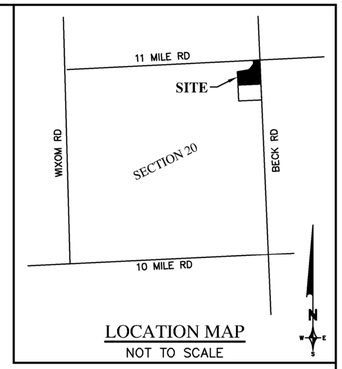
FINAL SITE PLAN FOR

GRIFFIN FUNERAL HOME

SECTION 20, NOVI, MICHIGAN

JSP 17-0013



LOCATION MAP
NOT TO SCALE

SITE DATA:

ZONED:	R-A
GROSS SITE AREA:	171,190.80 S.F. (3.93 ACRES)
GROSS BUILDING AREA:	12,176 S.F.
USABLE BUILDING AREA:	6,310 S.F.
LOT COVERAGE ALLOWED:	25%
LOT COVERAGE PROPOSED:	7.1%
BUILDING HEIGHT:	21'- 6" / 1 STORY
BUILDING SETBACK:	75' FRONT
PARKING SETBACK:	20' REAR AND SIDES

PARKING SCHEDULE

PARKING SPACES REQUIRED

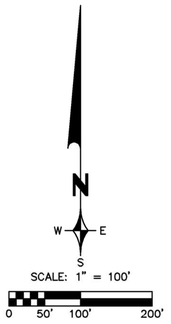
1 SPACE FOR EACH 50 SQUARE FEET OF USEABLE FLOOR AREA:
USEABLE FLOOR AREA (LESS THE LOBBY AREA) 6,030 S.F. / 50 = 121 SPACES

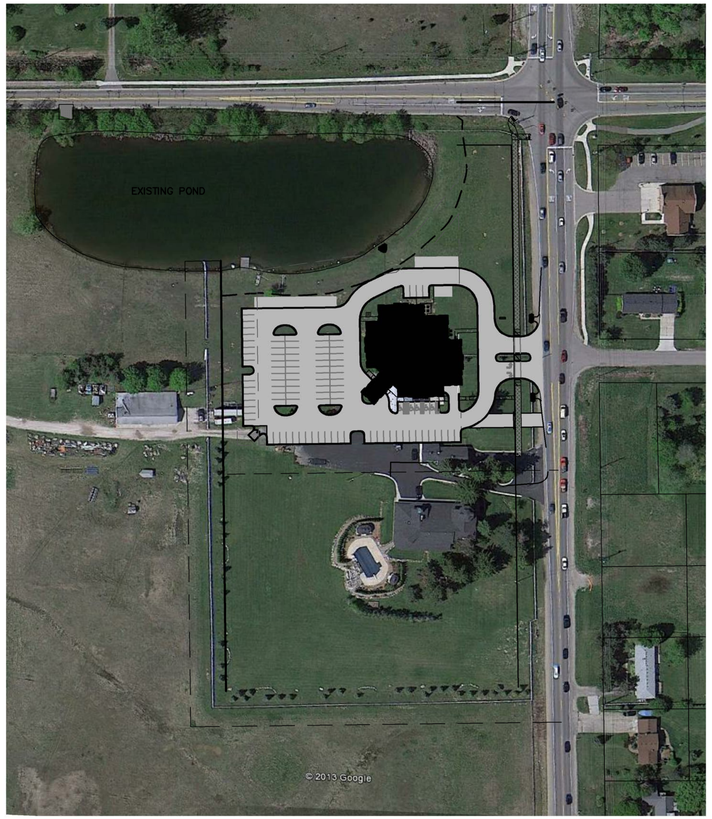
PARKING SPACES PROVIDED

STANDARD	93
BARRIER FREE (INCLUDES 2 VAN ACCESSIBLE SPACE)	5
BANKED	23
TOTAL	121 SPACES

BICYCLE PARKING SPACES PROVIDED

HOOPS	2
TOTAL	4 SPACES





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PROPRIETOR:

NOVI FUNERAL HOME, L.L.C.
7707 MIDDLEBELT RD.
WESTLAND, MI 48185
(734) 968-9401
DAVID GRIFFIN

ARCHITECT:

JST ARCHITECTS
2919 WELBORN STREET
DALLAS, TX 75219
(214) 522-4033
JACK WARDEN

CIVIL ENGINEER:

ZEIMET WOZNIAK AND ASSOCIATES
55800 GRAND RIVER AVE, SUITE 100
NEW HUDSON, MICHIGAN 48165
(248) 437-5099
JULIAN J. WARGO JR., P.E.

