HVA

HURON VALLEY AMBULANCE PARKING ADDITION

LOCATED IN THE SE 1/4 OF SECTION 8, T3S, R6E, PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN

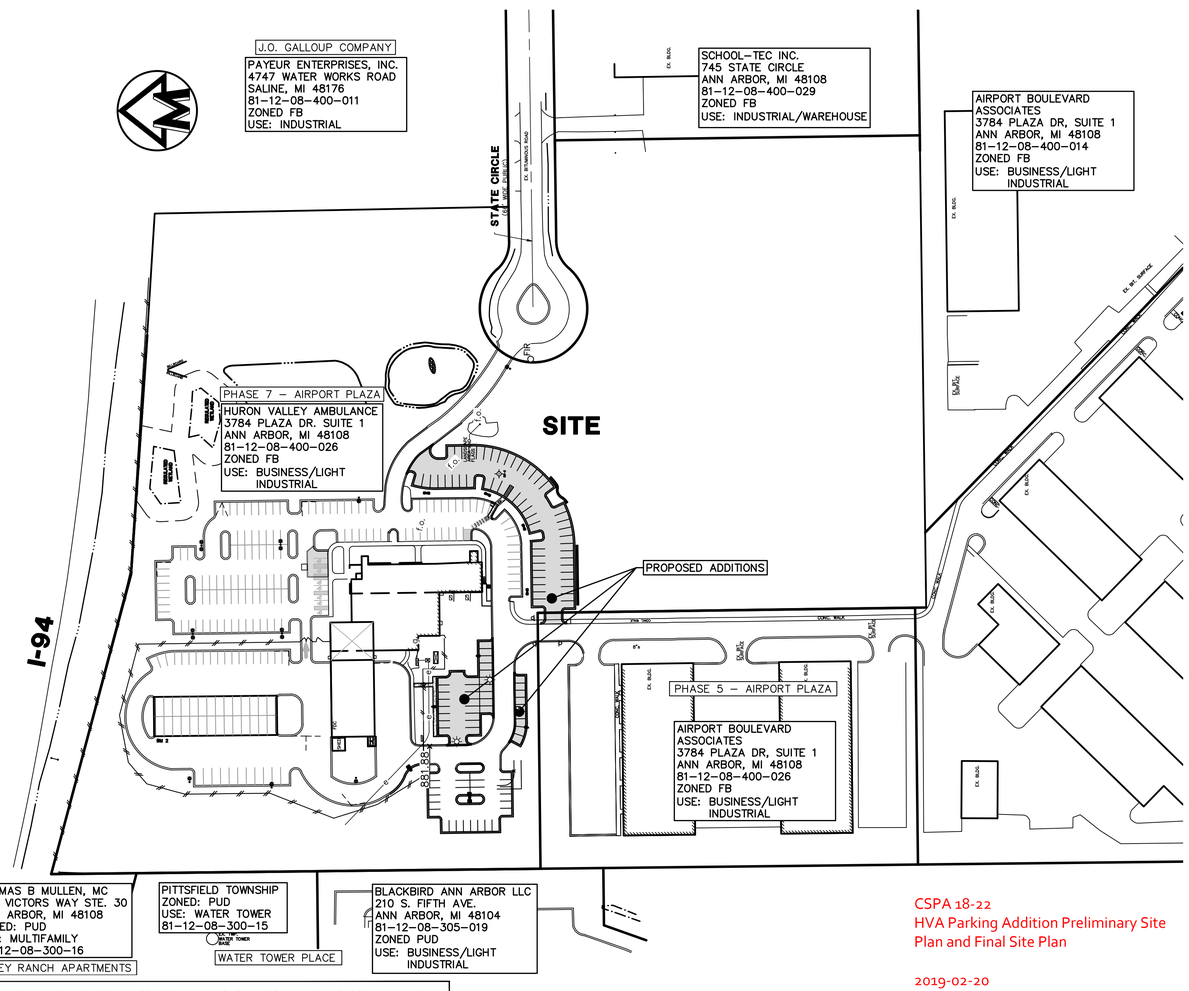
COMBINED PRELIMINARY AND FINAL SITE PLAN

OWNER/APPLICANT

HURON VALLEY AMBULANCE
1200 STATE CIRCLE
ANN ARBOR, MI 48108
(734) 971–4420

ENGINEER

MIDWESTERN CONSULTING, LLC
3815 PLAZA DR.
ANN ARBOR, MI 48108
(734) 995–0200



ZONING & USE MAP

SCALE 1" = 100'

DEVELOPMENT SUMMARY

	Required/Allowed	Existing	Proposed-(Total)
Zoning:	BP	FB	FB
Use:	Business Offices, Warehousing and Medical Offices	HVA Offices and Warehouse and Medical Examiner Offices	HVA Offices and Warehouse
Conditional Use:	Medical Laboratories and Technical Schools	Medical Examiner Laboratories and HVA Training Center	HVA Training Center
Lot Areas:			
Gross Area:	--	19.8 acres	19.8 acres
Wetland Area:	--	0.1 acres	0.1 acres
Net Lot Area:	1.00 acres	19.7 acres	19.7acres
Lot Width:	150' min	540' +/-	540' +/-
Floor Areas:			
Total-	--	35,770 sf	35,770 sf
Ground Floor-	--	24,760 sf	24,760 sf
Ground Floor:			
HVA-	--	24,760 sf	None Proposed
Second Floor HVA-		2,740 sf	None Proposed
Office-	--	5,030 sf	None Proposed
Mezzanine Storage-	--	3,240 sf	None Proposed
*Impervious Surfaces:	80% Max.	19.8 %	23.3 %
Floor Area Ratio:	40% Max.	4.1 %	4.1 %
Ground Floor Coverage:	25% Max.	2.9%	2.9 %
Setbacks:			
Front (E)-	10'	275'	275'
Side (S, E & N)-	5'	80'	80'
Rear (W)-	10'	185'	185'
Building Height:	3 stories/38' ht	2 stories/28'-9.5"' +/-	2 stories/28'-9.5" +/-
Car Parking:			
Medical Office-	32,530 sf / 200 = 163 sp	157 standard	241 standard - (84 new)
Warehouse-	3,240 sf/1,500 = 2 sp	4 handicap	7 handicap - (3 new)
Total Minimum-	165 sp	161 sp	248 spaces – (87 new)*1
*Impervious Surfaces:		171,002 sf	201,065 sf
Parking-		141,326 sf	170,713 sf
Walks-		4,133 sf	4,809 sf
Buildings-		25,543 sf	25,543 sf

Note #1) 90 new parking spaces are being constructed although, two existing spaces are lost for crosswalk construction and one is lost at new ADA parking configuration for a net of 87 new.

Site Layout and Parking Arrangement Considerations

There is a need for additional parking at the Huron Valley Ambulance site. There were a few different areas considered for increasing the needed parking capacity. In addition to the three areas of additional parking now proposed, another area directly east of the northerly parking lot was considered. Constructing parking in this area would have filling of the existing detention basin and relocation farther east.

Adding additional parking east of the detention basin was not seen as practical as the distance would be too far from the building.

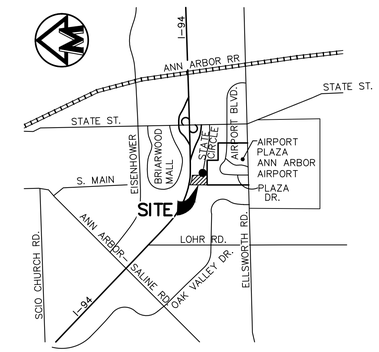
The currently proposed parking additions were determined to be the most practical. While the southeast proposed parking area does have an impact on the existing natural features, the impact is being kept to a minimum by the addition of retaining walls along the perimeter to reduce grading impacts. Also the additional stormwater detention storage required due to the increase in imperviousness is proposed in underground detention chambers under the parking area. While underground storage is more expensive than a surface detention basin, will help to reduce the impact to natural features.

CSPA 18-22
HVA Parking Addition Preliminary Site Plan and Final Site Plan

2019-02-20

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

HURON VALLEY AMBULANCE PARKING ADDITION CSPA #18–22



VICINITY MAP

NOT TO SCALE

SHEET INDEX

1. COVER SHEET
2. OVERALL SITE EXISTING CONDITIONS
3. EXISTING CONDITIONS AND DEMOLITION PLAN
4. OVERALL SITE PLAN
5. DIMENSIONAL SITE AND UTILITY PLAN
6. GRADING AND SOIL EROSION CONTROL PLAN
7. LANDSCAPE PLAN
8. STORM SEWER PROFILES
9. STORM WATER MANAGEMENT PLAN

NOTES & DETAILS

10. SITE DETAILS
11. LANDSCAPE DETAILS
12. STORM SEWER DETAILS
13. SOIL EROSION DETAILS AND NOTES
14. EARTHWORK SPECIFICATIONS

MISC. PLANS

15. AREA PLAN
16. PHOTOMETRIC PLAN

Agency	Approval Date
Washtenaw County Water Resources Commissioner	Dec. 4, 2018
Pittsfield Twp. Planning Commission	
Pittsfield Twp, SESC	
Pittsfield Twp, Utilities	
Washtenaw County Road Commission	

HURON VALLEY AMBULANCE

JOB No. 18193

REVISIONS:	REV. DATE
PER WCWRC	11/16/18
PER TOWNSHIP	1/15/19
PER TOWNSHIP	2/18/19

DATE: 10/16/18
SHEET 1 OF 16
CADD:
ENG: JCA
PM: SWB
TECH:
18193CV1

1

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RELEASED FOR:	DATE

P.E. #

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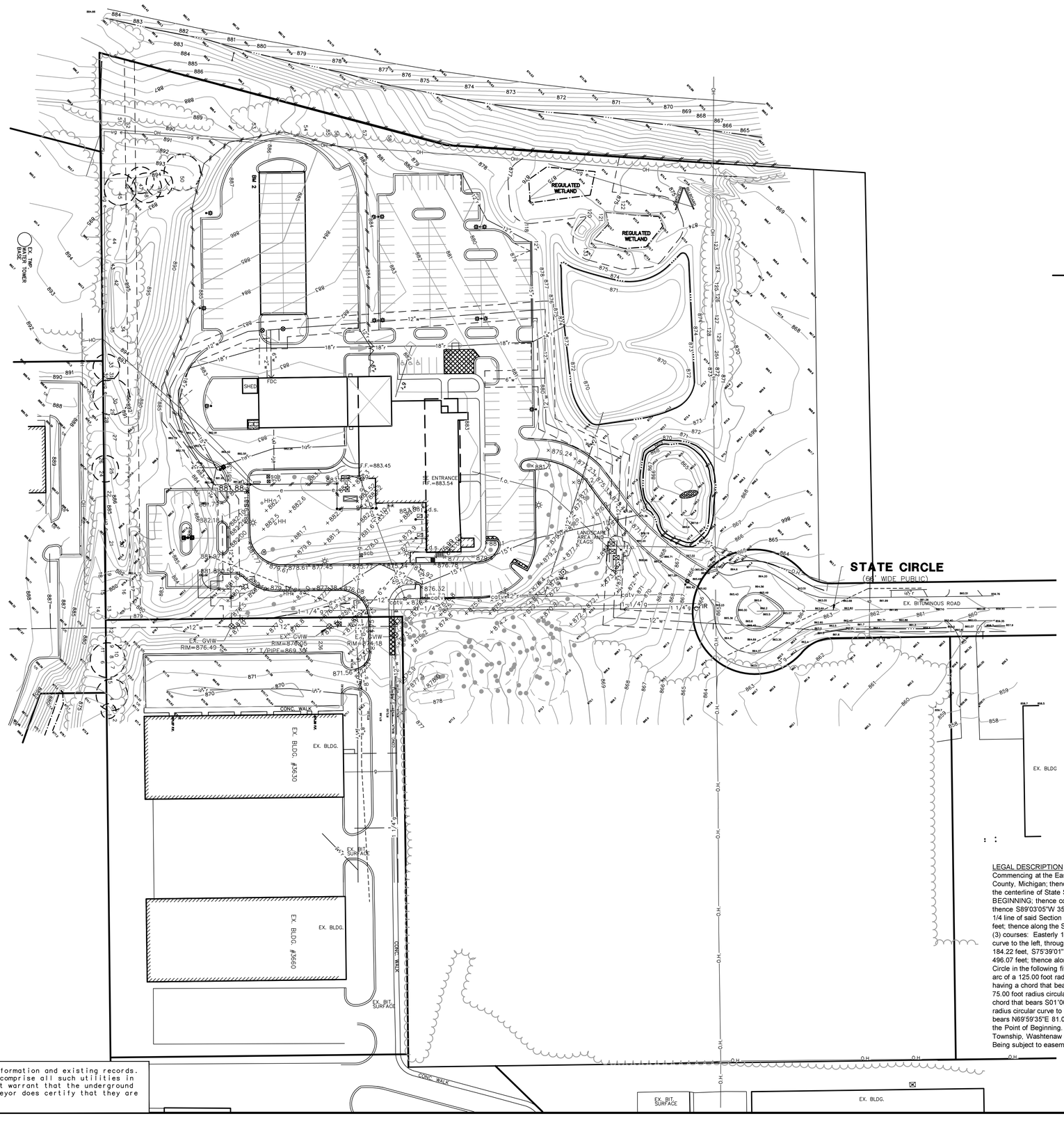

SCALE: 1" = 60'

0 60 120 180

Know what's below. Call before you dig.

LEGEND

838	EXIST. CONTOUR
×836.2	EXIST. SPOT ELEVATION
U.P.	EXIST. UTILITY POLE
GP	EXIST. GUY POLE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
w	EXIST. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
	EXIST. CURB STOP & BOX
	EXIST. BLOW-OFF
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	EXIST. CLEANOUT
s	EXIST. SANITARY SEWER
	℄ OF DITCH OR EDGE OF WATER
	DRAINAGE DIRECTION
	SIGN
	MAILBOX
	TELEPHONE RISER
	GAS METER
	FENCE
	TREE OR BRUSH LIMIT
	SINGLE TREE
	TREE TO BE REMOVED
	LANDMARK TREE
	TREE CRITICAL ROOT ZONE
	SECTION CORNER
	SOIL BORING LOCATION
S	SET IRON PIPE
F	FOUND IRON PIPE
F	FOUND MONUMENT
S	SET IRON ROD
FIR	FOUND IRON ROD
	CONTROL PT.

LEGAL DESCRIPTION

Commencing at the East 1/4 corner of Section 8, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan; thence S01°06'00"E 1165.50 feet along the East line of said Section and the centerline of State Street; thence S88°54'00"W 1760.11 feet to the POINT OF BEGINNING; thence continuing S88°54'00"W 638.53 feet; thence N01°06'00"W 543.00 feet; thence S89°03'05"W 357.89 feet; thence N00°57'13"W 530 38 feet along the North and South 1/4 line of said Section to the center of said Section; thence continuing N00°57'13"W 153.15 feet; thence along the Southerly right-of-way line of the 1-94 expressway in the following three (3) courses: Easterly 184.24 feet along the arc of a 3894.83 foot radius nontangential circular curve to the left, through a central angle of 02°42'37", having a chord that bears S78°56'39"E 184.22 feet, S75°39'01"E 310.10 feet and S86°42'00"E 443.57 feet; thence S00°38'30"E 496.07 feet; thence along the Northerly, Westerly and Southerly right-of-way lines of State Circle in the following five (5) courses: S88°54'00"W 13.38 feet, Westerly 82.50 feet along the arc of a 125.00 foot radius circular curve to the right, through a central angle of 37°48'50", having a chord that bears N72°11'35"W 81.01 feet, Southerly 334.62 feet along the arc of a 75.00 foot radius circular curve to the left, through a central angle of 255°37'43", having a chord that bears S01°06'00"E 118.50 feet, Easterly 82.50 feet along the arc of a 125.00 foot radius circular curve to the right, through a central angle of 37°48'50", having a chord that bears N69°59'35"E 81.01 feet and N88°54'00"E 90.76 feet; thence S01°06'00"E 509.99 feet to the Point of Beginning. Being a part of the East 1/2 of Section 8, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan and containing 19.81 acres of land, more or less. Being subject to easements and restrictions of record, if any.

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HURON VALLEY AMBULANCE

OVERALL SITE EXISTING CONDITIONS

2

DATE: 10/16/18
SHEET 2 OF 16
CADD:
ENG.: JCA
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18193EX1

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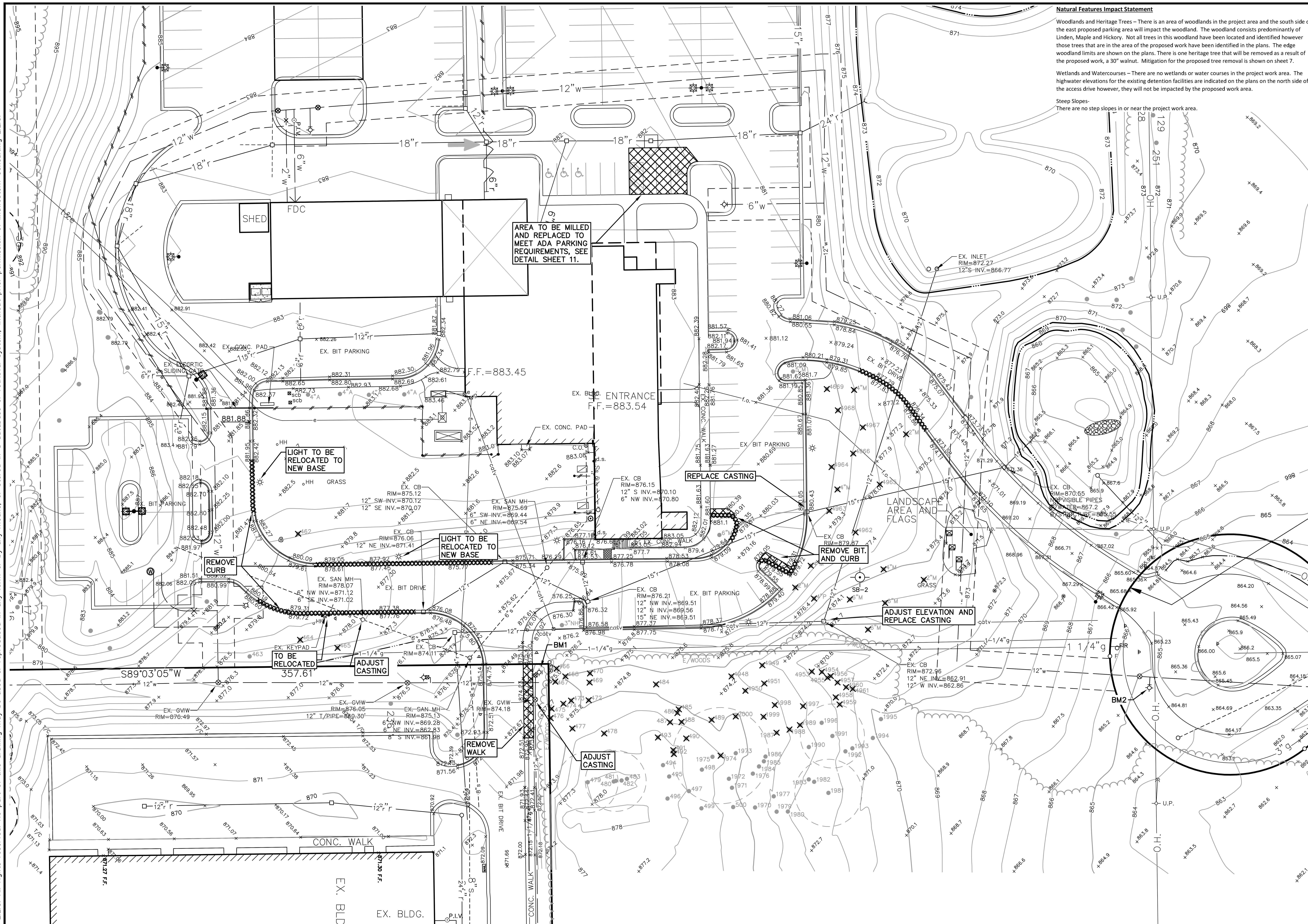

Natural Features Impact Statement

Woodlands and Heritage Trees – There is an area of woodlands in the project area and the south side of the east proposed parking area will impact the woodland. The woodland consists predominantly of Linden, Maple and Hickory. Not all trees in this woodland have been located and identified however those trees that are in the area of the proposed work have been identified in the plans. The edge woodland limits are shown on the plans. There is one heritage tree that will be removed as a result of the proposed work, a 30" walnut. Mitigation for the proposed tree removal is shown on sheet 7.

Wetlands and Watercourses – There are no wetlands or water courses in the project work area. The highwater elevations for the existing detention facilities are indicated on the plans on the north side of the access drive however, they will not be impacted by the proposed work area.

Steep Slopes-
There are no step slopes in or near the project work area.

SCALE: 1" = 30'

0 30 60 90

LEGEND

- 838 EXIST. CONTOUR
- ×836.2 EXIST. SPOT ELEVATION
- U.P. EXIST. UTILITY POLE
- GP EXIST. GUY POLE
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- SIGN
- MAIL MAILBOX
- t TELEPHONE RISER
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- FENCE
- TREE OR BRUSH LIMIT
- SINGLE TREE
- TREE TO BE REMOVED
- LANDMARK TREE
- TREE CRITICAL ROOT ZONE
- SECTION CORNER
- SOIL BORING LOCATION
- O S SET IRON PIPE
- O F FOUND IRON PIPE
- ◎ F FOUND MONUMENT
- O S SET IRON ROD
- OFIR FOUND IRON ROD
- CONTROL PT.
- CURB REMOVAL

BENCH MARKS

ADD 0.40' TO ELEVATIONS TO OBTAIN USGS DATUM

BM 1 –TOP OF SW STEAMER ON HYDRANT LOCATED AT THE NORTH END OF "PHASE 7" AIRPORT INDUSTRIAL PARK, APPROX. 100'± NORTH OF THE NORTHEAST CORNER OF BLDG. #3630. ELEV.=877.58 NAVD 88

BM 2– TOP OF EAST STEAMER ON HYDRANT LOCATED DIRECTLY AT THE END OF STATE CIRCLE DRIVE CUL-DE-SAC. ELEV.=866.44 NAVD 88

BM 3– TOP OF SOUTH STEAMER ON HYDRANT LOCATED AT THE NW CORNER OF PLAZA DRIVE AND 80' SOUTH OF THE SE CORNER OF BUILDING #3660. ELEV.=867.04 NAVD 88

NOTES:

1. EXISTING UTILITY LOCATIONS ARE FROM BEST AVAILABLE RECORDS. CONTRACTOR SHOULD VERIFY LCOATION AND DEPTH PRIOR TO WORK IN THE AREA.
2. SAWCUT EXISTING CURB, WALK AND PAVEMENT AT REMOVAL LIMITS.

