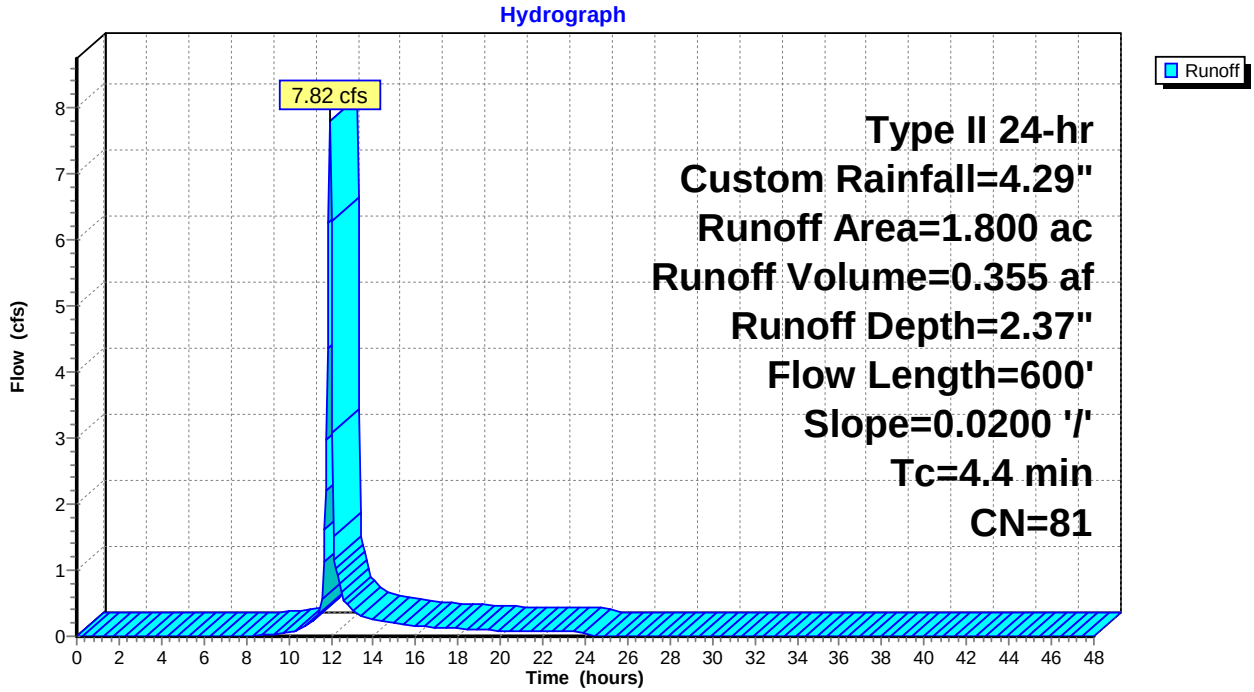
Runoff = 7.82 cfs @ 11.95 hrs, Volume= 0.355 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Custom Rainfall=4.29"

Area (ac)	CN	Description
1.660	80	>75% Grass cover, Good, HSG D
0.140	98	Paved parking, HSG D
1.800	81	Weighted Average
1.660		92.22% Pervious Area
0.140		7.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	600	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 25S: Area A Existing Conditions



Summary for Subcatchment 29S: Area B Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

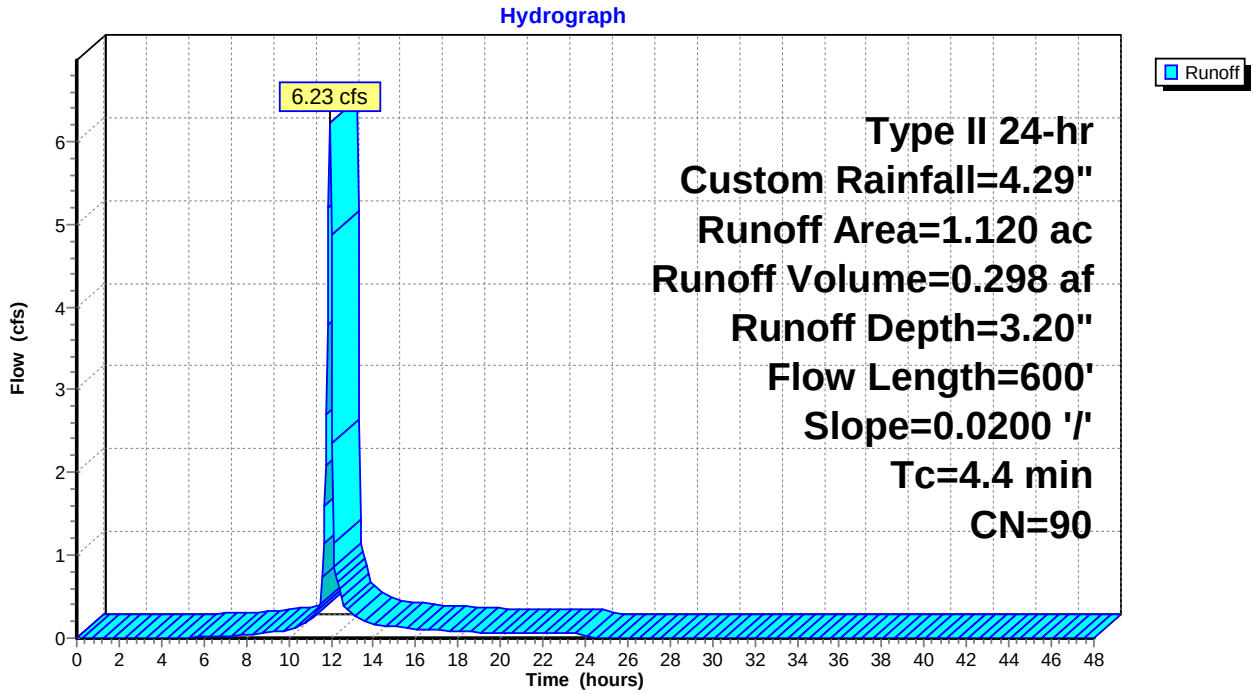
Runoff = 6.23 cfs @ 11.95 hrs, Volume= 0.298 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Custom Rainfall=4.29"

Area (ac)	CN	Description
0.410	80	>75% Grass cover, Good, HSG D
0.710	96	Gravel surface, HSG D
1.120	90	Weighted Average
1.120		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	600	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 29S: Area B Existing Conditions



Summary for Subcatchment 30S: Area D Existing Conditions

[49] Hint: Tc<2dt may require smaller dt

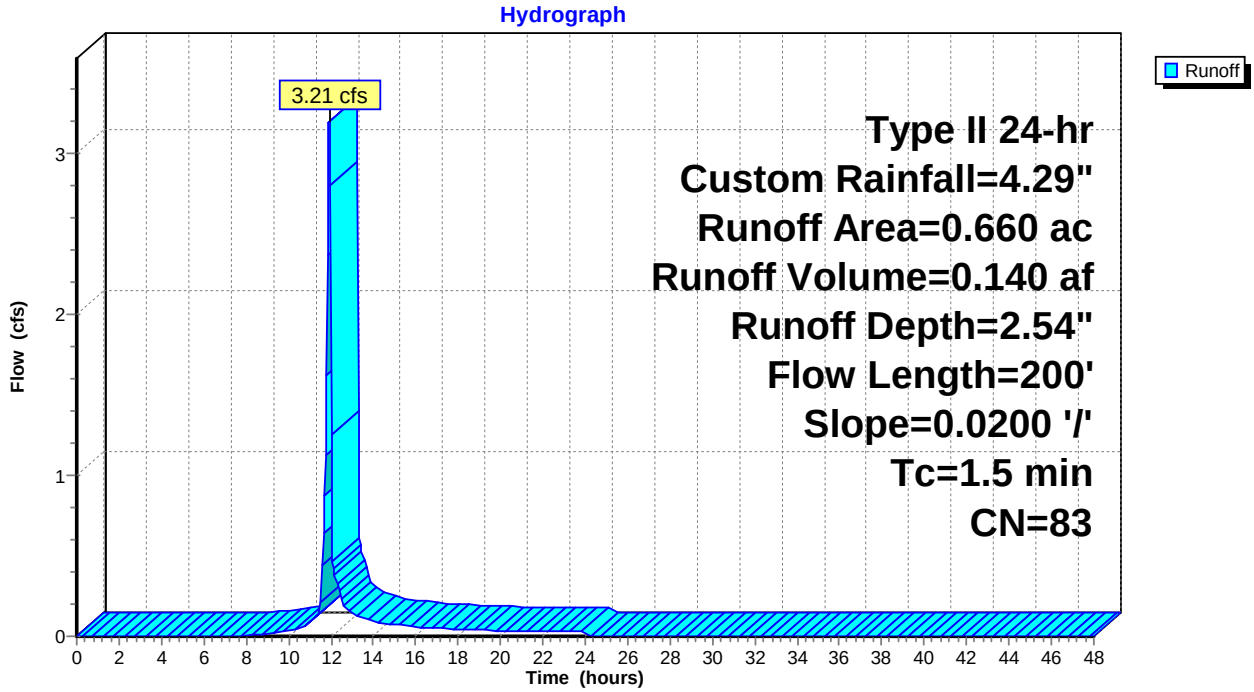
Runoff = 3.21 cfs @ 11.91 hrs, Volume= 0.140 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Custom Rainfall=4.29"

Area (ac)	CN	Description
0.560	80	>75% Grass cover, Good, HSG D
0.100	98	Paved parking, HSG D
0.660	83	Weighted Average
0.560		84.85% Pervious Area
0.100		15.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 30S: Area D Existing Conditions



Summary for Subcatchment 31S: Area C Proposed Basin Conditions

[49] Hint: Tc<2dt may require smaller dt

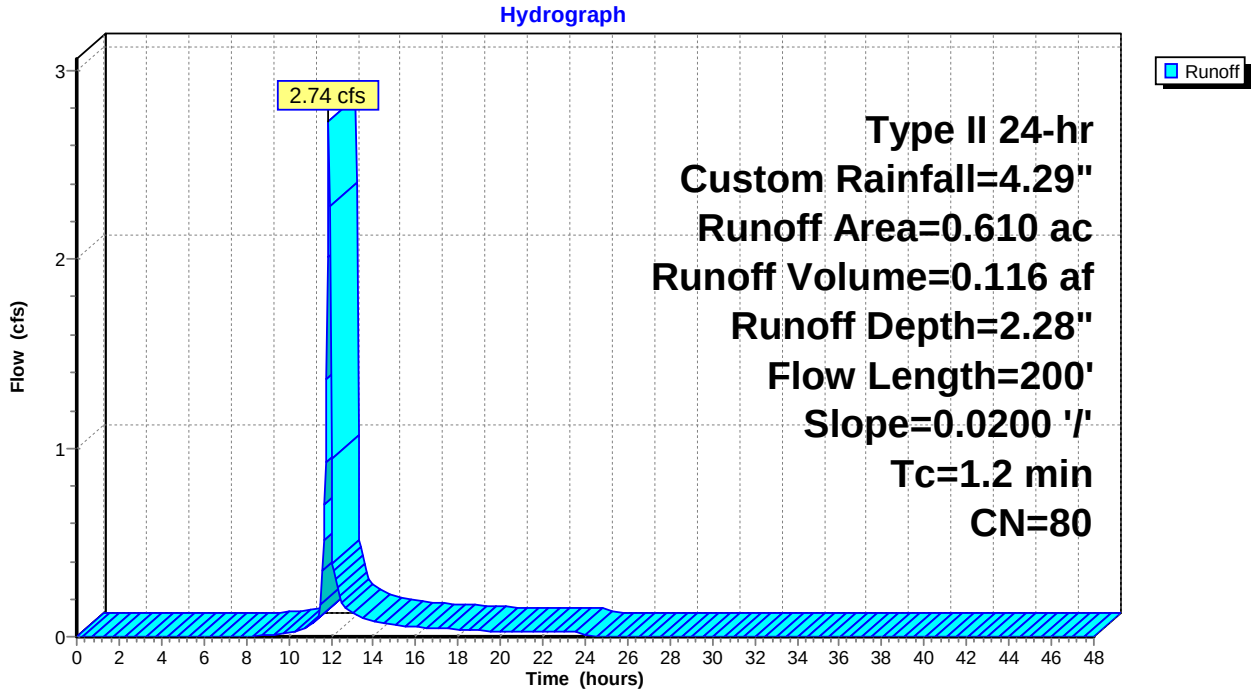
Runoff = 2.74 cfs @ 11.91 hrs, Volume= 0.116 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Custom Rainfall=4.29"

Area (ac)	CN	Description
0.610	80	>75% Grass cover, Good, HSG D
0.610		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	200	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 31S: Area C Proposed Basin Conditions