LANDSCAPE ARCHITECT:

DEAK PLANNING + DESIGN
143 CADYCENTER # 79
NORTHVILLE, MI 48167
(248) 444-7892
STEVE DEAK, RLA

APPROVED DEVIATIONS TO THE PLAN:

A. A. APPROVAL OF UP TO 23 LANDBANK PARKING (121 REQUIRED, 98 PROVIDED, 23 LAND BANKED) DUE TO PLANNING COMMISSIONS FINDING BELOW, WHICH IS HEREBY GRANTED;
   - THE APPLICANT HAS DEMONSTRATED THROUGH SUBSTANTIAL EVIDENCE THAT THE SPECIFIED OCCUPANT AND BUILDING USE WILL REQUIRE LESS PARKING THAN WHAT IS REQUIRED BY THE ZONING ORDINANCE;
   - PARKING WILL NOT OCCUR ON ANY STREET OR DRIVEWAY;
   - PARKING WILL NOT OCCUR ON ANY AREA NOT APPROVED AND DEVELOPED FOR PARKING;
   - PARKING WILL NOT OCCUR ON THAT AREA WHERE PARKING CONSTRUCTION HAS BEEN LANDBANKED UNTIL SUCH TIME AS THAT AREA IS CONSTRUCTED FOR SUCH PARKING;
   - THE REQUESTED PARKING LANDBANKING WILL NOT CREATE TRAFFIC OR CIRCULATION PROBLEMS ON OR OFF SITE; AND
   - THE REQUESTED PARKING LANKBANKING WILL BE CONSISTENT WITH THE PUBLIC HEALTH, SAFETY AND WELFARE OF THE CITY AND THE PURPOSES OF THE ZONING ORDINANCE;

B. WAIVER FOR ABSENCE OF NOISE IMPACT STATEMENT DUE TO THE NATURE OF USE, WHICH IS HEREBY GRANTED;

C. LANDSCAPE WAIVER FROM SECTION 5.5.3.B.II AND III TO PERMIT REDUCTION OF REQUIRED HEIGHT FOR BERM ALONG WESTERN PROPERTY LINE (4.5 FEET TO 6 FEET REQUIRED) PROVIDED OPACITY FOR SCREENING IS MET ALONG THE PROPERTY LINE, WHICH IS HEREBY GRANTED;

D. LANDSCAPE WAIVER FROM SECTION 5.5.3.B.II FOR ABSENCE OF REQUIRED BERM ALONG SOUTHERN PROPERTY, DUE TO APPLICANT'S WRITTEN INTENT THAT THE PROPERTY TO THE SOUTH WILL BE DEVELOPED NON-RESIDENTIAL AND TO RETROFIT THE SITE TO PROVIDE THE REQUIRED BUFFER AND SCREENING IF IT IS DEVELOPED RESIDENTIAL IN FUTURE, WHICH IS HEREBY GRANTED;

E. LANDSCAPE WAIVER FROM SECTION 5.5.3.E.I.C FOR REDUCTION OF MINIMUM REQUIRED STREET TREES ALONG BECK ROAD (13 REQUIRED, 10 PROVIDED) DUE TO CONFLICTS WITH CORNER CLEARANCE, WHICH IS HEREBY GRANTED;

F. CITY COUNCIL VARIANCE FROM SECTION 11-256.B OF DESIGN AND CONSTRUCTION STANDARDS MANUAL FOR ABSENCE OF REQUIRED SIDEWALK ALONG ELEVEN MILE ROAD DUE TO PRACTICAL DIFFICULTIES FOR EXTENSION OF SIDEWALK BEYOND THE SITE BOUNDARY, PROVIDED THE APPLICANT PAYS THE CITY THE CURRENT CONSTRUCTION COST OF THE SIDEWALK, AS APPROVED BY THE CITY ENGINEER;

NOTE:
THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AS DISCLOSED BY AVAILABLE UTILITY COMPANY RECORDS AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE COMPANY. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY IF A CONFLICT IS APPARENT.