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TAG#	DBH	COMMON NAME	GENUS/SPECIES	STEMS	SCORE	HERITAGE	WOODLAND	REMOVE	MITIGATE
462	6"	Red Maple	Acer rubrum		40% alive			X	
463	7"	Bradford Pear	Pyrus calleryana						
464	5"	Bradford Pear	Pyrus calleryana					X	
465	5"	Bradford Pear	Pyrus calleryana					X	
466	8"	Linden	Tilia americana				X	X	X
467	7"	Shagbark Hickory	Carya ovata				X	X	X
468	6"	Hawthorn	Crataegus				X	X	X
469	7"	Linden	Tilia americana				X	X	X
470	7"	White Oak	Quercus alba				X	X	X
472	7"	Linden	Tilia americana	twin			X	X	X
473	6"	Linden	Tilia americana				X	X	X
474	7"	Bitternut Hickory	Carya cordiformis				X	X	X
475	6"	Red Oak	Quercus palustris				X	X	X
476	6"	Red Oak	Quercus palustris				X	X	X
477	6"	Hop-Hornbeam	Ostrya virginia				X	X	X
478	6"	Hop-Hornbeam	Ostrya virginia				X	X	X
479	19"	Pignut Hickory	Carya glabra			X	X		
480	8"	Linden	Tilia americana				X		
481	19"	Linden	Tilia americana			X	X		
482	11"	Linden	Tilia americana				X		
483	7"	Linden	Tilia americana				X		
484	17"	Linden	Tilia americana		40% alive		X	X	X
485	15"	Linden	Tilia americana				X	X	X

TAG#	DBH	COMMON NAME	GENUS/SPECIES	STEMS	SCORE	HERITAGE	WOODLAND	REMOVE	MITIGATE
486	12"	Linden	Tilia americana				X	X	X
487	12"	Linden	Tilia americana		40% alive		X	X	X
488	8"	Linden	Tilia americana				X	X	X
489	10"	Sugar Maple	Acer saccharum		40% alive		X	X	X
490	7"	Linden	Tilia americana				X	X	X
491	8"	Linden	Tilia americana				X	X	X
492	12"	Linden	Tilia americana				X	X	X
493	14"	Pignut Hickory	Carya glabra				X	X	X
494	6"	Pignut Hickory	Carya glabra				X	X	X
495	10"	Linden	Tilia americana				X		
496	6"	Hop-Hornbeam	Ostrya virginia				X		
497	9"	Linden	Tilia americana				X		
498	9"	Linden	Tilia americana				X		
499	7"	Black Maple	Acer nigrum				X		
500	7"	Linden	Tilia americana				X		
1970	7"	Linden	Tilia americana				X		
1971	7"	Black Maple	Acer nigrum				X		
1972	6"	Black Maple	Acer nigrum				X		
1973	10"	Linden	Tilia americana				X		
1974	30"	Black Walnut	Juglans nigra			X	X	X	X
1975	7"	Linden	Tilia americana				X		
1976	6"	Linden	Tilia americana				X		

TAG#	DBH	COMMON NAME	GENUS/SPECIES	STEMS	SCORE	HERITAGE	WOODLAND	REMOVE	MITIGATE
1977	9"	Linden	Tilia americana				X		
1978	6"	Linden	Tilia americana				X		
1979	7"	Linden	Tilia americana				X		
1980	7"	Pignut Hickory	Carya glabra				X		
1981	21"	Shagbark Hickory	Carya ovata			X	X		
1982	9"	Shagbark Hickory	Carya ovata				X		
1983	11"	Shagbark Hickory	Carya ovata				X		
1984	12"	Linden	Tilia americana				X		
1985	9"	Linden	Tilia americana				X		
1986	6"	Linden	Tilia americana				X		
1987	13"	Linden	Tilia americana				X	X	X
1988	6"	Linden	Tilia americana				X	X	X
1989	8"	Linden	Tilia americana				X	X	X
1990	10"	Shagbark Hickory	Carya ovata				X		
1991	20"	Red Oak	Quercus palustris			X	X		
1992	7"	Linden	Tilia americana				X		
1993	7"	Linden	Tilia americana				X		
1994	8"	American Elm	Ulmus americana				X		
1995	8"	American Elm	Ulmus americana				X		
1996	7"	Linden	Tilia americana				X		
1997	9"	Linden	Tilia americana				X	X	X
1998	8"	American Elm	Ulmus americana				X	X	X
1999	7"	Black Maple	Acer nigrum				X	X	X

TAG#	DBH	COMMON NAME	GENUS/SPECIES	STEMS	SCORE	HERITAGE	WOODLAND	REMOVE	MITIGATE
2000	9"	Linden	Tilia americana				X	X	X
4948	7"	Linden	Tilia americana				X	X	X
4949	9"	Sugar Maple	Acer saccharum		40% alive		X	X	X
4950	6"	Sugar Maple	Acer saccharum		40% alive		X	X	X
4951	7"	Linden	Tilia americana				X	X	X
4953	13"	Linden	Tilia americana				X	X	X
4954	7"	Linden	Tilia americana				X	X	X
4955	7"	Linden	Tilia americana				X	X	X
4956	6"	Linden	Tilia americana				X	X	X
4957	9"	American Elm	Ulmus americana				X	X	X
4958	7"	Sugar Maple	Acer saccharum				X	X	X
4959	7"	Linden	Tilia americana				X	X	X
4960	6"	Linden	Tilia americana				X	X	X
4961	8"	Shagbark Hickory	Carya ovata				X	X	X
4962	6"	Black Pine	Pinus nigra					X	X
4963	6"	Black Pine	Pinus nigra					X	X
4964	6"	Black Pine	Pinus nigra					X	X
4965	6"	Black Pine	Pinus nigra					X	X
4966	7"	Black Pine	Pinus nigra					X	X
4967	8"	Black Pine	Pinus nigra					X	X
4968	8"	Black Pine	Pinus nigra					X	X
4969	7"	Black Pine	Pinus nigra					X	X

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HURON VALLEY AMBULANCE

EXISTING CONDITIONS AND DEMOLITION PLAN

3

DATE: 10/16/18
SHEET 3 OF 16
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REVISIONS:	REV. DATE
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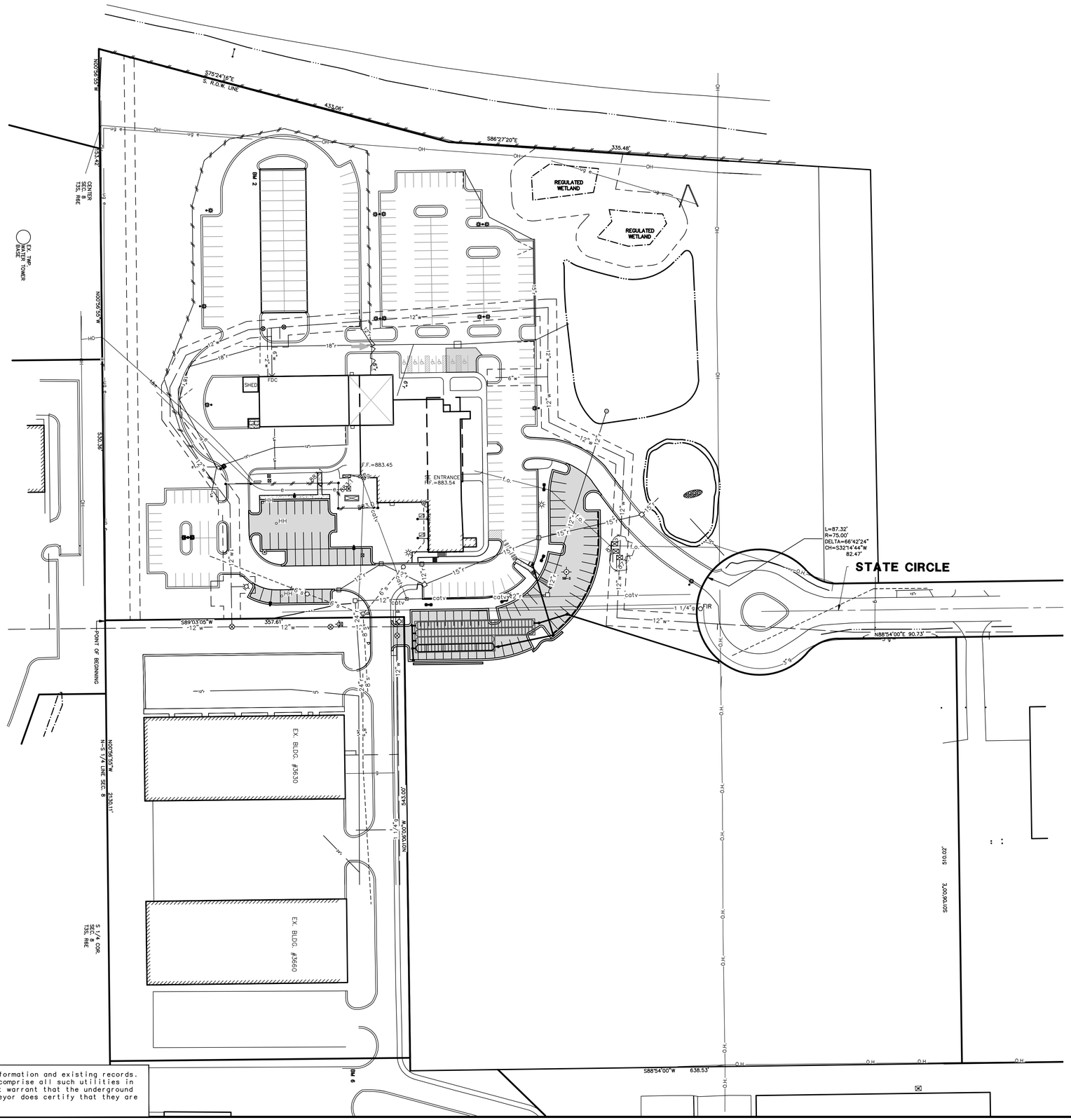

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0 60 120 180

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HURON VALLEY AMBULANCE

OVERALL SITE PLAN

4

JOB No. 18193
REVISIONS:
PER TOWNSHIP

REV.	DATE
	1/15/19

DATE: 10/16/18
SHEET 4 OF 16
CADD:
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18193SP1

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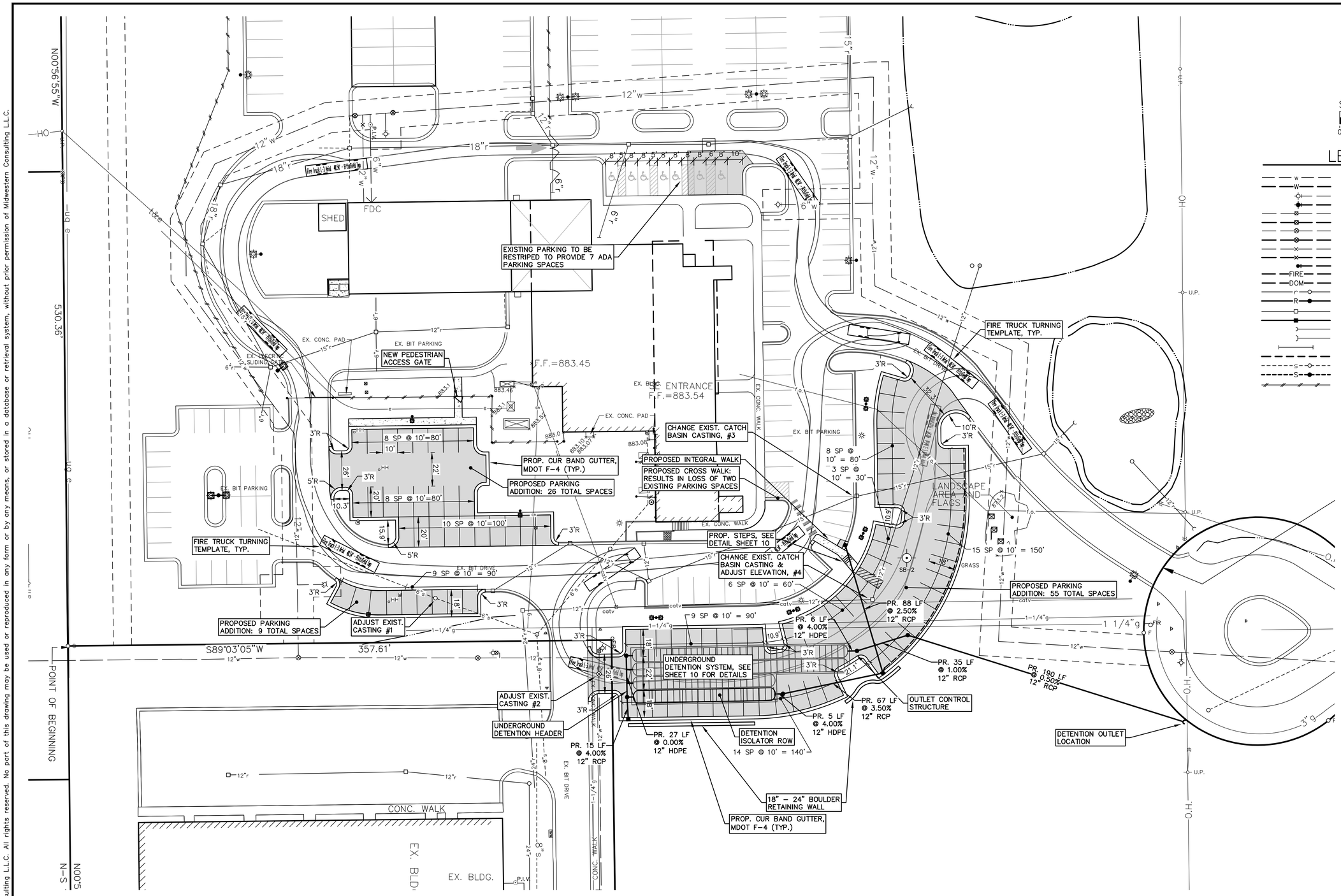

SCALE: 1" = 30'

0 30 60 90

LEGEND

- EXIST. WATER MAIN
- PROP. WATER MAIN
- EXIST. HYDRANT
- PROP. HYDRANT
- EXIST. GATE VALVE IN BOX
- PROP. GATE VALVE IN BOX
- EXIST. GATE VALVE IN WELL
- PROP. GATE VALVE IN WELL
- EXIST. CURB STOP & BOX
- PROP. CURB STOP & BOX
- PROP. BLOW-OFF
- PROP. FIRE PROTECTION SERVICE LEAD
- PROP. DOMESTIC WATER SERVICE LEAD
- EXIST. STORM SEWER
- PROP. STORM SEWER
- EXIST. CATCH BASIN OR INLET
- PROP. CATCH BASIN OR INLET
- END SECTION
- HEAD WALL
- CULVERT
- EDGE DRAIN
- EXIST. SANITARY SEWER
- PROP. SANITARY SEWER
- FENCE

Casting Adjustment Schedule

Adjust No.	Structure	Casting	Existing Rim Elevation	Proposed Rim Elevation
1	Sanitary MH	Reuse Existing	878.07	877.82
2	Gate Valve	Reuse Existing	874.18	874.05
3	Storm Catch Basin in Existing Parking Area	EJIWW 1040-B	879.97	879.95
4	Storm Catch Basin in Proposed Parking Area	EJIWW 1040-B	872.96	876.50

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DIMENSIONAL SITE AND UTILITY PLAN

5

DATE: 10/16/18
SHEET 5 OF 16
CADD:
ENG: JCA
PM: SWB
TECH:
18193SP1

JOB No. 18193

REVISIONS:

REV.	DATE
PER TOWNSHIP	1/17/19
PER TOWNSHIP	2/18/19

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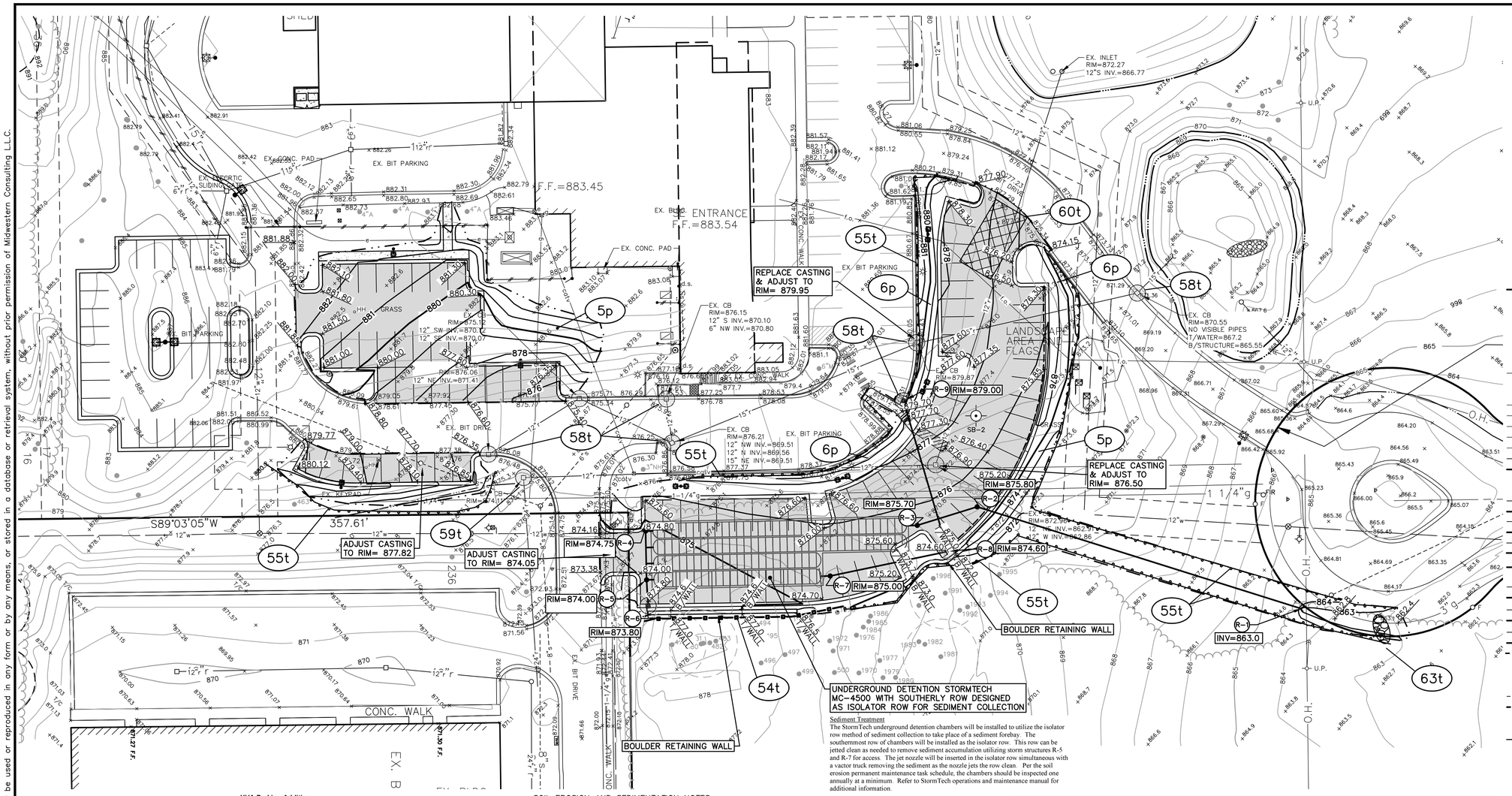

Sediment Treatment

The StormTech underground detention chambers will be installed to utilize the isolator row method of sediment collection to take place of a sediment forebay. The southernmost row of chambers will be installed as the isolator row. This row can be jetted clean as needed to remove sediment accumulation utilizing storm structures R-5 and R-7 for access. The jet nozzle will be inserted in the isolator row simultaneous with a vactor truck removing the sediment as the nozzle jets the row clean. Per the soil erosion permanent maintenance task schedule, the chambers should be inspected one annually at a minimum. Refer to StormTech operations and maintenance manual for additional information.

LEGEND

838	EXIST. CONTOUR
838	PROP. CONTOUR
×836.2	EXIST. SPOT ELEVATION
36.60	PROP. SPOT ELEVATION
U.P.	EXIST. UTILITY POLE
	GUY WIRE
	ELEC. TRANSFORMER
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
	PROP. LIGHT POLE
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
g	EXIST. GAS VALVE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
W	PROP. WATER MAIN
	EXIST. HYDRANT
	PROP. HYDRANT
	EXIST. GATE VALVE IN BOX
	PROP. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
	PROP. GATE VALVE IN WELL
	EXIST. CURB STOP & BOX
	PROP. CURB STOP & BOX
P.I.V.	POST INDICATOR VALVE
KB	PROP. KNOXBOX
r	EXIST. STORM SEWER
R	PROP. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	PROP. CATCH BASIN OR INLET
	EXIST. BEEHIVE INLET
	PROP. BEEHIVE INLET
RD	PROP. ROOF DRAIN
	END SECTION
	HEAD WALL
	CULVERT
s	EXIST. SANITARY SEWER
S	PROP. SANITARY SEWER
	EXIST. CLEANOUT
	PROP. CLEANOUT
	C/L OF DITCH
	DRAINAGE DIRECTION
	SIGN
	SINGLE TREE
	TREE OR BRUSH LIMIT
	FENCE
	SILTFENCE
	LIMITS OF DISTURBANCE
	CONSTRUCTION FENCE
	100-YEAR DETENTION ELEVATION

HVA Parking Addition

Permanent Maintenance Tasks and Schedule

Tasks	Drives	Storm Sewer System	Catch Basin Sumps	Catch Basin Inlet Castings	Ditches & Swales	Weir/ Outflow Control Structures	Riprap	Sediment Forebays	Detention Chambers	Schedule
Inspect for sediment accumulation		X	X		X	X		X	X	annually
Removal of sediment accumulation		X	X		X	X		X	X	every 2 years, as needed
Inspect for floatables and debris		X	X		X			X	X	annually
Inspect Infiltration Facilities events > 1 inch								X	X	as needed
Cleaning of floatables and debris		X	X		X			X	X	annually
Inspection for erosion					X	X	X	X	X	annually
Re-establish permanent vegetation on eroded slopes					X	X	X	X	X	as needed
Clean streets	X									semi-annually
Mowing					X					0-2 times per year
Inspect storm system components during wet weather and compare to as-built plans (by professional engineer) and report to Owner.	X	X	X	X	X	X	X	X	X	annually
Make adjustments or replacements as determined by annual wet weather inspection	X	X	X	X	X	X	X	X	X	as needed
Keep records of all inspections and maintenance activities and report to Owner.	X	X	X	X	X	X	X	X	X	annually
Keep records of all costs for inspection, maintenance and repairs and report to Owner.	X	X	X	X	X	X	X	X	X	annually

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SOIL EROSION AND SEDIMENTATION NOTES:

1. DESCRIPTION OF PROJECT: HURON VALLEY PARKING LOT ADDITIONS.
2. PREDOMINANT LAND FEATURES ARE SHOWN ON THE DRAWINGS.
3. GROUND SURFACE ELEVATIONS ARE SHOWN AS CONTOUR INTERVALS AND SPOT ELEVATIONS.
4. NO FLOODPLAIN EXISTS ON THE SUBJECT PROPERTY.
5. SOILS FOR THE AREA ARE BLOUNT AND MORLEY LOAM, 2% TO 6% SLOPES.
6. BASED ON PRELIMINARY INVESTIGATIONS, DEWATERING FOR THE SITE WILL NOT BE REQUIRED.
7. PHYSICAL LIMITS OF CONSTRUCTION ARE SHOWN ON THE DRAWING. APPROXIMATE SITE DISTURBANCE IS 1.12 ACRES.
8. ALL EXISTING ON-SITE DRAINAGE FEATURES ARE SHOWN ON THE DRAWINGS.
9. SEQUENCE OF CONSTRUCTION:
   MAY 2019 – CONSTRUCT TEMPORARY EROSION CONTROL MEASURES.
   ON-GOING: INSPECT ALL PROJECTS AT LEAST WEEKLY AND AFTER EVERY SIGNIFICANT STORM EVENT TO EVALUATE THE EFFECTIVENESS OF THE CONTROL MEASURES.
   MAY 2019 – SITE REMOVALS.
   MAY 2019 TO JULY 2019 – SITE CONSTRUCTION.
   AUGUST 2019 – PLACE PERMANENT OF EROSION CONTROL MEASURES.
10. THE CONTRACTOR WILL RESTORE ALL DISTURBED AREAS WITHIN FIVE (5) DAYS OF THE CONTRACTOR'S FINAL GRADING. A MINIMUM OF 4" TOPSOIL, SEED, MULCH AND FERTILIZER SHALL BE USED TO RESTORE DISTURBED AREAS.
11. THE CONTRACTOR SHALL SEED AND STABILIZE ANY DISTURBED AREAS OF THE DETENTION BASIN AS SOON AS FINAL GRADING HAS BEEN COMPLETED.
12. THE CONTRACTOR AS DIRECTED BY THE CONSTRUCTION MANAGER WILL BE RESPONSIBLE FOR ALL MAINTENANCE OF TEMPORARY EROSION CONTROL MEASURES PER THE PLANS AND PER TOWNSHIP AND AS NEEDED BASED ON THE SITE INSPECTIONS.
13. TEMPORARY MEASURES WILL ONLY BE REMOVED AFTER ALL PERMANENT MEASURES ARE IN PLACE AND COMPLETE INCLUDING WELL ROOTED GROWTH IN THE GRASS AREAS.
14. THE CONTRACTOR SHALL AS A TEMPORARY MEASURE SEED AND MULCH DISTURBED AREAS THAT ARE NOT ACTUALLY PART OF THE CONSTRUCTION WORK ZONE IF SAID AREAS ARE NOT TO BE WORKED ON FOR ANY EXTENDED PERIOD OF TIME.
15. PLACE ANTI-TRACKING MUD MATS AT LOCATIONS AS SPECIFIED BY THE CONSTRUCTION MANAGER.
16. SOIL MUST NOT BE PERMITTED TO LEAVE THE SITE. THIS INCLUDES TRACK-OUT AND DUST EMISSIONS. PROVIDE SWEEPING AND DUST CONTROL DAILY PER TOWNSHIP STANDARDS.
17. ALL INLET FILTER SILT SACK BAGS SHALL INCLUDE BEAVER DAMS FOR ALL CURB INLET CASTINGS.
18. EROSION CONTROL BLANKETS ARE REQUIRED FOR ALL SLOPE STABILIZATION STEEPER THAN 4:1 SLOPE.