Summary for Subcatchment 32S: Area D Proposed Existing Wetland Conditions

[49] Hint: Tc<2dt may require smaller dt

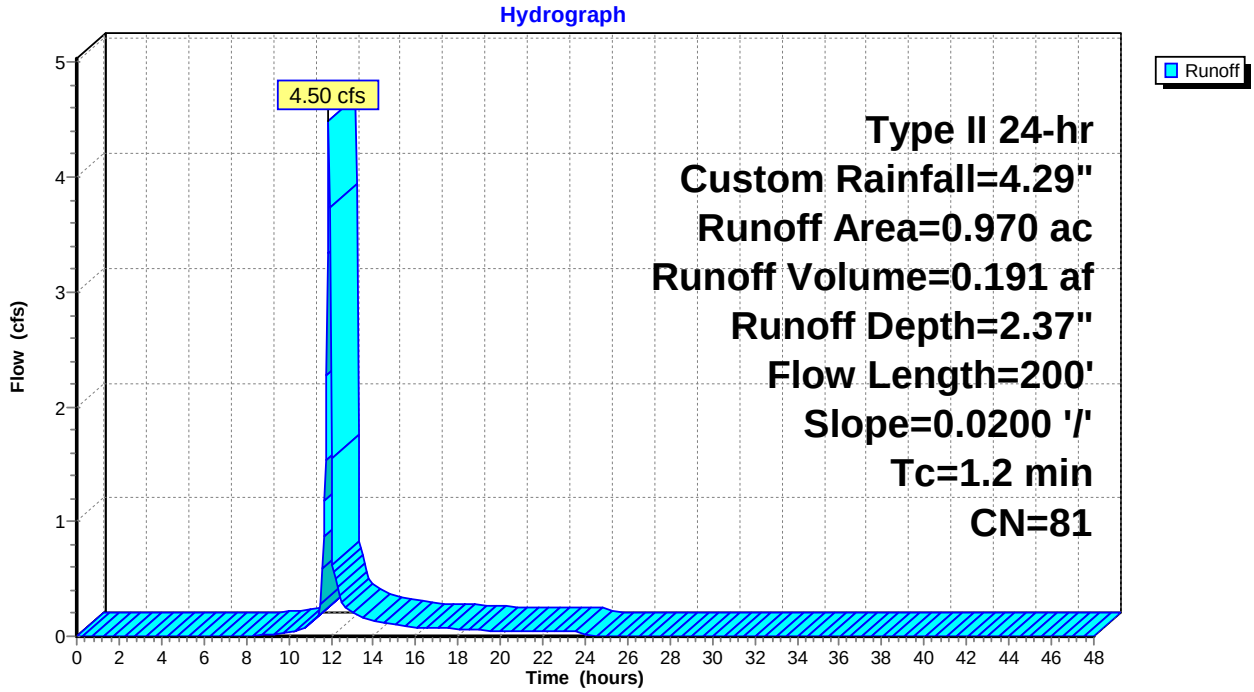
Runoff = 4.50 cfs @ 11.91 hrs, Volume= 0.191 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Custom Rainfall=4.29"

Area (ac)	CN	Description
0.900	80	>75% Grass cover, Good, HSG D
0.070	98	Paved parking, HSG D
0.970	81	Weighted Average
0.900		92.78% Pervious Area
0.070		7.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	200	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 32S: Area D Proposed Existing Wetland Conditions



Summary for Subcatchment 33S: Area A Proposed Parking/Roof Conditions

[49] Hint: Tc<2dt may require smaller dt

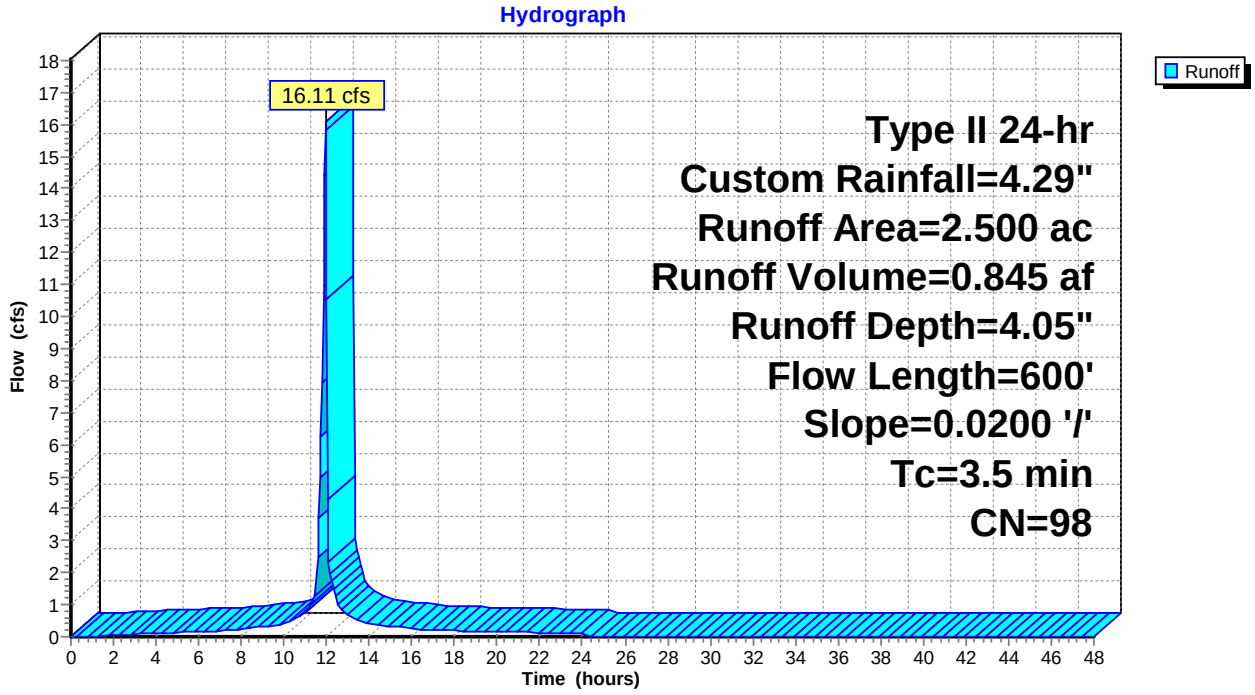
Runoff = 16.11 cfs @ 11.94 hrs, Volume= 0.845 af, Depth= 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Custom Rainfall=4.29"

Area (ac)	CN	Description
2.500	98	Paved parking, HSG D
2.500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	600	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 33S: Area A Proposed Parking/Roof Conditions



Summary for Subcatchment 34S: Area B Proposed Driveway Conditions

[49] Hint: Tc<2dt may require smaller dt

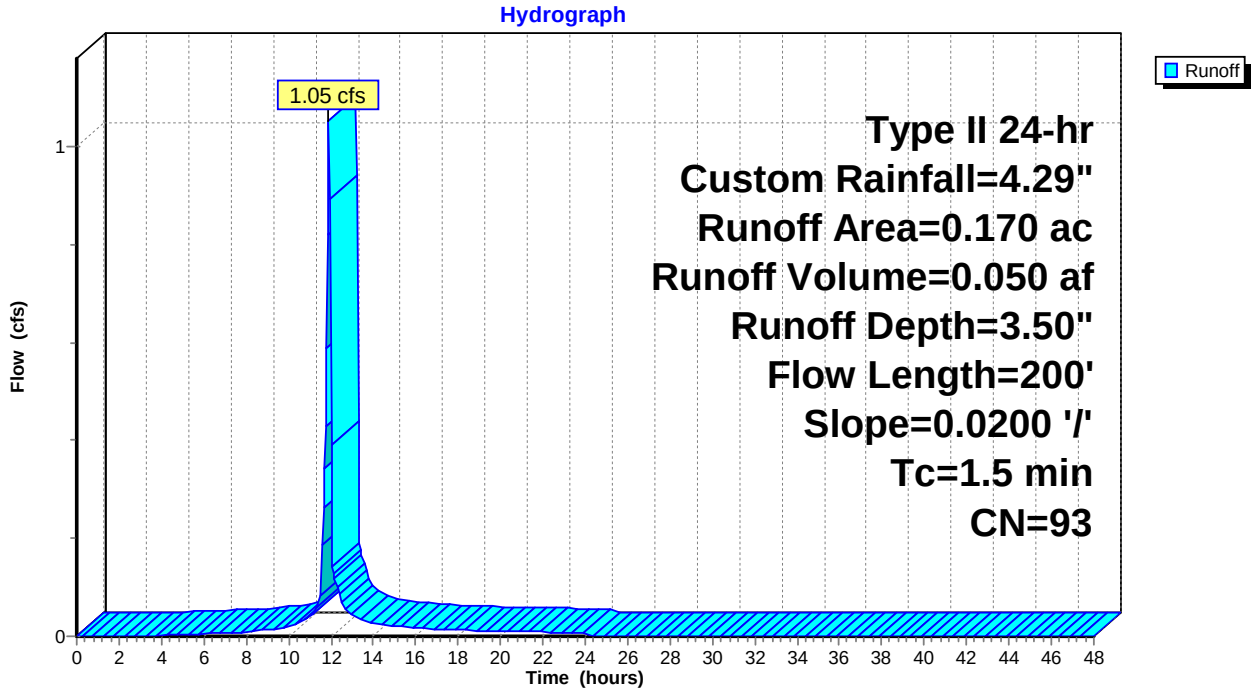
Runoff = 1.05 cfs @ 11.90 hrs, Volume= 0.050 af, Depth= 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr Custom Rainfall=4.29"

Area (ac)	CN	Description
0.050	80	>75% Grass cover, Good, HSG D
0.120	98	Paved parking, HSG D
0.170	93	Weighted Average
0.050		29.41% Pervious Area
0.120		70.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	200	0.0200	2.28		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps

Subcatchment 34S: Area B Proposed Driveway Conditions



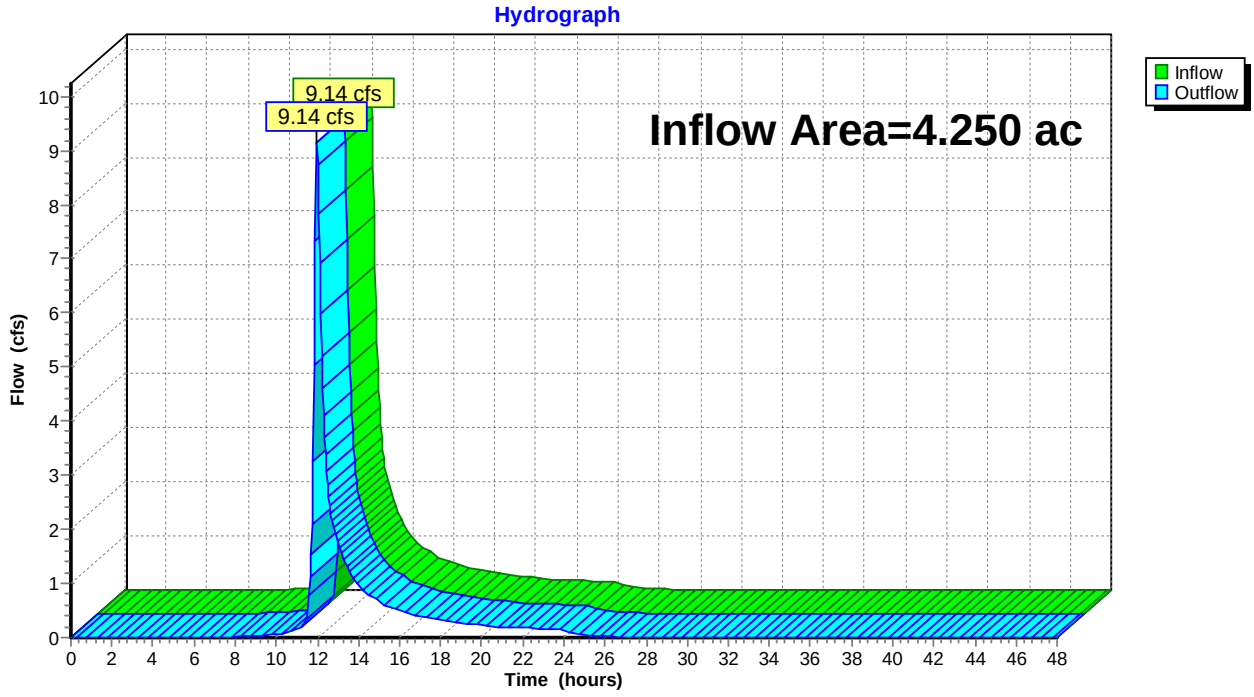
Summary for Reach 22R: City Storm Sewer

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

Inflow Area = 4.250 ac, 63.29% Impervious, Inflow Depth = 2.45" for Custom event
Inflow = 9.14 cfs @ 11.97 hrs, Volume= 0.868 af
Outflow = 9.14 cfs @ 11.97 hrs, Volume= 0.868 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 22R: City Storm Sewer



