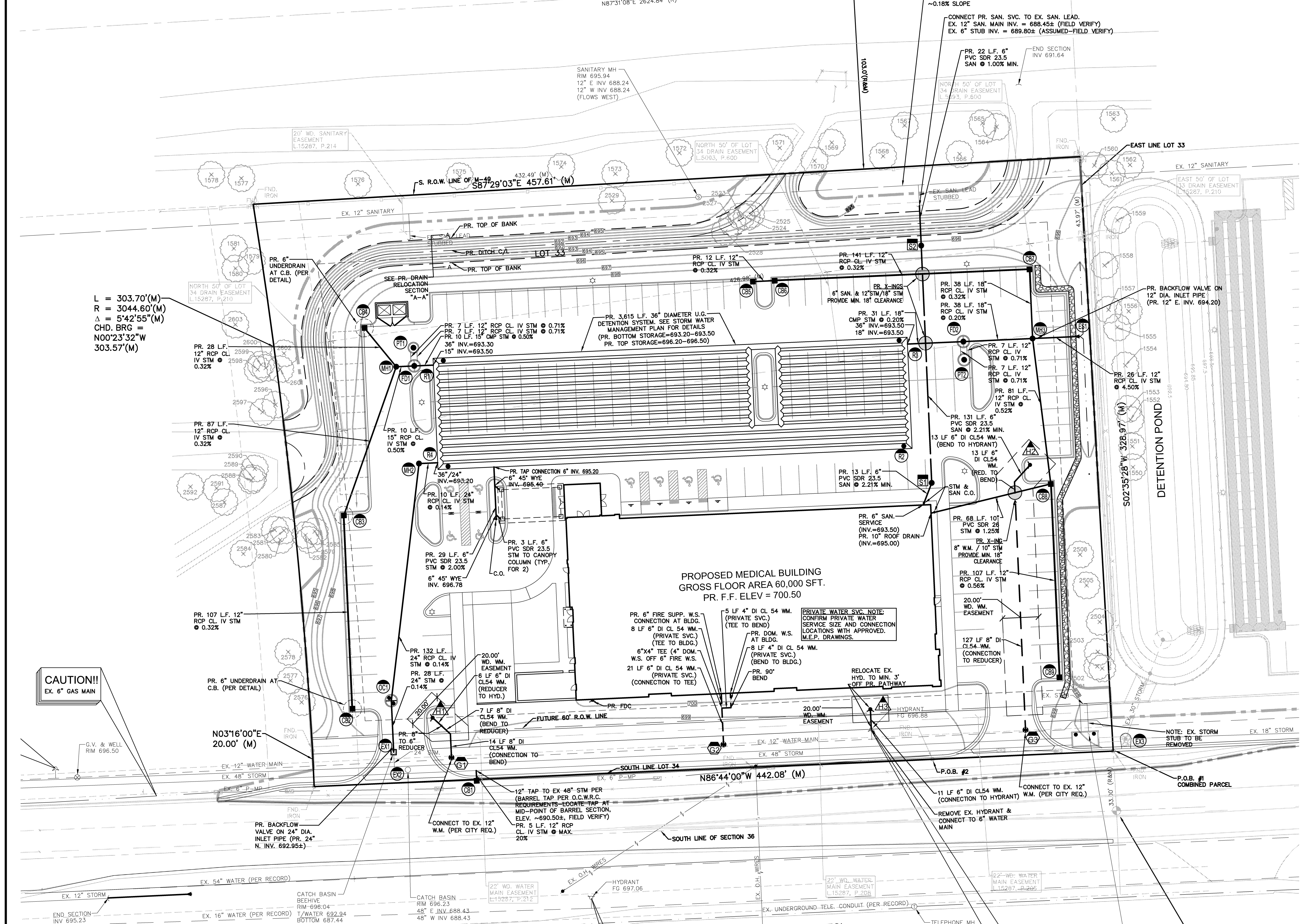


M-59 EXPRESSWAY (206' WIDE)

SURVEY CENTERLINE OF M-59
N87°31'08"E 2624.84' (R)