Stormwater Management System Maintenance Plan

1. Responsibility for Maintenance:
   (a) During construction, it is the contractor's responsibility to perform the maintenance.
   (b) Following construction, it will be the responsibility of Owner to perform the maintenance.
   (c) The Master Deed will specify that routine maintenance of the stormwater facilities must be completed within thirty (30) days of receipt of written notification that action is required, unless other acceptable arrangements are made with the Washtenaw County Water Resources Commissioner or successors. Emergency maintenance (i.e., when there is endangerment to public health, safety, or welfare) shall be performed immediately upon receipt of written notice. Should the Owner fail to act within these time frames, the County or successors may perform the needed maintenance and assess the costs against the Owner.
   (d) The use of chemicals are not allowed in the stormwater features or buffer zones with the following exception: invasive species may be treated with chemicals by a certified operator.
2. Source of Financing
   (a) The Owner shall be required to pay for all maintenance activities on a continuing basis.
3. Maintenance Tasks and Schedule
   (a) See the chart on this page. The chart describes maintenance tasks to be performed by the Owner.
   (b) Immediately following construction, the owner will have the stormwater management system inspected by an engineer to verify grades of the detention and filtration areas and to make recommendations for any necessary sediment removal.
   (c) Upon completion of home construction in any phase of the project, responsibility for maintenance will be the Owner's.

MAINTENANCE PLAN BUDGET

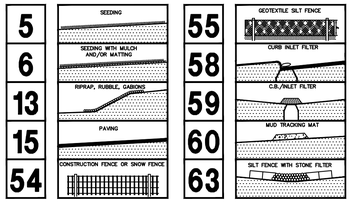
Annual inspection for sediment accumulation	$200.00
Removal of sediment accumulation every two (2) years, as needed	$400.00
Inspect pretreatment structure annually and after major storms	$200.00
Removal of floatables and debris annually and after major storms	$200.00
Inspect system for erosion annually and after major storms	$100.00
Re-establish permanent vegetation on eroded slopes, as needed	$400.00
Inspect structural elements during wet weather and compare to as-built plans every two (2) years	$200.00
Make structural adjustments or replacements as determined by inspection, as needed	$300.00
Have professional engineer carry out emergency inspections upon identification of severe problems	$200.00
Total Annual Budget	**$2200.00**

CONSTRUCTION SEQUENCE	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.
INSTALL AND MAINTAIN SOIL EROSION CONTROL MEASURES AS REQUIRED								
STRIP AND MASS GRADE SITE								
INSTALL UTILITIES								
INSTALL UNDERGROUND DETENTION								
CONSTRUCT PARKING LOT								
FINE GRADE SITE								
SEEDING AND PLANTINGS								
CLEANUP SITE								

OPERATION TIME SCHEDULE – BEGINNING MAY 2019

SOIL EROSION AND SEDIMENT CONTROL MEASURES

t – INDICATES TEMPORARY CONTROL MEASURE
p – INDICATES PERMANENT CONTROL MEASURE



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HURON VALLEY AMBULANCE

GRADING AND SOIL EROSION CONTROL PLAN

6

JOB No. 18193

DATE: 10/16/18
SHEET 6 OF 16
CADD:
ENG: JCA
PM: SWB
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18193GP1

REVISIONS:	REV. DATE
PER WCWRC	11/15/18
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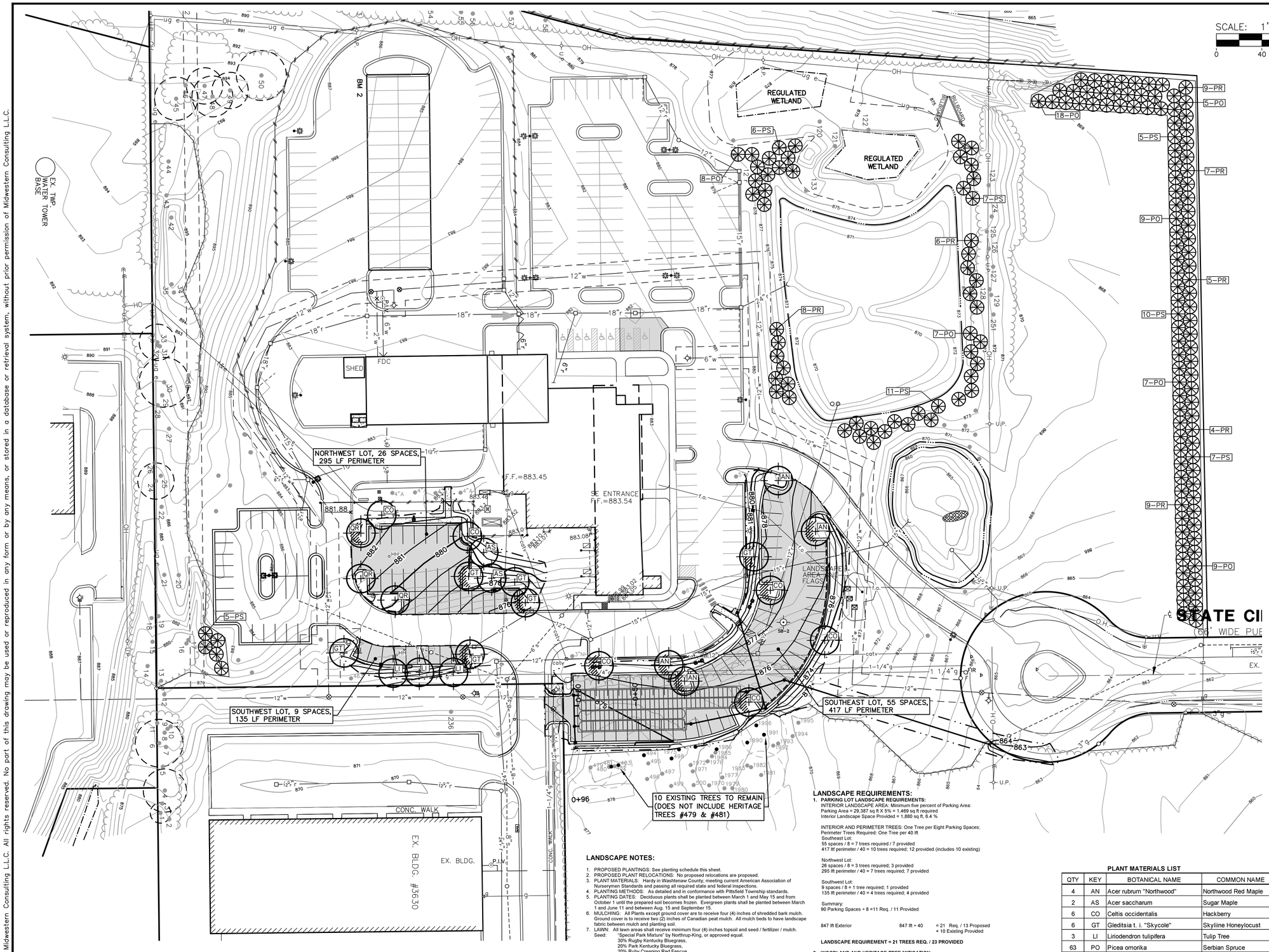

LEGEND

883	EXIST. CONTOUR
883	PROP. CONTOUR
×883.2	EXIST. SPOT ELEVATION
83.60	PROP. SPOT ELEVATION
	DRAINAGE DIRECTION
—— w ——	EXIST. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
—— r ——	EXIST. STORM SEWER
—— R ——	PROP. STORM SEWER
	EXIST. CATCH BASIN OR INLET
	PROP. CATCH BASIN OR INLET
	END SECTION
—— s ——	EXIST. SANITARY SEWER
	PROP. EDGEDRAIN
	EX. FENCE
	TREE OR BRUSH LIMIT

EXSITING TREE LEGEND

PE	PEAR
CA	CRABAPPLE
P	PINE
M	MAPLE
SP	SPRUCE
O	OAK
SB	SERVICE BERRY
	HERITAGE TREE W/CRITICAL ROOT ZONE
	EXISTING PREDEVELOPMENT TREE
	EXISTING DEVELOPMENT TREE

LANDSCAPE LEGEND

	WOODLAND/HERITAGE TREE MITIGATION: EVERGREEN TREE
	PARKING LOT PERIMETER TREES
	PARKING LOT INTERIOR TREES

LANDSCAPE NOTES:

1. PROPOSED PLANTINGS: See planting schedule this sheet.
2. PROPOSED PLANT RELOCATIONS: No proposed relocations are proposed.
3. PLANT MATERIALS: Hardy in Washtenaw County; meeting current American Association of Nurserymen Standards and passing all required state and federal inspections.
4. PLANTING METHODS: As detailed and in conformance with Pittsfield Township standards.
5. PLANTING DATES: Deciduous plants shall be planted between March 1 and May 15 and from October 1 until the prepared soil becomes frozen. Evergreen plants shall be planted between March 1 and June 11 and between Aug. 15 and September 15.
6. MULCHING: All Plants except ground cover are to receive four (4) inches of shredded bark mulch. Ground cover is to receive two (2) inches of Canadian peat mulch. All mulch beds to have landscape fabric between mulch and planting soil.
7. LAWN: All lawn areas shall receive minimum four (4) inches topsoil and seed / fertilizer / mulch.
   Seed: "Special Park Mixture" by Northrup-King, or approved equal.
   30% Rugby Kentucky Bluegrass,
   20% Park Kentucky Bluegrass,
   20% Ruby Creeping Red Fescue,
   10% Pennfine Perennial Ryegrass,
   20% Scaldis Hardy Fescue.
   Apply mechanically at 3 lbs. per 1000 square feet.
   Fertilizer: Commercial fertilizer as needed to provide:
   - not less than four percent (4%) potassium,
   - not less than two percent (2%) phosphoric acid,
   - percentage of nitrogen required to provide not less than one (1) pound of actual nitrogen per 1000 square feet of lawn area.
   Mulch: Within 24 hours of seeding, apply either straw mulch at two 100 pounds per 1000 square feet, or excelsior mulch at 2 bales per 1000 square feet. Anchor mulch with spray adhesive applied at 3.5 gallons per 1000 square feet.
8. PLANT LOCATION: All trees are to be located a minimum of 10 horizontal feet from all water main, sanitary sewer and storm sewer structures.

LANDSCAPE REQUIREMENTS:

1. **PARKING LOT LANDSCAPE REQUIREMENTS:**
   INTERIOR LANDSCAPE AREA: Minimum five percent of Parking Area:
   Parking Area = 29,387 sq ft X 5% = 1,469 sq ft required
   Interior Landscape Space Provided = 1,880 sq ft, 6.4 %

   INTERIOR AND PERIMETER TREES: One Tree per Eight Parking Spaces;
   Perimeter Trees Required: One Tree per 40 lft
   Southeast Lot:
   55 spaces / 8 = 7 trees required / 7 provided
   417 lft perimeter / 40 = 10 trees required; 12 provided (includes 10 existing)

   Northwest Lot:
   26 spaces / 8 = 3 trees required; 3 provided
   295 lft perimeter / 40 = 7 trees required; 7 provided

   Southwest Lot:
   9 spaces / 8 = 1 tree required; 1 provided
   135 lft perimeter / 40 = 4 trees required; 4 provided

   Summary:
   90 Parking Spaces ÷ 8 =11 Req. / 11 Provided

   847 lft Exterior 847 lft ÷ 40 = 21 Req. / 13 Proposed
   + 10 Existing Provided

   LANDSCAPE REQUIREMENT = 21 TREES REQ. / 23 PROVIDED

2. **WOODLAND AND HERITAGE TREE MITIGATION:**
   Woodland total DBH proposed removal = 359 inches, replacement at 100%
   One heritage tree, a 30" walnut, is proposed for removal. 150% replacement required or 45 inches
   A total of 404 inches of mitigation plantings are required.
   Using 2.5" replacement trees, 162 replacement trees are required
   MITIGATION REQUIREMENT = 162 TREES REQ / 162 PROVIDED

3. **SITE LANDSCAPING AREA**
   Required 20% of site area to landscaping area – 19.8 acres total - 3.96 acres required
   Wooded hedgerow along west property line – 0.44 acres
   New mitigation plantings along east property line 0.34 acres
   Existing wooded area to remain 7.22 acres
   8.0 acres or 40% of area
   LANDSCAPE AREA REQUIRED = 0.44 ACRES / PROVIDED 8.0 ACRES

PLANT MATERIALS LIST

QTY	KEY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	COMMENT
4	AN	Acer rubrum "Northwood"	Northwood Red Maple	2-1/2" cal.	B&B	6 ft branch height
2	AS	Acer saccharum	Sugar Maple	2-1/2" cal.	B&B	6 ft branch height
6	CO	Celtis occidentalis	Hackberry	2-1/2" cal.	B&B	6 ft branch height
6	GT	Gleditsia t. i. "Skycole"	Skyliine Honeylocust	2-1/2" cal.	B&B	6 ft branch height
3	LI	Liriodendron tulipifera	Tulip Tree	2-1/2" cal.	B&B	6 ft branch height
63	PO	Picea omorika	Serbian Spruce	6 ft hgt.	B&B	
48	PR	Pinus resinosa	Red Pine	6 ft hgt.	B&B	unsheared
51	PS	Pinus strobus	White Pine	6 ft hgt.	B&B	unsheared
3	QR	Quercus rubra	Red Oak	2-1/2" cal.	B&B	6 ft branch height

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HURON VALLEY AMBULANCE

LANDSCAPE PLAN

7

DATE: 10/16/18
SHEET 7 OF 16
CADD:
ENG: JCA
PM: SWB
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18193LP-1

JOB No. 18193
REVISIONS:
PER TOWNSHIP
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STRUCTURE TABLE						
STRUCTURE NO.	TYPE	RIM ELEV.	INV.	DEPTH	SUMP	TYPE OF CASTING
R-1	12" DIAM. ES	N/A	12" W 863.00	N/A	0'	N/A
R-2	4' DIAM. MH	875.80	12" E 863.95 12" W 864.05	11.85	0'	EJIW 1040 Type B
R-3	4' DIAM. MH	875.70	12" E 864.40 12" W 865.50	13.30	2'	EJIW 1040 Type B
R-4	4' DIAM. MH	874.75	12" E 866.00 12" S 866.00	8.75	0'	EJIW 1040 Type B
R-5	4' DIAM. MH	874.00	12" N 866.00 12" S 869.50 12" E 866.00	8.00	0'	EJIW 1040 Type B
R-6	2' DIAM. CB	873.80	12" N 870.08	3.72	0'	EJIW 7045 Type M1
R-7	4' DIAM. MH	875.00	12" E 868.05 12" W 867.85	7.15	0'	EJIW 1040 Type B
R-8	4' DIAM. CB	874.60	12" W 870.39 4" N 871.00 12" N 870.59	6.21	2'	EJIW 1040 Type B
R-9	2' DIAM. CB	879.00	12" S 872.78	6.22	0'	EJIW 7045 Type M1

Casting Adjustment Schedule

Adjust No.	Structure	Casting	Existing Rim Elevation	Proposed Rim Elevation
1	Sanitary MH	Reuse Existing	878.07	877.82
2	Gate Valve	Reuse Existing	874.18	874.05
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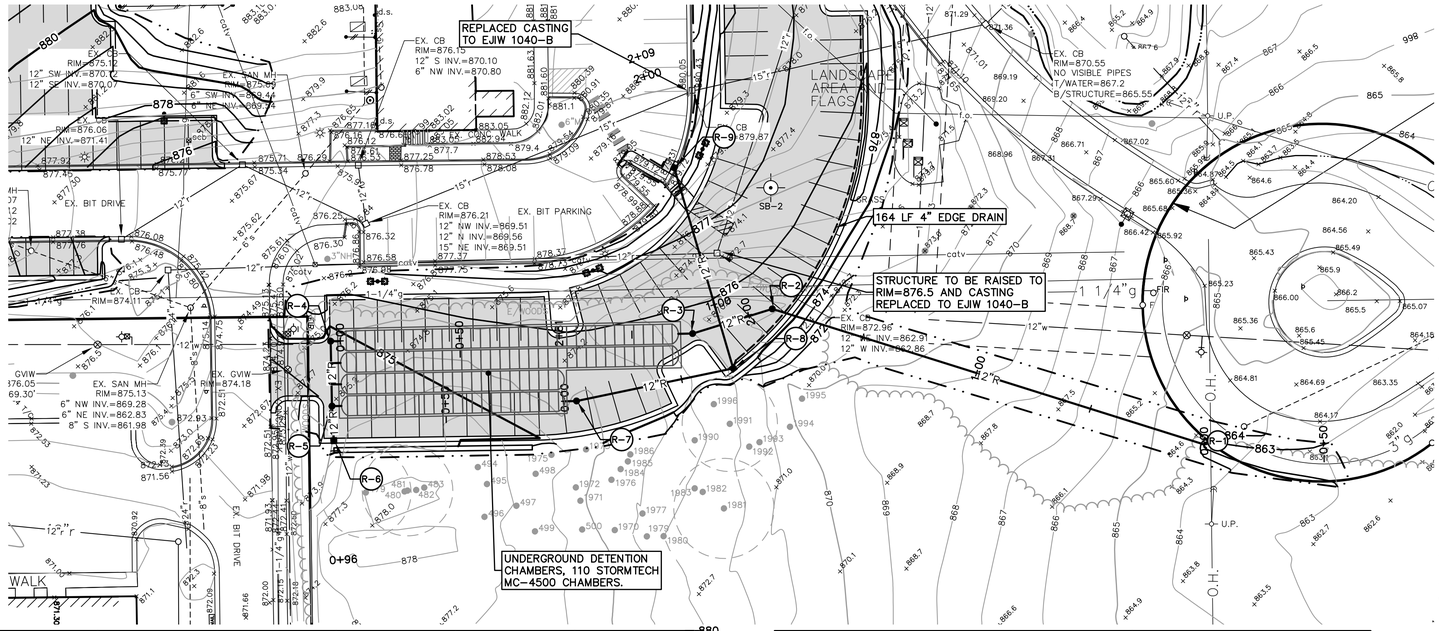

SCALE: 1" = 30'

0 30 60 90

Know what's below. Call before you dig.

LEGEND

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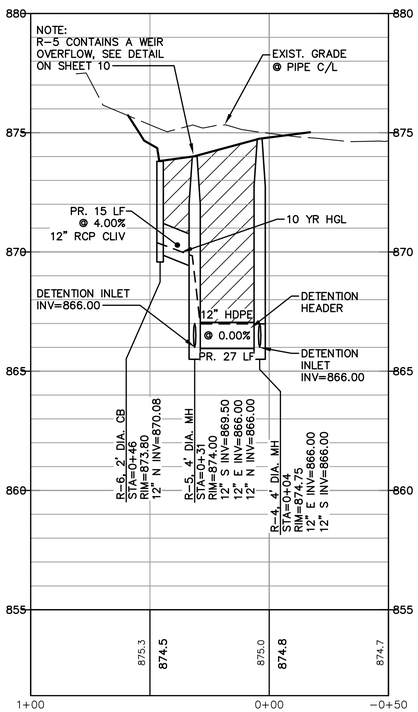
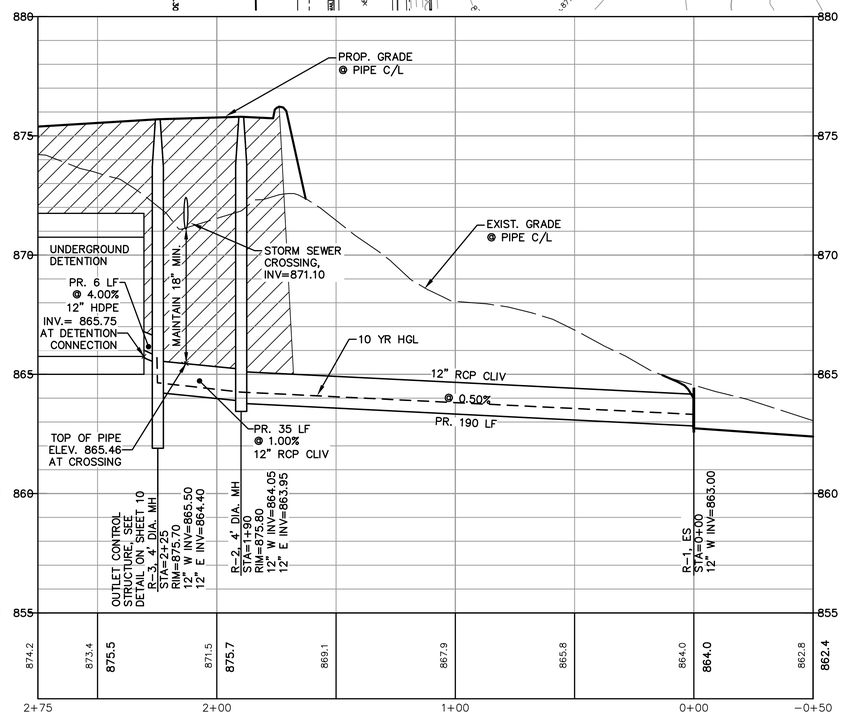
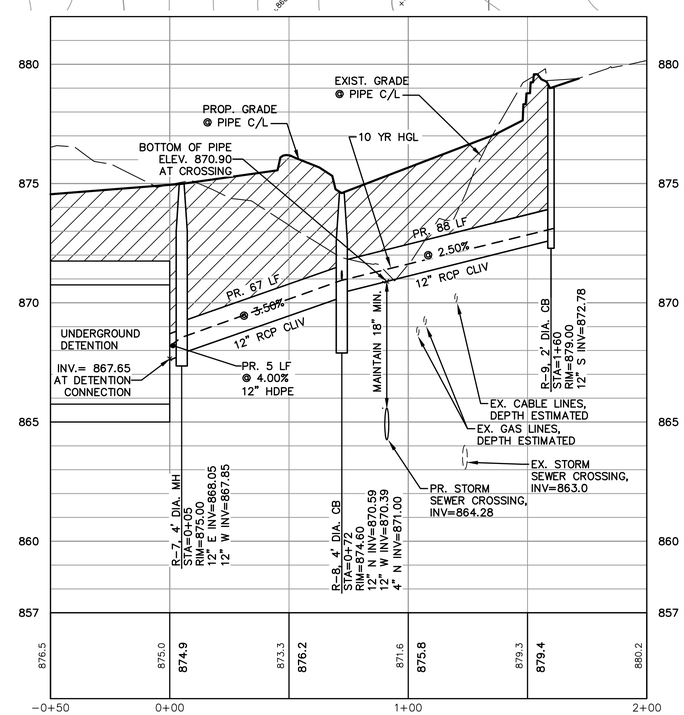
RD	PROP. ROOF DRAIN
	END SECTION
	HEAD WALL
	CULVERT
s	EXIST. SANITARY SEWER
S	PROP. SANITARY SEWER
	EXIST. CLEANOUT
	PROP. CLEANOUT
	C/L OF DITCH
	DRAINAGE DIRECTION
	SIGN
	SINGLE TREE
	TREE OR BRUSH LIMIT
	FENCE
	LIMITS OF DISTURBANCE
	CLII BACKFILL, 95% COMPACTION



WEST INLET



DETENTION OUTLET



EAST INLET

STORM DRAINAGE CALCULATION SHEET

Runoff Formula: Q = CIA

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I = x/T+y x = 175 y= 25 (10 Year Storm Event)
Type of Pipe = rcp
n = 0.013

PROJECT/CLIENT:
Job No.: 18193
Date: 10/02/18
By:
Revised:

Structure No. From	Structure No. To	Drainage Area A (Acres)	Runoff Coeff. C	CxA	ADD. CxA	Σ CxA	Time T (min.)	Rainfall I (in./hr.)	Q (cfs)	Pipe Dia. (in.)	Pipe Length (ft.)	Pipe Slope %	H.G. Slope %	Avg. Depth of Flow (ft.)	Velocity Flowing Full (ft./sec.)	Design Velocity (ft./sec.)	Travel Time (min.)	Sewer Capacity (cfs)	Surface Elev. Upstr.	H.G. Upstr.	H.G. Dwnstr.	Invert Elev. Upstr.	Invert Elev. Dwnstr.
9	8	0.26	0.85	0.22		0.22	15.00	4.38	0.97	12	88	2.50	0.07	0.33	7.19	4.53	0.20	5.65	879.00	873.11	870.92	872.78	870.59
8	7	0.32	0.85	0.27		0.49	15.20	4.35	2.15	12	67	3.50	0.36	0.43	8.50	6.22	0.13	6.68	874.60	870.82	868.48	870.39	868.05
7	DET	0.00	1.00	0.00		0.49	15.33	4.34	2.14	12	5	4.00	0.36	0.43	9.10	6.66	0.01	7.14	875.00	868.28	868.08	867.85	867.65
6	5	0.29	0.85	0.25		0.25	15.00	4.38	1.08	12	15	4.00	0.09	0.30	9.10	5.49	0.03	7.14	873.80	870.38	869.80	870.08	869.50
5	4	0.00	1.00	0.00		0.25	15.03	4.37	1.08	12	27	0.00	0.09	1.00	1.38	1.38	0.33	0.04	874.00	867.02	867.00	866.00	866.00
DET	3								0.13	12	6	4.00	0.00	0.23	9.10	4.64	0.01	7.14	875.70	865.97	865.73	865.74	865.50
2	2								0.13	12	35	1.00	0.00	0.23	4.55	2.32	0.13	3.57	875.70	864.63	864.28	864.40	864.05
1	1								0.13	12	190	0.50	0.00	0.23	3.22	1.64	0.98	2.53	875.80	864.18	863.23	863.95	863.00