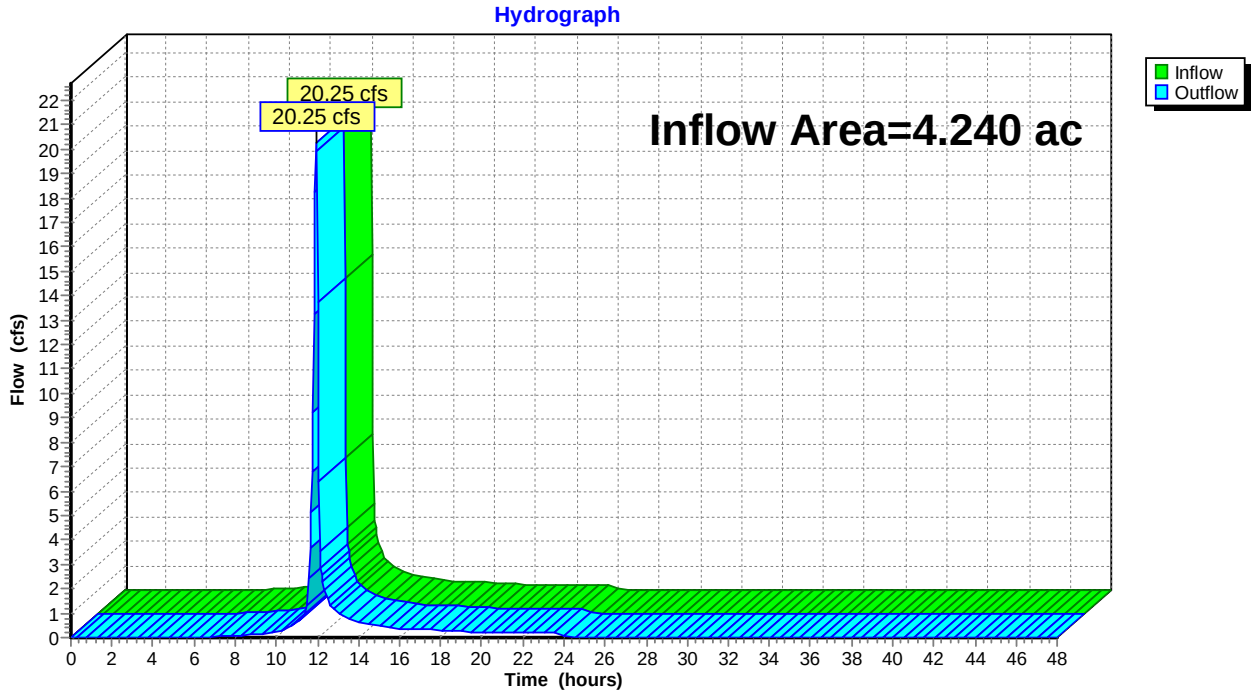
Summary for Reach 26R: City Storm

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

Inflow Area = 4.240 ac, 5.66% Impervious, Inflow Depth = 2.70" for Custom event
Inflow = 20.25 cfs @ 11.94 hrs, Volume= 0.953 af
Outflow = 20.25 cfs @ 11.94 hrs, Volume= 0.953 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 26R: City Storm



Summary for Pond 19P: Filtration Basin

[95] Warning: Outlet Device #1 rise exceeded

Inflow Area = 3.110 ac, 80.39% Impervious, Inflow Depth = 3.71" for Custom event
Inflow = 18.64 cfs @ 11.93 hrs, Volume= 0.961 af
Outflow = 7.17 cfs @ 12.04 hrs, Volume= 0.817 af, Atten= 62%, Lag= 6.3 min
Discarded = 0.07 cfs @ 12.04 hrs, Volume= 0.190 af
Primary = 7.09 cfs @ 12.04 hrs, Volume= 0.627 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 989.39' @ 12.04 hrs Surf.Area= 0.250 ac Storage= 0.495 af

Plug-Flow detention time= 343.0 min calculated for 0.816 af (85% of inflow)
Center-of-Mass det. time= 275.2 min (1,028.8 - 753.6)

Volume	Invert	Avail.Storage	Storage Description
#1	987.00'	1.275 af	**Custom Stage Data (Prismatic)** Listed below

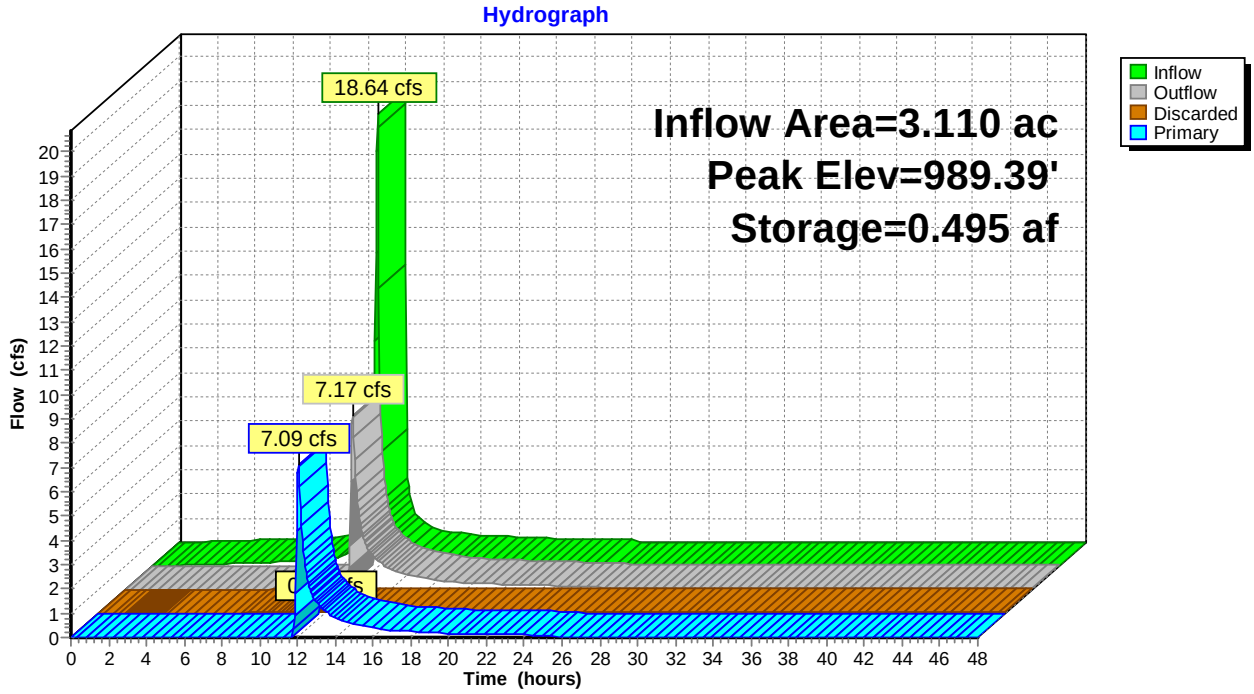
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
987.00	0.140	0.000	0.000
988.00	0.210	0.175	0.175
989.00	0.230	0.220	0.395
990.00	0.280	0.255	0.650
991.00	0.300	0.290	0.940
992.00	0.370	0.335	1.275

Device	Routing	Invert	Outlet Devices
#1	Device 2	988.25'	**30.0 deg x 0.7' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.61 (C= 3.26)
#2	Primary	983.50'	**30.0" Round Culvert** L= 49.0' Ke= 1.000 Inlet / Outlet Invert= 983.50' / 983.30' S= 0.0041 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#3	Device 2	989.00'	**5.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	987.50'	**15.0" Round Culvert** L= 20.0' Ke= 1.000 Inlet / Outlet Invert= 987.50' / 987.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#5	Discarded	987.00'	**0.200 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 983.00'

Discarded OutFlow Max=0.07 cfs @ 12.04 hrs HW=989.38' (Free Discharge)
└**5=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=6.98 cfs @ 12.04 hrs HW=989.38' (Free Discharge)
└**2=Culvert** (Passes 6.98 cfs of 38.16 cfs potential flow)
  ├**1=Sharp-Crested Vee/Trap Weir** (Orifice Controls 3.51 cfs @ 3.63 fps)
  │ └**4=Culvert** (Passes 3.51 cfs of 4.72 cfs potential flow)
  └**3=Broad-Crested Rectangular Weir** (Weir Controls 3.46 cfs @ 1.80 fps)

Pond 19P: Filtration Basin



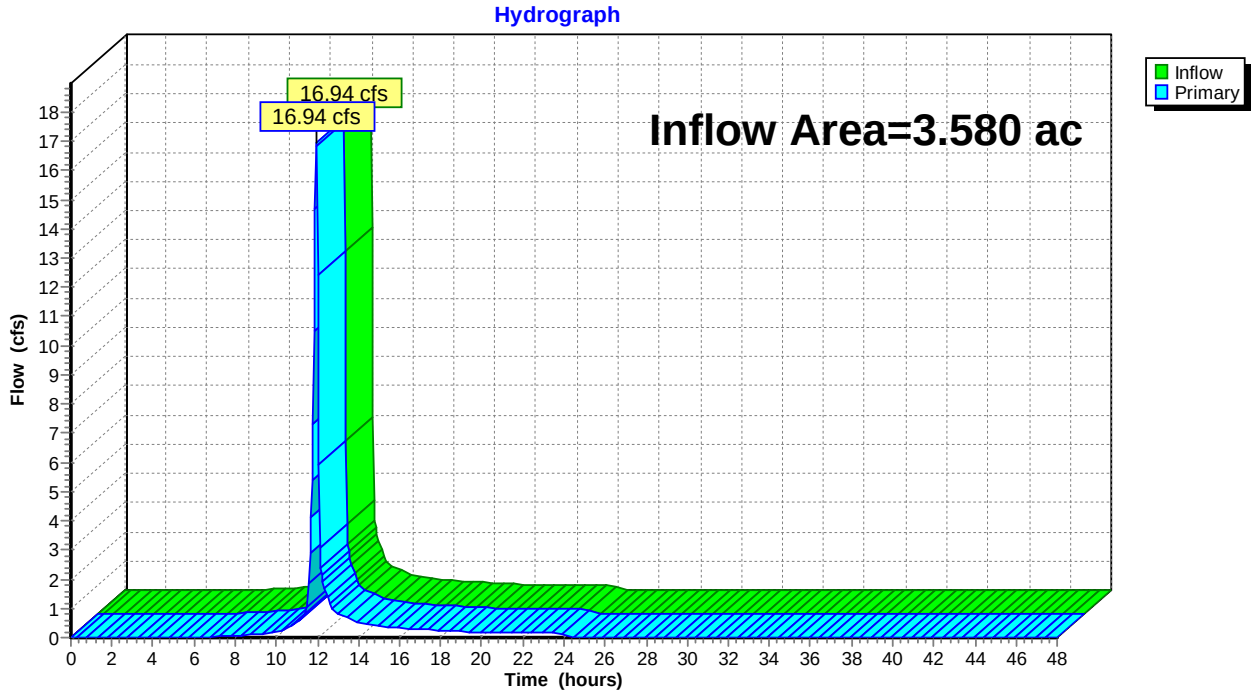
Summary for Pond 20P: West Wetland

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

Inflow Area = 3.580 ac, 6.70% Impervious, Inflow Depth = 2.66" for Custom event
Inflow = 16.94 cfs @ 11.94 hrs, Volume= 0.793 af
Primary = 16.94 cfs @ 11.94 hrs, Volume= 0.793 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 20P: West Wetland