NOTE: THE OWNER OF THE PROPERTY SHALL REPORT ANY PROPOSED CHANGE IN USE OF OCCUPANCY FOR FURTHER EVALUATION.

NOTE: ROOF TOP EQUIPMENT IS NOT PROPOSED.

NOTE: A RIGHT-OF-WAY PERMIT WILL BE REQUIRED FROM THE CITY OF NOVI.

NOTE: ALL WORK SHALL CONFORM TO THE CURRENT CITY OF NOVI STANDARDS AND SPECIFICATIONS.

STATE OF MICHIGAN * JULIAN JAY WARGO, JR. * ENGINEER NO. 36177 * LICENSED PROFESSIONAL ENGINEER

Julian J. Wargo, Jr.

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
PSP REVIEW	02/16/17	JJW	FSP SUBMITTAL	10/25/17	JJW						
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CITY REVIEW	9/11/17	JJW									

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WESTLAND, MI 48185 (734) 968-9401

COVER
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK NO.

DATE	2-16-17	SCALE	HOR: 1" = 100' VER: 1" = N/A
DESIGNED BY	JJW	JOB NO.	16121
DRAWN BY	DAB	SHEET	COVER

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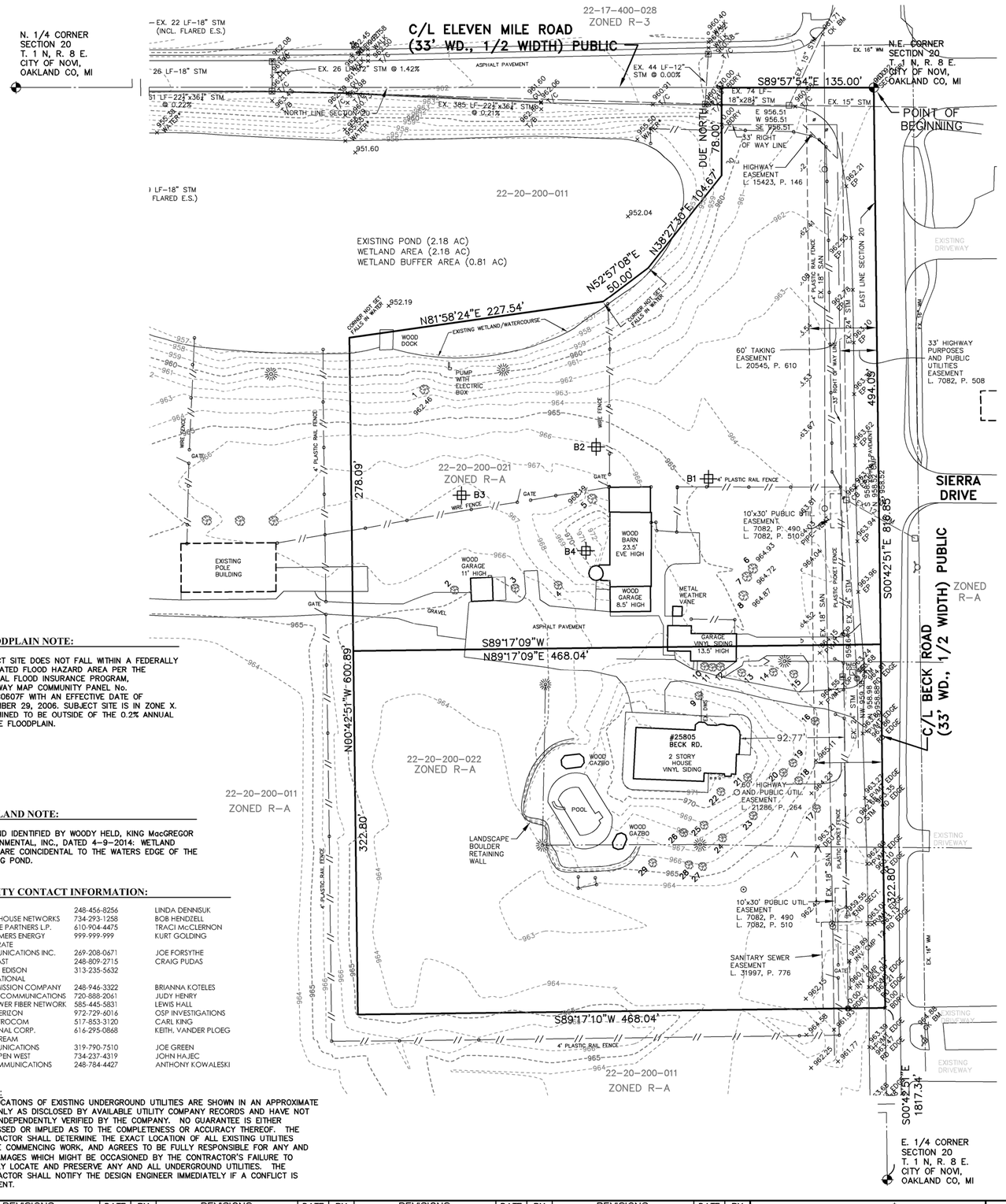
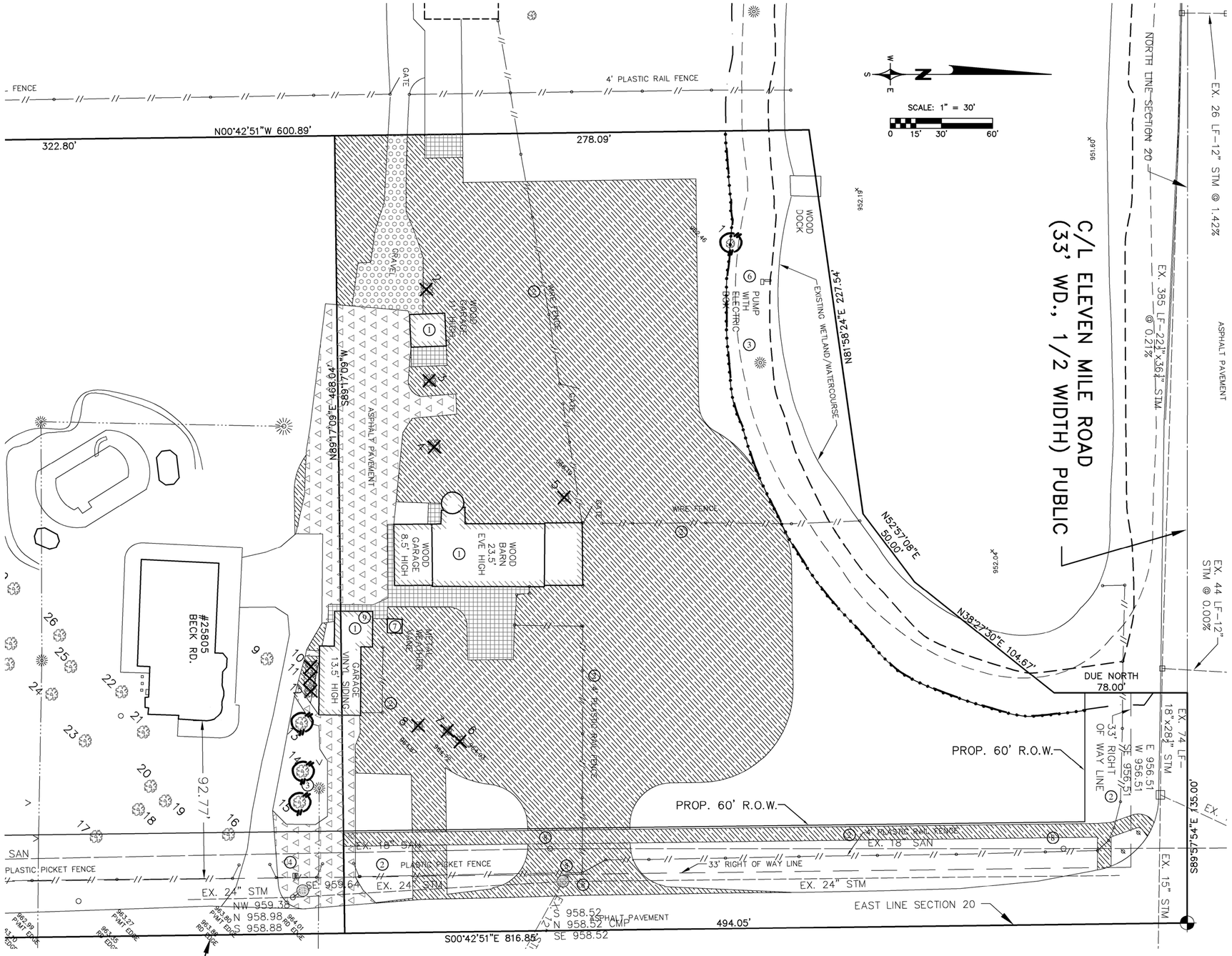