STORM SEWER STRUCTURE SCHEDULE

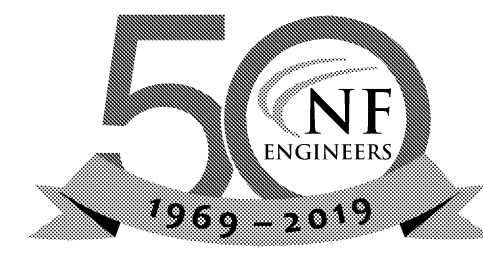
- (EX1) TAP, ADJ. & CONVERT TO MANHOLE EX. CATCH BASIN BEEHIVE EX. RIM 696.04 PR. RIM 698.95 (INSTALL EJM 1040A FRAME & COVER) T/WATER 690.94 BOTTOM 687.44
- (EX2) ADJ. & CONVERT TO MANHOLE EX. CATCH BASIN EX. RIM 696.23 PR. RIM 697.85 (INSTALL 1040A FRAME & COVER) EX. 48" INV. E. 688.43 EX. 48" INV. S. 693.43
- (EX3) FIELD VERIFY/LOCATE/MAINTAIN EX. CATCH BASIN (REC.) EX. RIM 696.29 EX. 30" INV. W. 690.49 EX. 30" INV. NE. 689.59 EX. 18" INV. E. 690.59
- (OC1) PR. 6" DIA. OUTLET CONTROL STRUCTURE W/ 2' SUMP & WEIR WALL EX. RIM 698.75 PR. 24" INV. NE. 692.99 TOP/WEIR 695.50 PR. 24" INV. S. 692.99
- (FD1) PR. 6" DIA. FLOW DIV. MANHOLE EX. RIM 698.40 PR. 15" INV. W. 693.65 PR. 12" INV. N. 693.65 (UPSTREAM) TOP/WEIR 694.90 PR. 12" INV. N. 693.55 (DOWNSTREAM) PR. 15" INV. E. 693.55
- (FD2) PR. 6" DIA. FLOW DIV. MANHOLE EX. RIM 698.20 PR. 12" INV. N.E. 693.66 PR. 12" INV. S. 693.56 (UPSTREAM) TOP/WEIR 695.16 PR. 12" INV. S. 693.56 (DOWNSTREAM) PR. 18" INV. W. 693.55
- (PT1) PR. OFF-LINE PRE-TREATMENT STRUCTURE (CONTECH CASCADE CS-4 OR EQUAL) RIM 698.10 PR. 12" INV. S. 693.60 PR. 12" INV. N. 693.61
- (PT2) PR. OFF-LINE PRE-TREATMENT STRUCTURE (CONTECH CASCADE CS-6 OR EQUAL) RIM 698.30 PR. 12" INV. N. 693.61 PR. 30" DIA. CMP RISER MANHOLE PR. RIM 698.50 PR. 36" INV. 693.30
- (CB1) PR. 4" DIA. CATCH BASIN W/ 2' SUMP EX. RIM 697.41 PR. 12" INV. N. 691.50
- (CB2) PR. 2" DIA. INLET W/ 2' SUMP EX. RIM 698.50 PR. 12" INV. NE. 694.52
- (CB3) PR. 4" DIA. SPECIAL SHALLOW CATCH BASIN W/ 3' SUMP (PER DETAIL) EX. RIM 697.75 PR. 12" INV. S.E. 693.99 (TRAP) PR. 12" INV. E. 694.34
- (CB4) PR. 4" DIA. SPECIAL SHALLOW CATCH BASIN W/ 2' SUMP (PER DETAIL) EX. RIM 697.75 PR. 12" INV. E. 694.30
- (CB5) PR. 4" DIA. SPECIAL SHALLOW CATCH BASIN W/ 3' SUMP (PER DETAIL) EX. RIM 697.50 PR. 12" INV. W. 693.85 PR. 12" INV. S. 693.85 (TRAP)
- (CB6) PR. 4" DIA. CATCH BASIN W/ 2' SUMP EX. RIM 698.75 PR. 10" INV. W. 694.15 PR. 12" INV. S. 694.15 (ROOF)
- (CB7) PR. 2" DIA. INLET EX. RIM 697.75 PR. 12" INV. E. 694.75
- (MH1) PR. 4" DIA. MANHOLE EX. RIM 698.20 PR. 12" INV. N.W. 693.90 PR. 12" INV. S.W. 693.90 PR. 15" INV. E. 693.70
- (MH2) PR. 5" DIA. MANHOLE EX. RIM 699.00 PR. 24" INV. E. 693.18 PR. 5" DIA. MANHOLE EX. RIM 698.20 PR. 12" INV. E. 694.20 (INSTALL BACKFLOW VALVE)
- (MH3) PR. 30" DIA. CMP RISER MANHOLE NO. RIM 698.50 PR. 36" INV. 693.30
- (R1) PR. 30" DIA. CMP RISER MANHOLE NO. RIM 698.50 PR. 36" INV. 693.30
- (R2) PR. 30" DIA. CMP RISER MANHOLE NO. RIM 698.50 PR. 36" INV. 693.30
- (R3) PR. 30" DIA. CMP RISER MANHOLE NO. RIM 698.50 PR. 36" INV. 693.30
- (R4) PR. 30" DIA. CMP RISER MANHOLE NO. RIM 698.50 PR. 36" INV. 693.30
- (ES1) PR. 12" END SECTION W/ BAR SCREEN PR. 12" INV. 694.90

SANITARY SEWER STRUCTURE SCHEDULE

- (S1) PR. 4" DIA. SANITARY MANHOLE EX. RIM 699.40 PR. 6" INV. S. 693.21 PR. 6" INV. N. 693.11
- (S2) PR. 4" DIA. SANITARY MANHOLE EX. RIM 696.50 PR. 6" INV. S. 690.21 PR. 6" INV. N. 690.11

WATER MAIN STRUCTURE SCHEDULE

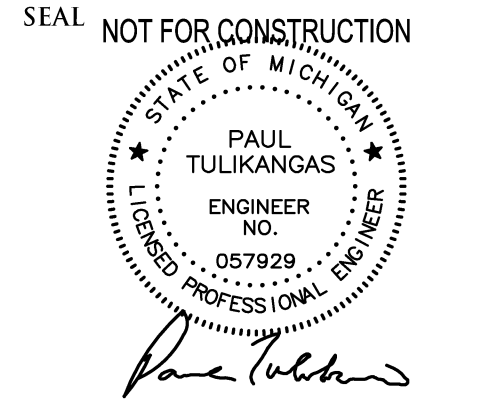
- (H1) PR. HYDRANT ASSEMBLY EX. F.G. 699.25 PR. T/PIPE 693.75
- (H2) PR. HYDRANT ASSEMBLY EX. F.G. 699.75 PR. T/PIPE 694.25
- (H3) RELOCATE EX. HYDRANT EX. F.G. 699.50 PR. T/PIPE 694.00
- (G1) PR. 12"x8" TAPPING SLEEVE, GATE VALVE IN WELL EX. 12" W.M. ELEV. PR. T/PIPE - FIELD VERIFY EX. 12" W.M. ELEV.
- (G2) PR. 12"x8" TAPPING SLEEVE, GATE VALVE IN WELL EX. 12" W.M. ELEV. PR. T/PIPE - FIELD VERIFY EX. 12" W.M. ELEV.
- (G3) PR. 12"x8" TAPPING SLEEVE, GATE VALVE IN WELL EX. 12" W.M. ELEV. PR. T/PIPE - FIELD VERIFY EX. 12" W.M. ELEV.



NOWAK & FRAUS ENGINEERS

CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NOWAKFRAUS.COM



PROJECT
Rochester Hills Surgery Center

CLIENT
The Alan Group
1800 Brinston Dr.
City of Troy, MI 48083

Contact: Jim Harding
Ph. (248) 284-1512
Fax (248) 840-1100
Email jharding@thealangroup.com

PROJECT LOCATION
Part of the S.W. 1/4 of Section 36
T.3N., R.11E. (L-13)
City of Rochester Hills, Oakland County, Michigan

SHEET
Utility Plan



Know what's below
Call before you dig.