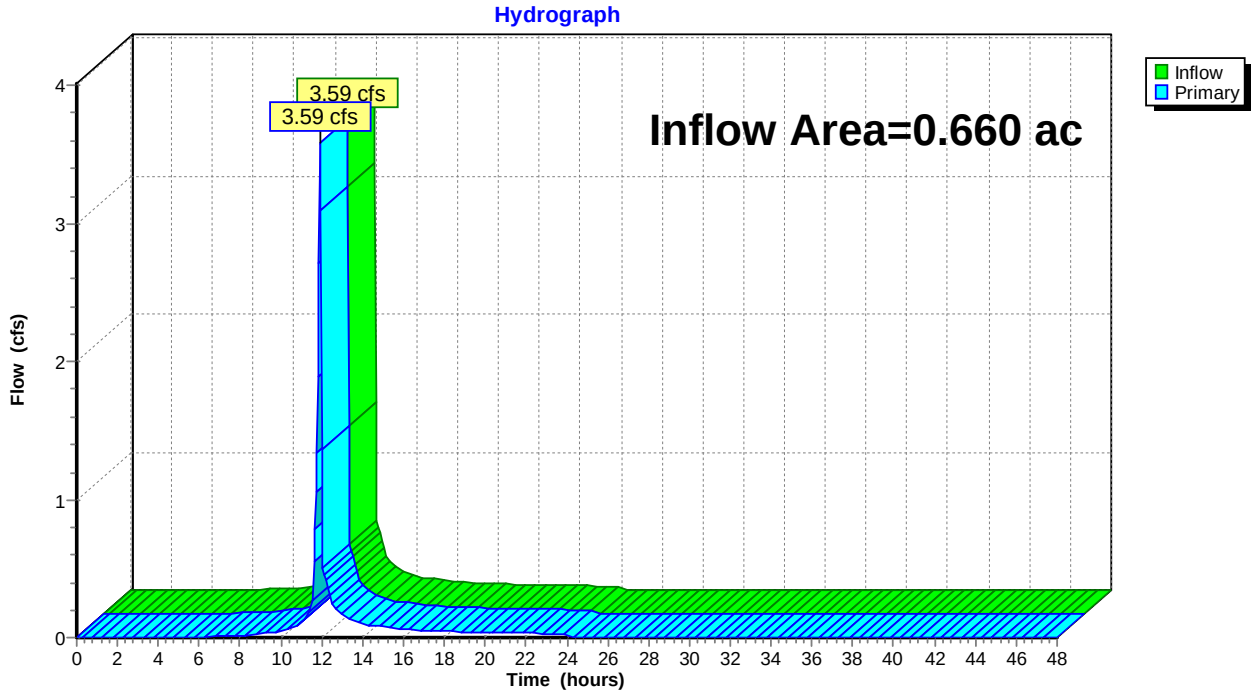
Summary for Pond 21P: East Wetland

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

Inflow Area = 0.660 ac, 0.00% Impervious, Inflow Depth = 2.90" for Custom event
Inflow = 3.59 cfs @ 11.91 hrs, Volume= 0.160 af
Primary = 3.59 cfs @ 11.91 hrs, Volume= 0.160 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 21P: East Wetland



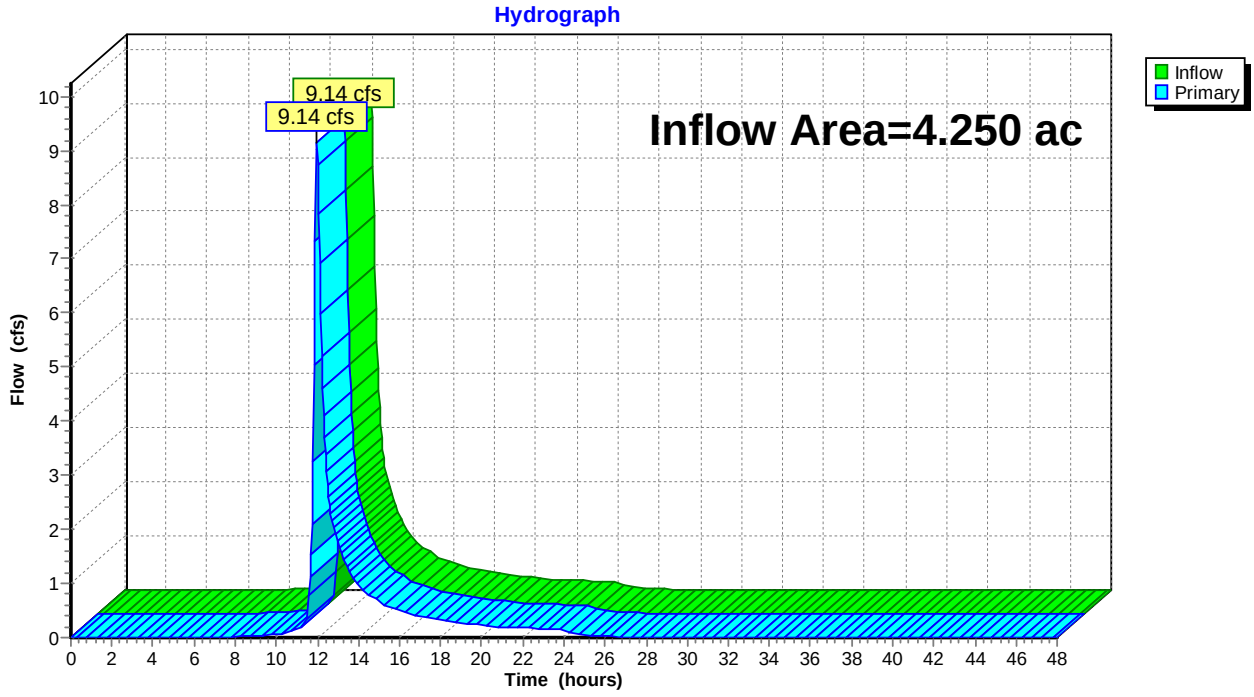
Summary for Pond 27P: Existing Wetlands

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

Inflow Area = 4.250 ac, 63.29% Impervious, Inflow Depth = 2.45" for Custom event
Inflow = 9.14 cfs @ 11.97 hrs, Volume= 0.868 af
Primary = 9.14 cfs @ 11.97 hrs, Volume= 0.868 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Pond 27P: Existing Wetlands



United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Blue Earth County, Minnesota

June 20, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

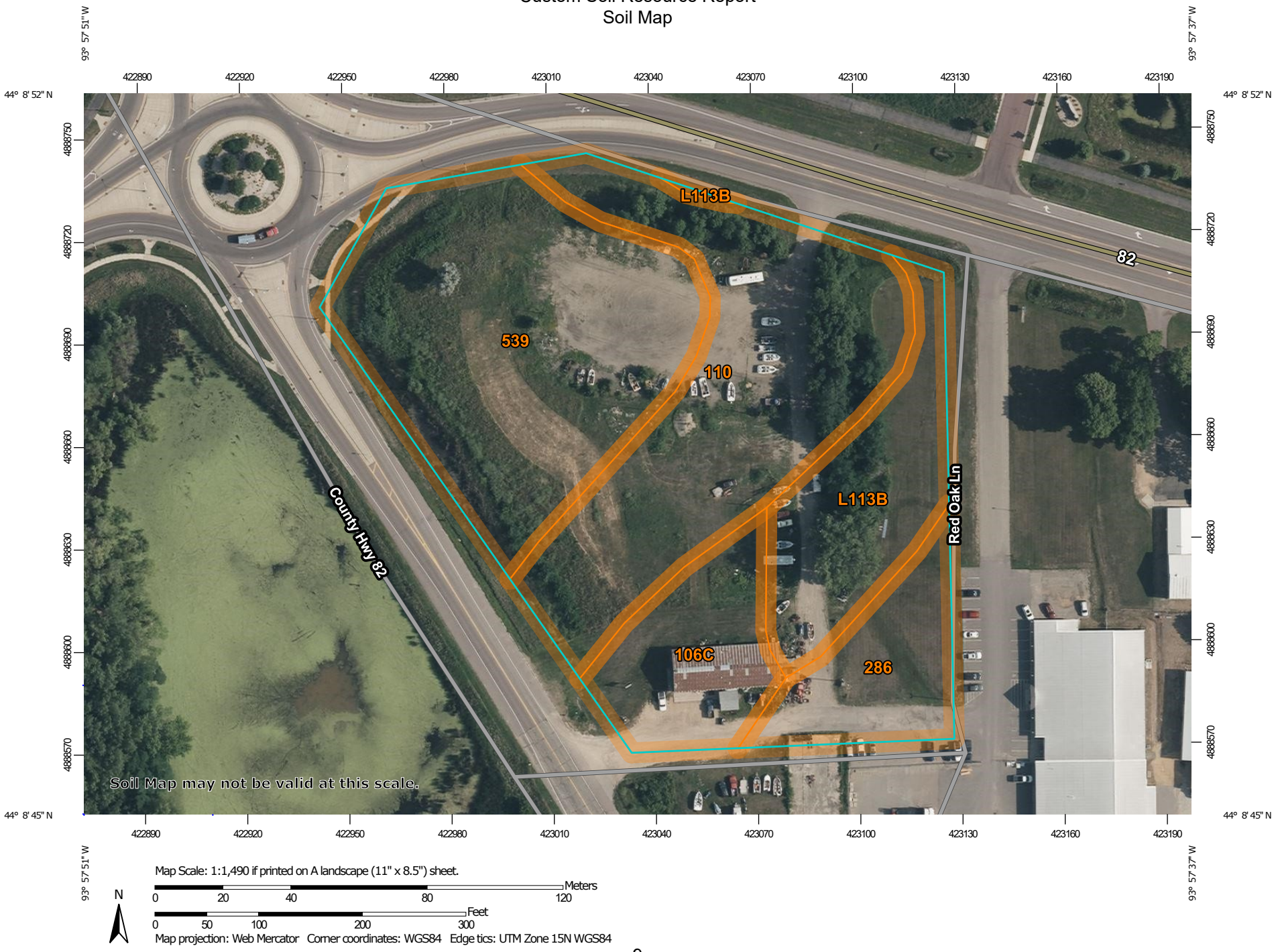
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,490 if printed on A landscape (11" x 8.5") 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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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: Blue Earth County, Minnesota
Survey Area Data: Version 22, Sep 7, 2024

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

Date(s) aerial images were photographed: Jul 2, 2023—Aug 8, 2023

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
106C	Lester loam, 6 to 10 percent slopes	0.6	10.7%
110	Marna silty clay loam, 0 to 2 percent slopes	1.9	32.1%
286	Shorewood silty clay loam, 1 to 6 percent slopes	0.5	9.2%
539	Klossner muck, lake plain, depressional, 0 to 1 percent slopes	2.0	34.4%
L113B	Reedslake-Le Sueur complex, 1 to 6 percent slopes	0.8	13.6%
Totals for Area of Interest		**5.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Blue Earth County, Minnesota

106C—Lester loam, 6 to 10 percent slopes

Map Unit Setting

National map unit symbol: 2ttc7
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Lester and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lester

Setting

Landform: Hillslopes, ground moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 9 inches: loam
Bt - 9 to 30 inches: clay loam
C - 30 to 79 inches: loam

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 47 to 63 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R103XY020MN - Loamy Upland Savannas
Forage suitability group: Sloping Upland, Acid (G103XS006MN)
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Minor Components

Le sueur

Percent of map unit: 10 percent
Landform: Ground moraines, hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Webster

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R103XY001MN - Loamy Wet Prairies
Other vegetative classification: Level Swale, Neutral (G103XS001MN)
Hydric soil rating: Yes

Storden, moderately eroded

Percent of map unit: 3 percent
Landform: Ground moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Calcareous (G103XS010MN)
Hydric soil rating: No

Lester

Percent of map unit: 2 percent
Landform: Ground moraines, hillslopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

110—Marna silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2vwk0
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches

Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Marna and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marna

Setting

Landform: Lake plains, ground moraines, flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glaciolacustrine deposits over till

Typical profile

Ap - 0 to 7 inches: silty clay loam
A - 7 to 18 inches: silty clay loam
Bg - 18 to 36 inches: silty clay
2Bkg - 36 to 45 inches: clay loam
2Cg - 45 to 79 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 0 to 8 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: R103XY008MN - Clayey Wet Prairies
Forage suitability group: Level Swale, Neutral (G103XS001MN)
Other vegetative classification: Level Swale, Neutral (G103XS001MN)
Hydric soil rating: Yes

Minor Components

Okoboji

Percent of map unit: 7 percent
Landform: Depressions, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R103XY015MN - Depressional Marsh
Other vegetative classification: Ponded If Not Drained (G103XS013MN)
Hydric soil rating: Yes

Guckeen

Percent of map unit: 5 percent
Landform: Ground moraines, flats, lake plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R103XY005MN - Clayey Upland Prairies
Other vegetative classification: Level Swale, Neutral (G103XS001MN)
Hydric soil rating: No

Brownton

Percent of map unit: 3 percent
Landform: Lake plains, flats, ground moraines
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R103XY008MN - Clayey Wet Prairies
Other vegetative classification: Level Swale, Calcareous (G103XS009MN)
Hydric soil rating: Yes

286—Shorewood silty clay loam, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: f97m
Elevation: 700 to 1,570 feet
Mean annual precipitation: 23 to 35 inches
Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Shorewood and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shorewood

Setting

Landform: Rises on lake plains
Landform position (two-dimensional): Summit
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey lacustrine deposits over fine-loamy till

Typical profile

Ap,A - 0 to 17 inches: silty clay loam
Bt - 17 to 39 inches: silty clay
C - 39 to 60 inches: loam

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.57 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: R103XY021MN - Clayey Upland Savannas
Forage suitability group: Sloping Upland, Neutral (G103XS002MN)
Other vegetative classification: Sloping Upland, Neutral (G103XS002MN)
Hydric soil rating: No

Minor Components

Minnetonka

Percent of map unit: 5 percent
Landform: Flats
Hydric soil rating: Yes

Guckeen

Percent of map unit: 5 percent
Landform: Lake plains
Hydric soil rating: No

539—Klossner muck, lake plain, depressional, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2s8x1
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Klossner, drained, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klossner, Drained