N. 1/4 CORNER
SECTION 20
T. 1 N, R. 8 E.
CITY OF NOVI,
OAKLAND CO, MI
C/L ELEVEN MILE ROAD
(33' WD., 1/2 WIDTH) PUBLIC
22-17-400-028
ZONED R-3
N.E. CORNER
SECTION 20
T. 1 N, R. 8 E.
CITY OF NOVI,
OAKLAND CO, MI
S89°57'54"E 135.00'
POINT OF BEGINNING
DUE NORTH 78.00'
E 956.51
W 956.51
S 956.51
33' RIGHT OF WAY LINE
HIGHWAY EASEMENT
L. 15423, P. 146
22-20-200-011
EXISTING POND (2.18 AC)
WETLAND AREA (2.18 AC)
WETLAND BUFFER AREA (0.81 AC)
N38°27'30"E 104.67'
N52°57'08"E 50.00'
N81°58'24"E 227.54'
EXISTING WETLAND/WATERCOURSE
WOOD DOCK
PUMP WITH ELECTRIC BOX
60' TAKING EASEMENT
L. 20545, P. 610
33' HIGHWAY PURPOSES AND PUBLIC UTILITIES EASEMENT
L. 7082, P. 508
EAST LINE SECTION 20
494.05'
S00°42'51"E 816.85'
22-20-200-021
ZONED R-A
278.09'
10'x30' PUBLIC UTIL. EASEMENT
L. 7082, P. 490
L. 7082, P. 510
SIERRA DRIVE
EXISTING POLE BUILDING
WOOD GARAGE 11' HIGH
WOOD BARN 23.5' EVE HIGH
WOOD GARAGE 8.5' HIGH
METAL WEATHER VANE
GARAGE VINYL SIDING 13.5' HIGH
GRAVEL
ASPHALT PAVEMENT
S89°17'09"W
N89°17'09"E 468.04'
N00°42'51"W 600.89'
C/L BECK ROAD
(33' WD., 1/2 WIDTH) PUBLIC
ZONED R-A
#25805 BECK RD.
2 STORY HOUSE VINYL SIDING
WOOD GAZBO
POOL
WOOD GAZBO
22-20-200-022
ZONED R-A
22-20-200-011
ZONED R-A
LANDSCAPE BOULDER RETAINING WALL
20' HIGHWAY AND PUBLIC UTIL. EASEMENT
L. 21286, P. 264
322.80'
10'x30' PUBLIC UTIL. EASEMENT
L. 7082, P. 490
L. 7082, P. 510
SANITARY SEWER EASEMENT
L. 31997, P. 776
EXISTING DRIVEWAY
EXISTING DRIVEWAY
EXISTING DRIVEWAY
S89°17'10"W 468.04'
S00°42'51"E 1817.34'
E. 1/4 CORNER
SECTION 20
T. 1 N, R. 8 E.
CITY OF NOVI,
OAKLAND CO, MI
B1
B2
B3
B4
4' PLASTIC RAIL FENCE
WIRE FENCE
GATE
EX. 22 LF-18" STM (INCL. FLARED E.S.)
EX. 26 LF-12" STM @ 1.42%
EX. 44 LF-12" STM @ 0.00%
EX. 74 LF-18"x284" STM
EX. 385 LF-22"x36" STM @ 0.21%
EX. 15" STM
EX. 24" STM
EX. 18" SAN.
EX. 8" SAN.
EX. 16" WM
EX. 18" WM
EX. 6" WM
EX. 8" WM
EX. 12" WM
EX. 6" GAS
EX. 4" GAS
EX. 2" GAS
EX. 1" GAS
EX. 6" ELEC.
EX. 4" ELEC.
EX. 2" ELEC.
EX. 1" ELEC.
EX. 4" TEL.
EX. 2" TEL.
EX. 1" TEL.
EX. 6" TEL.
EX. 4" PLASTIC RAIL FENCE
EX. 18" SAN.
EX. 8" SAN.
EX. 24" STM
EX. 15" STM
EX. 12" STM
EX. 8" STM
EX. 6" STM
EX. 4" STM
EX. 2" STM
EX. 1" STM
EX. 18" WM
EX. 16" WM
EX. 12" WM
EX. 8" WM
EX. 6" WM
EX. 4" WM
EX. 2" WM
EX. 1" WM
EX. 6" GAS
EX. 4" GAS
EX. 2" GAS
EX. 1" GAS
EX. 6" ELEC.
EX. 4" ELEC.
EX. 2" ELEC.
EX. 1" ELEC.
EX. 4" TEL.
EX. 2" TEL.
EX. 1" TEL.
EX. 6" TEL.
EX. 4" PLASTIC RAIL FENCE
EX. 4" PLASTIC PICKET FENCE