DATE	ISSUED/REVISED
12-19-19	ISSUED FOR PRELIMINARY REVIEW
1-7-20	SURVEY UPDATE
03-24-20	OWNERS REVIEW
04-15-20	SITE PLAN SUBMITTAL
06-15-20	SITE PLAN SUBMITTAL
07-20-20	SITE PLAN SUBMITTAL
08-14-20	ENGINEERING REVIEW
10-16-20	SITE PLAN SUBMITTAL

DRAWN BY:
C. Ellison
DESIGNED BY:
P. Tulikangas
APPROVED BY:
B. Buchholz
DATE:
December 17, 2019

SCALE: 1" = 30'

NFE JOB NO. SHEET NO.
L289 C4

SANITARY SEWER BASIS OF DESIGN

Based on Ten States Standards Equation for Peak Flow

Name of Project: Rochester Hills Surgical Center
Location of Project: City of Rochester Hills, MI 48069
N/E Project No.:
Calculate Project Residential Equivalency Units (REU)

Type of Project Use: Medical Office Building
OCWRC Unit Assignment Factor per 2018 REU Study: 0.4 REU per 1,000 SF Floor Area
Building Floor Area: 6000 square feet
Equivalent Single-Family REU: 24 REU

Calculate Peak Flows

Based on OCWRC 2018 REU Study for Clinton-Oakland service area

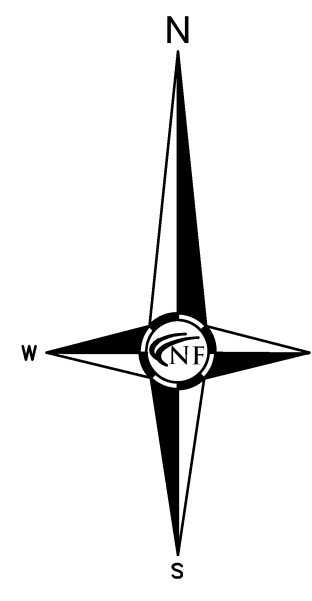
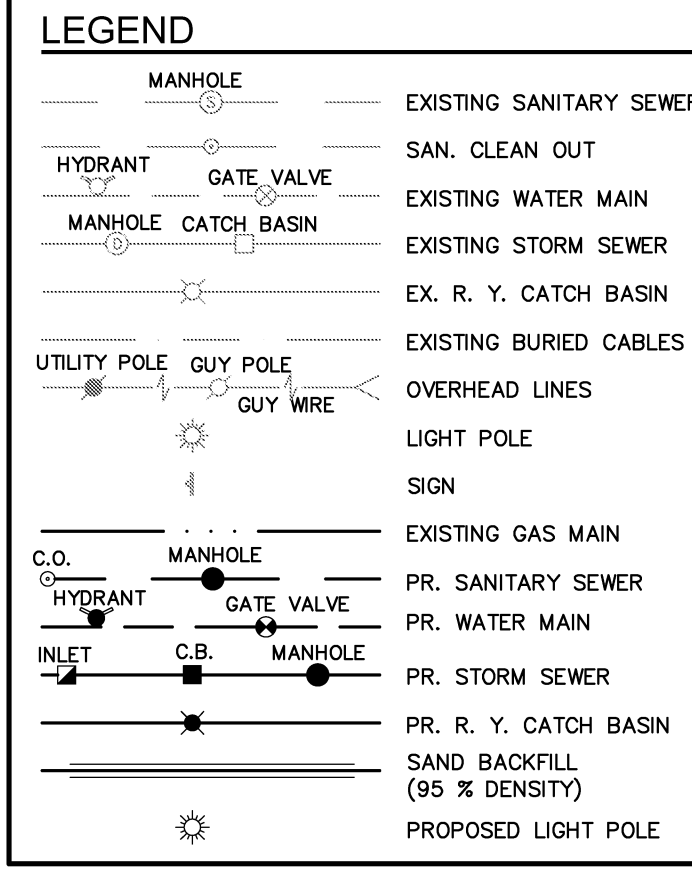
Population Density per Unit:	2.44 people/unit
Design/Ultimate Population To be Served:	59 people
Design Daily Flowrate per Capita:	100 gallons/person/day
Average Flow:	5,856 gallons/day
Average Flow (convert to gpm):	4,507 gallons/minute
Average Flow (convert to cfs):	0.009 cfs
Peaking Factor (per Ten States Equation):	4.30
Peak Flow:	25,182.77 gallons/day
Peak Flow (convert to gpm):	17.49 gallons/minute
Peak Flow (convert to cfs):	0.04 cfs

Calculate Design Pipe Capacity (per Manning's Equation) (Qcap) = (1.49/n) * (P-2)^0.78 * (S-1)^0.48 * (D^3)^0.78

D" Proposed Pipe Diameter: 6 inches
n" Proposed Manning's Coefficient: 0.013 (PVC)
S" Proposed Minimum Slope: 0.01
A" (Calculate Pipe Cross-Sectional Area) (3.14159 * (D/2)^2)
R" (Calculate Hydraulic Radius for Circular Pipe) (D/4)
Qcap (Pipe Capacity in cfs): 0.36 cfs
V (Pipe Velocity) (1.48/0.013 * (0.013)^0.48 * (6/12)^2.48): 2.86 ft/s

UTILITY NOTE

THE LOCATIONS AND ELEVATIONS OF SOME OF THE EXISTING UNDERGROUND UTILITIES AS SHOWN ON THE SURVEY DRAWING WERE OBTAINED FROM MUNICIPAL AND UTILITY COMPANY RECORDS AND MAPS. THEREFORE, NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

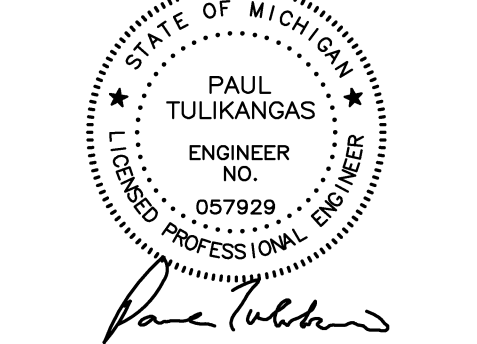


CAUTION!
EX. 6" GAS MAIN

SOUTH BOULEVARD EAST (WIDTH VARIES)

BENCHMARK
ARROW ON HYDRANT
ELEVATION 699.01
NAVD 88 DATUM

BENCHMARK
ARROW ON HYDRANT
ELEVATION 700.01
NAVD 88 DATUM



Know what's below
Call before you dig.