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over glaciolacustrine deposits

Typical profile

Oap - 0 to 9 inches: muck
Oa - 9 to 24 inches: muck
2A - 24 to 46 inches: silty clay loam
2Cg - 46 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 17.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: R103XY016MN - Organic Marsh
Forage suitability group: Organic (G103XS014MN)
Other vegetative classification: Organic (G103XS014MN)
Hydric soil rating: Yes

Minor Components

Lura

Percent of map unit: 10 percent
Landform: Depressions, ground moraines, lake plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R103XY015MN - Depressional Marsh
Other vegetative classification: Ponded If Not Drained (G103XS013MN)
Hydric soil rating: Yes

Brownton

Percent of map unit: 5 percent
Landform: Lake plains, flats, ground moraines
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R103XY008MN - Clayey Wet Prairies
Other vegetative classification: Level Swale, Calcareous (G103XS009MN)

Hydric soil rating: Yes

L113B—Reedslake-Le Sueur complex, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2y037
Elevation: 690 to 1,450 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 37 to 52 degrees F
Frost-free period: 140 to 168 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Reedslake and similar soils: 59 percent
Le sueur and similar soils: 30 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reedslake

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam
A - 6 to 15 inches: loam
Bt - 15 to 33 inches: loam
Bk - 33 to 54 inches: loam
C - 54 to 79 inches: loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 20 to 41 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C
Ecological site: R103XY020MN - Loamy Upland Savannas
Forage suitability group: Sloping Upland, Neutral (G103XS002MN)
Other vegetative classification: Sloping Upland, Neutral (G103XS002MN)
Hydric soil rating: No

Description of Le Sueur

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: clay loam
A - 6 to 11 inches: clay loam
Bt - 11 to 24 inches: clay loam
Bkg - 24 to 36 inches: loam
BC - 36 to 55 inches: loam
C - 55 to 79 inches: loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C/D
Ecological site: R103XY020MN - Loamy Upland Savannas
Forage suitability group: Sloping Upland, Acid (G103XS006MN)
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)
Hydric soil rating: No

Minor Components

Cordova

Percent of map unit: 7 percent
Landform: Depressions
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R103XY022MN - Loamy Wet Savannas
Other vegetative classification: Level Swale, Neutral (G103XS001MN)
Hydric soil rating: Yes

Swanlake

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Convex
Ecological site: R103XY020MN - Loamy Upland Savannas
Other vegetative classification: Sloping Upland, Calcareous (G103XS010MN)
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

BOARD OF WATER AND SOIL RESOURCES

Minnesota Wetland Conservation Act
Notice of Decision

Local Government Unit: Blue Earth County	**County:** Blue Earth
Applicant Name: Kyle Smith – Growth Holdings, LLC and Menk	**Applicant Representative:** : Addie Theis – Bolton
Project Name: Victory Drive and TH 83 Redevelopment	**LGU Project No. (if any):** PL2023123
Date Application Received by LGU: 11/8/2023	
Date of LGU Decision: 12/19/2023	
Date this Notice was Sent: 12/19/2023	

WCA Decision Type - check all that apply

☒ Wetland Boundary/Type ☐ Sequencing ☐ Replacement Plan ☐ Bank Plan (not credit purchase)
☐ No-Loss (8420.0415) ☐ Exemption (8420.0420)
Part: ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H Subpart: ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

Replacement Plan Impacts (replacement plan decisions only)

Total WCA Wetland Impact Area:
Wetland Replacement Type: ☐ Project Specific Credits: ☐ Bank Credits:
Bank Account Number(s):

Technical Evaluation Panel Findings and Recommendations (attach if any)

☒ Approve ☐ Approve w/Conditions ☐ Deny ☐ No TEP Recommendation

LGU Decision

☐ Approved with Conditions (specify below)[1] ☒ Approved[1] ☐ Denied
List Conditions:

Decision-Maker for this Application: ☒ Staff ☐ Governing Board/Council ☐ Other:

Decision is valid for: ☒ 5 years (default) ☐ Other (specify):

[1] *Wetland Replacement Plan approval is not valid until BWSR confirms the withdrawal of any required wetland bank credits. For project-specific replacement a financial assurance per MN Rule 8420.0522, Subp. 9 and evidence that all required forms have been recorded on the title of the property on which the replacement wetland is located must be provided to the LGU for the approval to be valid.*

LGU Findings – Attach document(s) and/or insert narrative providing the basis for the LGU decision[1].

☐ Attachment(s) (specify):
☒ Summary: On November 14th the Victory Drive site was visited by Blue Earth County. The boundary of the identified wetland basins were walked and found to be accurate based off of the topography of the site. On November 15th the Blue Earth County Technical Evaluation Pannel met to discuss the submitted report. Blue Earth County staff communicated what was observed during the site visit on the day prior and the TEP reviewed the boundaries against aerial photos. The TEP concurred that the boundaries and type identified were accurate.

For more information regarding this application go to:
https://cityview.blueearthcountymn.gov/cityviewportal/Planning/Status?planningId=15003

[1] *Findings must consider any TEP recommendations.*

Attached Project Documents

☐ Site Location Map ☒ Project Plan(s)/Descriptions/Reports (specify): Victory Drive and TH 83 Redevelopment Wetland Delineation

Appeals of LGU Decisions

If you wish to appeal this decision, you must provide a written request within 30 calendar days of the date you received the notice. All appeals must be submitted to the Board of Water and Soil Resources Executive Director along with a check payable to BWSR for $500 *unless* the LGU has adopted a local appeal process as identified below. The check must be sent by mail and the written request to appeal can be submitted by mail or e-mail. The appeal should include a copy of this notice, name and contact information of appellant(s) and their representatives (if applicable), a statement clarifying the intent to appeal and supporting information as to why the decision is in error. Send to:

Appeals & Regulatory Compliance Coordinator
Minnesota Board of Water & Soils Resources
520 Lafayette Road North
St. Paul, MN 55155
travis.germundson@state.mn.us

Does the LGU have a local appeal process applicable to this decision?

☒ Yes[1] ☐ No

[1]*If yes, all appeals must first be considered via the local appeals process.*

Local Appeals Submittal Requirements (LGU must describe how to appeal, submittal requirements, fees, etc. as applicable)

Appeal of an LGU staff decision. Send petition and $700.00 fee to: Blue Earth County Property and Environmental Resources PO BOX 3566 Mankato, MN 56002

Notice Distribution (include name)

Required on all notices:

☒ SWCD TEP Member: Jake Fritz	☒ BWSR TEP Member: Alyssa Core
☐ LGU TEP Member (if different than LGU contact):	
☒ DNR Representative: Erynn Jenzen	
☐ Watershed District or Watershed Mgmt. Org.:	
☒ Applicant (notice only): Kyle Smith – Growth Holdings, LLC	☒ Agent/Consultant (notice only): Addie Theis – Bolton and Menk

Optional or As Applicable:

☒ Corps of Engineers: Corps of Engineers General Notification	
☐ BWSR Wetland Mitigation Coordinator (required for bank plan applications only):	
☐ Members of the Public (notice only):	☐ Other:

Signature:	**Date:**
Dan Lynch	12/19/23

This notice and accompanying application materials may be sent electronically or by mail. The LGU may opt to send a summary of the application to members of the public upon request per 8420.0255, Subp. 3.

Victory & TH 83 Redevelopment

Joint Type & Boundary Application

Growth Holdings, LLC.
October 27, 2023

Submitted by:
Bolton & Menk, Inc.
1960 Premier Drive
Mankato, MN 56001
P: (507) 625-4171
F: (507) 625-4177

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Appendix

PART ONE: Applicant Information

If applicant is an entity (company, government entity, partnership, etc.), an authorized contact person must be identified. If the applicant is using an agent (consultant, lawyer, or other third party) and has authorized them to act on their behalf, the agent's contact information must also be provided.

Applicant/Landowner Name:	Kyle Smith | Growth Holdings, LLC.
Mailing Address:	530 Front Street | Suite 100 | Mankato, MN 56001
Phone:	507-469-0887
E-mail Address:	ksmith@thetailwindgroup.com

Authorized Contact (do not complete if same as above):
Mailing Address:
Phone:
E-mail Address:

Agent Name:	Bolton & Menk, Inc. | Addeline Theis | Natural Resource Specialist
Mailing Address:	1960 Premier Drive | Mankato, MN | 56001
Phone:	507-625-4171 ext 3745
E-mail Address:	Addeline.theis@bolton-menk.com

PART TWO: Site Location Information

County: Blue Earth **City/Township: Mankato TWP**
Parcel ID and/or Address: 901 S Victory Dr Mankato, MN 56001 (Parcel ID: R430921177001)
Legal Description (Section, Township, Range): 21, 108N, 26W
Lat/Long (decimal degrees):
Attach a map showing the location of the site in relation to local streets, roads, highways.
Approximate size of site (acres) or if a linear project, length (feet): 4.5 acres

If you know that your proposal will require an individual Permit from the U.S. Army Corps of Engineers, you must provide the names and addresses of all property owners adjacent to the project site. This information may be provided by attaching a list to your application or by using block 25 of the Application for Department of the Army permit which can be obtained at:

http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RegulatoryDocs/engform_4345_2012oct.pdf

PART THREE: General Project/Site Information

If this application is related to a delineation approval, exemption determination, jurisdictional determination, or other correspondence submitted ***prior to*** this application then describe that here and provide the Corps of Engineers project number.

Describe the project that is being proposed, the project purpose and need, and schedule for implementation and completion. The project description must fully describe the nature and scope of the proposed activity including a description of all project elements that effect aquatic resources (wetland, lake, tributary, etc.) and must also include plans and cross section or profile drawings showing the location, character, and dimensions of all proposed activities and aquatic resource impacts.

PART FOUR: Aquatic Resource Impact[1] Summary

If your proposed project involves a direct or indirect impact to an aquatic resource (wetland, lake, tributary, etc.) identify each impact in the table below. Include all anticipated impacts, including those expected to be temporary. Attach an overhead view map, aerial photo, and/or drawing showing all of the aquatic resources in the project area and the location(s) of the proposed impacts. Label each aquatic resource on the map with a reference number or letter and identify the impacts in the following table.

Aquatic Resource ID (as noted on overhead view)	**Aquatic Resource Type** (wetland, lake, tributary etc.)	**Type of Impact** (fill, excavate, drain, or remove vegetation)	**Duration of Impact** Permanent (P) or Temporary (T)[1]	**Size of Impact**[2]	**Overall Size of Aquatic Resource** [3]	**Existing Plant Community Type(s)** in Impact Area[4]	**County, Major Watershed #, and Bank Service Area #** of Impact Area[5]

[1]If impacts are temporary; enter the duration of the impacts in days next to the "T". For example, a project with a temporary access fill that would be removed after 220 days would be entered "T (220)".
[2]Impacts less than 0.01 acre should be reported in square feet. Impacts 0.01 acre or greater should be reported as acres and rounded to the nearest 0.01 acre. Tributary impacts must be reported in linear feet of impact and an area of impact by indicating first the linear feet of impact along the flowline of the stream followed by the area impact in parentheses). For example, a project that impacts 50 feet of a stream that is 6 feet wide would be reported as 50 ft (300 square feet).
[3]This is generally only applicable if you are applying for a de minimis exemption under MN Rules 8420.0420 Subp. 8, otherwise enter "N/A".
[4]Use *Wetland Plants and Plant Community Types of Minnesota and Wisconsin* 3rd Ed. as modified in MN Rules 8420.0405 Subp. 2.
[5]Refer to Major Watershed and Bank Service Area maps in MN Rules 8420.0522 Subp. 7.

If any of the above identified impacts have already occurred, identify which impacts they are and the circumstances associated with each:

N/A

PART FIVE: Applicant Signature

☐ Check here if you are requesting a pre-application consultation with the Corps and LGU based on the information you have provided. Regulatory entities will not initiate a formal application review if this box is checked.

By signature below, I attest that the information in this application is complete and accurate. I further attest that I possess the authority to undertake the work described herein.

Signature: _____ Date: 11/10/23

I hereby authorize **Bolton & Menk, Inc** to act on my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this application.

[1] The term "impact" as used in this joint application form is a generic term used for disclosure purposes to identify activities that may require approval from one or more regulatory agencies. For purposes of this form it is not meant to indicate whether or not those activities may require mitigation/replacement.

Attachment A

Request for Delineation Review, Wetland Type Determination, or Jurisdictional Determination

By submission of the enclosed wetland delineation report, I am requesting that the U.S. Army Corps of Engineers, St. Paul District (Corps) and/or the Wetland Conservation Act Local Government Unit (LGU) provide me with the following (check all that apply):

☒ **Wetland Type Confirmation**

☒ **Delineation Concurrence**. Concurrence with a delineation is a written notification from the Corps and a decision from the LGU concurring, not concurring, or commenting on the boundaries of the aquatic resources delineated on the property. Delineation concurrences are generally valid for five years unless site conditions change. Under this request alone, the Corps will not address the jurisdictional status of the aquatic resources on the property, only the boundaries of the resources within the review area (including wetlands, tributaries, lakes, etc.).