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

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HURON VALLEY AMBULANCE

STORM SEWER PROFILES

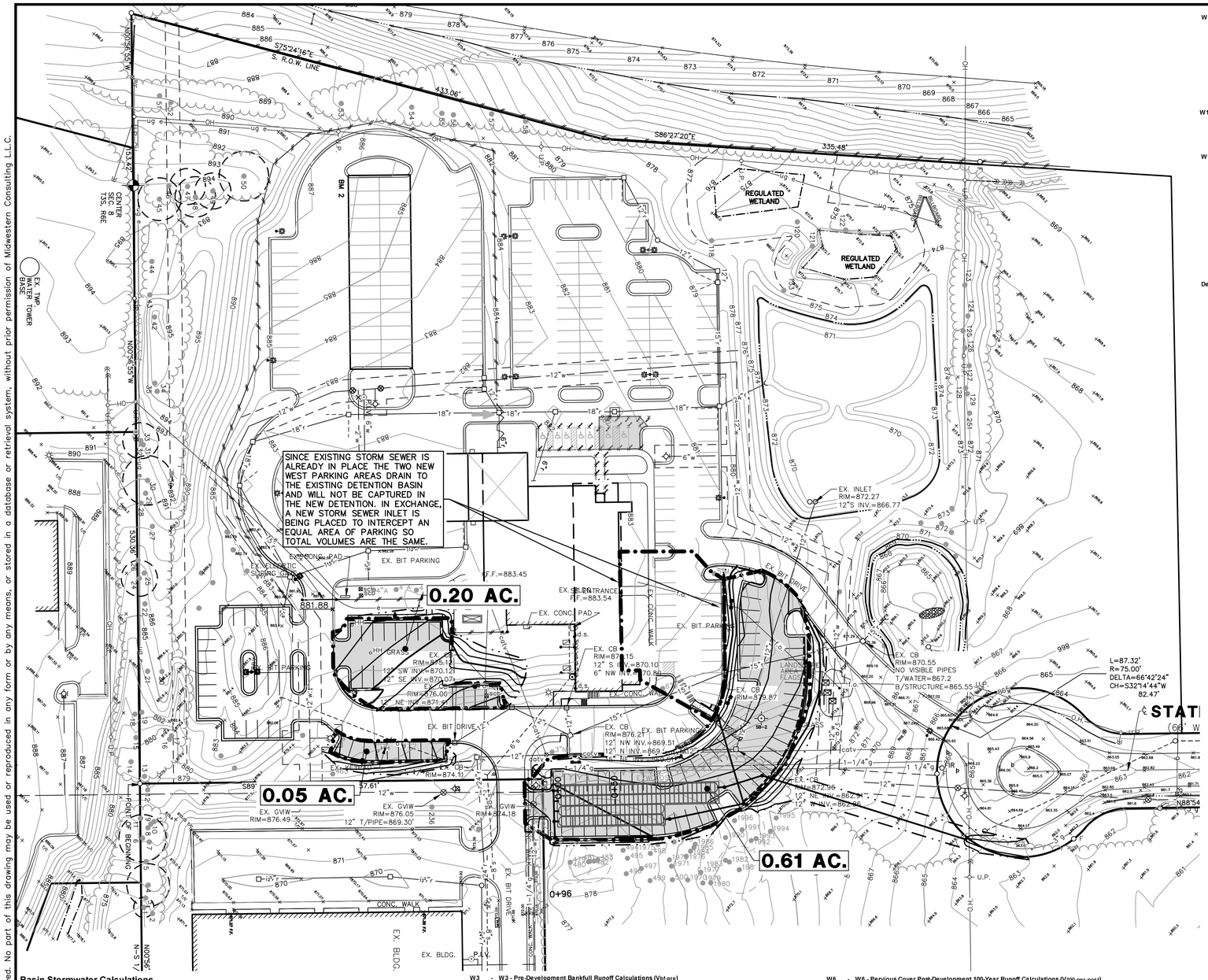
8

DATE: 10/16/18
SHEET 8 OF 16
CADD:
ENG: JCA
PM: SWB
TECH:
18193PR1

JOB No. 18193

REVISIONS:

REV.	DATE
PER TOWNSHIP	2/15/19
PER TOWNSHIP	2/18/19



Basin Stormwater Calculations

W1 - Determining Post-Development Cover Types, Areas, Curve Numbers, and Runoff Coefficients

Rational Method Variables

Cover Type	Soil Type	Area (sft)	Area (ac)	Runoff Coeff. (C)	(C) x (Area)
Pavement		30,700	0.70	0.95	0.67
Grass	D	6,600	0.15	0.45	0.07
Total		37,300	0.86		0.74

Weighted C = (Sum(C)x(Area))/(Area Total)= 0.86

NRCS Variables (Pervious)

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) x (Area)
Grass	D	6,600	0.15	84	0.13
Total		6,600	0.15		0.13

Weighted CN = (Sum(CN)x(Area))/(Area Total)= 84

NCRS Variables (Impervious)

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) x (Area)
Pavement		30,700	0.70	98	0.69
Total		30,700	0.70		0.69

Weighted CN = (Sum(CN)x(Area))/(Area Total)= 98

W2 - W2 - First Flush Runoff Calculations (Vrf)

A. Vrf = 1" x 1'/12" x 43560 sft/ac x A x C where A= 0.86 and where C= 0.86

Vrf = 1" x 1'/12" x 43560 sft/ac x 0.86 x 0.86 = 2,673 cf

W3 - W3 - Pre-Development Bankfull Runoff Calculations (Vbf-pre)

A. 2 year / 24 hour storm event:	P=	2.35 in
B. Pre-Development CN (Good Cover Woods, Type D Soils)	CN=	79
C. S = (1000 / CN) - 10	S=	2.658 in
D. Q = [(P-0.2S)^2] / [P+0.8S]	Q=	0.739 in
E. Total Site Area excluding "Self-Crediting" BMPs		37,300 sft
F. Vbf-pre = Q x (1/12) x Area	Vbf-pre =	2,296 cft

W4 - Pervious Cover Post-Development Bankfull Runoff Calculations (Vbf-per-post)

A. 2 year / 24 hour storm event:	P=	2.35 in
B. Pervious Cover CN From Worksheet 1	CN=	84
C. S = (1000 / CN) - 10	S=	1.905 in
D. Q = [(P-0.2S)^2] / [P+0.8S]	Q=	1.001 in
E. Pervious Cover Area from Worksheet 1		6,600 sft
F. Vbf-per-post = Q x (1/12) x Area	Vbf-per-post =	550 cft

W5 - W5 - Impervious Cover Post-Development Bankfull Runoff Calculations (Vbf-imp-post)

A. 2 year / 24 hour storm event:	P=	2.35 in
B. Impervious Cover CN From Worksheet 1	CN=	98
C. S = (1000 / CN) - 10	S=	0.204 in
D. Q = [(P-0.2S)^2] / [P+0.8S]	Q=	2.122 in
E. Impervious Cover Area from Worksheet 1		30,700 sft
F. Vbf-imp-post = Q x (1/12) x Area	Vbf-imp-post =	5,428 cft

W6 - W6 - Pervious Cover Post-Development 100-Year Runoff Calculations (V100-per-post)

A. 100 year / 24 hour storm event:	P=	5.11 in
B. Pervious Cover CN From Worksheet 1	CN=	84
C. S = (1000 / CN) - 10	S=	1.905 in
D. Q = [(P-0.2S)^2] / [P+0.8S]	Q=	3.371 in
E. Pervious Cover Area from Worksheet 1		6,600 sft
F. V100-per-post = Q x (1/12) x Area	V100-per-post =	1,854 cft

W7 - W7 - Impervious Cover Post-Development 100-Year Runoff Calculations (V100-imp-post)

A. 2 year / 24 hour storm event:	P=	5.11 in
B. Impervious Cover CN From Worksheet 1	CN=	98
C. S = (1000 / CN) - 10	S=	0.204 in
D. Q = [(P-0.2S)^2] / [P+0.8S]	Q=	4.873 in
E. Impervious Cover Area from Worksheet 1		30,700 sft
F. Vbf-imp-post = Q x (1/12) x Area	Vbf-imp-post =	12,467 cft

W8 - Time of Concentration (Tc-hrs)

A. Assume 15-minute minimum time of concentration Tc= 0.25 hr

W9 - Runoff Summary & On-Site Infiltration Requirement

A. Summary from Previous Worksheets

First Flush Volume (Vff)	**2,673 cft**
Pre-Development Bankfull Runoff Volume (Vbf-pre)	**2,296 cft**
Pervious Cover Post-Development Bankfull Volume (Vbf-per-post)	*550 cft*
Impervious Cover Post-Development Bankfull Volume (Vbf-imp-post)	*5,428 cft*
Total BF Volume (Vbf-post)	**5,978 cft**
Pervious Cover Post-Development 100-Year Volume (V100-per-post)	*1,854 cft*
Impervious Cover Post-Development 100-Year Volume (V100-imp-post)	*12,467 cft*
Total 100-Year Volume (V100)	**14,321 cft**

B. Determine Onsite Infiltration Requirement

Subtract the Pre-Development Bankfull from the Post-Development Bankfull Volume

Total Post-Development Bankfull Volume (Vbf-post)	5,978 cft
Pre-Development Bankfull Runoff Volume (Vbf-pre)	2,296 cft
Bankfull Volume Difference	**3,683 cft**
Infiltration Requirement (Vinf)	**3,683 cft**

W10 - Detention/Retention Requirement

A. $Q_P = 238.6\ Tc^{-0.82}$	743.63 cfs/(in x sq. mi)
B. Total Site Area excluding "Self-Crediting" BMPs	0.86 ac
C. $Q_{100} = Q_{100\text{-per}} * Q_{100\text{-imp}}$ (from W6 and W7, respectively)	8.244 in
D. Peak Flow (PF) = $Q_P \times Q_{100} \times$ Area / 640	8.20 cfs
E. Delta = PF - 0.15 x Area (ac)	8.07 cfs
(0.15 x Area (ac))	*0.13 cfs*
F. V_{det} = Delta / PF x V_{100}	14,097 cft
Required Detention not including infiltration credit or penalty.	
Sediment Forebay Volume Required (5% of V100)	716 cft

W11 - Determine Applicable BMPs and Associated Volume Credits

Infiltration test pits were excavated and review of the subsurface conditions disclosed clay material. Based on the soils encountered, it was recommended that no infiltration capacity exists and therefore no infiltration testing was performed. This was agreed upon through the WCWRC personnel.

W13 - Site Summary of Infiltration & Detention

A. Stormwater Management Summary

Min Infiltration Requirement (Vinf)	3,683 cft
Designed/Provided Infiltration Volume	0 cft
% Minimum Required Infiltration Provided	0 %
Total Calculated Detention Volume, V_{det}	14,097 cft
Net Required Detention Volume (V_{det} - Designed/Provided Infiltration Volume)	14,097 cft

B. Detention Volume Increase for sites where the required infiltration volume cannot be achieved.

% Required Infiltration NOT Provided (100% - % Minimum Required Infiltration Provided)	100.0 %
Net % Penalty (20% x % Required Infiltration NOT Provided)	20.0 %
Total Required Detention Volume, including penalty	**16,916 cft**

[(100% + Net % Penalty) x Net Required Detention Volume)]

Detention Outlet Calculations

A. Required Detention Volumes (Reduced by 6-hour infiltration)

Storm Event	Req'd Volume	less	Infil. Credit	=	Final Volume
First Flush	2,673 cft	-	0 cft	=	**2,673** cft
Bankfull	5,978 cft	-	0 cft	=	**5,978** cft
100 -year	14,097 cft	-	0 cft	=	**14,097** cft
100-year + Req'd Penalty	16,916 cft	-	0 cft	=	**16,916** cft
Forebay Volume Required (5% of 100-yr)				=	**705** cft

B. Detention Volumes Provided

Detention volume will be provided in Stormtech underground chambers, quantity 111 - MC-4500. From the Stormtech staged storage spreadsheet we get the following elevations for the storm events:

Bottom of Stone =	865.00
Bottom of chambers =	865.75
First Flush =	866.22
Bankfull =	867.15
100 Yr =	871.67

C. Three-Stage Outlet Design

The Detention Basin will have a 3-stage outlet. This will consist of a manhole and wall with a series of holes in three (3) tiers. The lower tier of holes will detain the first-flush volume in a timeframe to exceed 24 hours. The middle tier along with the lower tier will detain and drain the bankfull flood volume in a timeframe not-to-exceed 48 hours. The upper tier along with the middle and lower tiers will detain the runoff from the site. The perforated manhole will be surrounded by a stone filter.

First Flush Discharge (24-36 hours for the detention of first flush storm event)

Average Head (H_{fave}) = 2/3 (Xff - Xbot) =	2/3 (866.22 - 865) =	0.81 ft
First Flush Max. Flowrate ($Q_{ff\text{-}max}$) = Vff / 24 hrs =	2673cfs / (24 hrs*3600) =	0.031 cfs
Req Area (Aff) = $Q_{ff\text{-}max}$ / 0.62 / sqrt(2*g*H_{ave}) =	0.031/0.62/(2*32.2*0.81)^0.5=	0.007 sft
Orifice Diameter, Proposed	=	1.125 in
Orifice Area	=	0.0069 sft
Number Required for 24 hr drainage = Aff / Orifice Area=	0.007 sft / 0.0069 sft =	1.00 holes
Number of Holes to Use	=	1 holes
Area of (1) - 1.125 inch Orifi Arr	=	0.007 sft
Actual Flow (Qrf) = 0.62 * Arf * sqrt(2*g*H_{ave}) =	0.62 * 0.007 *sqrt(2*32.2*0.81) =	0.031 cfs
Actual Time (Trf) = Vrf / Qrf =	2673 cf / 0.031 cfs / 3600 =	24.03 hr

Therefore Use (1) 1.125 " hole(s) at Elev. = 865.00

Bankfull Discharge (36-48 hours)

Average Head (H_{ave}) =	2/3 (Xbf - Xbot) = 2/3 (867.15 - 865) =	1.43 ft
Actual Flow (Qbf) = 0.62 * Arf * sqrt(2 * g * H_{ave}) =	0.62 * 0.0069 * sqrt(2 * 32.2 * 1.43)=	0.04 cfs
Actual Time (Tbf) = Vbf / Qbf =	5978 cf / 0.041 cfs / 3600 =	40.45 hr

Drawdown Time for Bankfull Volume is between 36 and 48 hours

Assumed Target time for bankfull detention drawdown	=	44 hrs
Bankfull storage volume above firstflush (V_{rem}) = Vbf - Vff =	5978 cf - 2673 cf =	3305 cf
Time to Drain Remaining Storage (T_{rem}) = T_{bf} - Trf =	44 hrs - 24.03 hrs =	19.97 hrs
Average head to first flush holes (Hf1) = 2/3 (Xrf - Xff) + (Xff - Xbot) =	= 2/3 (867.15 - 866.22) + (866.22 - 865) =	1.84 ft
Average Flow through first flush holes (Q_1) = 0.62 * Aff * sqrt(2 * g * Hf1) =	= 0.62 * 0.0069 * sqrt(2 * 32.2 * 1.84) =	0.047 cfs
Volume through First Flush Holes (V_1) = Q_1*T_{rem} =	0.047cfs * 19.97hrs * 3600 =	3,348 cf
Volume Remaining (V_2) = V_{rem} - V_1 =	3305 cf - 3348 cf =	(43) cf
Average flow to drain Volume Remaining (Q_{rem}) =V_2/(T_{rem} * 3600) =	-43 / (19.97 * 3600) =	(0.001) cfs
Average Head to Bankfull Holes (Hf2) = 2/3 (Xbf - Xff) =	2/3 (867.15 - 866.22) =	0.62 ft
Area for Bankfull Holes (Abf) = Q_{rem} / (0.62*sqrt(2*g*Hf2) = -0.001/(0.62*SQRT(2*32.2*0.62)) =		(0.000) sf
Orifice Diameter, Bankfull Proposed	=	0.750 in
Orifice Area =	(0.75 / 2 / 12)^2 * 3.1415927 =	0.0031 sft
Number Required for 24 hr drainage = Arf / Orifice Area=	-0.0002 sft / 0.0031 sft =	-0.05 holes
Number of Holes to Use	=	0 holes
Area of (0) - 0.75 inch Orific (Aor) =	=	0.0000 sft

Therefore Use (0) 0.750 " hole(s) at Elev. = 866.22

Actual Discharge through Bankfull Holes (Q_{bf}) = 0.62 * Aor * sqrt(2*32.2*Hf2)	= 0.62 * 0 * SQRT(2*32.2*0.62) =	0.000 cfs
Actual Time to Drain to First Flush Elevation (T_2) = V_{rem} / (Q_1 + Q_2) =	3305/(0.047+0=	19.71 hrs
Actual Time to Drain Bankfull Volume (T_{bf}) = Trf + T_2 =	24.03 hrs + 19.71 hrs =	43.74 hrs

100-year Discharge (0.15 cfs/acre max. allowed)

Max Head to First Flush Holes ($H_{max\text{-}ff}$) = X_{100} - X_{ff}=	871.67 - 865 =	6.67 ft
Max Flow at Lowest Holes ($Q_{max\text{-}ff}$)= 0.62 * Arf * sqrt(2 * g * $H_{max\text{-}ff}$) =	= 0.62 * 0.0069 * sqrt(2 * 32.2 * 6.67) =	0.09 cfs
Max Head to Bankfull Holes ($H_{max\text{-}bf}$) = X_{100} - X_{bf}=	871.67 - 866.22 =	5.45 ft
Max Flow at Bankfull Holes ($Q_{max\text{-}bf}$)= 0.62 * Aor * sqrt(2 * g * $H_{max\text{-}bf}$) =	= 0.62 * 0 * sqrt(2 * 32.2 * 5.45) =	- cfs
Max Head to 100yr Holes ($H_{max\text{-}100}$) = X_{100} - X_{bf} =	871.67 - 867.15 =	4.52 ft
Q_A (Allowable 100-year release rate)= 0.15 cfs/acre =	0.15 cfs * 0.86 ac =	0.13 cfs
Max flow through 100-year holes = $Q_{max\text{-}100}$ = Q_A - $Q_{max\text{-}bf}$ - $Q_{max\text{-}ff}$ =	0.13 cfs - 0 cfs -0.089 cfs =	0.040 cfs
Max. Area for Orifices (A_{100}) = Q_{max} / 0.62 / sqrt (2*g*h-100_{max})		0.004 sft
Orifice Diameter, 100-yr Proposed		0.810 in
Orifice Area		0.0036 sft
Number Required for 0.15 cfs/acre drainage		1.05
Number of holes used		1 ea
Area of (1) - 0.81 inch Holes (A_{100})		0.004 sft
100-year orifices - Actual Flow ($Q_{max\text{-}100}$) = 0.62 * A_{100} * sqrt (2 * g * $H_{max\text{-}100}$) =	= 0.62 * 0.004 * sqrt (2 * 32.2 * 4.52) =	0.038 cfs
Actual Max Release Rate (Q_{max}) = $Q_{max\text{-}100}$+$Q_{max\text{-}bf}$+$Q_{max\text{-}ff}$ =	0.038cfs+0cfs+0.089cfs=	0.127 cfs

Therefore Use (1) 0.810 " hole(s) at Elev. = 867.15

100-year Drawdown Time (72-hour max)

Average head to first flush holes with all orifice in use ($H_{ff\text{-}ave}$) = 2/3 (X_{100} - Xff) + (Xff - Xbot)	= 2/3 (871.67 - 867.15) + (866.22 -865) =	5.16 ft
Average flow through first flush holes to bankfull elevation ($Q_{ff\text{-}ave}$) = 0.62 * Arf * sqrt (2*g*$H_{ff\text{-}ave}$)	= 0.62 * 0.0069 * SQRT(2 * 32 2 * 5.15) =	0.078 cfs
Average head to bankfull holes with all orifice in use ($H_{bf\text{-}ave}$) = 2/3 (X_{100} - Xbf) + (Xbf - Xff)	= 2/3 (871.67 - 867.15) + (867.15 -866.22) =	3.94 ft
Average flow through bankfull holes ($Q_{bf\text{-}ave}$)= 0.62 * Aor * sqrt (2*g*$H_{bf\text{-}ave}$)	= 0.62 * 0 * SQRT(2 * 32.2 * 3.94) =	0.000 cfs
Average head to 100-yr holes ($Q_{100\text{-}ave}$) = 2/3 (X_{100}-Xbf) =	2/3 * (871.67 - 867.15) =	3.01 ft
Average flow through 100-yr holes ($Q_{100\text{-}ave}$) = 0.62 * A_{100} * SQRT (2*g* $H_{100\text{-}ave}$)	0.62 * 0.004 * sqrt(2 * 32.2 * 3.01) =	0.031 cfs
Combined drawdown flow ($Q_{100\text{-}bf}$) = $Q_{100\text{-}ave}$ + $Q_{bf\text{-}ave}$ + $Q_{ff\text{-}ave}$ =	0.031 + 0 + 0.078 =	0.109 cfs
Volume of Storage above Bankfull Elev (V_{rem}) = V_{100} - Vbf =	16916 - 5978 =	10,938 cft
Time to drain Volume between 100yr and bankfull elevations = V_{rem}/($Q_{100\text{-}bf}$/3600	= 10938 cf / 0.109 cfs / 3600 =	27.91 hr
Total 100-year drawdown time = T_{100} = $T_{100\text{-}bf}$ + T_{bf} =	27.91 hrs + 43.74 hrs =	71.65 hr

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SCALE: 1" = 40'

0 40 80 120

811 Know what's below. Call before you dig.

Stormwater Narrative:

In general the stormwater flows from the west to east toward the State Circle. There are three areas where parking will be added. The two new west parking areas flow into the existing storm sewer and flow out to the existing detention basin. In order to not completely replace the storm sewer system and provide drainage for these two new parking areas, an equal area in the existing parking area will be removed from the existing detention watershed and routed to the new underground detention basin to compensate for the two new westerly parking areas.

The easterly main parking addition and the compensatory area of the existing parking area will be routed to the new underground detention basin. The underground detention consists of StormTech chambers under the parking area. The chambers will detention the stormwater and release the runoff at the rate not to exceed 0.15 cfs/acre of drainage area. The detention chambers will discharge through an outlet control structure, through a discharge pipe to the roadside ditch along State Circle before flowing to the Mallets Creek flowing along the southerly ROW of I-94.

Existing Drainage

Using the rational method we will estimate the existing flows that discharge from the site. The area of improvement is 0.86 acres.

Q = CIA

C = 0.45 for existing site.
Tc = 15 min

I_{10} = 175/(Tc+25) 10 year storm = 4.38 In/Hr
I_{100} = 275/(Tc+25) 100 year storm = 6.88 In/Hr

Southwest
Q_{10} = 0.45 x 4.38 x 0.86 = 1.69 cfs
Q_{100} = 0.45 x 6.88 x 0.86 = 2.66 cfs

Proposed drainage

The onsite drainage will be routed to the underground detention basin. The onsite soils do not provide any infiltration capability. All three storm events, the first flush, bankfull and 100-year storm events will be detained and will discharge the stormwater at a controlled rate not to exceed the agricultural rate of 0.15 cfs per acre. The basin will have controlled peak discharges of:

Basin : Q_{100} = 0.13 cfs will discharge to the State Circle ditch.

The additional of the onsite detention basins will reduce the outflow from the site and so it will not have a detrimental impact of the downstream drain capacity.

Sediment Treatment

The StormTech underground detention chambers will be installed to utilize the isolator row method of sediment collection to take place of a sediment forebay. The southernmost row of chambers will be installed as the isolator row. This row can be jetted clean as needed to remove sediment accumulation utilizing storm structures R-5 and R-7 for access. The jet nozzle will be inserted in the isolator row simultaneous with a vactor truck removing the sediment as the nozzle jets the row clean. Per the soil erosion permanent maintenance task schedule, the chambers should be inspected one annually at a minimum. Refer to StormTech operations and maintenance manual for additional information.