REMOVALS LEGEND:

- REMOVE EXISTING ASPHALT PAVEMENT
- REMOVE EXISTING VEGETATION – STRIP EXISTING TOPSOIL TO MIN. 6" DEPTH AND REMOVE FROM SITE. EXCAVATE SUBGRADE TO REQUIRED DEPTHS WHERE APPLICABLE FOR PROPOSED IMPROVEMENTS.
- REMOVE EXISTING CONCRETE (4" THICK)
- REMOVE EXISTING GRAVEL PAVEMENT
- INSTALL PLASTIC TREE PROTECTION FENCE
- WETLAND/ WOODLAND BUFFER PROTECTION FENCING
- REMOVE TREE AND STUMP
- INSTALL "SILT-SACK" INLET FILTER ON DRAINAGE STRUCTURE IN PUBLIC ROAD.

SITE PREPARATION NOTES:

1. ALL EROSION CONTROLS SHALL FOLLOW THE CITY'S STANDARDS.
2. CONTRACTOR TO COORDINATE BUILDING UTILITY SERVICE SHUTOFFS AT BARN AND GARAGE WITH MECHANICAL/PLUMBING/ELECTRICAL ENGINEER.
3. PROTECT ALL EXISTING UTILITIES, STRUCTURES, SIGNS AND POSTS IN PUBLIC RIGHT-OF-WAY UNLESS OTHERWISE NOTED.
4. REFER TO LANDSCAPE PLANS FOR TREE REMOVAL/PRESERVATION/PROTECTION.