☐ **Preliminary Jurisdictional Determination**. A preliminary jurisdictional determination (PJD) is a non-binding written indication from the Corps that waters, including wetlands, identified on a parcel may be waters of the United States. For purposes of computation of impacts and compensatory mitigation requirements, a permit decision made on the basis of a PJD will treat all waters and wetlands in the review area as if they are jurisdictional waters of the U.S. PJDs are advisory in nature and may not be appealed.

☐ **Approved Jurisdictional Determination**. An approved jurisdictional determination (AJD) is an official Corps determination that jurisdictional waters of the United States are either present or absent on the property. AJDs can generally be relied upon by the affected party for five years. An AJD may be appealed through the Corps administrative appeal process.

In order for the Corps and LGU to process your request, the wetland delineation must be prepared in accordance with the 1987 Corps of Engineers Wetland Delineation Manual, any approved Regional Supplements to the 1987 Manual, and the *Guidelines for Submitting Wetland Delineations in Minnesota* (2013).
http://www.mvp.usace.army.mil/Missions/Regulatory/DelineationJDGuidance.aspx

Appendix

Victory & TH 83 Redevelopment

Wetland Delineation Report

Growth Holdings, LLC.
October 27, 2023

Submitted by:
Bolton & Menk, Inc.
1960 Premier Drive
Mankato, MN 56001
P: (507) 625-4171
F: (507) 625-4177

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Tables

Exhibits

Appendix

I. INTRODUCTION

Growth Holdings, LLC. Is proposing site improvements to their property at 901 s Victory Dr in Mankato, MN. This report details the findings of the field delineation completed on October 27, 2023.

The project is found in Section 21, in Township 108 North of Range 26 West.

II. WETLAND DELINEATION METHODOLOGY

The wetland boundaries were delineated and staked in the field in October 2023, using methods described in the "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)". Wetlands identified were classified using "Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, et al., 1979)", "Wetlands of the United States (United States Fish and Wildlife Service Circular No. 39, 1971 edition)" and "Wetland Plants and Plant Communities of Minnesota and Wisconsin" (Eggers and Reed Third Edition). Subsequently, the three mandatory technical criteria for wetland determinations are as follows:

Hydrophytic Vegetation. A hydrophytic plant community is present when the dominant plant species present can endure prolonged inundation and/or soil saturation during the growing season. A plant's Wetland Indicator Status is determined using the 2016 National Wetland Plant List for Minnesota, published by the Army Corp of Engineers.

Hydric Soils. A hydric soil is defined as a soil that is formed under conditions of saturation, flooding or ponding long enough during the growing season (the portion of the year when there is above ground growth and development of vascular plants and/or soil temperature at 12 inches below the soil surface is above 41 degrees Fahrenheit or higher) to develop anaerobic conditions in the upper part.

Wetland Hydrology. An area has wetland hydrology if it experiences 14 or more consecutive days of flooding, ponding or a water table within 12 inches of the surface during the growing season at a minimum frequency of five out of ten years. This is determined by using both primary and secondary Wetland Hydrology indicators.

III. BACKGROUND INFORMATION

Prior to conducting a field investigation of this site, Exhibits A through E were used to complete a preliminary evaluation. The data gathered during the preliminary investigation was used as described below:

Exhibit A is a location map of the study area.

Exhibits B is an aerial photo with topographic information overlaid on it. This provides information regarding topography of the site, helping to identify areas that may have wetland characteristics.

Exhibit C is the National Wetlands Inventory of the site and surrounding properties. This information is used to complete a preliminary investigation of the wetlands that may or may not exist on the site.

Exhibit D is used to identify waters that are regulated by the DNR. This exhibit shows where there are DNR public waters relative to the site.

Exhibit E is the Blue Earth County Soil Survey and is used to identify hydric soils that may lie within the study area.

Delineation Exhibits F and G were prepared from the information gathered at the site.

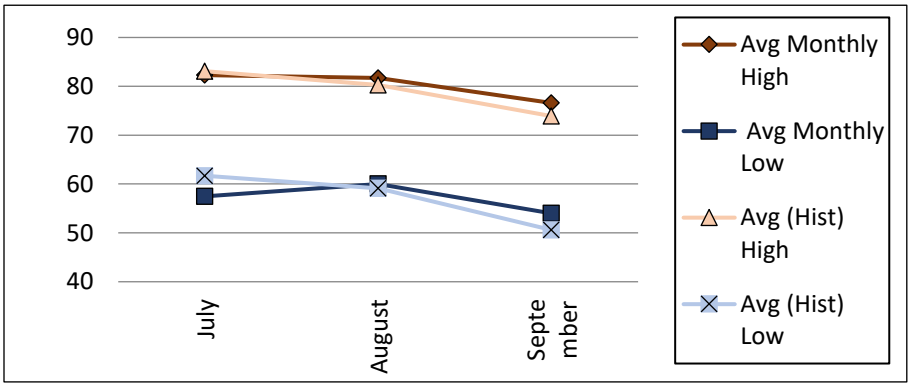
Exhibit F is the site map showing the delineated aquatic resources.

Exhibit G includes the wetland delineation data sheets.

IV. CLIMATE DATA

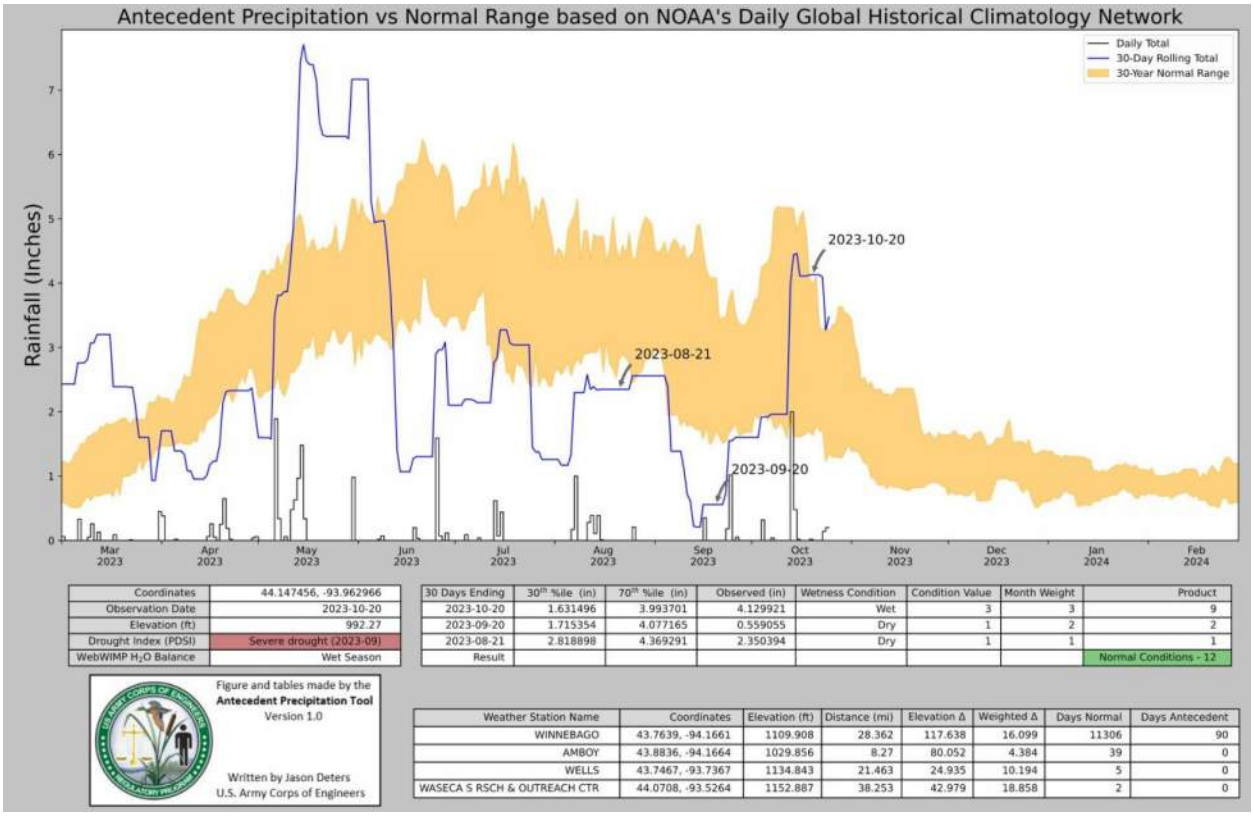
The monthly temperature table below shows the average high and low temperatures for the three months prior to the field delineation, along with the historical averages for these months. The monthly low and high temperatures have been within normal ranges for this period.

MONTHLY TEMPERATURE RANGE



Antecedent precipitation was evaluated using a combination of the NRCS Method and the Rolling Totals Method. The analysis found that precipitation was normal over the past two months.

ANTECEDENT PRECIPITATION CONDITIONS



Coordinates	44.147456, -93.962966
Observation Date	2023-10-20
Elevation (ft)	992.27
Drought Index (PDSI)	Severe drought (2023-09)
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-10-20	1.631496	3.993701	4.129921	Wet	3	3	9
2023-09-20	1.715354	4.077165	0.559055	Dry	1	2	2
2023-08-21	2.818898	4.369291	2.350394	Dry	1	1	1
Result							Normal Conditions - 12

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WINNEBAGO	43.7639, -94.1661	1109.908	28.362	117.638	16.099	11306	90
AMBOY	43.8836, -94.1664	1029.856	8.27	80.052	4.384	39	0
WELLS	43.7467, -93.7367	1134.843	21.463	24.935	10.194	5	0
WASECA S RSCH & OUTREACH CTR	44.0708, -93.5264	1152.887	38.253	42.979	18.858	2	0

This climatic data was gathered using the Climatology Working Group Website, http://climate.umn.edu/ and the National Weather Service Forecast Office, http://w2.weather.gov/climate/. The information for the investigation was retrieved from the WETS Station in St. Peter (ID: 217405)

V. FINDINGS

On October 27, 2023 a field investigation was performed to evaluate and verify the existence and boundary of any aquatic resources located within the study area. One wetland complex found to exist within the study area. The following describes the aquatic resources identified, together with a brief description of wetland types and observations made during the field investigation.

Wetland 1 (W1-A & W1-B):
NWI Cowardin: PEM1C
PWI (Hydro) ID: None
Field Observation Circular 39: Types 2, 3, & 4
Field Observation Eggers and Reed: Fresh (wet) Meadow, Shallow Marsh, & Deep Marsh
Soil Mapping Unit(s):

Wetland 1 is a complex of fresh wet meadow, shallow and deep marsh.

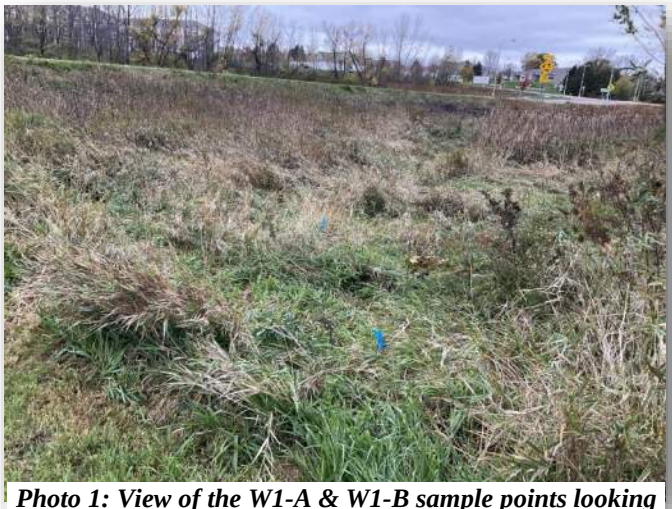


Photo 1: View of the W1-A & W1-B sample points looking into the wetland.

The field investigation found that the site has met all three wetland indicators and this wetland complex should be considered a combination of a palustrine emergent persistent temporarily flooded (PEM1A) wetland, a palustrine emergent persistent seasonally flooded (PEM1C) wetland and a palustrine emergent persistent continuously flooded (PEM1E) wetland. Two sample points were taken to determine the wetland boundary. The wetland boundary was largely drawn based on the changes in topography.

Photo 2: View of the Type 4 portion of wetland 1-A, facing south.