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HURON VALLEY AMBULANCE

STORM WATER MANAGEMENT PLAN

9

JOB No. 18193

REVISIONS:
PER WCWRC
PER TOWNSHIP

REV.	DATE
1	11/5/18
2	1/15/19

DATE: 10/16/18
SHEET 9 OF 16
CADD:
ENG: JCA
PM: SWB
TECH:
18193SM1

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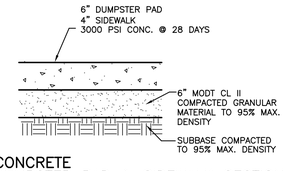
Chamber Model -	MC-4500	
Units -	Imperial	
Number of Chambers -	111	
Number of End Caps -	6	
Voids in the stone (porosity) -	30	%
Base of STONE Elevation -	865.00	ft
Amount of Stone Above Chambers -	12	in
Amount of Stone Below Chambers -	9	in

StormTech — Detention • Retention • Water Quality — A division of ADS

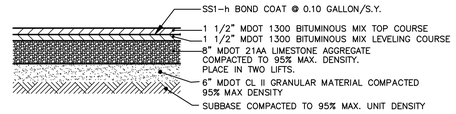
☐ Include Perimeter Stone in Calculations

StormTech MC-4500 Cumulative Storage Volumes

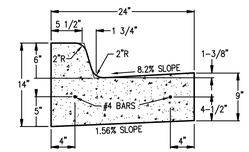
Height of System (inches)	Incremental Single Chamber (cubic feet)	Incremental Single End Cap (cubic feet)	Incremental Chambers (cubic feet)	Incremental End Cap (cubic feet)	Incremental Stone (cubic feet)	Incremental Ch, EC and Stone (cubic feet)	Cumulative System (cubic feet)	Elevation (feet)
81	0.00	0.00	0.00	0.00	106.30	106.30	17035.77	871.75
80	0.00	0.00	0.00	0.00	106.30	106.30	16929.47	871.67
79	0.00	0.00	0.00	0.00	106.30	106.30	16823.17	871.58
78	0.00	0.00	0.00	0.00	106.30	106.30	16716.87	871.50
77	0.00	0.00	0.00	0.00	106.30	106.30	16610.57	871.42
76	0.00	0.00	0.00	0.00	106.30	106.30	16504.27	871.33
75	0.00	0.00	0.00	0.00	106.30	106.30	16397.97	871.25
74	0.00	0.00	0.00	0.00	106.30	106.30	16291.68	871.17
73	0.00	0.00	0.00	0.00	106.30	106.30	16185.38	871.08
72	0.00	0.00	0.00	0.00	106.30	106.30	16079.08	871.00
71	0.00	0.00	0.00	0.00	106.30	106.30	15972.78	870.92
70	0.00	0.00	0.00	0.00	106.30	106.30	15866.48	870.83
69	0.04	0.00	4.55	0.00	104.93	109.48	15760.18	870.75
68	0.12	0.01	12.89	0.06	102.42	115.36	15650.70	870.67
67	0.16	0.03	18.29	0.16	100.77	119.21	15535.34	870.58
66	0.21	0.05	23.17	0.29	99.26	122.72	15416.13	870.50
65	0.27	0.07	29.79	0.41	97.24	127.43	15293.41	870.42
64	0.45	0.09	50.26	0.53	91.06	141.85	15165.98	870.33
63	0.67	0.11	73.84	0.68	83.94	158.46	15024.13	870.25
62	0.80	0.14	88.69	0.85	79.44	168.98	14865.66	870.17
61	0.91	0.17	100.80	1.01	75.76	177.56	14696.68	870.08
60	1.00	0.19	111.32	1.15	72.56	185.03	14519.12	870.00
59	1.09	0.22	120.69	1.29	69.70	191.69	14334.09	869.92
58	1.16	0.24	129.15	1.45	67.12	197.72	14142.40	869.83
57	1.23	0.27	136.98	1.62	64.72	203.32	13944.69	869.75
56	1.30	0.30	144.26	1.79	62.48	208.53	13741.37	869.67
55	1.36	0.32	151.07	1.94	60.39	213.41	13532.84	869.58
54	1.42	0.35	157.48	2.09	58.43	217.99	13319.43	869.50
53	1.47	0.37	163.54	2.23	56.57	222.34	13101.43	869.42
52	1.53	0.39	169.29	2.36	54.80	226.46	12879.10	869.33
51	1.57	0.42	174.77	2.50	53.12	230.39	12652.64	869.25
50	1.62	0.44	179.97	2.64	51.51	234.13	12422.25	869.17
49	1.67	0.46	184.95	2.78	49.98	237.71	12188.12	869.08
48	1.71	0.48	189.71	2.90	48.51	241.13	11950.41	869.00
47	1.75	0.50	194.26	3.03	47.11	244.40	11709.28	868.92
46	1.79	0.53	198.61	3.15	45.77	247.53	11464.88	868.83
45	1.83	0.55	202.82	3.27	44.47	250.56	11217.35	868.75
44	1.86	0.56	206.84	3.39	43.23	253.46	10966.78	868.67
43	1.90	0.58	210.71	3.50	42.04	256.25	10713.33	868.58
42	1.93	0.60	214.43	3.61	40.89	258.93	10457.08	868.50
41	1.96	0.62	218.01	3.72	39.78	261.51	10198.15	868.42
40	2.00	0.64	221.46	3.83	38.71	264.00	9936.63	868.33
39	2.03	0.66	224.78	3.93	37.69	266.40	9672.64	868.25
38	2.05	0.67	227.97	4.04	36.70	268.71	9406.24	868.17
37	2.08	0.69	231.05	4.14	35.74	270.93	9137.53	868.08
36	2.11	0.71	234.00	4.24	34.83	273.07	8866.60	868.00
35	2.13	0.72	236.86	4.34	33.94	275.14	8593.53	867.92
34	2.16	0.74	239.61	4.44	33.08	277.14	8318.40	867.83
33	2.18	0.76	242.26	4.54	32.26	279.06	8041.26	867.75
32	2.21	0.77	244.81	4.63	31.47	280.91	7762.20	867.67
31	2.23	0.79	247.27	4.72	30.70	282.69	7481.29	867.58
30	2.25	0.80	249.62	4.81	29.97	284.40	7198.60	867.50
29	2.27	0.82	251.90	4.92	29.25	286.07	6914.20	867.42
28	2.29	0.84	254.08	5.04	28.56	287.68	6628.12	867.33
27	2.31	0.85	256.17	5.08	27.93	289.17	6340.44	867.25
26	2.33	0.86	258.18	5.15	27.30	290.63	6051.26	867.17
25	2.34	0.87	260.11	5.23	26.70	292.04	5760.63	867.08
24	2.36	0.89	261.95	5.31	26.12	293.38	5468.60	867.00
23	2.38	0.90	263.71	5.39	25.57	294.67	5175.22	866.92
22	2.39	0.91	265.40	5.46	25.04	295.90	4880.55	866.83
21	2.41	0.92	267.01	5.53	24.54	297.08	4584.64	866.75
20	2.42	0.93	268.54	5.61	24.06	298.20	4287.57	866.67
19	2.43	0.95	269.99	5.67	23.60	299.27	3989.37	866.58
18	2.44	0.96	271.38	5.74	23.16	300.28	3690.10	866.50
17	2.46	0.97	272.69	5.80	22.75	301.24	3389.82	866.42
16	2.47	0.98	273.92	5.87	22.36	302.15	3088.58	866.33
15	2.48	0.99	275.09	5.93	21.99	303.01	2786.42	866.25
14	2.49	1.00	276.20	5.99	21.64	303.83	2483.41	866.17
13	2.50	1.01	277.24	6.04	21.31	304.60	2179.59	866.08
12	2.51	1.02	278.22	6.10	21.00	305.32	1874.99	866.00
11	2.51	1.02	279.13	6.15	20.72	306.00	1569.67	865.92
10	2.53	1.03	280.49	6.20	20.29	306.98	1263.67	865.83
9	0.00	0.00	0.00	0.00	106.30	106.30	956.69	865.75
8	0.00	0.00	0.00	0.00	106.30	106.30	850.39	865.67
7	0.00	0.00	0.00	0.00	106.30	106.30	744.09	865.58
6	0.00	0.00	0.00	0.00	106.30	106.30	637.79	865.50
5	0.00	0.00	0.00	0.00	106.30	106.30	531.50	865.42
4	0.00	0.00	0.00	0.00	106.30	106.30	425.20	865.33
3	0.00	0.00	0.00	0.00	106.30	106.30	318.90	865.25
2	0.00	0.00	0.00	0.00	106.30	106.30	212.60	865.17
1	0.00	0.00	0.00	0.00	106.30	106.30	106.30	865.08



CONCRETE DUMPSTER PAD & SIDEWALK SECTION
NO SCALE



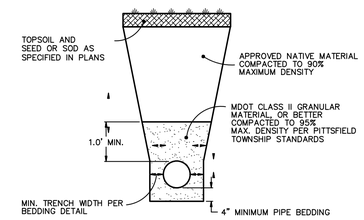
PAVEMENT SECTION ON SITE
NOT TO SCALE



EJIW 7045 OR
NEENAH R-3031-B
CASTING TO STATE THE INSCRIPTION:
"DUMP NO WASTE! DRAINS TO RIVERS".

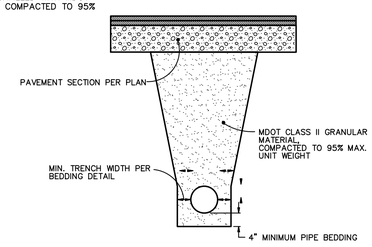
MDOT F4 CONCRETE CURB & GUTTER
NO SCALE

NOTE: ALL UTILITIES LYING WITHIN THE ROAD RIGHT-OF-WAY COORIDOR (EXISTING OR PROPOSED) SHALL BE BACKFILLED WITH MDOT CL II GRANULAR MATERIAL COMPACTED TO 95% MAXIMUM UNIT WEIGHT.



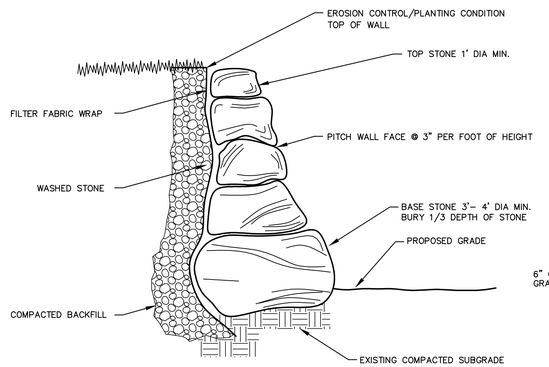
NOTE:
1. TRENCH DETAILS SHOW TYPE OF BACKFILL AND SURFACE RESTORATION. FINAL SURFACE RESTORATION INCLUDING, BUT NOT LIMITED TO; CONCRETE CURB AND GUTTER, CONCRETE PAVEMENT, BITUMINOUS PAVEMENT, AGGREGATE BASE, AND GREENBELT RESTORATION SHALL BE PAID FOR SEPARATELY – FINAL SURFACE RESTORATION TO BE IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
2. ALL TRENCHING TO CONFORM TO ALL APPLICABLE M.D.O.T. STANDARDS.

UTILITY TRENCH – TYPE V
(IN GREENBELT AREA OUTSIDE PAVEMENT INFLUENCE)
NO SCALE

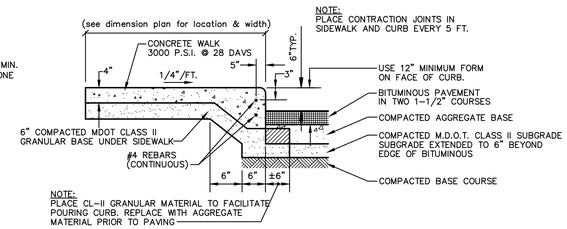


NOTE:
1. TRENCH DETAILS SHOW TYPE OF BACKFILL AND SURFACE RESTORATION. FINAL SURFACE RESTORATION INCLUDING, BUT NOT LIMITED TO; CONCRETE CURB AND GUTTER, CONCRETE PAVEMENT, BITUMINOUS PAVEMENT, AGGREGATE BASE, AND GREENBELT RESTORATION SHALL BE PAID FOR SEPARATELY – FINAL SURFACE RESTORATION TO BE IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
2. ALL TRENCHING TO CONFORM TO ALL APPLICABLE M.D.O.T. STANDARDS.

UTILITY TRENCH – TYPE I
(UNDER OR WITHIN 1:1 INFLUENCE OF PAVEMENT)
NO SCALE



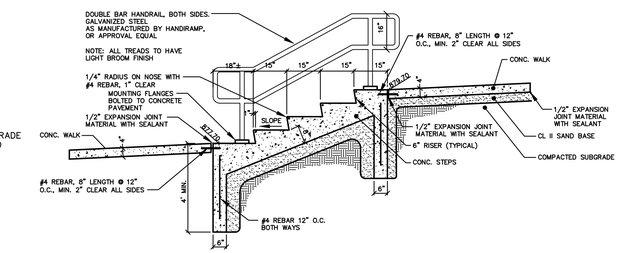
BOULDER RETAINING WALL
NO SCALE



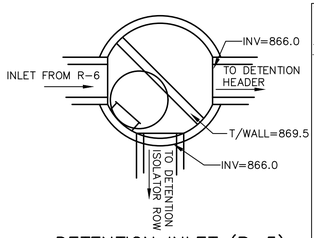
NOTE:
PLACE CONTRACTION JOINTS IN SIDEWALK AND CURB EVERY 5 FT.

NOTE:
PLACE CL-II GRANULAR MATERIAL TO FACILITATE POURING CURB. REPLACE WITH AGGREGATE MATERIAL PRIOR TO PAVING

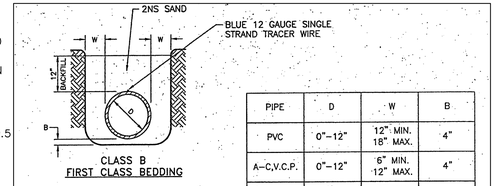
TYPICAL INTEGRAL WALK & CURB
NOT TO SCALE



STEP DETAIL
NO SCALE



DETENTION INLET (R-5)



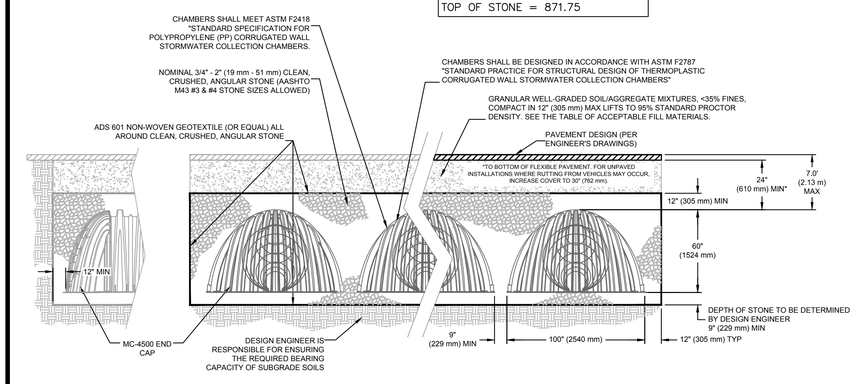
PIPE	D	W	B
PVC	0"–12"	12" MIN. 18" MAX.	4"
A-C,V.C.P.	0"–12"	6" MIN. 12" MAX.	4"
DIP	0"–24"	6" MIN. 12" MAX.	4"
A-C,CONC.	0"–24"	6" MIN. 12" MAX.	4"
CONC. DIP	24" +	6" MIN. 12" MAX.	4"

NOTES:
1. MINIMUM TRENCH WIDTH (SEE TABLE).
2. RECESS TRENCH TO RELIEVE THE BELL OFF ALL LOAD
3. GRANULAR BACKFILL TO DEPTH OF ONE FOOT ABOVE PIPE. TAMPED LAYERS NOT TO EXCEED 6" IN DEPTH
4. ALL PIPE TO BE PLACED AND JOINTED IN A DRY TRENCH AND LAID ACCURATELY TO LINE AND GRADE WITH BELLS UPHILL.
5. ALL CONCRETE ENCASEMENT AND CRADLING TO BE CLASS "A" CONCRETE.

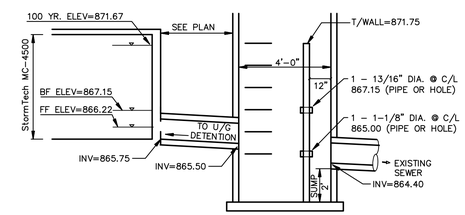
BEDDING

NOTE: ALL UTILITIES SHALL BE INSTALLED WITH 2NS SAND BEDDING OR BETTER.

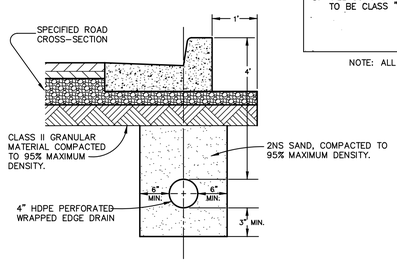
HVA DETENTION ELEVATIONS
BOTTOM OF STONE = 865.0
INVERT OF CHAMBERS = 865.75
TOP OF CHAMBERS = 870.75
TOP OF STONE = 871.75



THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS, WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.



DETENTION OUTLET DETAIL (R-3)
NOT TO SCALE



NOTE: ALL TRENCHING TO CONFORM TO ALL APPLICABLE M.I.O.S.H.A. STANDARDS

NOTE: FOR PAVEMENT BASE AND SUBBASE THICKNESS, SEE TYPICAL PAVEMENT CROSS-SECTION.

EDGE DRAIN
NO SCALE

811 Know what's below. Call before you dig.

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

ADS ADVANCED DRAINAGE SYSTEMS, INC.

THE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

StormTech — Subsurface Stormwater Management — 70 INWOOD ROAD, SUITE 3 | ROCKY HILL, CT 06067 — PHONE: 888-892-2694 | FAX: 866-328-8401 — WWW.STORMTECH.COM

MC-4500 TYP CROSS SECTION

SCALE:	NTS
DATE:	08-22-12
DRAWN BY:	JLM
CHECKED:	

M:\Civil3d_Proj\18193\Site Plan\18193011.dwg, 2/15/2019 3:29 PM, Jim Ahnert, 10, MCLLC PDF.pc3
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CLIENT
HURON VALLEY AMBULANCE
1200 STATE CIRCLE
ANN ARBOR, MI 48108
RICHARD WHITE
734-971-4420

HURON VALLEY AMBULANCE

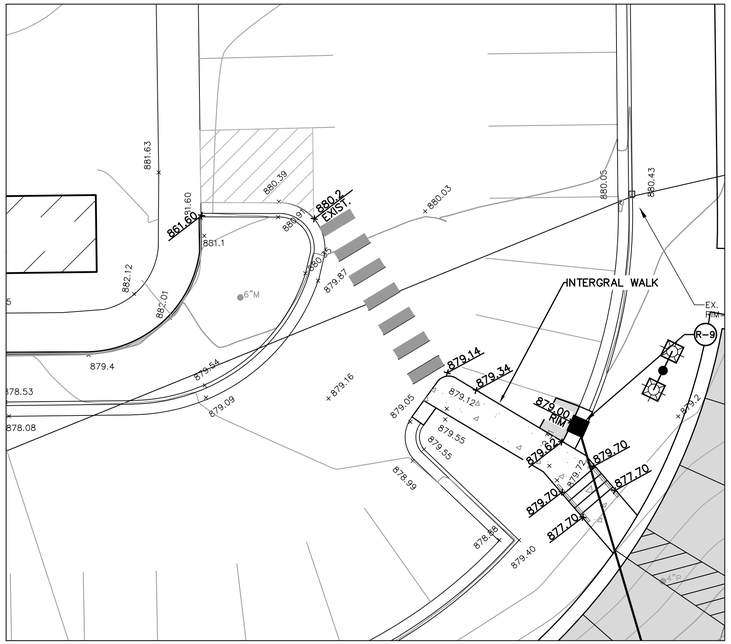
SITE DETAILS

10

DATE: 10/16/18
SHEET 10 OF 16
CADD:
ENG: JCA
PM: SWB
TECH:
18193011

JOB No. 18193

REVISIONS:	REV. DATE
PER TOWNSHIP	1/15/19
PER TOWNSHIP	2/18/19



PROPOSED STAIRS AND CROSSWALK DETAILED GRADING

SCALE 1" = 10'

Landscape Maintenance Schedule

Perennial Beds Maintenance Task	Winter	Spring	Summer	Fall
Soil Testing				
Prune shade trees, summer flowering shrubs, hedges and groundcovers, check evergreen plants for removal of dead leaves				
Fertilize Trees and Shrubs, planting beds				
Clean flower beds, remove winter weeds and dead plant material left for winter interest				
Apply double shredded bark mulch to tree/shrub beds and ground leaf compost to flower beds				
Pressurize irrigation system and perform spring audit				
Remove all winter mulch from planting beds, Aerate soil with fork hoe				
Install new plantings, add compost during planting				
Water newly planted trees and shrubs				
Prune spring blooming shrubs immediately after flowering				
Prune wither damaged branches or plants that have not begun to grow after last frost				
Replace mulch as necessary				
Weed flower beds routinely				
Install summer annual flowers				
Cut back/pinch spring flowering plants as needed				
Inspect plants for pests and treat as necessary				
Thin out perennial beds and prune plants as needed				
Water beds as needed				
Deadhead spent blooms, deadleaf yellowing foliage				
Prune shrubs to maintain spacing in bed				
Add touch up mulch to planting beds				
Rake leaves, mow or shred for composting				
Clean up planting beds - remove yellowing foliage not left for winter interest, remove stakes/hoops				
Top-dress planting beds with organic matter if not done in spring				
Turn off irrigation system and flush out				
Winter mulch tender plants once ground is frozen				

Turfgrass Areas Maintenance Task	Winter	Spring	Summer	Fall
Remove wet leaves, fallen branches/twigs				
Apply pre-emergent crabgrass control herbicide to cool season turfgrass				
Fertilize lawn				
Pressurize irrigation system and perform spring audit				
Aerate lawn as needed (every two years)				
Inspect for grubs, treat as needed				
Hand remove weeds, Spot application of herbicide if necessary				
Weekly mowing of turfgrass (when reaches height of 2.5 to 3 in.), leave grass clippings, remove clumps				
Bi-weekly edging of turfgrass				
Deep water lawn areas (~1 inch per week)				
Prepare and seed bare areas				
Water newly seeded areas				
Rake leaves or mow and leave for composting				
Fertilize lawn				
Turn off irrigation system and flush out				
Routinely remove debris such as leaves, twigs, trash, etc.				