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DRAWN BY:
C. Ellison

DESIGNED BY:
P. Tulikang

APPROVED BY:
B. Buchholz

DATE:
December 17, 2019

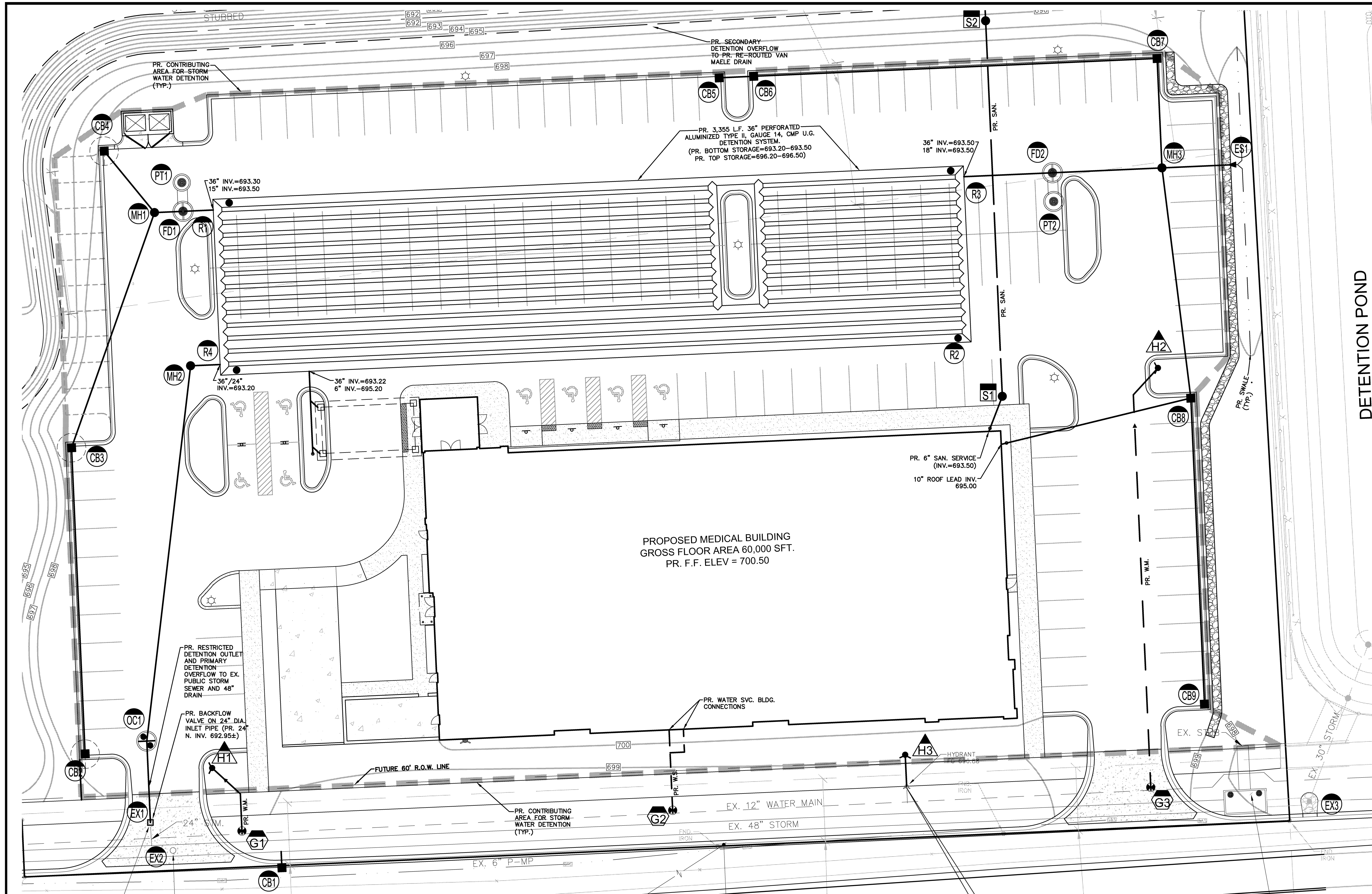
SCALE: 1" = 20'

20 10 0 10 20 30

NFE JOB NO. SHEET NO.

L289

C5



PROJECT NO:	L289
PROJECT NAME:	R.H. Surgery Center
LOCATION:	Rochester Hills, MI
DATE:	6/15/2020
REVISED:	10/14/2020

C - Pervious	0.200
C - Impervious	0.950
C - Water	1.000

SURFACE TYPE	TOTAL AREA	PERVIOUS AREA	IMPERVIOUS AREA
OVERALL SITE (Contributing Area)	2,230		1,540
Pavement/Curbs/Walk/Walls*			0.469
Buildings		0.221	
Lawn / Landscape		0.221	2.009
OVERALL TOTALS	2,230	0.221	2.009
Weighted C Factor		0.876	
OVERALL SITE		0.876	

DETENTION BASIN DESIGN
Using OCDC Equations for a 100 Year Storm

Name of Project: Rochester Hills Surgery Center
Location of Project: Rochester Hills, MI
Total Site Acreage is: 3.344 acres
Contributing Acreage is: 2.23 acres
Runoff Coefficient is: 0.876
Allowable Discharge is: 0.2 cfs/acre

Then Q_p is: 0.4460 cfs
Then Q_s is: 0.2283 cfs (acre x runoff coefficient)
Detention Time T is: 187.53 minutes
Storage Volume V_s is: 12,846.49 cf (acre x runoff coefficient)

Total Storage Volume
Required V_s is: 25,095.37 cubic feet
Required Storage in U.G. System: 25,095.37 cubic feet

Underground Detention
Proposed Pipe Diam. 36 inches
Cross-Sectional Area (Pipe) 7.07 square feet

Provided Length of 36" Pipe 3615 feet
Provided Storage (Pipe) 25,552.91 cubic feet