At the W1-A wetland pit location, the plant community was dominated by reed canary grass. The W1-B upland pit location was dominated by smooth brome and reed canary grass. Only the wetland pit location met hydrophytic vegetation. Soils in the W1-A wetland pit location met the hydric soil indicator F6-Redox Dark Surface. Soils in the W1-B upland pit location did not meet any of the hydric soil indicators. The W1-A wetland location met primary indicator A1 and two secondary hydrology indicators D2-Geomorphic Position and D5- FAC-Neutral Test. The W1-B upland pit location did not meet any of the secondary hydrology indicators.

From the observations of both upland and wetland pit locations we can determine this area meets the criteria to be considered a wetland.

Photo 3: View of the Type 3 portion of wetland 1-A, facing west.

Photo 4: View of the Type 2 portion of wetland 1-A, facing north.

Photo 5: View of the Type 2 portion of wetland 1-A, facing east.

Photo 6: View of the Type 2 portion of wetland 1-B, facing south-east.

Photo 7: View of the Type 2 portion of wetland 1BA, facing south.

Photo 8: View of upland area of site. Water sitting due to previous rainfall.

VI. CONCLUSION

The delineation was performed on October 27, 2023. The boundaries of the wetlands were staked in the field with three foot "Wetland Delineation" pin flags. The location of the pin flags were surveyed by Bolton & Menk, Inc. using a Juniper Geode Data Collector and tied to the Blue Earth County coordinate system. The delineated limits are believed to be the upper limits of where all three of the required wetland criteria were present.

Bolton & Menk, Inc., was asked to determine the boundaries of those jurisdictional wetlands that exist upon this property as defined by the Wetland Conservation Act.

Based upon all available information, the existing conditions that currently prevail, and the on-site investigation, evidence supports the presence of one wetland complex within the boundaries of the study area.

WETLAND SUMMARY

Id #	Wetland Type^	Size*
W1-A	Type 2/3/4	0.31 ac
W1-B	Type 2	0.06 ac
Total:		**0.37 ac**

**size measured within study area.*
^wetland type within study area

Sincerely,
BOLTON & MENK, INC.

Addeline Theis
Certified Wetland Delineator, No. 1434

APPENDIX

Victory & TH 83 Redevelopment

Mankato TWP, Blue Earth County, MN

Exhibit A: Location Map

October 2023

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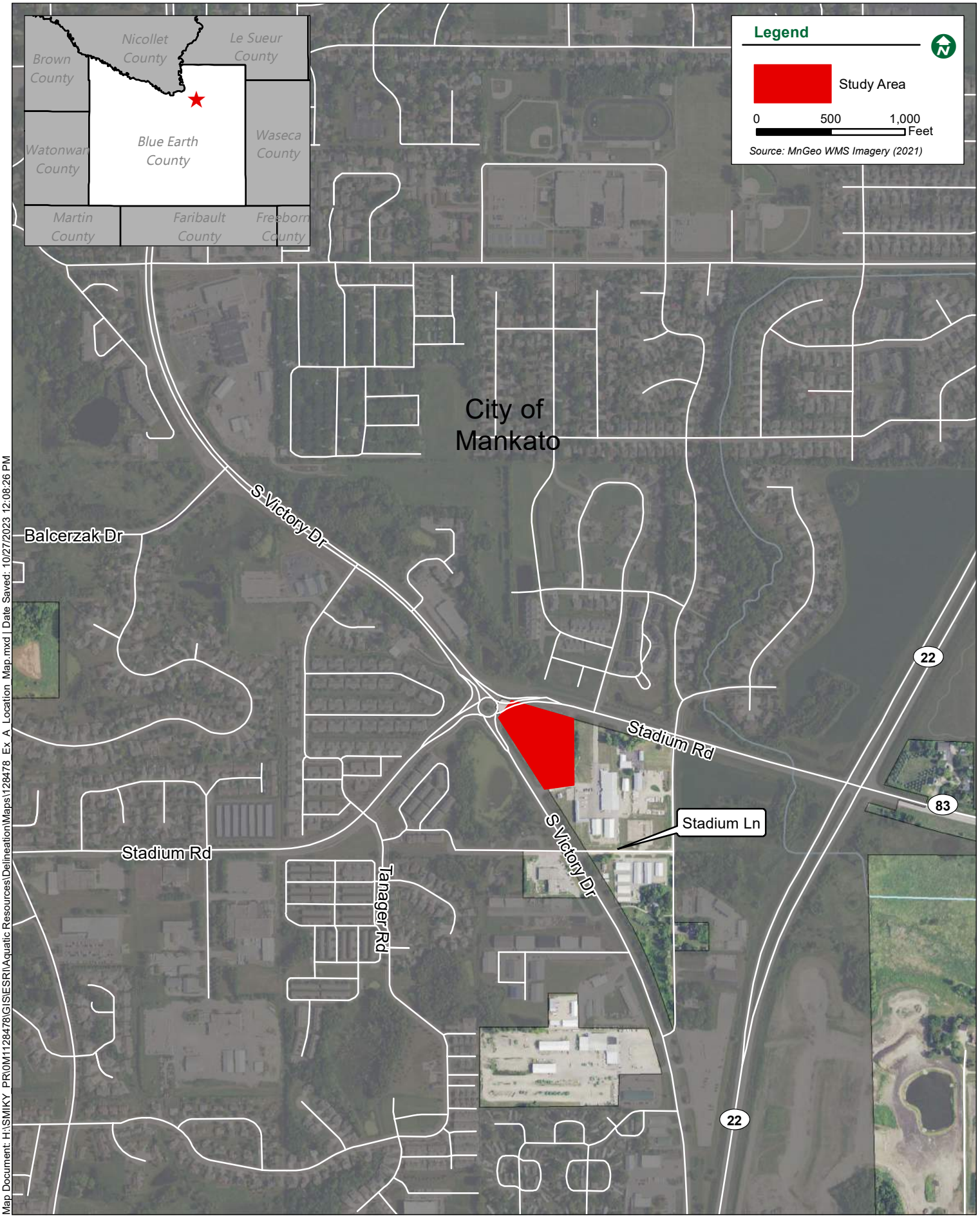

Map Document: H:\SMIKY_PR\0M1128478\GIS\ESRI\Aquatic Resources\Delineation\Maps\1128478_Ex_A_Location_Map.mxd | Date Saved: 10/27/2023 12:08:26 PM

Victory & TH 83 Redevelopment

Mankato TWP, Blue Earth County, MN

Exhibit B: 2-Foot LiDAR Contours Map

October 2023

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Map Document: H:\SMIKY_PR\0M1128478\GIS\ESRI\Aquatic Resources\Delineation\Maps\1128478_Ex_B_LiDAR_Map.mxd | Date Saved: 10/27/2023 12:58:41 PM

Victory & TH 83 Redevelopment

Mankato TWP, Blue Earth County, MN

Exhibit C: National Wetlands Inventory Map

October 2023

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Map Document: H:\SMIKY_PR\0M1128478\GIS\ESRI\Aquatic Resources\Delineation\Maps\1128478_Ex_C_NWI_Map.mxd | Date Saved: 10/27/2023 12:59:48 PM

Victory & TH 83 Redevelopment

Mankato TWP, Blue Earth County, MN

Exhibit D: Public Waters Inventory Map

October 2023

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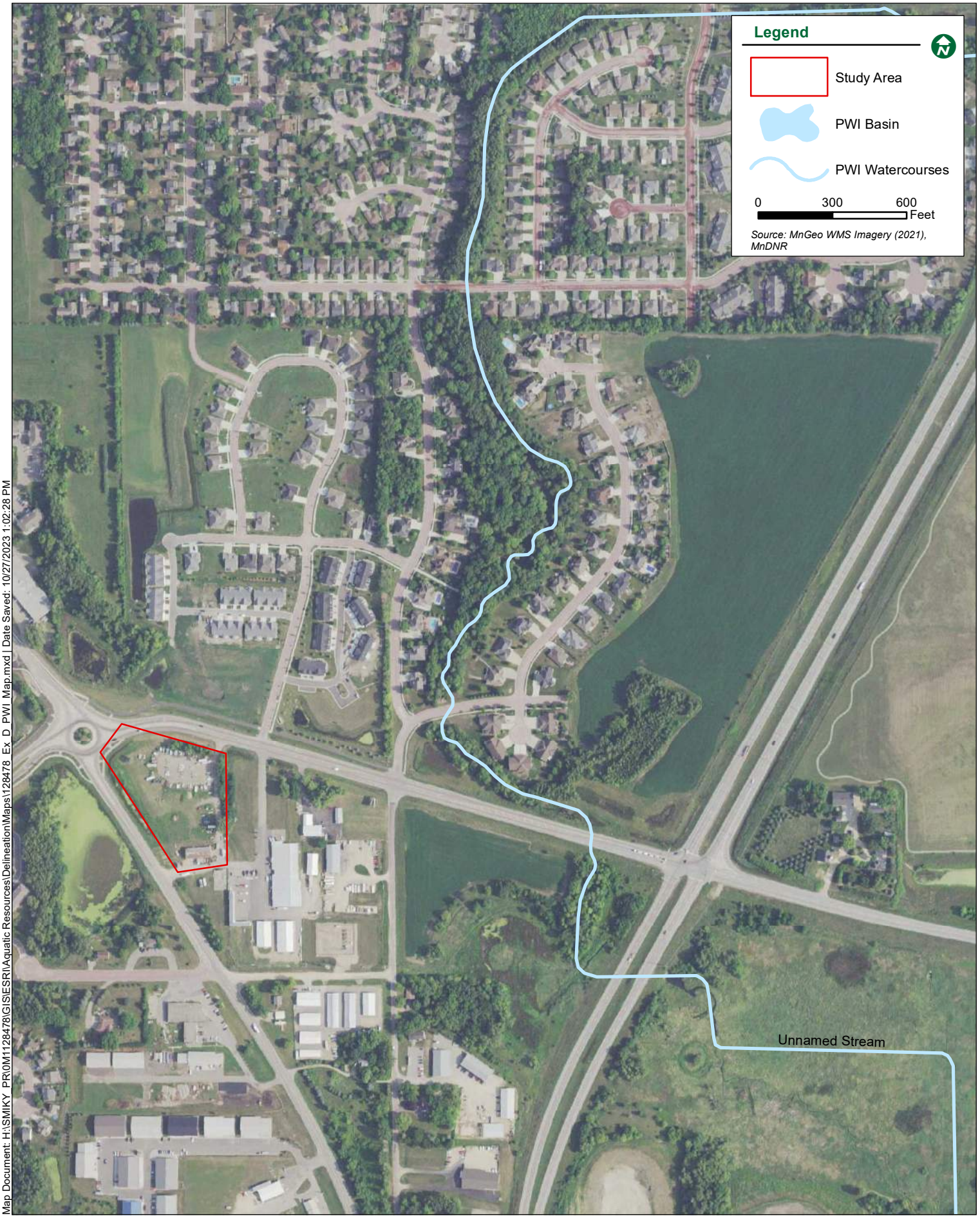

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Victory & TH 83 Redevelopment