Project Name: Huron Valley Ambulance Parking Lot Expansion
Project Location: 1200 State Circle, Ann Arbor, Michigan
G2 Project No. 183393
Latitude: 42.23483° Longitude: -83.74749°

Test Pit No. TP-01

G2 CONSULTING GROUP

SUBSURFACE PROFILE			SOIL SAMPLE DATA				
ELEV. (ft)	PROFILE	GROUND SURFACE ELEVATION: 875.0 ft ± / DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Topsoil: Dark Brown Clayey Sand (8 inches) 0.7	S-01				
870.0		Hard Light Brown Silty Clay with trace sand and gravel, occasional cobbles and silt partings 5	S-02		8.8		9000*
		8.0	S-03		16.2		9000*
865.0		End of Test Pit @ 8 ft 10					
860.0		15					

Total Depth: 8 ft
Excavation Date: September 5, 2018
Inspector: R. Carpus
Contractor: Nixon Services, LLC
Operator: R. Nixon

Excavation Equipment:
Bobcat 435 FastTrack Mini Excavator

Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavation backfilled with excavated material

Figure No. 1

Project Name: Huron Valley Ambulance Parking Lot Expansion
Project Location: 1200 State Circle, Ann Arbor, Michigan
G2 Project No. 183393
Latitude: 42.23508° Longitude: -83.74725°

Test Pit No. TP-02

G2 CONSULTING GROUP

SUBSURFACE PROFILE			SOIL SAMPLE DATA				
ELEV. (ft)	PROFILE	GROUND SURFACE ELEVATION: 877.0 ft ± / DEPTH (ft)	SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCOF. COMP. ST. (PSF)
		Topsoil: Dark Brown Clayey Sand (12 inches) 1.0	S-01				
		Fill: Hard Dark Brown Sandy Clay with trace gravel and organic material 4.0	S-02		15.8		8000*
872.0		Very Stiff Dark Gray Silty Clay with trace sand and gravel 5 / 7.0	S-03		24.9		4000*
		Hard Gray Silty Clay with trace sand and gravel, occasional silt partings	S-04		15.7		9000*
867.0		10.0	S-05		14.8		9000*
		End of Test Pit @ 10 ft 10					
862.0		15					

Total Depth: 10 ft
Excavation Date: September 5, 2018
Inspector: R. Carpus
Contractor: Nixon Services, LLC
Operator: R. Nixon

Excavation Equipment:
Bobcat 435 FastTrack Mini Excavator

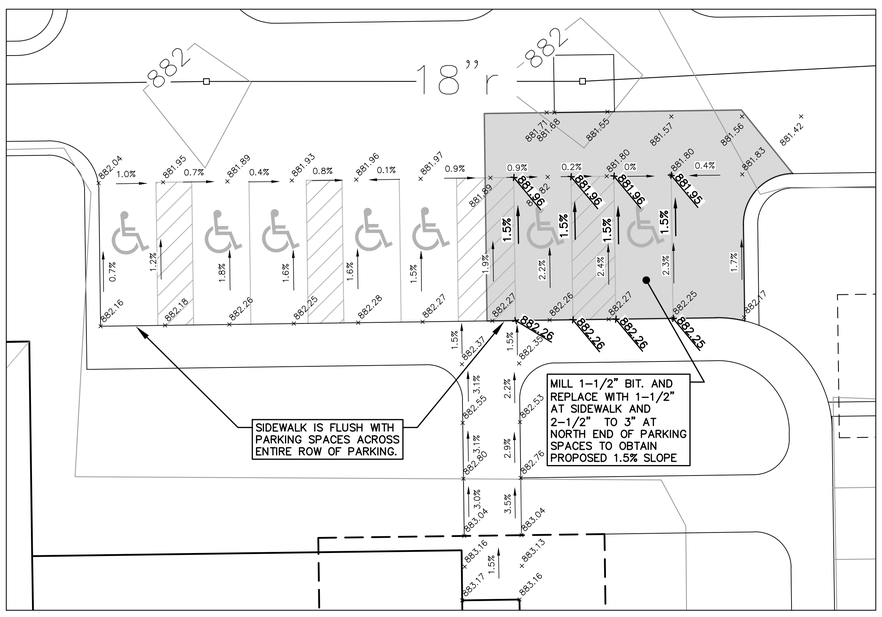
Water Level Observation:
Dry during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
Excavation backfilled with excavated material

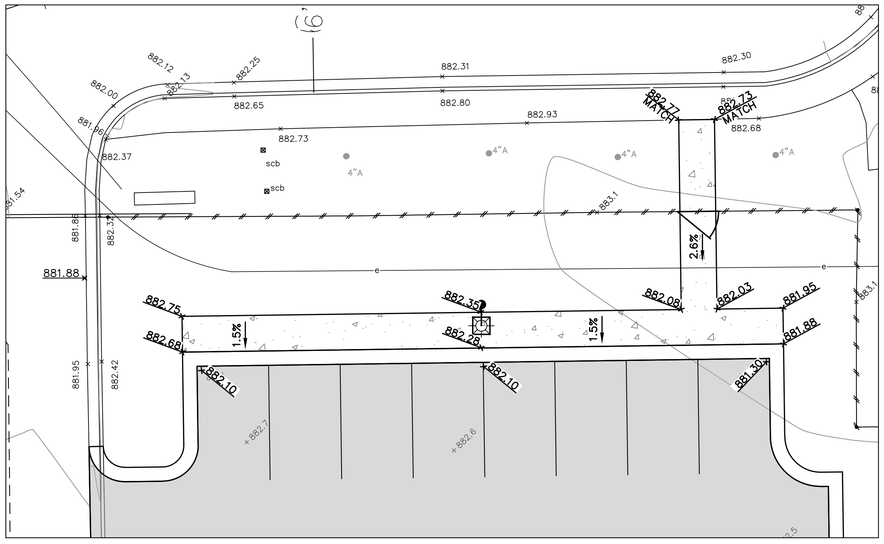
Figure No. 2

SOIL BORINGS



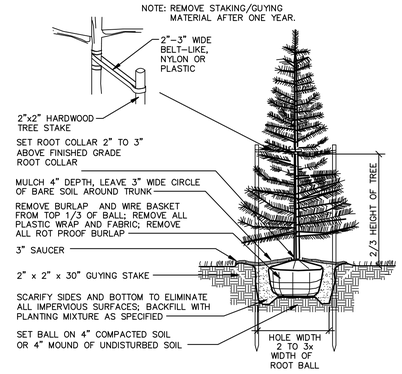
ADA PARKING GRADING

SCALE 1" = 10'



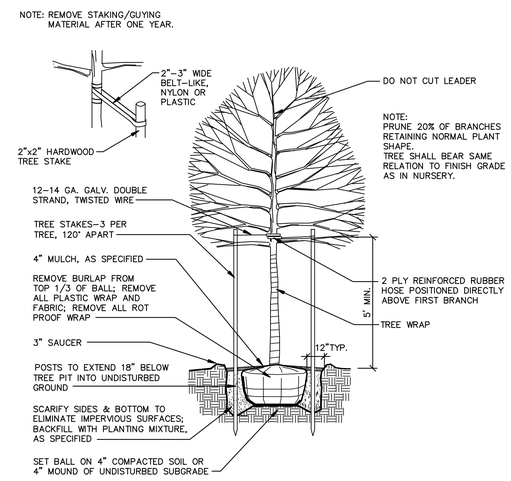
PROPOSED NORTHWEST SIDEWALK DETAILED GRADING

SCALE 1" = 10'



EVERGREEN TREE PLANTING DETAIL

NOT TO SCALE



DECIDUOUS TREE PLANTING DETAIL

2-1/2" CAL. OR SMALLER

M:\Civil3d_Proj\18193\Site Plan\18193D11.dwg, 2/15/2019 3:29 PM, Jim Ahnert, 11 LANDSCAPE DETAILS, MCLLC PDF.pc3
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The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

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1200 STATE CIRCLE
ANN ARBOR, MI 48108
RICHARD WHITE
734-971-4420

HURON VALLEY AMBULANCE

LANDSCAPE DETAILS
GRADING DETAILS

11

DATE: 10/16/18
SHEET 11 OF 16
CADD:
ENG: JCA
PM: SWB
TECH:
18193D11

JOB No. 18193

REVISIONS:	REV. DATE
PER TOWNSHIP	2/15/19
PER TOWNSHIP	2/18/19

STORM SEWER AND DRAINAGE STRUCTURES

1.00 GENERAL

1.01 DESCRIPTION

A. Furnish all labor, tools, equipment and materials to construct all storm sewers, and drainage structures as herein specified. No sewers shall be accepted until the sewer system has passed the system acceptance tests.

1.02 TESTING

A. General

1. The CONTRACTOR shall furnish all equipment and personnel to conduct system acceptance tests as specified herein on all completed sewers. All tests shall be conducted under the supervision of the ENGINEER. No acceptance tests shall be conducted until the entire sewer system is constructed or just prior to placing the line in service providing the sewer pipe has been installed for not less than 30 days.

B. Test for Alignment

1. All sewers shall be laid accurately to the line and grade designed by the ENGINEER. The sewers will be tested for alignment by shining a light through the pipe at a manhole and viewing the light from an adjacent manhole. Any section of sewer in which a light cannot be seen from one manhole to the next shall be corrected to the satisfaction of the ENGINEER to pass this test.

C. Material Tests

1. The CONTRACTOR shall have tests of pipe strength made by an independent testing laboratory. Tests of up to 4 lengths of sewer pipe per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturer's certificate of compliance to the Specifications.

D. Submittals

1. The CONTRACTOR shall submit shop drawings, or data sheets for all castings, steps and manholes.

2. The CONTRACTOR shall submit certification letters for all pipes. All letters must contain the following: Contractors name, project name, township name, current date, certification of pipe provided and letterhead of the certifying company.

2.00 PRODUCTS

2.01 PIPE

A. Reinforced concrete pipe and manhole tees shall be no less than the latest revision of ASTM C76, with the class designation as shown on the Plans or in the Proposal.

B. Concrete pipe shall have tongue and groove gasketed premium joints.

C. Corrugated steel pipe shall meet the requirements of AASHO M-190 for coated pipe latest revision. Minimum gage thickness shall be as shown on the Plans.

2.02 REINFORCED CONCRETE MANHOLES

A. Manholes shall conform to the current ASTM Specifications for precast reinforced concrete Manhole Sections, serial designation C478. Manhole section joints shall conform to ASTM Designation C990. All cones shall be eccentric with an offset step configuration. Concrete adjustment rings or riser rings shall not be used for adjusting the height of the structure.

B. All manhole component parts shall have the name of the manufacturer stencilled on the inside. The lettering or logo shall be a minimum of 4 inches high.

2.03 MORTAR FOR MANHOLES

A. Mortar for plastering manholes and drainage structures shall be made of one part Portland cement and two parts fine aggregate.

2.04 BRICK AND BLOCK

A. Brick for brick and mortar structures shall conform to the current ASTM Specification C32. Block for block and mortar structures shall conform to the current ASTM Specification C135.

B. The concrete block masonry used to construct manhole and catch basin walls shall be solid curved blocks with the inside and outside surfaces curved to the required radii. The blocks shall have tongue and groove or other approved type of joint at the ends so that the units interlock to form a strong, rigid structure. Curved blocks shall have the inside and outside surfaces parallel.

C. The block shall not exceed 18 inches in length or 8 inches in depth (height). No block shall be less than 6 inches in width (thickness). All blocks in one structure shall be of the same height dimension. The blocks shall be designed for length so that only full-length or half-length blocks are required to lay the circular wall of any one course.

D. Blocks intended for use in the cones or tops of manholes and catch basins shall have such shape as may be required to form the structure as shown on the Plans with inside and outside joint not to exceed 1/4-inch in thickness.

2.05 STRUCTURE FRAMES AND COVERS

A. Structures frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitably notched for convenient removal of the cover. Each solid manhole cover shall be marked Storm Sewer with letters integrally cast into the cover.

B. Frames and Covers shall be as follows:

1. For use on manholes: East Jordan 1040Z, with Type B cover lettered "STORM SEWER", or equal. Structures 24-inches in diameter shall have the 1045 Z frame.
2. For use on drainage structures in paved areas: East Jordan 1040Z, with Type M1 cover, with "DUMP NO WASTE" lettering and trout logo.
3. For use on drainage structures in curbed areas: East Jordan 7045 or 7065, with "DUMP NO WASTE" lettering and trout logo.
4. For use on drainage structures in landscaped areas: East Jordan 1040Z, with 1040 N 7", with "DUMP NO WASTE" lettering and trout logo.

C. All frames and covers shall be coated by the manufacturer with coal tar pitch varnish or other asphaltum coating reviewed by the ENGINEER.

D. All covers for drainage structures shall have storm drain markers affixed to the nearest available flat surface. The storm drain markers shall be manufactured by Das Manufacturing and shall be #SDR "No Dumping. Drains to River." The storm drain markers shall be installed per the manufacturer's recommendations.

2.06 MANHOLE STEPS

A. Steps shall be plastic coated steel. They shall be M.A. Industries PS1-PF for precast manholes, PS1-B for block manholes, or equal.

2.07 DRAINAGE STRUCTURES

A. All manholes and catch basins shall be precast unless otherwise specified.

B. Manhole and catch basin bottoms shall be concrete and top of slab shall have a troweled finish.

C. Upon approval by the ENGINEER, the manhole and catch basin walls may be constructed of concrete block masonry or concrete manhole pipe conforming to the requirements of the specifications previously listed. Construction shall be in accordance with the details for Catch Basin and Storm Sewer Manhole shown on the Plans.

D. A plaster coat of mortar 1/2-inch in thickness shall be applied to the inside and outside surface of all manholes and catch basins constructed with concrete block masonry or sewer brick. The inside coat of mortar shall be applied in a smooth, neat workmanlike manner.

E. Final adjustment of the top of manholes and catch basins, so that the manhole or catch basin cover is at finished elevations as shown on the Plans or meets the finished surface, may be accomplished with sewer brick conforming to the previously listed Specifications. The total height of brick for this purpose shall not exceed 9 inches. The total chimney height shall not exceed 18 inches.

F. All block and brick masonry units shall be laid in a full bed of mortar. The inside joints of the block masonry construction shall be tooled in a neat and workmanlike manner.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill 12 inches above the crown of pipe shall conform to Section 2.04, Earthwork of these specifications.

B. The trench shall be backfilled closely behind the pipe laying. Unless otherwise directed or permitted by the ENGINEER, the backfilling shall follow and be completed to the top of the trench within four pipe lengths behind pipe laying.

3.02 BEDDING

A. Concrete pipe shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 4 inches. Where indicated on the Plans or required by the ENGINEER, concrete encasement or cradle shall be used.

B. For all pipes, compacted aggregate material shall be placed at the sides of the pipe in 12-inch lifts and cover not less than 12 inches above the crown of the pipe.

C. "Granular Material" shall be MDOT class II, placed in not more than 6-inch layers and compacted to not less than 90% standard density.

3.03 PIPE INSTALLATION

A. All pipe shall be laid true to the required lines and grades. All trenches when pipe laying is in progress, shall be kept dry, and all pipes and fittings shall be uniformly supported on a properly trimmed bedding with holes at each joint to receive bells. All pipe shall be laid with bells uphill.

B. The grade as shown on the profiles is that of the pipe invert and that to which the work must conform. The grade shall be kept by laser or other tools which shall be furnished by the CONTRACTOR at his expense. Each pipe shall be laid accurately to the line and grade as shown on the Plans and in such manner as to form a close concentric joint with the adjoining pipe and prevent sudden offsets of the invert. The interior of sewers shall, as the work progresses, be cleaned of all dirt, cement, debris and other superfluous materials of every description. Bulkheads shall be used to keep foreign materials out of the open end of the sewer when work is not in progress.

C. The location of the piping as shown on the Plans has been determined to avoid, insofar as possible, interference with trees or structures or fixtures above ground and other underground mains, services, utilities or structures. Any change in location or alignment of piping, which may be found more feasible or practicable as the work progresses, shall be made by the CONTRACTOR, as the ENGINEER may direct.

D. All pipe shall be carefully lowered and moved into position in trench or vault in a controlled manner such as will prevent damage to the pipe and any coatings or lining. An excessive amount of scratching on the surface of the concrete pipe will be considered cause for rejection.

E. All cutting of the pipe shall be done in a neat workmanlike manner with the least amount of waste and without damage to existing or new lines. A fine toothsaw, tubing cutter or similar tool may be used to cut concrete pipe. Cuts must be square. Ragged edges shall be removed with a cutting tool or file.

F. Breaks in pipe or joints shall be repaired to the satisfaction of the ENGINEER and at the expense of the CONTRACTOR.

3.04 CONNECTIONS TO EXISTING MANHOLES

A. When a sewer is connected to an existing manhole, a hole adequate to receive the new pipe shall be cored into the manhole.

B. If the existing manhole is of brick construction, a single rowlock of brick shall be turned over the new pipe and the existing manhole brick work shall be cleaned, pointed and given a 1/2-inch mortar coat on the outside surface.

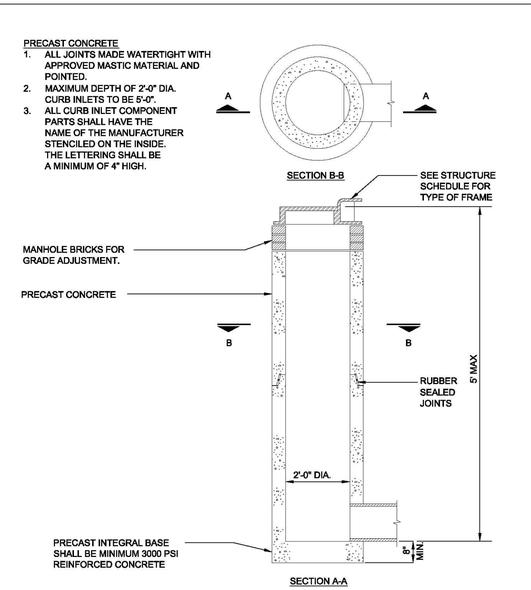
C. For connections to existing precast reinforced concrete manholes, a hole shall be cored into the concrete manhole wall to receive the pipe. Reinforcing steel shall not be cut out shall be bent and replaced in the area that is to be patched. A form shall be constructed over the area of pipe penetration. The formed area shall then be filled with concrete.

D. Closure of the manhole wall shall be made watertight using concrete.

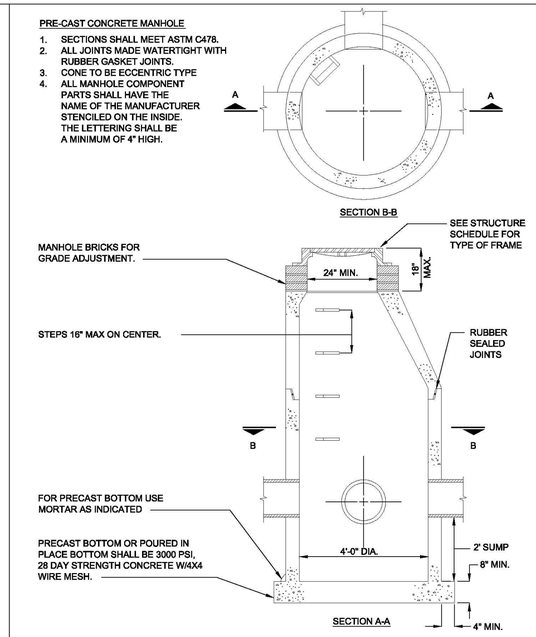
3.05 ANIMAL GRATES

A. Animal grates shall be required on all endsections greater than 12-inch diameter.

PCT February 2008



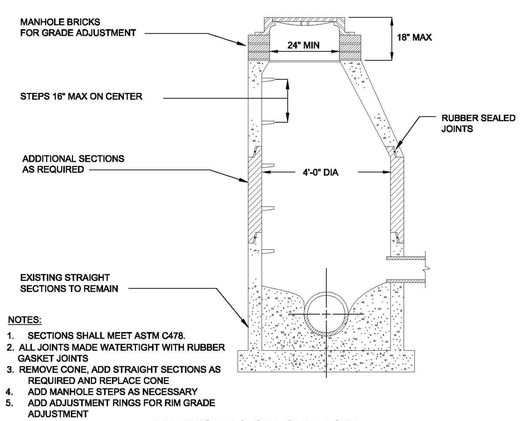
2' DIAMETER INLET



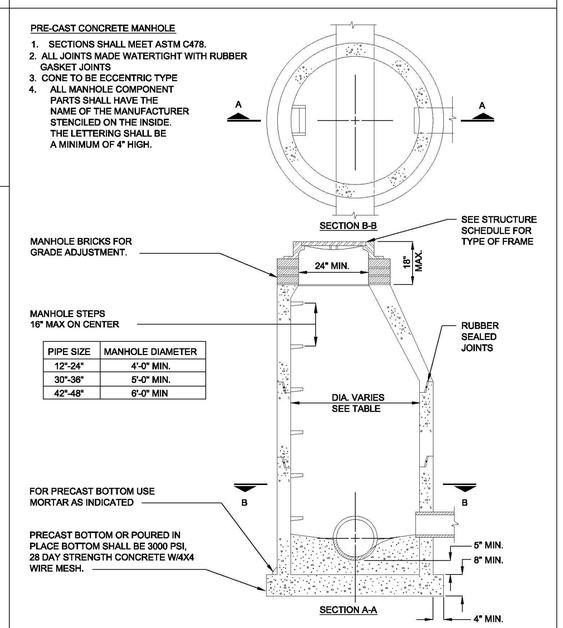
4' DIAMETER CATCH BASIN

AFFIX TO SURFACE ON OR NEAR ALL DRAINAGE COVERS.

STORM DRAIN MARKER

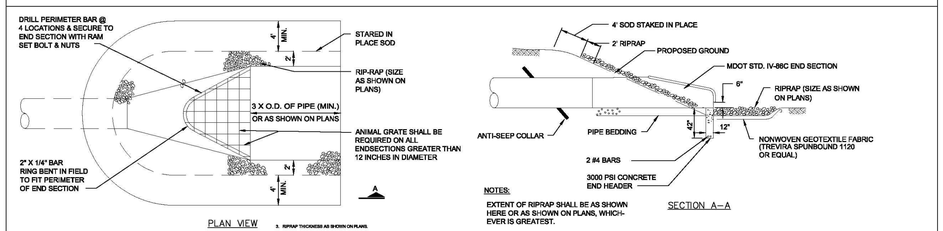


MANHOLE & CATCH BASIN RECONSTRUCTION DETAIL

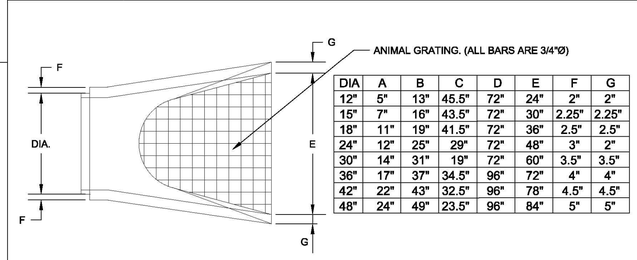


PIPE SIZE	MANHOLE DIAMETER
12"-24"	4'-0" MIN.
30"-36"	5'-0" MIN.
42"-48"	6'-0" MIN

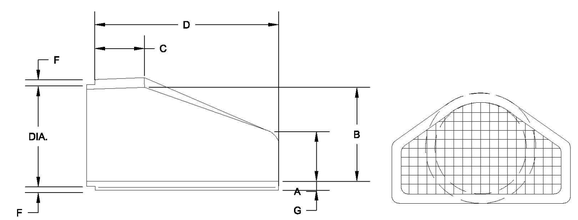
STORM SEWER MANHOLE



END SECTION AND RIPRAP DETAIL



DIA	A	B	C	D	E	F	G
12"	5"	13"	45.5"	72"	24"	2"	2"
15"	7"	16"	43.5"	72"	30"	2.25"	2.25"
18"	11"	19"	41.5"	72"	36"	2.5"	2.5"
24"	12"	25"	29"	72"	48"	3"	2"
30"	14"	31"	19"	72"	60"	3.5"	3.5"
36"	17"	37"	34.5"	96"	72"	4"	4"
42"	22"	43"	32.5"	96"	78"	4.5"	4.5"
48"	24"	49"	23.5"	96"	84"	5"	5"



NOTE:
FLARED END SECTIONS SHALL BE MANUFACTURED TO THE CLASS SPECIFICATIONS AS THE PIPE ITSELF.

STANDARD END SECTIONS FOR PRECAST CONCRETE

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108–9721
48108–9721
Tel. 734.822.3101
www.pittsfield-mi.gov

Revision	By	Appd.	YY.MM.DD
UPDATES	MRH	DRW	14.01.24
TWP REV	BWA	DRW	12.08.09
TWP REV	BWA	DRW	11.04.27
UPDATES	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD
File Name: ST–01	TTN	DRW	07.10.01
	Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

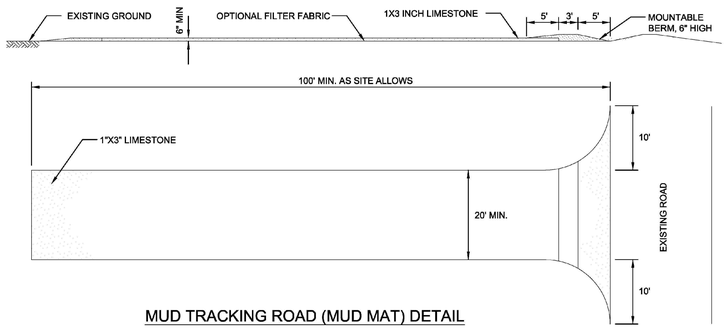
Title
STORM SEWER DETAILS AND SPECIFICATIONS

Project No. 2075001300

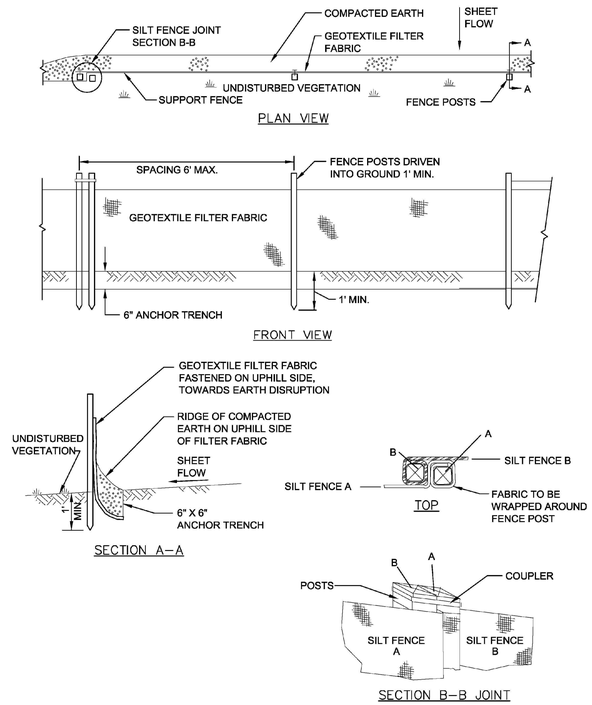
Scale NOT TO SCALE

Revision

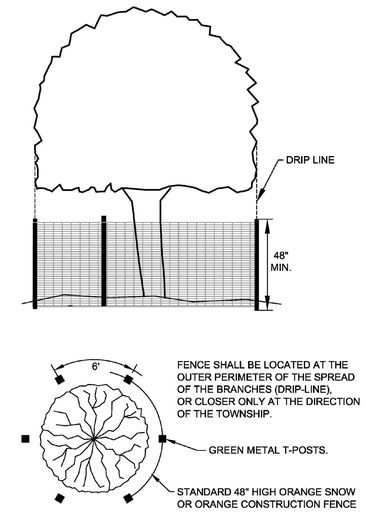
SHEET 12



MUD TRACKING ROAD (MUD MAT) DETAIL



SILT FENCE
NOT TO SCALE



NOTES:
1. ALL TREES TO BE REMOVED WILL BE IDENTIFIED BY RED FLAGGING.
2. TREE PROTECTION FENCING IS TO BE ERECTED PRIOR TO ANY EARTHWORK OR CONSTRUCTION AND IS TO REMAIN IN PLACE UNTIL CONSTRUCTION AND GRADING IS COMPLETE.
3. ALL DEBRIS, FILL, EQUIPMENT OR MATERIAL IS TO BE KEPT CLEAR OF AREA WITHIN PROTECTIVE FENCE. NO CLEANING OF EQUIPMENT OR MATERIAL OR STORAGE OR DISPOSAL OF ANY MATERIAL WITHIN THE DRIP LINE OF ANY TREES TO BE SAVED.