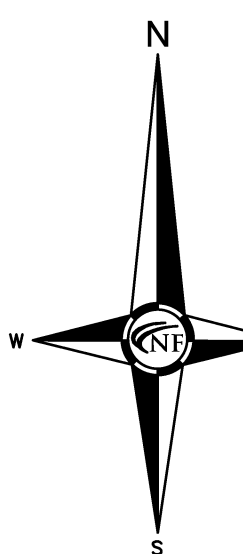
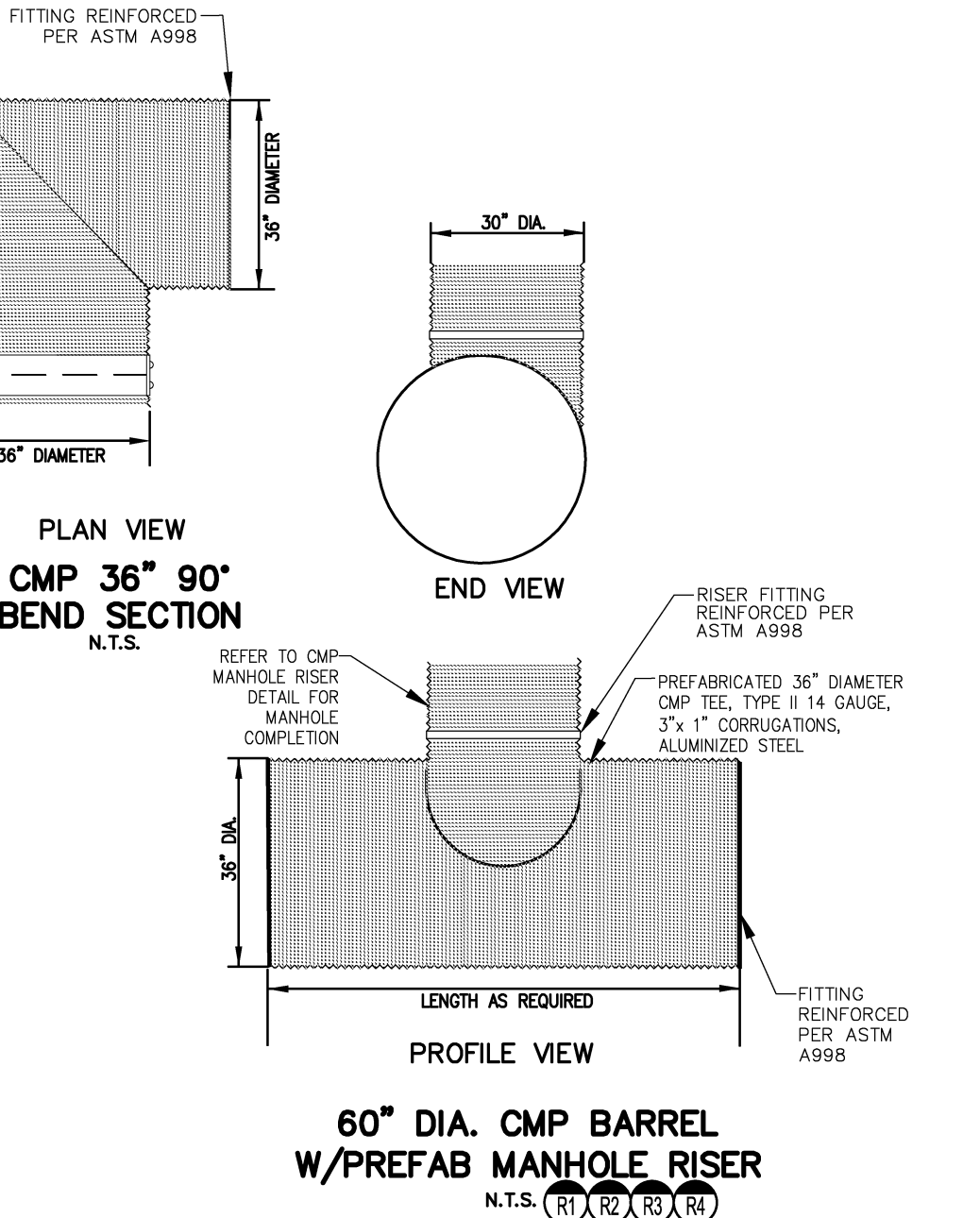
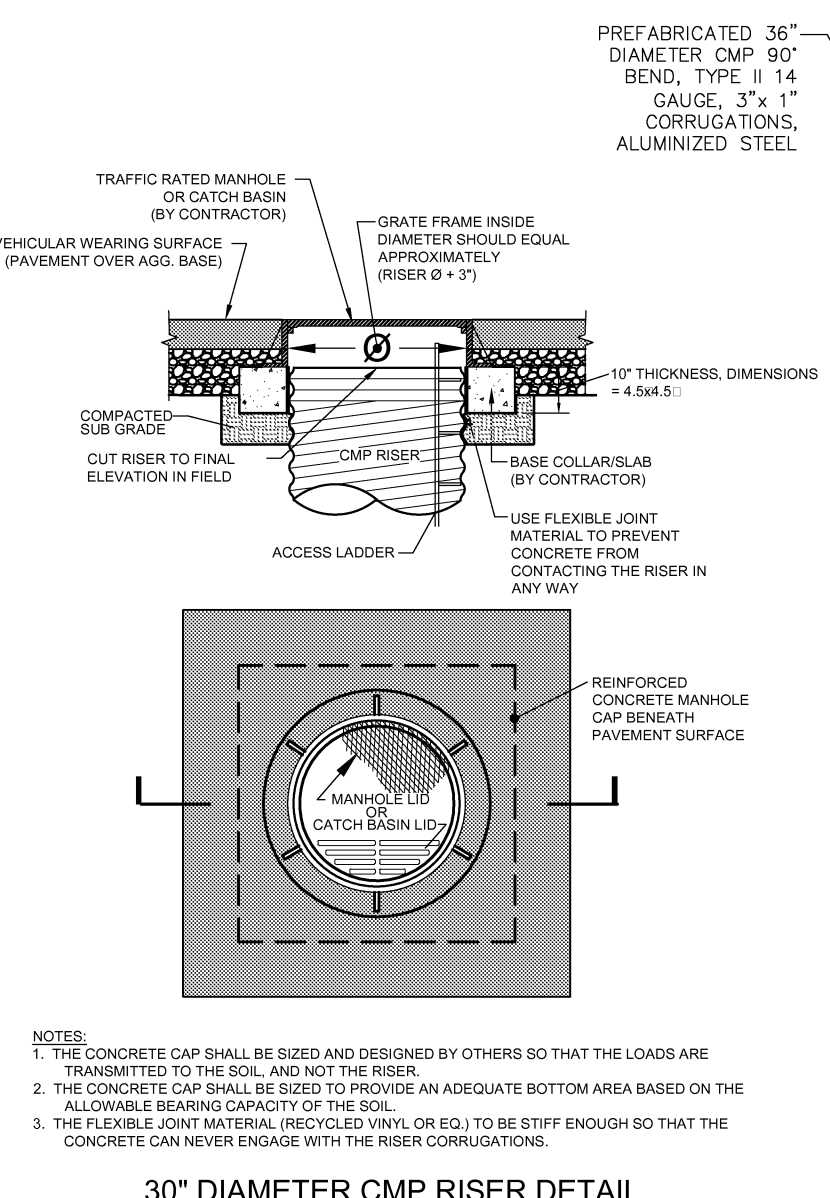