Mankato TWP, Blue Earth County, MN

Exhibit E: Blue Earth County Soil Survey Map

October 2023

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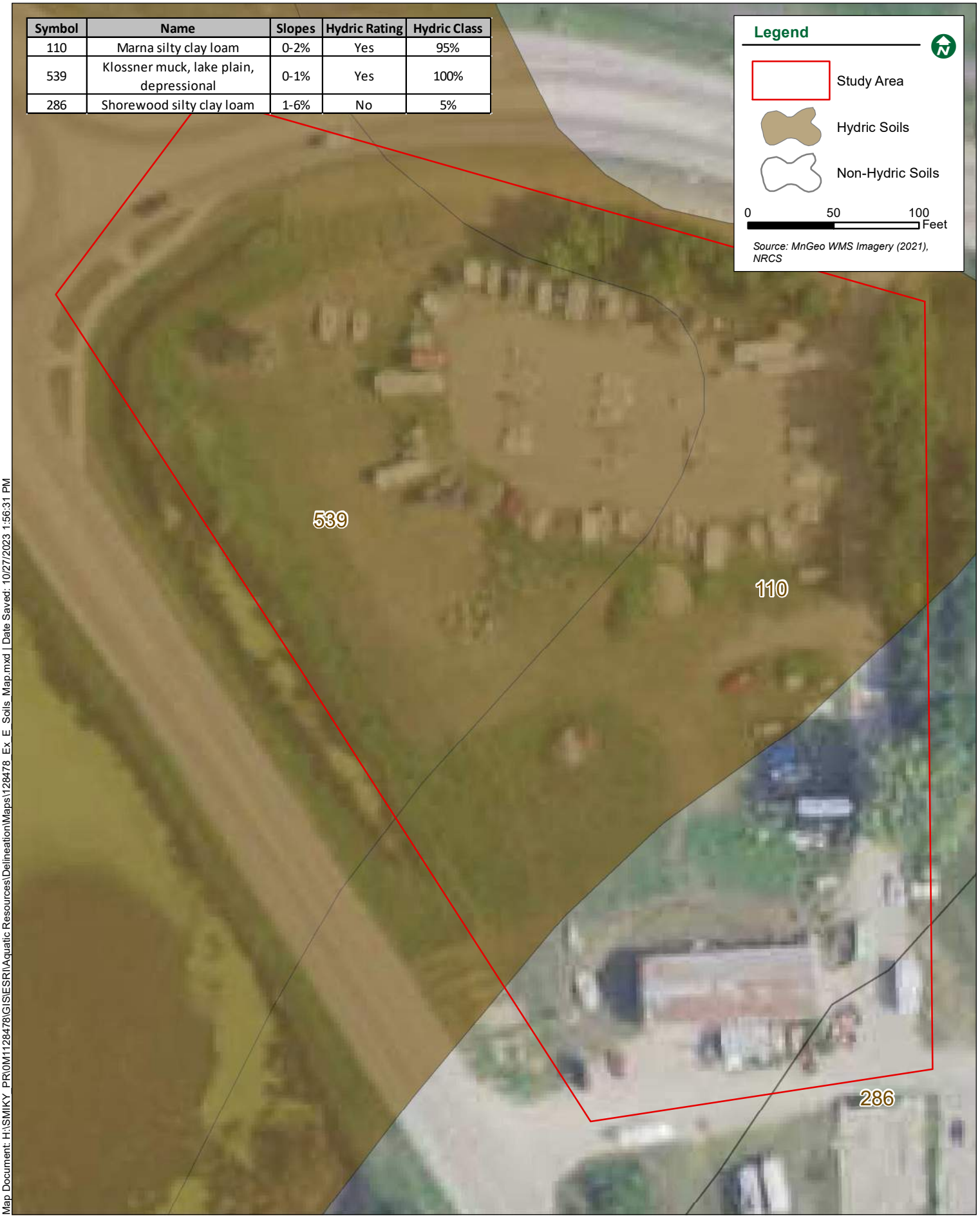
Symbol	Name	Slopes	Hydric Rating	Hydric Class
110	Marna silty clay loam	0-2%	Yes	95%
539	Klossner muck, lake plain, depressional	0-1%	Yes	100%
286	Shorewood silty clay loam	1-6%	No	5%



Map Document: H:\SMIKY_PR\0M1128478\GIS\ESRI\Aquatic Resources\Delineation\Maps\1128478_Ex_E_Soils_Map.mxd | Date Saved: 10/27/2023 1:56:31 PM

Victory & TH 83 Redevelopment

Mankato TWP, Blue Earth County, MN

Exhibit F: Wetland Delineation Map

October 2023

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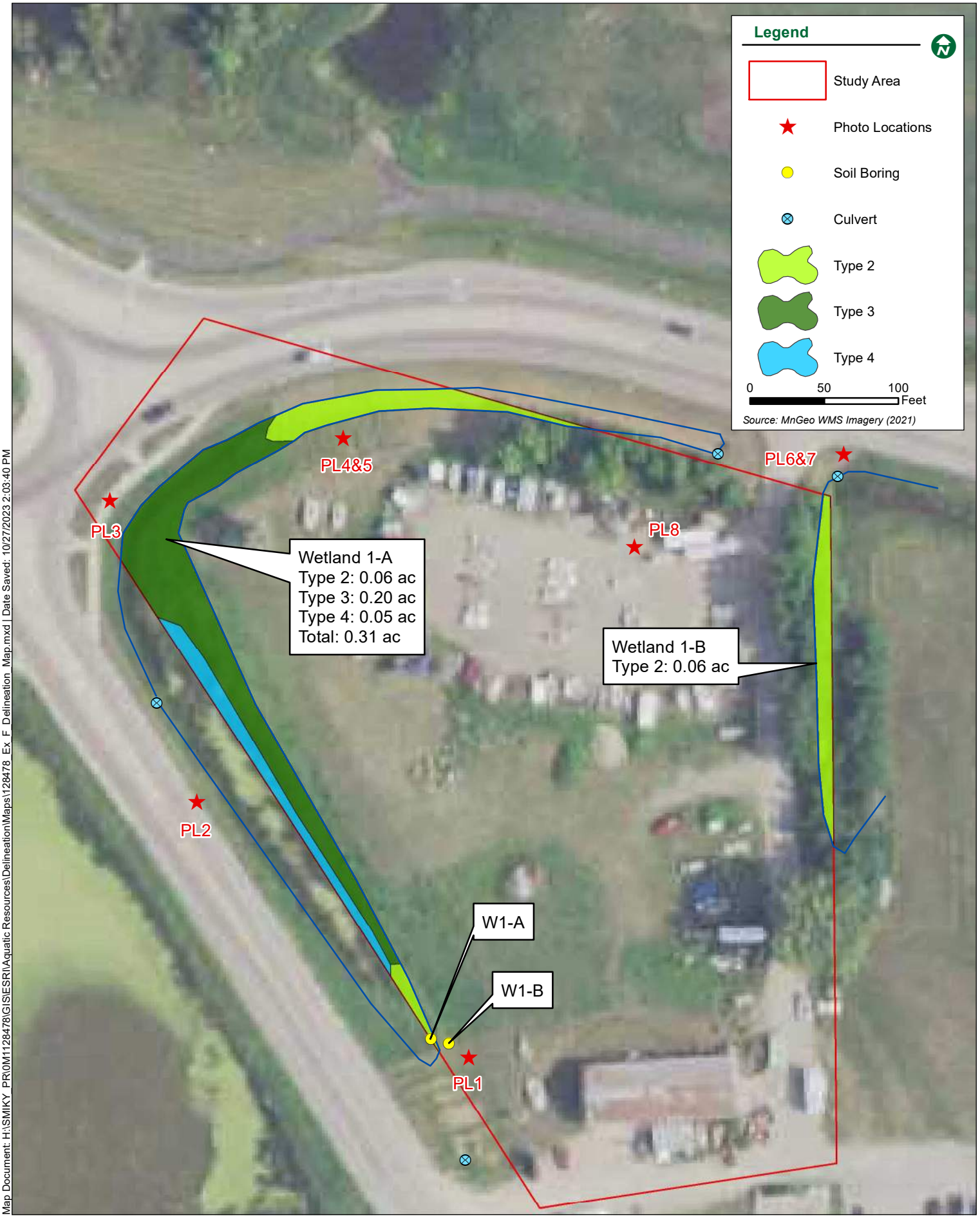

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Victory & TH 83 Redevelopment City/County: Blue Earth County Sampling Date: 2023-10-27

Applicant/Owner: Growth Holdings, LLC. State: Minnesota Sampling Point: W1-A

Investigator(s): Addeline Theis Section, Township, Range: sec 21 T108N R026W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 0-2 Lat: 44.146584 Long: -93.962611 Datum: WGS84

Soil Map Unit Name: Marna silty clay loam, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:
While drought conditions were dominate for a majority of the growing season, late fall rains just before site visit brought climate conditions back to normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. *Phalaris arundinacea*	65	Y	FACW
2. *Typha angustifolia*	15	N	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	80.0 = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15.00	x 1 =	15.00
FACW species	65.00	x 2 =	130.00
FAC species	0.00	x 3 =	0.00
FACU species	0.00	x 4 =	0.00
UPL species	0.00	x 5 =	0.00
Column Totals:	80.00 (A)		145.00 (B)

Prevalence Index = B/A = 1.81

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W1-A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 2/1	100					CL	
7-16	10YR 2/1	85	7.5YR 4/6	15	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 8

Water Table Present? Yes ✓ No ___ Depth (inches): 15

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Victory & TH 83 Redevelopment City/County: Blue Earth County Sampling Date: 2023-10-27

Applicant/Owner: Growth Holdings, LLC. State: Minnesota Sampling Point: W1-B

Investigator(s): Addeline Theis Section, Township, Range: sec 21 T108N R026W

Landform (hillslope, terrace, etc.): Footslope Local relief (concave, convex, none): Linear

Slope (%): 3-7 Lat: 44.146583 Long: -93.962567 Datum: WGS84

Soil Map Unit Name: Marna silty clay loam, 0 to 2 percent slopes NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:
While drought conditions were dominate for a majority of the growing season, late fall rains just before site visit brought climate conditions back to normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. *Bromus inermis*	55	Y	FACU
2. *Phalaris arundinacea*	45	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100.0 = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0.00	x 1 =	0.00
FACW species	45.00	x 2 =	90.00
FAC species	0.00	x 3 =	0.00
FACU species	55.00	x 4 =	220.00
UPL species	0.00	x 5 =	0.00
Column Totals:	100.00 (A)		310.00 (B)

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W1-B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/1	100					CL	
10-19	10YR 2/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
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- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SSTS LLC
8112 W 16th St, St Louis Park, MN
www.s2traffic.com

June 6th, 2025

To: **Brian Johnson, Jones, Haugh & Smith Inc.**

From: **Katie Schmidt, PE (MN PE License #47147)**

Re: **Trip Generation Memorandum – Mankato Apartments Development, Mankato, MN**

Per your request, SSTS LLC has conducted a trip generation estimate for the proposed Mankato Apartment Development in the City of Mankato, Blue Earth County, MN. The Proposed Project is located on the south side of Stadium Rd (CSAH 60) and east of S Victory Dr. The Proposed Project includes 72 apartment units split between two three-level buildings and a 150-stall surface parking lot. Access is proposed on S Victory Dr. The adjacent **Figure 1** depicts the site layout and access location. It is noted that traffic will not be able to cut-through to eastern property.

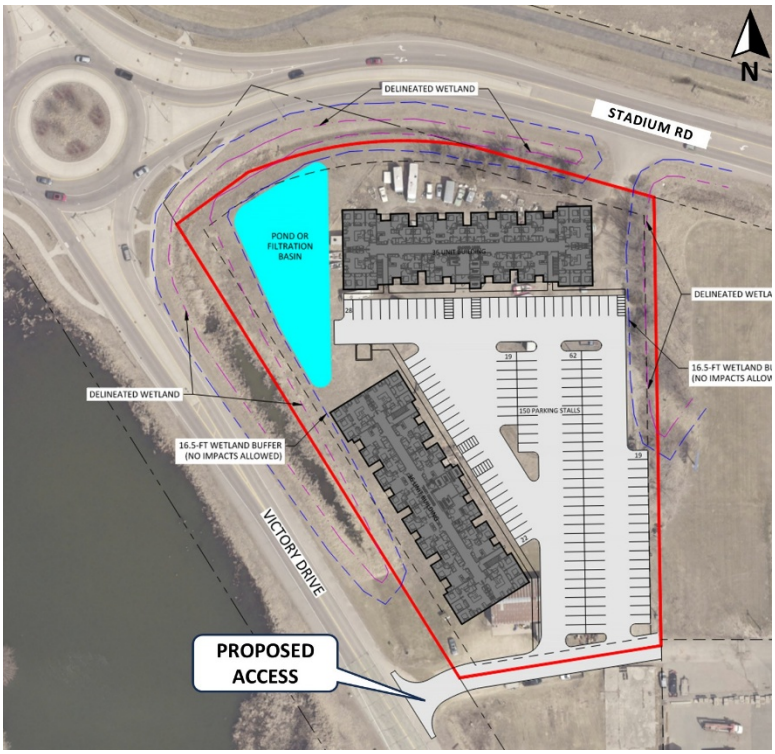

Figure 1. Proposed Project

Trip Generation

The volume of vehicle trips generated by the Proposed Project has been estimated for the weekday AM and PM peak traffic hours and on a daily basis using the data and methodology described in the Institute of Transportation Engineers' (ITE) ***Trip Generation Manual*** [1], which is a standard industry reference used by public agencies to estimate trips generated by specific land uses. **Table 1** summarizes the trip generation estimates. ITE's Low Rise Multifamily land use corresponds to the proposed three-level apartment buildings.

Table 1 - Trip Generation

Land Use	ITE Land Use Code	Size	Trips Generated:				
			AM Peak		PM Peak		Weekday ADT
			Enter	Exit	Enter	Exit	
Multifamily Housing (Low-Rise)	220	72 units	7	22	23	14	485
Totals			**7**	**22**	**23**	**14**	**485**
			29		**37**		

The Proposed Project is estimated to generate the following:

- 29 new trips (7 entering and 22 exiting) during the morning traffic peak hour,
- 37 new trips (23 entering and 14 exiting) during the evening traffic peak hour, and
- 485 daily trips.

The anticipated travel patterns for residents of the Proposed Project are approximately 85% to/from the north and 15% to/from the South on S Victory Dr. The number of vehicle trips generated by the Proposed Project is low, approximately one new vehicle trip every two minutes during the peak hours, and impacts to existing traffic operations are anticipated to be minimal. Additionally, turning volumes at the access point do not warrant turn lanes per industry references (AASHTO and NCHRP Reports).

[1] ***Trip Generation Manual***, Institute of Transportation Engineers (ITE), 11th Edition