TREE PROTECTION FENCE DETAIL
NOT TO SCALE

PITTSFIELD CHARTER TOWNSHIP
SOIL EROSION AND SEDIMENTATION CONTROL NOTES
GENERAL

1. The contractor shall implement and maintain the soil erosion control measures as shown on the plans at all times during construction on this project. Any modifications or additions to the soil erosion control measures due to construction or changed conditions, shall be complied with as required or directed by the owner, project engineer or Pittsfield Township.
2. All soil erosion and sedimentation control work shall conform to the permit requirements of Pittsfield Township and the laws of the State of Michigan.
3. A NPDES construction activity permit is required for all sites greater than 5 acres.
4. Daily inspections shall be made by the contractor. Periodic inspections may be made by the owner/project engineer/Township to determine the effectiveness of erosion and sedimentation control measures. Any necessary corrections shall be made without delay.
5. Erosion and sedimentation from work on the site shall be contained on the site and not be allowed to collect on any off-site areas or in waterways.
6. All mud/dirt tracked onto roads from the site due to construction, shall be promptly removed by the contractor.
7. Restoration of all disturbed areas, including placement of topsoil, seed, fertilizer and mulch and/or sod shall be done within 5 days of the completion of final grade.
8. Construction operations shall be scheduled and performed so that preventative soil erosion control measures are in place prior to excavation in critical areas and temporary stabilization measures are in place immediately following backfilling operations.
9. Special precautions will be taken in the use of construction equipment to prevent situations that promote erosion.
10. Proper dust control shall be maintained during construction by use of water trucks and/or chloride as required.
11. The contractor shall be responsible for maintaining all temporary soil erosion control measures and removal of some upon authorized completion of project. Completion of project will not be authorized until all site work, home building, road work and utility construction is complete and all soils are stabilized.
12. The contractor shall not grade in existing wetland or conservation areas to be protected. Silt fence shall be installed and maintained adjacent to existing wetland and conservation areas to prevent grading, erosion and sedimentation into them.
13. Tree protection fencing must remain intact until restoration of the site is complete.

SEQUENCE OF CONSTRUCTION

1. Install sediment fence and tree protection fencing prior to any grading operation.
2. Install mud-tracking pad.
3. Construct temporary sediment/detention basin.
4. Place topsoil, fertilizer, seed and mulch over the entire detention basin area.
5. Rough grade site, stockpile topsoil and begin building construction.
6. Install storm drainage system including riprap and parking lot inlet filters and detention basin standpipe.
7. Maintain erosion and sedimentation control measures, as required.
8. Install sanitary sewer and water systems.
9. Bring pavement areas to sub-base grade, place sub-base and bituminous pavement.
10. Install franchised utilities.
11. Finish grade, redistribute topsoil, seed and mulch all disturbed areas.
12. Remove any accumulated sediment within the detention basin and replace clean washed stone around standpipe.
13. Complete construction of site.
14. Insure all soil is stabilized. Remove all temporary soil erosion control measures.

SEEDING/SOD

1. Seed or sod in accordance with project specifications.
2. All areas of disturbed earth that are not to be paved or sodded shall have 4 inches of topsoil, seed, fertilizer and mulch.
3. Immediately after seeding, mulch all seeded areas with unweathered small grain straw (preferably wheat) or hay spread. Spread uniformly at the rate of 1 ½ to 2 tons or 100 pounds (2 to 3 bales) per 1,000 square foot. This mulch should be anchored with a disc-type mulch-anchoring tool.
4. Any disturbed area not paved, seeded or mulched, sodded or built upon by November 15, is to be mulched in the manner as specified above, in order to provide soil erosion protection during the winter and early spring.
5. All erosion and sedimentation control prevention procedures and structures are to comply with the Standards and Specifications for soil erosion and sediment control of the Washtenaw County Soil Conservation District.
6. Drainage ditches and slopes steeper than 1:4 (25%) shall be stabilized with erosion control blankets.
7. Steep slopes that do not take upon initial seeding must be re-seeded and stabilized with erosion control blankets.
8. Where excavation has been through lawn areas, the CONTRACTOR shall restore the disturbed area by placing topsoil and seeding or sodding over the final backfill material.

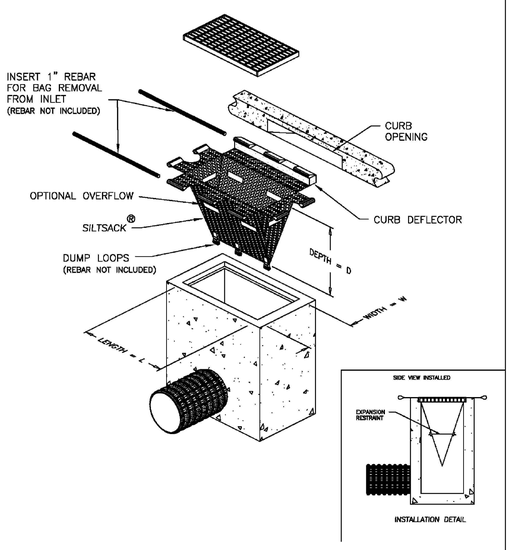
CATCH BASIN/MANHOLE PROTECTION

1. Protect storm sewer catch basins with Siltsack. or approved equivalent as follows:

ROADS

1. During construction, all roads shall be protected from unvegetated areas washing onto road surfaces by placement of silt fence behind curb or a 10 foot wide straw mulch bank behind the curb or other approved method and/or as shown on the plans.
2. During construction of any portion of the project, roads shall be maintained free of dirt, silt and construction debris.

Pittsfield SEC 9/22/2009



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TYPE B – WITH CURB DEFLECTOR

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SILTSACK®
SPECIFICATIONS

NOTE: THE SILTSACK® WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

REGULAR FLOW SILTSACK®
(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	120 LBS
MULLEN BURST	ASTM D-3786	800 PSI
TRAPEZOID TEAR	ASTM D-4533	120 LBS
UV RESISTANCE	ASTM D-4355	80 %
APPARENT OPENING SIZE	ASTM D-4751	40 US SIEVE
FLOW RATE	ASTM D-4491	40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	0.55 SEC -1

* HI-FLOW SILTSACK®
(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOID TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90 %
APPARENT OPENING SIZE	ASTM D-4751	30 US SIEVE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1

OIL-ABSORBANT SILTSACK®
(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK WITH A WOVEN PILLOW INSERT.

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(* HI-FLOW SILT SACK SHALL BE USED FOR ALL APPLICATIONS WITHIN PITTSFIELD TOWNSHIP)

SILTSACK
NOT TO SCALE

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108–9721
48108–9721
Tel. 734.822.3101
www.pittsfield–mi.gov

Revision	By	Appd.	YY.MM.DD
SILTSACK	BWA	DRW	12.01.03
TWP REV	BWA	DRW	11.04.27
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD
File Name: SE–01	TTN	DRW	07.10.01
	Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
SOIL EROSION DETAILS AND NOTES

Project No. 2075001300
Scale NOT TO SCALE
Revision 1

SHEET 13

Earthwork

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall perform all excavation and backfilling necessary to complete the work. This shall include the excavation of earth and rock, the removal and disposal of unsuitable material, dewatering, placement of suitable fill and backfill material, pipe boring and jacking, all quality assurance testing, and the restoration and final grading for all earth surfaces.

1.02 WORK WITHIN RIGHTS-OF-WAY

A. Where the governmental bodies having jurisdiction of the streets or rights-of-way have specific specifications relating to the requirements for work within their jurisdiction, such requirements must be met as a minimum requirement, and if these Specifications impose further limitation on the work, they shall also be met as the required work standard.

B. During all operations of the CONTRACTOR in the streets and roadways, the CONTRACTOR shall maintain barricades, lights, and warning signs as required by the agency having jurisdiction.

1.03 WORK WITHIN EASEMENTS

A. During construction within any easements, the CONTRACTOR shall confine himself to the limits shown on the Plans. He shall notify property owners in advance of moving equipment on easements and use of the access routes which will be designated by the OWNER. The OWNER will cooperate in working out the details of access. The topsoil over the trench shall be removed and carefully replaced upon completion of the work. The backfill of the trench in the easement may be left slightly high to provide for any slight residual settlement. Any trees, shrubs, or bushes removed shall be replaced to the satisfaction of the property owner.

1.04 SOIL BORINGS

A. Soil boring results, if taken on a site, are appended to these Specifications with locations noted. Boring logs are shown to be generally representative of the site and to assist in the design and construction of the work.

2.00 PRODUCTS

2.01 BACKFILL MATERIAL

A. For areas not requiring "granular backfill" material, backfill shall be of the excavated material, with the exception that materials such as soft clay, topsoil, muck, cinders, vegetable matter, refuse, boulders and other objectionable and non-packing earth shall be excluded from the backfill and removed from the site. Stone larger than 3 inches in any dimension shall be excluded from the backfill and removed from the site by the CONTRACTOR.

B. Where "granular material" backfill is required as specified herein, backfill material shall be defined as a material meeting granular material Class II as defined in 2003 MDOT 902.08.

C. All utilities within road right-of-way corridor (existing or proposed) shall be backfilled with MDOT CL II granular material compacted to 95% maximum unit weight.

D. All utilities shall be installed with 2 NS sand bedding or better.

2.02 ENCASING PIPE

A. Steel encasing pipe for boring and jacking shall conform to the requirements of either, ASTM A53, Type E or S, Grade B or ASTM A139, Grade B.

B. Steel encasing pipe used under channels and highways shall meet the requirements of the governmental agency having jurisdiction and the following minimum requirements:

Nominal Diameter (Inches)	Maximum Wall Thickness
Under 13	0.188 inches
13-24	0.250 inches
25-36	0.312 inches
42	0.438 inches
48	0.500 inches
54	0.563 inches

C. Steel encasing pipe used under railroads shall meet the requirements of the railroad and the following minimum requirements:

	Minimum Wall Thickness (inches)	
Nominal Diameter (Inches)	Coated or Cathodically Protected	Uncoated & Unprotected
Under 14	0.180	0.251
14-16	0.219	0.282
18	0.250	0.313
20	0.281	0.344
22	0.312	0.375
24	0.344	0.407
26	0.375	0.438
28-30	0.406	0.469
32	0.438	0.501
34-36	0.469	0.532
38-42	0.500	0.563
48	0.563	0.626

D. Casing pipe joints shall be welded to form a leak-proof continuous casing.

E. The inside diameter of casing pipe shall be at least 2 inches greater than the largest outside diameter of the carrier pipe joints or couplings for carrier pipe less than 6 inches in diameter, and at least 4 inches greater than the largest outside diameter of the carrier pipe joints for carrier pipe 6 inches and over in diameter, unless otherwise shown on the Plans.

F. The steel casing pipe shall be of smooth interior and shall be placed accurately to line and grade, allowing for the encased pipe thickness and supports under each length of encased pipe.

3.00 EXECUTION

3.01 GENERAL EXCAVATION

A. Excavation shall be performed by any practicable method consistent with the integrity and protection of the work and neighboring structures, workmen, and the public. Topsoil shall be separately removed and stockpiled for reuse.

B. All excavation, except where necessary to tunnel, bore or jack under roads, railroads, tree roots and other obstructions within the limits indicated on the Plans, may be open cut from the surface. Tunnelling or boring under trees shall be considered as incidental to construction and will not be considered as cause for request for additional payment.

C. Foreign material or unsuitable foundation material encountered such as wood, boulders, etc., which obstruct the excavation, shall be removed. Such materials found at the bottom of the excavation shall be removed and the foundation restored with approved materials.

D. If excess excavation is made or the material becomes disturbed so as to require removal beyond the prescribed limits, the resulting space shall be filled with selected material solidly tamped into place, in not more than 6-inch layers to the satisfaction of the ENGINEER, before the construction work proceeds. At the direction of the ENGINEER, the excess excavation may be filled with 2000 psi concrete at the CONTRACTOR's expense.

E. The excavation shall be kept dry during the work. Where water is encountered in the excavation, it shall be removed by pumping or well points. All necessary precautions shall be taken to prevent damage to existing wells and to completed or partially completed structures. The CONTRACTOR shall be responsible for all damages caused by him due to inadequate or improper protection.

F. The CONTRACTOR shall take ample precautions to protect all trees and ornamental shrubbery not within the limits of the construction areas, or within the construction areas shown on the Plans to be retained from injury by workmen, equipment, or any other agencies connected with the work, including subcontractors. Such protection shall be provided during the progress of the excavation, grading, or other phases of the work as necessary. Such trees or shrubbery shall be surrounded by protective posts or fencing before construction begins, when in judgment of the ENGINEER, such precautionary measures are necessary. If, as a result of any phase of the work, trees are damaged or it is necessary to remove limbs in the way of construction, the repair of the damage and such limb removal shall be done by the CONTRACTOR as directed by the ENGINEER. All costs for the protective work shall be borne by the CONTRACTOR as incidental the Contract work.

G. Any excavation not backfilled at the end of each day must be clearly marked and surrounded by appropriate safety fencing as directed by the ENGINEER. If directed by the ENGINEER, the CONTRACTOR shall cover the open excavation with a steel plate and light the excavated area.

3.02 EXCAVATION FOR SEWERS AND WATER MAINS

A. Trenches shall be excavated to the depth required with allowance for bedding the pipe. The trench shall be cut wider and deeper at each pipe joint location to provide for properly completing the pipe joint and to relieve the joint of all loadings.

B. The width of the trench at the top of a rigid pipe shall be sufficient to allow the pipe to be laid and jointed properly and shall provide for a minimum net clearance of 6 inches and a maximum net clearance of 12 inches on each side of the barrel of the pipe and to allow the backfill to be placed and properly compacted.

C. The width of trench at the top of a flexible pipe backfill when using concrete bedding shall be sufficient to allow the pipe to be laid and jointed properly with the minimum net clearance of 12 inches and a maximum net clearance of 18 inches on each side of the barrel of the pipe.

D. Where the conditions of the ground require or where the work is in close proximity of existing structures, the sides of excavation shall be securely held by bracing and/or sheeting which may be removed in units when the level of the backfill has reached a point where it is safe to pull the sheeting without disturbing the protected feature. No sheeting, bracing, or other timber shall be left in the excavation upon the completion of the main or other structures, except with the specific review and direction of the ENGINEER.

E. Other underground mains, sewers or structures encountered in the excavation shall be adequately supported during the CONTRACTOR's operations, and before backfilling, shall be given permanent support as directed by the ENGINEER to meet the standards or requirements of the owning utility or agency.

F. Water, sewer, gas and other utility services disturbed by the CONTRACTOR in his operations shall be repaired or replaced in a manner equal to the original condition by the CONTRACTOR at his own expense. Where these services are encountered and are undamaged, they shall be supported and/or protected by the CONTRACTOR at his expense against later settlement and/or damage after backfill. The CONTRACTOR shall consult the agency or the utility firm having jurisdiction over any duct line, gas main, etc., which may cross the excavation to determine method of supporting such duct or pipe.

G. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve manhole covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the work is completed. Gutters shall be kept clean, or other satisfactory provisions made for street drainage, and natural water courses shall not be obstructed except as otherwise provided for herein on a temporary basis.

3.03 EXCAVATION FOR STRUCTURES

A. Excavation for structures shall be extended sufficiently beyond the limits of the structure to provide ample room for form construction and for practicable construction methods to be followed.

B. Requirements for excavation of sewers and water mains shall also apply to this Section.

3.04 EXCAVATION FOR PAVED SURFACES

A. In excavating around manholes and catch basins or inlets, care shall be exercised to avoid removing the casings and pushing dirt into the structures. Dirt pushed into manholes, catch basins or inlets by the CONTRACTOR's operations shall be immediately removed so that the dirt will not be carried into the sewer by the flow of sewage or storm water.

B. The CONTRACTOR shall take ample precautions to protect all trees and ornamental shrubbery not within the limits of the construction area, or within the construction areas shown on the Plans to be retained from injury by workmen, equipment, or any other agencies connected with the work, including subcontractors. Such protection shall be provided during the progress of the excavation, grading, or other phases of the work as necessary. Such trees or shrubbery shall be surrounded by protective posts or fencing before construction begins, when in judgment of the ENGINEER, such precautionary measures are necessary. If, as a result of any phase of the work, trees are damaged or it is necessary to remove limbs in the way of construction, the repair of the damage and such limb removal shall be done by the CONTRACTOR as directed by the ENGINEER. All costs for the protective work shall be borne by the CONTRACTOR as incidental to the Contract work.

3.05 ROCK EXCAVATION

A. Rock excavation shall consist of excavating igneous, metamorphic and sedimentary rock which cannot be excavated without continuous drilling and blasting or drilling and splitting to fracture the rock. Blasting shall be permitted only after it has been shown that other methods of excavation are impractical. All rock excavation shall be carried to a minimum depth of 8 inches below the pipe or manhole bottom and to the bottom of all footings. The width of the rock excavation shall not exceed the diameter of the pipe plus 12 inches on either side or the edge of the foundation footing.

B. When the use of explosives is necessary for the progression of the work, the CONTRACTOR shall comply with all laws, ordinances and applicable safety code requirements and regulations relative to the handling, storage and use of explosives and protection of life and property. A person competent and experienced in the use of explosives shall be employed to supervise the work. The CONTRACTOR shall schedule all blasting for a definite hour of the day and shall so notify all residents and businesses in the area as to the scheduled day and hour for such blasting operations. Explosive materials shall not be stockpiled and stored in residential areas. Explosives and initiating devices shall not be carried in the same vehicle.

C. Suitable weighted plank coverings or timber mats shall be provided to confine all materials lifted by blasting within the limits of the excavation of trench. Excessive blasting or overshooting shall not be permitted. Any material outside of the authorized excavation cross section which may be shattered or loosened shall be removed at the CONTRACTOR's expense. The CONTRACTOR shall be responsible for all damage resulting from the use of explosives.

3.06 PIPE BORING AND JACKING

A. The CONTRACTOR shall obtain all necessary permits for jacking the encasing pipe under channels, highways and/or railroads and shall notify the governmental agency and/or company having jurisdiction 48 hrs before work at any crossing is started. The CONTRACTOR shall pay all costs for an inspector and/or flagmen required by a railroad or governmental agency.

B. A suitable approach trench shall be opened, adjacent to the toe of the slope of the embankment. The approach trench shall be long enough to accommodate the length of pipe units to be placed, and wide enough to provide sufficient working room. Guide timbers or rails for keeping the pipe on-line and grade shall be installed in the bottom of the trench and heavy timber backstop supports installed at the rear of the trench to take the thrust of the jacks. A timber bearing a "pushing frame" shall be built and furnished to fit or match the end of the pipe to be jacked, so that the pressure of the jacks will be evenly distributed over the end of the pipe. Two (2) hydraulic jacks of sufficient power shall be used to apply pushing or jacking pressure. For firm ground, excavation shall be carried on from inside the pipe, not to exceed twelve (12) inches ahead of the lead pipe. For unstable ground, the lead pipe shall precede the auger. Excavation at the top and sides shall be accurately cut to line and grade. Adjoining sections of steel pipe shall be welded. Pipe shall be jacked on successive shifts until completed to guard against the "freezing of the line" due to settlement and compaction of surrounding soil.

C. The sheeting of pits along any road will be required if the leading edge of all work pits will be closer to the pavement edge than the shoulder point or ten (10) ft, which ever distance is greater, or on curb and gutter sections, at least five (5) ft from back of curb.

D. Upon completion of the installation of the steel pipe encasement, the contractor shall furnish and install a bolted style casing spacer as described below on the carrier pipe. Casing spacers shall be placed a maximum of seven (7) feet apart along the length of the carrier pipe with one casing spacer within 2-1/2 feet of each side of a pipe joint and the rest evenly spaced. Wood skids are not an acceptable method of supporting the carrier pipe.

1. Casing spacers for carrier pipes from 4" - 24" shall be made of a molded, segmented high density polyethylene plastic with 304 stainless steel connecting nuts and bolts. Minimum spacer width shall be 5.2" for carrier pipes from 4" - 12" and 7.0" for carrier pipes 14" - 24". Each casing spacer shall have at least six (6) integrally molded skids extending 1" beyond the bell or mechanical joint of the carrier pipe. The casing spacers shall be equal to the PSI Ranger as manufactured by Pipeline Seal and Insulator, Inc., Houston, TX.

2. Casing spacers for carrier pipes larger than 24" shall be a PVC fusion bonded coated (10-16 mils) steel shell (minimum 14 gauge steel) with a 90 mil PVC inner liner and 2" wide 30% glass reinforced polyester runners (minimum compressive strength = 18,000 psi) (polyethylene is not an acceptable runner material) attached by 3/8" coated steel studs welded to the steel shell. All bolts and nuts used to fasten the shell to the carrier pipe shall be cadmium plated steel. Where riser are required under the runners they shall be a minimum 10 gauge steel welded to the shell and coated as specified for the shell (epoxy is not an acceptable coating for the shell riser). The casing spacers shall be equal to the PSI Model C as manufactured by Pipeline Seal and Insulator, Inc., Houston, Texas.

E. Boring shall be performed by accepted and recognized methods which will provide adequate safety and protection at all times to workmen employed in the work and to inspectors and others involved in the construction.

F. If voids should develop around the outside of the encasing pipe, grouting or other methods approved by the ENGINEER shall be employed to fill such voids.

G. After the pipes are tested satisfactorily, the remaining space between the carrier pipe and the encasing pipe shall be pressure grouted or otherwise filled with concrete. The carrier pipe shall be adequately braced to prevent floating or movement of the pipe.

3.07 SHORING, SHEETING AND BRACING

A. Where sheet piling, shoring, sheeting, bracing, or other supports are necessary, they shall be furnished, placed, maintained, and except as shown or specified otherwise, removed by the CONTRACTOR.

B. All sheet piling, shoring, sheeting and bracing shall be designed by a professional engineer engaged by the CONTRACTOR with demonstrated competence and experience in such work. The sheeting system shall be designed to prevent bottom failure and hydrostatic uplift within the excavation. Provision shall also be made in the design for lateral pressures due to side slope and construction equipment or other surcharge loads, as applicable.

C. The CONTRACTOR shall provide to the ENGINEER for his review, design calculation and arrangement drawings of the sheeting system prior to ordering any materials for bracing, sheeting, etc., and prior to the commencement of the excavation.

D. All materials, except as otherwise specified, used for sheeting and sheet piling, lagging, braces, shores, and stringers, or waling strips shall be of approved quality and dimensions throughout.

E. Materials for sheeting systems shall be furnished and driven or set in place by the CONTRACTOR, where necessary or wherever ordered by the ENGINEER, whether the same is or is not considered necessary by the CONTRACTOR. If, in the opinion of the ENGINEER, the materials furnished by the CONTRACTOR are not of proper quality or sufficient size or not properly placed to ensure the safety of the work or of adjacent structures and property, the CONTRACTOR shall, upon notice from the ENGINEER to that effect, forthwith procure, furnish and set in place or drive other and satisfactory materials, or place the material in a satisfactory manner; and if he shall fail or neglect to do so, the ENGINEER may order all or any part of the work to be stopped until such materials so used are furnished and placed; and the CONTRACTOR shall not be entitled to claim, demand, or receive any compensation for larger size or better quality or different disposal of materials ordered by the ENGINEER, nor any compensation for allowance of any kind whatsoever for or on account of any damage or delay resulting from such stoppage of work.