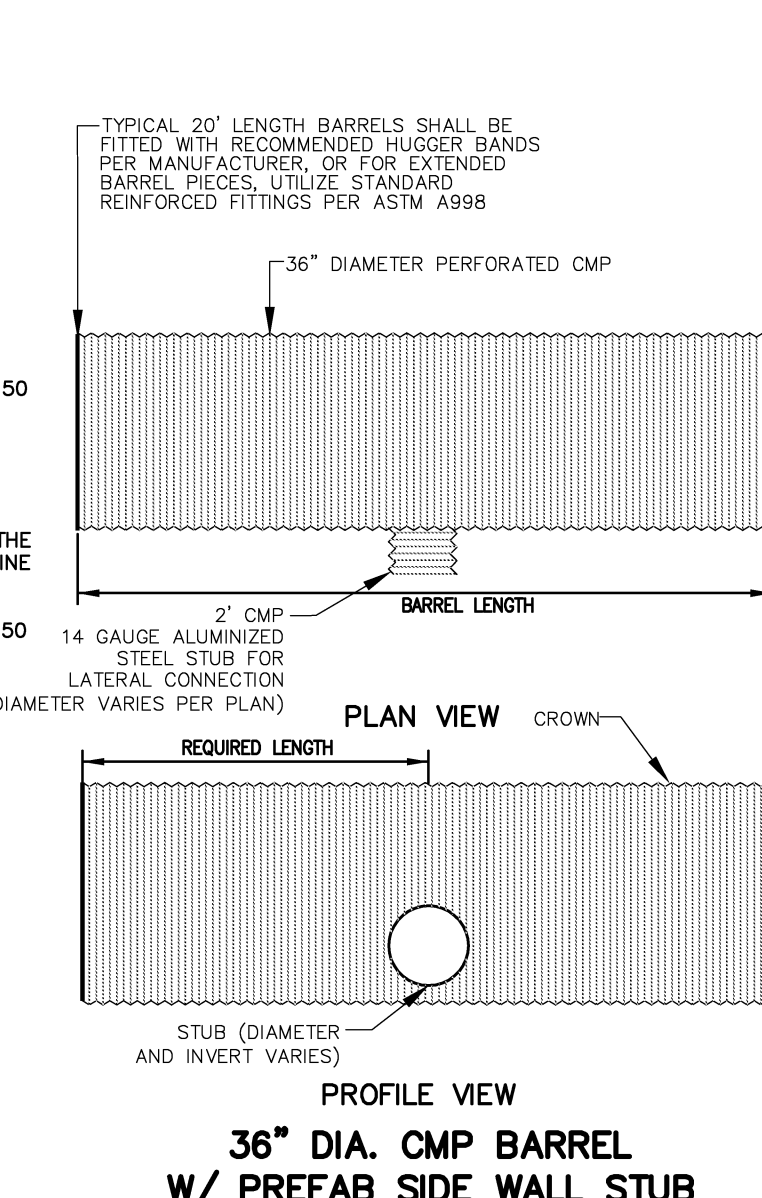
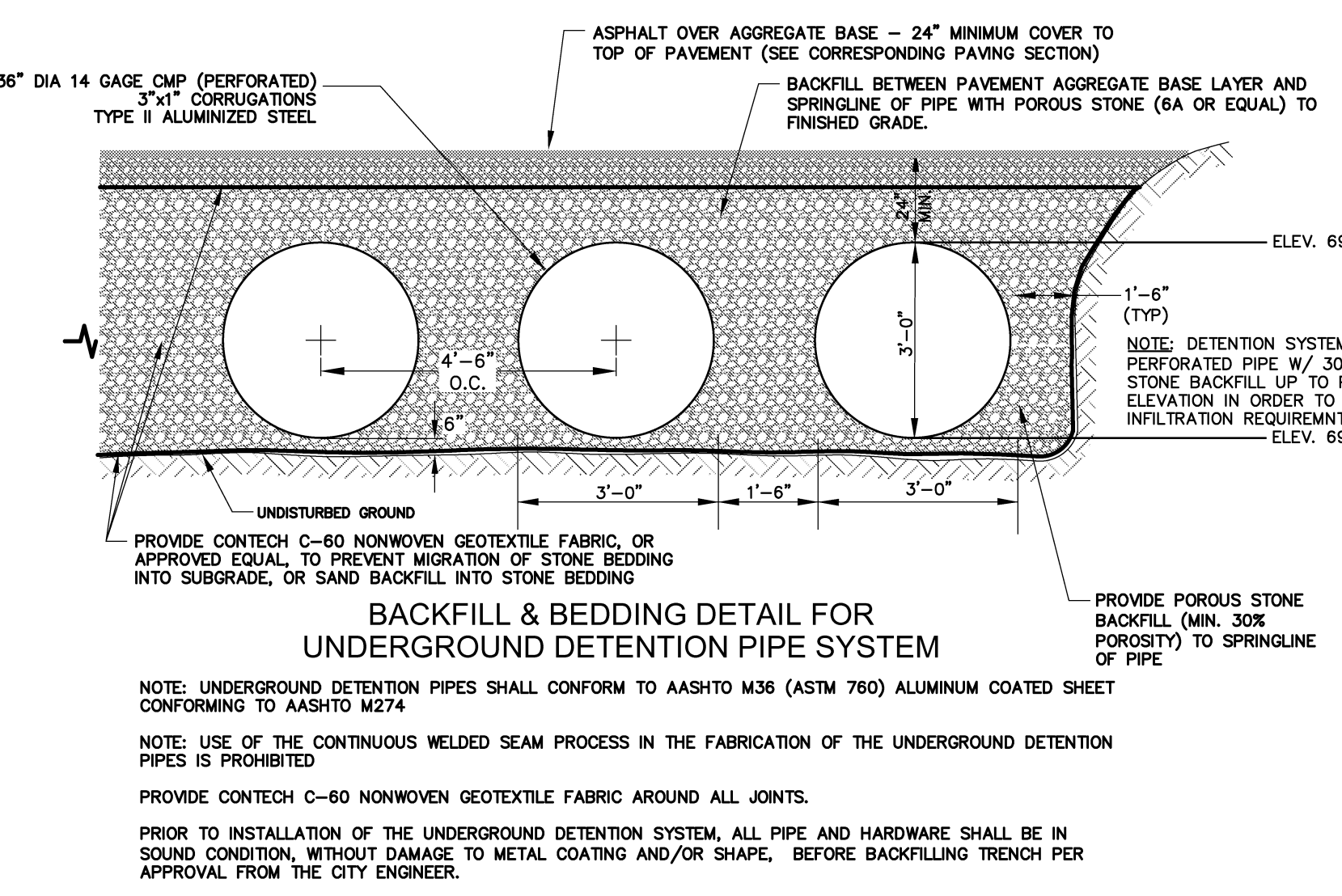
PR. STORAGE IN U.G. SYSTEM
25,552.91 cubic feet

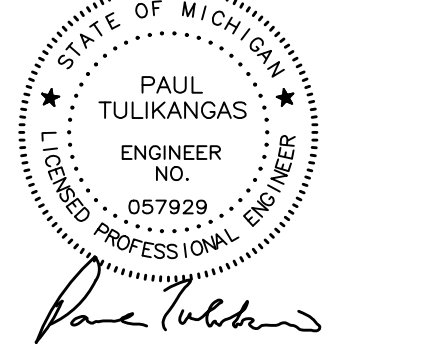
TOTAL STORAGE PROVIDED
Infiltration Volume (Per Linear Foot):
Head on Orifice Pipe
Outlet at Dry Basin is: 3.51 feet
Area Required for Orifice
Pipe Outlet at U.G. System is: 0.04785 sf
Required Hole Dia. at Structure OC1 (outlet Control MH w/ weir) 2.96 inches
Provide (1) 2-7/8" Holes in Structure OC1

STORM SEWER STRUCTURE SCHEDULE

- (EX1) TAP, ADJ. & CONVERT TO MANHOLE EX. CATCH BASIN BEEHIVE EX. RM 697.50 PR. 12" INV. S.E. 693.99 (PER DETAIL) PR. 12" INV. S.E. 693.99 (TRAP)
- (EX2) ADJ. & CONVERT TO MANHOLE EX. CATCH BASIN EX. RM 698.23 PR. 12" INV. W. 694.30 PR. 12" INV. E. 694.30
- (EX3) FIELD VERIFY/LOCATE/MAINTAIN EX. CATCH BASIN (REG.) EX. RM 696.29 PR. 12" INV. W. 694.15 (ROOF) PR. 12" INV. S. 694.15
- (OC1) PR. 6" DIA. OUTLET CONTROL STRUCTURE W/ 2" SUMP & WEIR WALL PR. RM 698.75 PR. 24" INV. NE. 692.99 TOP/WEIR 696.50 PR. 24" INV. S. 692.99
- (FD1) PR. 6" DIA. FLOW DIV. MANHOLE RM 698.40 PR. 12" INV. N.W. 693.65 PR. 12" INV. N. 693.65 (UPSTREAM) PR. 24" INV. E. 693.18 PR. 15" INV. E. 693.55
- (FD2) PR. 6" DIA. FLOW DIV. MANHOLE TOP/WEIR 695.16 PR. 12" INV. S. 693.66 (UPSTREAM) PR. 12" INV. S. 693.56 (DOWNSTREAM) PR. 18" INV. W. 693.56
- (PT1) PR. OFF-LINE PRE-TREATMENT STRUCTURE (CONCRETE) CASCADE CS-4 OR EQUAL RM 698.10 PR. 12" INV. S. 693.60 PR. 12" INV. S. 693.60
- (PT2) PR. OFF-LINE PRE-TREATMENT STRUCTURE (CONCRETE) CASCADE CS-6 OR EQUAL RM 698.30 PR. 12" INV. N. 693.61 PR. 12" INV. N. 693.61
- (CB1) PR. 4" DIA. CATCH BASIN W/ 2" SUMP RM 697.41 PR. 12" INV. N. 691.50 PR. 2" DIA. INLET RM 698.10 PR. 12" INV. NE. 694.52
- (CB2) PR. 4" DIA. SPECIAL SHALLOW CATCH BASIN W/ 3" SUMP (PER DETAIL) RM 697.75 PR. 12" INV. S. 694.18 PR. 12" INV. NE. 694.18 (TRAP)
- (CB3) PR. 4" DIA. SPECIAL SHALLOW CATCH BASIN W/ 3" SUMP (PER DETAIL) RM 697.50 PR. 12" INV. S.E. 693.99 (TRAP)
- (CB4) PR. 2" DIA. INLET RM 697.75 PR. 12" INV. E. 694.34
- (CB5) PR. 4" DIA. SPECIAL SHALLOW CATCH BASIN W/ 2" SUMP (PER DETAIL) RM 697.75 PR. 12" INV. W. 694.30
- (CB6) PR. 4" DIA. SPECIAL SHALLOW CATCH BASIN W/ 3" SUMP (PER DETAIL) RM 697.50 PR. 12" INV. W. 693.85 PR. 12" INV. S. 693.85 (TRAP)
- (CB7) PR. 4" DIA. CATCH BASIN W/ 2" SUMP RM 698.75 PR. 10" INV. W. 694.15 (ROOF) PR. 12" INV. S. 694.15
- (CB8) PR. 2" DIA. INLET RM 698.75 PR. 12" INV. E. 694.75
- (CB9) PR. 4" DIA. MANHOLE RM 698.20 PR. 12" INV. N.W. 693.90 PR. 12" INV. S.W. 693.90 PR. 15" INV. E. 693.70
- (MH1) PR. 5" DIA. MANHOLE RM 699.00 PR. 24" INV. E. 693.18 PR. 12" INV. S.W. 693.18
- (MH2) PR. 5" DIA. MANHOLE RM 698.20 PR. 12" INV. E. 694.20 (INSTALL BACKFLOW VALVE) PR. 12" INV. N. 693.73 PR. 12" INV. S. 693.73
- (MH3) PR. 5" DIA. MANHOLE RM 698.20 PR. 12" INV. E. 694.20 (INSTALL BACKFLOW VALVE) PR. 12" INV. N. 693.73 PR. 12" INV. S. 693.73
- (R1) PR. 30" DIA. CMP RISER MANHOLE PR. RM 698.50 PR. 36" INV. 693.30
- (R2) PR. 30" DIA. CMP RISER MANHOLE PR. RM 699.10 PR. 36" INV. 693.40
- (R3) PR. 30" DIA. CMP RISER MANHOLE PR. RM 698.50 PR. 36" INV. 693.50
- (R4) PR. 30" DIA. CMP RISER MANHOLE PR. RM 699.20 PR. 36" INV. 693.20
- (ES1) PR. 12" END SECTION W/ BAR SCREEN PR. 12" INV. 694.90

STORM WATER MANAGEMENT SYSTEM DETAIL





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Call before you dig.