F. Steel sheet piling may be either new or used. It shall be of adequate strength, straight and properly braced. Steel sheet piling shall be of the interlocking type. Friction in the interlocks shall not be assumed to contribute to the strength of the sheet piling.

G. The design, planning, installation and removal, if required, of all sheet piling, shoring, sheeting, and bracing shall be accomplished in such a manner as to maintain the required excavation or trench section and to maintain the undisturbed state of the soils below and adjacent to the excavation.

H. Steel sheet piling for the excavation shall be driven straight and in-line. The piling shall be supported above ground, before driving, by a guide frame at least 20 ft high which will keep the piling accurately in the required position and vertical. Each piece of piling shall be driven only a few feet at a time and driving shall proceed continuously around the perimeter so that the piles shall reach their full penetration together.

I. Walers and bracing shall be supplied and installed as required to complete the sheeting system. Walers and braces shall be of adequate strength for the load imposed. Splices in walers shall develop the full strength of the member in bending, shear, and axial compression.

J. If bracing members are to be removed during construction, the timing and procedure for removal shall not induce excessive stresses in the permanent structures or in steel sheet piling and bracing members.

K. If the construction sequence of structures requires the transfer of bracing to the completed portions of any structure, the CONTRACTOR shall secure written acceptance of the ENGINEER prior to the installation of such bracing.

L. In trenching operations the use of horizontal strutting below the barrel of pipe or the use of the pipe as support for trench racing will not be permitted. The use of a traveling shield for sewer construction shall require that the device be approved for use by a professional engineer. Sheet piling and timbers in trench excavations shall be withdrawn in a manner so as to prevent subsequent settlement of the pipe or additional backfill loadings which might overload the pipe.

M. The neglect, failure, or refusal of the ENGINEER to order the use of sheeting, or sheet piling or steel, or to order the same to be left in place, or the giving or failure to give of any order or directions as to the manner or methods of driving or placing sheeting, sheet piling, bracing, shores, etc., shall not in any way relieve the CONTRACTOR of any or all obligations under this Contract. Sheeting left in place shall be cut off one (1) ft below existing grade.

N. The rules of the OSHA and the State Department of Labor with respect to excavation and construction shall at all times be strictly observed.

3.08 GENERAL BACKFILLING

A. For all areas, unless otherwise noted, backfilling shall consist of placing excavated material as defined in Paragraph 2.01.A. of this Section, in 12-inch lifts to finish grade. Compaction of backfill shall be such as to obtain 90% of the maximum density.

B. Under pavements, curb, paved driveways, and sidewalks, and where pipe is within a one on one influence of pavement, compaction testing shall be performed by an independent testing laboratory. Testing shall be performed at intervals of one test per lift per 50 feet of trench or as determined necessary by the ENGINEER.

C. In residential developments, all backfill within the road corridor shall be granular material compacted in layers not to exceed 12 inches loose thickness with backfilling carried up to subgrade. Compaction of backfill shall be as such to obtain 95% of the maximum unit density as determined at the optimum moisture content. For purposes of this section, the road corridor is defined as front of house to front of house, including right-of-way and adjacent easements and setbacks.

3.09 BACKFILLING FOR SEWERS AND WATER MAINS

A. Backfilling shall consist of placement of the prescribed materials from a level 12 inches above the crown of the pipe. Placement shall be as follows:

1. Under gravel driveways, gravel roads and shoulders, the backfill shall be granular material which shall be solidly compacted by mechanical tamps in layers of not more than 12 inches loose thickness with backfilling carried up to within 12 inches of finished grade. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content.

2. Under pavements, curb, paved driveways, and sidewalks, the backfill shall be granular material compacted in layers not to exceed 12 inches loose thickness with backfilling carried up to subgrade. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content. After a period of about 60 days or less, if the backfill compaction is satisfactory to the ENGINEER, to provide for any slight settlement, the CONTRACTOR shall retrim neatly any broken edges of pavement and replace the top surface of the backfill within the pavement area with pavement surface equal to that surface which was removed. The pavement shall be replaced in accordance with the standard specifications of the agency having jurisdiction.

3. Backfill around lift stations, or buried underground structures shall be granular material compacted in 12-inch lifts. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content.

4. For all other areas, backfilling shall consist of placing excavated material as defined in Paragraph 2.01.A. of this Section, in 12-inch lifts to finish grade. Compaction of backfill shall be such as to obtain 90% of the maximum unit density as determined at the optimum moisture content.

3.10 FILLING AND BACKFILLING FOR STRUCTURES

A. Embankments underlying structural footings, streets and drives, sidewalks and around structures shall be granular material meeting the requirements of the Michigan Department of Transportation for granular material compacted to 95% density.

B. In all other areas, material required for embankments and backfilling shall be soil or soil-rock mixture free of organic and other deleterious matter and shall contain no more than 15% rocks or lumps larger than 2-1/2 inches in the greatest dimension, compacted to 90% density.

C. Under all interior and exterior floor slabs, an 8-inch thick granular cushion shall be placed. This material shall be clean mineral aggregate meeting the following gradation requirements:

Passing the No. 4 Sieve	100%
Passing the No. 200 Sieve	0-3%

D. Where embankment material is placed to achieve a new surface elevation, the top 4 inches shall be approved topsoil either salvaged from the site or hauled in by the CONTRACTOR.

3.11 FILLING AND BACKFILLING FOR PAVED SURFACES

A. Embankments, including sand cushions and granular fills, shall be placed in successive layers not more than 6 inches in depth the full width of the cross section, each layer to be thoroughly compacted by means of vibratory compactors or by an approved pneumatic-tired roller or combination thereof, as required by the ENGINEER. Each layer shall be compacted to not less than 95% of the maximum unit density as determined at the optimum moisture content. All parts of the embankment shall be uniformly compacted and the CONTRACTOR shall so direct all earthmoving equipment used in the work so that the same shall be attained. Embankment or fill outside the limits of the subgrade where sand or gravel is not required shall be made with suitable material which is free from perishable organic matter, rubbish, stones, broken concrete, roots, or other foreign materials, at no additional compensation. Before any embankments are begin, the base shall be made firm and cleared of topsoil, sod or other perishable material. The sides of the embankment shall be neatly and evenly dressed to the slope shown on the Plans, or such other slope as the ENGINEER may direct.

B. Upon completion of the placing of the curbs, and after the concrete has cured sufficiently, forms shall be removed and the excavated space behind the curb shall be backfilled with a good quality of surface soil, free of rubbish, stone, broken concrete, roots or other foreign material. Where adequate acceptable material for backfill behind the curb is not available, granular fill conforming to 2003 MDOT 8.02.06, Class II, shall be used. Where the area behind the curb is in cut, it shall be trimmed from the top of the curb on the slope shown on the Plans. If the area is in embankment or fill, an earth berm shall be placed immediately adjacent to the top of the curb and then the embankment of fill shall be finished to the slope shown on the Plans. All trimming and finishing shall be done in a neat, workmanlike manner. All excess concrete and debris shall be removed from the excavation behind the curb line before backfilling begins.

C. In construction of non-rigid pavements, backfilling back of curb and gutter shall be completed before placement and compaction of the base course of the roadway.

3.12 PREPARATION OF SUBGRADE FOR ROADWAY SURFACES

A. The bottom of the excavation for the pavement or top of the fill shall be known as the pavement subgrade and shall be smoothed, trimmed and compacted to the required line, grade and cross section to receive the road metal. It shall be thoroughly compacted by rolling with a roller of approved type weighing not less than 8 tons. The subgrade shall be compacted to at least 95% of the maximum density as designated by the test method AASHTO T-180. Inaccessible areas, where rolling is not practical, shall be thoroughly compacted by mechanical tampers capable of striking a blow equivalent to at least 250 foot-pounds per square foot. The subgrade thus formed shall be maintained in a smooth and compacted condition until the pavement has been placed. No base course, surfacing, curb, or curb and gutter, shall be placed until the subgrade has been reviewed by the ENGINEER. The subgrade shall be finished in an acceptable condition at least one day in advance of the pavement construction at all times. Six inches of compacted depth of granular material shall be used where uncompactable soil is encountered. The granular fill shall conform to the 2003 MDOT 9.02.08., Class II, compacted to 95% of its density.

B. Immediately prior to placing the pavement, the subgrade shall be tested for conformity with the cross section shown on the Plans by means of an approved template riding on the curb and gutter sections or on side forms. If necessary, materials shall be removed or added, as required, to bring all portions of the subgrade to the correct elevation. Corrected portions shall then be thoroughly compacted and again tested with the template. Pavement material shall not be placed at any portion of the subgrade which has not been tested for correct elevation.

C. The finished subgrade shall be maintained in a smooth and compacted condition until the pavement is placed. No storage piles of fine or coarse aggregate shall be placed directly upon the finished subgrade. Should the subgrade become rutted or disturbed in any manner, it shall be reshaped and recompacted.

3.13 GRADING

A. The CONTRACTOR shall grade the site to achieve the elevations as shown on the Plans. All disturbed areas beyond the grading limits shall be restored to prior condition.

B. Surplus excavated material not needed for embankment shall be disposed of by the CONTRACTOR. Headwalls, culverts, drains, sewers and appurtenances filled or damaged by the CONTRACTOR during the course of his operations shall be cleaned, repaired, or replaced at his expense.

C. All temporary earth changes shall be in conformance with the Soil and Erosion Control Act.

3.14 RESTORATION

A. Headwalls, culverts, and drainage systems filled or damaged by the CONTRACTOR during the course of his operations shall be cleaned, relaid or rebuilt with new materials to a condition equal to the original state, and of thickness equal to the original structure and to the original line and grade at the CONTRACTOR's expense.

B. Where the excavation is located beside a ditch and/or where an existing ditch is filled or disturbed in the CONTRACTOR's operations, the CONTRACTOR shall clean, repair, or replace the ditch with properly pitched bottom and side slopes and of section and capacity not less than the original section.

C. Where excavation has been through lawn areas, the CONTRACTOR shall restore the disturbed area by placing topsoil and seeding or sodding over the final backfill material.

D. The CONTRACTOR shall remove excess dirt and other construction material from the site of the work and leave the site in a condition equal to its original state.

E. The final condition of the streets and roadways shall be subject to the approval of the governmental body having jurisdiction thereof, as well as review by the ENGINEER.

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TWP REV		BWA	DRW	11.04.27
UPDATES		TTN	DRW	10.01.20
Revision		By	Appd.	YY.MM.DD
Issued		By	Appd.	YY.MM.DD
File Name: SE-02	TTN	DRW	DRW	07.10.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
EARTHWORK SPECIFICATIONS

Project No.
2075001300

Scale
NOT TO SCALE

Revision
1

SHEET 14

LEGEND

—— w ——	EXIST. WATER MAIN
—— W ——	PROP. WATER MAIN
—— s —o——	EXIST. SANITARY SEWER
····· S ·····	PROP. SANITARY SEWER
—— 880 ——	U.S.G.S. CONTOUR

SCALE: 1" = 200'

0 200 400 600

811 Know what's below. Call before you dig.

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

NOTE: SURROUNDING UTILITIES WERE TAKEN FROM PITTSFIELD TWP. UTILITY MAPS DATE JAN. 2001.

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AREA PLAN

15

DATE: 10/16/18
SHEET 15 OF 16
CADD:
ENG: JCA
PM: SWB
TECH:
18193AP

JOB No. 18193

REVISIONS:

REV.	DATE

M:\Civil3d_Proj\18193\Site Plan\18193AP.dwg, 2/15/2019 3:30 PM, Jim Ahnert, 15, MCLLC PDF.pc3
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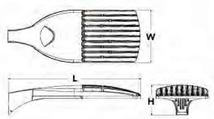
D-Series Size 1

LED Area Luminaire

d^series

Catalog Number:
Notes:
Type:

Specifications



EPA:	1.01 ft² (0.09 m²)
Length:	33" (83.8cm)
Width:	13" (33.0cm)
Height:	7-1/2" (19.1cm)
Weight (max):	27 lbs (12.2kg)

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and system-level interoperability.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is A+ Certified when ordered with DTL® controls marked by a shaded background. DTL DLL equipped luminaires meet the A+ specification for luminaire to photocontrol interoperability!
- This luminaire is part of an A+ Certified solution for ROAM® or XPoint™ Wireless control networks, providing out-of-the-box control compatibility with simple commissioning, when ordered with drivers and control options marked by a shaded background.

To learn more about A+, visit www.acuitybrands.com/aplus.

1. See ordering tree for details.
2. A+ Certified Solutions for ROAM require the order of one ROAM node per luminaire. Sold Separately: Unit ja Power; Unit ja DTL DLL

A+ Capable options indicated by this color background.

Ordering Information

EXAMPLE: DSX1 LED P7 40K T3M MVOLT SPA DDBXD

DSX1 LED

Series	LEDs	Color temperature	Distribution	Voltage	Mounting
DSX1 LED	**Forward optics** P1 P4 P7 P2 P5 P8 P3 P6 P9 **Rotated optics** P10[1] P12[1] P11[1] P13[1]	30K 3000K 40K 4000K 50K 5000K AMBPC Amber phosphor converted[2]	T1S Type I short T2S Type II short T2M Type II medium T3S Type III short T3M Type III medium T4M Type IV medium TFTM Forward throw medium T5VS Type V very short T5S Type V short T5M Type V medium T5W Type V wide BLC Backlight control[3] LCCO Left corner cutoff[3] RCCO Right corner cutoff[3]	MVOLT[4,5] 120[5] 208[5] 240[5] 277[5] 347[4,6] 480[5,6]	**Shipped included** SPA Square pole mounting RPA Round pole mounting WBA Wall bracket SPUMBA Square pole universal mounting adaptor[7] RPUMBA Round pole universal mounting adaptor[7] **Shipped separately** KMA8DDBXD U Mast arm mounting bracket adaptor (specify finish)[7]

Control options		Other options	Finish
Shipped installed NLTAIR2 nLIGHT AIR generation 2 enabled[8] PIR High, mid, low output with motion sensor, 15-30' mounting height, ambient sensor enabled at 5fc.[9,10,11] PIR5 Five-wire receptacle only (controls ordered separately)[12,13] PIR7 Seven-wire receptacle only (controls ordered separately)[12,13] DMG 0-10V dimming wires extended back of housing for external control (leads exit luminaire) DS Dual switching[12,14] PIR High, mid, low output with motion sensor, 8-15' mounting height, ambient sensor enabled at 5fc.[9,10,11] PIRH High, mid, low output with motion sensor, 15-30' mounting height, ambient sensor enabled at 5fc.[9,10,11] PIRHN Network, high, mid, low output with motion sensor[10] PIRHTC2V High, mid, low output with motion sensor, 15-30' mounting height, ambient sensor enabled at 5fc.[9,10,11]	PIRH1FC3V High, mid, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc.[9,10,11] BL30 Bi-level switched dimming, 30%[9,10,15] BL50 Bi-level switched dimming, 50%[9,10,15] PNMTD2S Part night, dim till dawn[9,16] PNMTD5S Part night, dim 5 hrs.[9,16] PNMTD6S Part night, dim 6 hrs.[9,16] PNMTD7S Part night, dim 7 hrs.[9,16] FAO Field adjustable output[17]	**Shipped installed** HS House-side shield[1] SF Single fuse (120, 277, 347V)[5] DF Double fuse (208, 240, 480V)[5] L90 Left rotated optics[7] R90 Right rotated optics[7] **Shipped separately** BS Bird spikes[18] EGS External glare shield[19]	DDBXD Dark bronze DBLXD Black DNAXD Natural aluminum DWHXD White DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DWHGXD Textured white

LITHONIA LIGHTING

One Lithonia Way • Conyers, Georgia 30012 • Phone: 800.279.8041 •

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DSX1 LED
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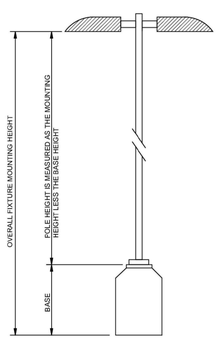


CONTROLS NOTE:

UNLESS EXEMPT, PROJECT MUST COMPLY WITH LIGHTING CONTROLS REQUIRMENTS DEFINED IN ASHRAE 90.1 2013. FOR SPECIFIC INFORMATION CONTACT GBA CONTROLS GROUP AT ASG@GASSERBUSH.COM OR 734-266-6705

GENERAL NOTE

1. SEE SCHEDULE FOR LUMINAIRE MOUNTING HEIGHT.
2. SEE LUMINAIRE SCHEDULE FOR LIGHT LOSS FACTOR.
3. CALCULATIONS ARE SHOWN IN FOOTCANDLES AT: GRADE.

THE ENGINEER AND/OR ARCHITECT MUST DETERMINE APPLICABILITY OF THE LAYOUT TO EXISTING / FUTURE FIELD CONDITIONS. THIS LIGHTING LAYOUT REPRESENTS ILLUMINATION LEVELS CALCULATED FROM LABORATORY DATA TAKEN UNDER CONTROLLED CONDITIONS IN ACCORDANCE WITH ILLUMINATING ENGINEERING SOCIETY APPROVED METHODS. ACTUAL PERFORMANCE OF ANY MANUFACTURER'S LUMINAIRE MAY VARY DUE TO VARIATION IN ELECTRICAL VOLTAGE, TOLERANCE IN LAMPS, AND OTHER VARIABLE FIELD CONDITIONS. MOUNTING HEIGHTS INDICATED ARE FROM GRADE AND/OR FLOOR UP.

THESE LIGHTING CALCULATIONS ARE NOT A SUBSTITUTE FOR INDEPENDENT ENGINEERING ANALYSIS OF LIGHTING SYSTEM SUITABILITY AND SAFETY. THE ENGINEER AND/OR ARCHITECT IS RESPONSIBLE TO REVIEW FOR MICHIGAN ENERGY CODE AND LIGHTING QUALITY COMPLIANCE.

Note:
Per Section 13.05.D.5 of the Pittsfield Township Zoning Ordinance, all outdoor light fixtures, existing or hereafter installed and maintained upon private property, shall be turned off or reduced in intensity between 11:00 pm and sunrise.

New Luminaire Schedule

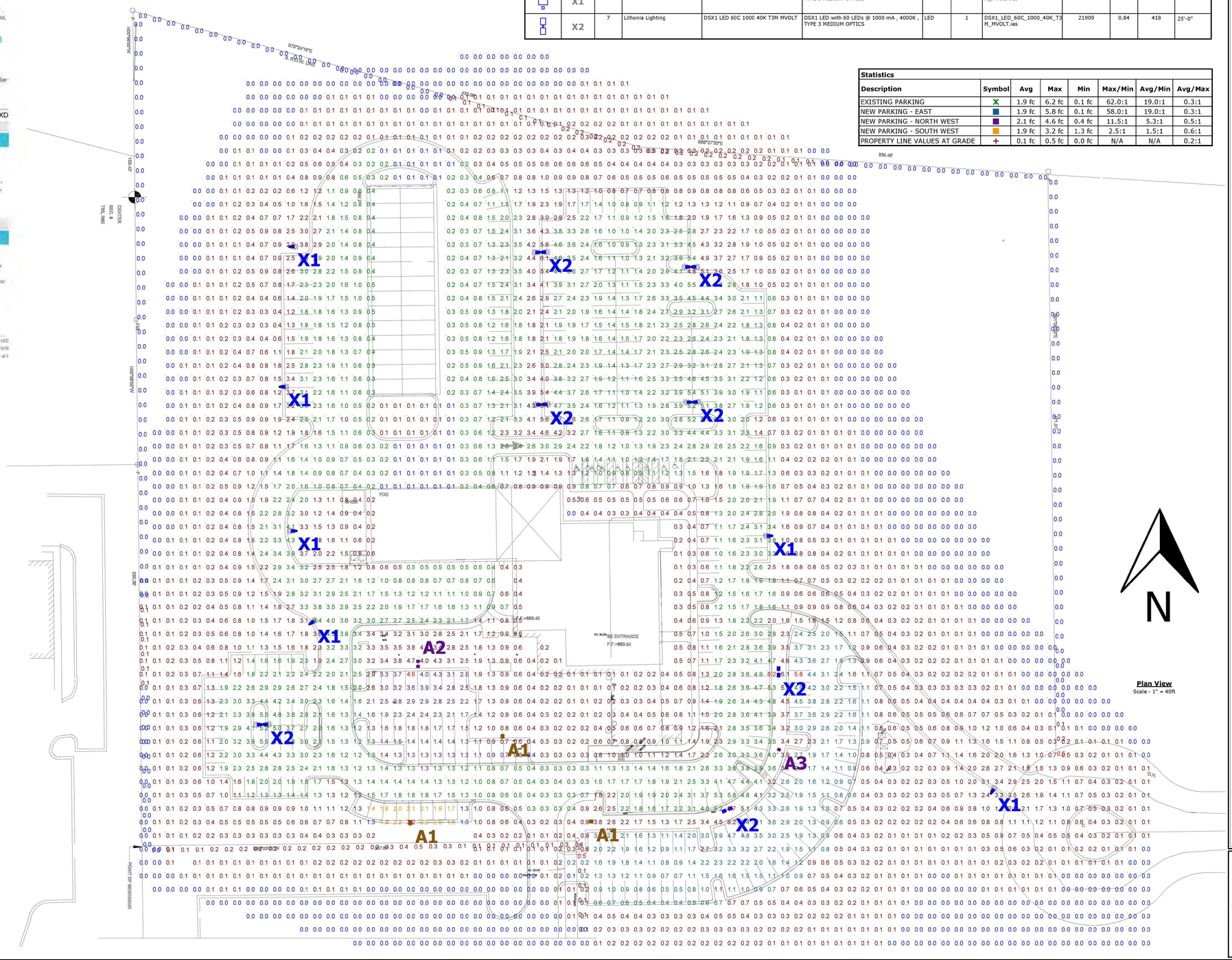
Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Filename	Lumens per Lamp	LLF	Wattage	Mounting Height
	A1	3	Lithonia Lighting	DSX1 LED P6 40K T3M MVOLT HS	DSX1 LED P6 40K T3M MVOLT with houseside shield	LED	1	DSX1_LED_P6_40K_T3M_MVOLT_HS.ies	14985	0.9	163	25'-0"
	A2	2	Lithonia Lighting	DSX1 LED P8 40K T5W MVOLT	DSX1 LED P8 40K T5W MVOLT	LED	1	DSX1_LED_P8_40K_T5W_MVOLT.ies	25014	0.9	414	25'-0"
	A3	1	Lithonia Lighting	DSX1 LED P8 40K T5W MVOLT	DSX1 LED P8 40K T5W MVOLT	LED	1	DSX1_LED_P8_40K_T5W_MVOLT.ies	25014	0.9	207	25'-0"

Existing Luminaire Schedule

Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Filename	Lumens per Lamp	LLF	Wattage	Mounting Height
	X1	6	Lithonia Lighting	DSX1 LED 60C 1000 40K T3M MVOLT	DSX1 LED with 60 LEDs @ 1000 mA , 4000K , TYPE 3 MEDIUM OPTICS	LED	1	DSX1_LED_60C_1000_40K_T3M_MVOLT.ies	21909	0.84	209	25'-0"
	X2	7	Lithonia Lighting	DSX1 LED 60C 1000 40K T3M MVOLT	DSX1 LED with 60 LEDs @ 1000 mA , 4000K , TYPE 3 MEDIUM OPTICS	LED	1	DSX1_LED_60C_1000_40K_T3M_MVOLT.ies	21909	0.84	418	25'-0"

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
EXISTING PARKING	×	1.9 fc	6.2 fc	0.1 fc	62.0:1	19.0:1	0.3:1
NEW PARKING - EAST	■	1.9 fc	5.8 fc	0.1 fc	58.0:1	19.0:1	0.3:1
NEW PARKING - NORTH WEST	■	2.1 fc	4.6 fc	0.4 fc	11.5:1	5.3:1	0.5:1
NEW PARKING - SOUTH WEST	■	1.9 fc	3.2 fc	1.3 fc	2.5:1	1.5:1	0.6:1
PROPERTY LINE VALUES AT GRADE	+	0.1 fc	0.5 fc	0.0 fc	N/A	N/A	0.2:1



Plan View
Scale - 1" = 40ft

GBA

HURON VALLEY AMBULANCE
PHOTOMETRIC SITE PLAN
PREPARED FOR: MIDWESTERN CONSULTING
GASSER BUSH ASSOCIATES
WWW.GASSERBUSH.COM

Designer
LLB/AAM
Date
10/8/2018
REV 12/19/2018
Scale
Not to Scale
Drawing No.
#18-24613-V2
SHT 16