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10-16-20	SITE PLAN SUBMITTAL

DRAWN BY:
C. Ellison

DESIGNED BY:
P. Tulikangas

APPROVED BY:
B. Buchholz

DATE:
December 17, 2019

SCALE: 1" = 20'

20 10 0 10 20 30

NFE JOB NO. SHEET NO.
L289 C6

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-4 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION

GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (GPD)	
PEAK FLOW RATE (GPD)	
RETURN PERIOD OF PEAK FLOW (yrs)	
FIN ELEVATION	
PIPE DATA: INVERT MATERIAL DIAMETER	
INLET PIPE 1	
INLET PIPE 2	
OUTLET PIPE	

NOTES: SPECIAL REQUIREMENTS:

GENERAL NOTES

- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
- FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
- CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PRODUCT.
- CASCADE SEPARATOR STRUCTURE SHALL MEET ASHTO HIGH LOAD RATING, ASSUMING EARTH COVER OF 2' (2) (15) AND GROUNDWATER ELEVATION AT OR BELOW THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET ASHTO M308 AND BE CAST WITH THE CONTECH LOGO.
- CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND ASHTO LOAD FACTOR DESIGN METHOD.
- ALTERNATE UNITS ARE SHOWN IN MILLIMETERS (mm).

INSTALLATION NOTES

- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CASCADE SEPARATOR MANHOLE STRUCTURE.
- CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
- CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
- CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

FRAME AND COVER (DIAMETER VARIES) N.T.S.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
4035 Cedar Pointe Dr., Suite 400, West Chester, OH 45386
800-338-1122 513-645-7000 513-645-7901 FAX

OCWRC MANUFACTURED SYSTEMS
CASCADE TREATMENT UNIT
OFFLINE CS-4
STANDARD DETAIL

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-4 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION

GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (GPD)	
PEAK FLOW RATE (GPD)	
RETURN PERIOD OF PEAK FLOW (yrs)	
FIN ELEVATION	
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- CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PRODUCT.
- CASCADE SEPARATOR STRUCTURE SHALL MEET ASHTO HIGH LOAD RATING, ASSUMING EARTH COVER OF 2' (2) (15) AND GROUNDWATER ELEVATION AT OR BELOW THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET ASHTO M308 AND BE CAST WITH THE CONTECH LOGO.
- CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND ASHTO LOAD FACTOR DESIGN METHOD.
- ALTERNATE UNITS ARE SHOWN IN MILLIMETERS (mm).

INSTALLATION NOTES

- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CASCADE SEPARATOR MANHOLE STRUCTURE.
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- CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
- CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

FRAME AND COVER (DIAMETER VARIES) N.T.S.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
4035 Cedar Pointe Dr., Suite 400, West Chester, OH 45386
800-338-1122 513-645-7000 513-645-7901 FAX

CS-4
CASCADE SEPARATOR
STANDARD DETAIL

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-6 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION

GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (GPD)	
PEAK FLOW RATE (GPD)	
RETURN PERIOD OF PEAK FLOW (yrs)	
FIN ELEVATION	
PIPE DATA: INVERT MATERIAL DIAMETER	
INLET PIPE 1	
INLET PIPE 2	
OUTLET PIPE	

NOTES: SPECIAL REQUIREMENTS:

GENERAL NOTES

- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
- FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
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CS-6
CASCADE SEPARATOR
STANDARD DETAIL

SECTION A-A

8" THICK PRE-CAST CONCRETE WEIR WALL PROVIDE REINFORCEMENT PER MANUFACTURER. SUBMIT SHOP DRAWING FOR REVIEW & APPROVAL.

TOP OF WEIR ELEVATION (TOP STORAGE) 696.50

24" OUTLET DEVI. = 692.99

24" INLET ELEV. = 692.99

MANHOLE STEP (TYPICAL)

6" THICK PRE-CAST CONCRETE WEIR WALL PROVIDE REINFORCEMENT PER MANUFACTURER. SUBMIT SHOP DRAWING FOR REVIEW & APPROVAL.

7"x1.5" WEIR CAST INTO STRUCTURE WALLS (TYP FOR 2)

SECTION DETAIL

KEYWAY DETAIL

6" DIAMETER OUTLET CONTROL MANHOLE (SCHEMATIC DETAIL) N.T.S.

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-4 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION

GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (GPD)	
PEAK FLOW RATE (GPD)	
RETURN PERIOD OF PEAK FLOW (yrs)	
FIN ELEVATION	
PIPE DATA: INVERT MATERIAL DIAMETER	
INLET PIPE 1	
INLET PIPE 2	
OUTLET PIPE	

NOTES: SPECIAL REQUIREMENTS:

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CS-4
CASCADE SEPARATOR
STANDARD DETAIL

END SECTION AND BAR SCREEN DETAIL

N.T.S.

3" TYP

STAKED IN PLACE SOD

4" SOD STAKED-IN-PLACE

8" TO 15" RIP-RAP ROCK FRAGMENT

3" X O.D. OF PIPE (MIN)

#6 BARS

PIPE BEDDING

JOINT

3000 P.S.I. CONC. END HEADER (42" MIN. DEPTH)

(2) #4 RE-BARS

8" TO 15" RIP-RAP ROCK FRAGMENT

GEOTEXTILE FABRIC

12" - 3/16" - 2" CRUSHED STONE

PLAN VIEW

PROFILE VIEW

#6 RE-BAR AT 6" O.C. BOTH WAYS, WELDED, EXTENDED 3" (BOTH ENDS) BEYOND OPENINGS AND BEND TO FIT SIDES (TYP). SIZE OF PIPE AND END SECTION VARIES.

NOTE: DETAILED PRE-TREATMENT CALCULATIONS IN ACCORDANCE WITH CITY REQUIREMENTS WILL BE SUBMITTED DURING THE DETAILED DESIGN PHASE.