NOTE KEY:

① REMOVE/DEMOLISH EXISTING BUILDING AND FOUNDATION.
② REMOVE FENCE AND POSTS.
③ REMOVE LIGHT POLE AND BASE.
④ REMOVE AND RELOCATE RESIDENTIAL MAILBOX AND POST.
⑤ REMOVE UTILITY POLE (CONTRACTOR TO COORDINATE WORK WITH FRANCHISE UTILITY CO.)
⑥ REMOVE EXISTING PUMP AND HOUSING.
⑦ REMOVE EXISTING WEATHER VANE AND FOUNDATIONS.
⑧ ADJUST FRAME AND COVER/REBUILD STRUCTURE AS NEEDED: ANY UTILITY STRUCTURE REQUIRING MORE THAN 18 INCHES OF TOTAL ADJUSTMENT (MEASURED FROM THE TOP OF CONE TO BOTTOM OF CASTING) WILL REQUIRE PRE-CAST RISERS OR BRICK BENEATH THE CONE AS DETERMINED NECESSARY.
⑨ ABANDON EXISTING WELL AND CONNECT TO NEW WATER SERVICE.

EXISTING TREES

Tag	Scientific Name	Common Name	Diameter at Breast Height			Condition
			Trunk 1	Trunk 2	Trunk 3	
		GRIFFIN FUNERAL HOME (NORTH PARCEL)				
1	Acer saccharinum	Silver Maple	12.0			Good
~~2~~	~~Acer saccharum~~	~~Sugar Maple~~	~~19.0~~			~~Good~~
~~3~~	~~Acer saccharum~~	~~Sugar Maple~~	~~14.0~~			~~Good~~
~~4~~	~~Malus Floribunda~~	~~Japanese Crabapple~~	~~10.0~~	~~7.0~~		~~Good~~
~~5~~	~~Acer saccharum~~	~~Sugar Maple~~	~~24.0~~			~~Good~~
~~6~~	~~Picea Pungens~~	~~Norway Spruce~~	~~35.0~~			~~Good~~
~~7~~	~~Picea Pungens~~	~~Norway Spruce~~	~~15.0~~			~~Good~~
~~8~~	~~Picea Pungens~~	~~Norway Spruce~~	~~24.0~~			~~Good~~
		OFF-SITE (SOUTH PARCEL)				
9	Picea Pungens	Norway Spruce	34.0			Good
~~10~~	~~Picea Pungens~~	~~Norway Spruce~~	~~20.0~~			~~Good~~
~~11~~	~~Picea Pungens~~	~~Norway Spruce~~	~~14.0~~			~~Good~~
~~12~~	~~Picea Pungens~~	~~Norway Spruce~~	~~14.0~~			~~Good~~
13	Picea Pungens	Norway Spruce	24.0			Good
14	Picea Pungens	Norway Spruce	23.0			Good
15	Picea Pungens	Norway Spruce	24.0			Good
16	Prunus Subhirtella	Dwarf Weeping Cherry	16.0			Good
17	Picea Pungens	Norway Spruce	20.0			Good
18	Pinus Strobus	Eastern White Pine	24.0			Good
19	Pinus Strobus	Eastern White Pine	20.0			Good
20	Pinus Strobus	Eastern White Pine	29.0			Good
21	Picea Pungens	Norway Spruce	16.0			Good
22	Pinus Strobus	Eastern White Pine	23.0			Good
23	Picea Pungens	Norway Spruce	36.0			Good
24	Picea Pungens	Norway Spruce	20.0			Good
25	Picea Pungens	Norway Spruce	23.0			Good
26	Picea Pungens	Norway Spruce	32.0			Good
27	Pinus Strobus	Eastern White Pine	15.0			Good
28	Pinus Strobus	Eastern White Pine	26.0			Good
29	Pinus Strobus	Eastern White Pine	21.0			Good

Condition based on the International Society of Arboriculture Health Ratings, 9th Edition

Excellent:	Trees in this class are judged to be exceptional trees and possess the best qualities of the species. All have excellent form and very minor maintenance problems and are growing in a location which will enable them to achieve full mature shape.
Good:	Trees in this class are judged to be high-quality trees with decent crown shape and little to no dead limbs or insect activity.
Fair:	These trees are in general decent health, which may be brought into better condition with better maintenance. They have few dead limbs, limited insect or disease activity, or slight nutritional deficiencies.
Poor:	Most trees in this group have the following problems: large dead limbs, with as much as one-third (1/3) of the tree already dead; large cavities; drastic deformities; girdling roots; severe disease problems; or restricted growing spaces.
Very Poor:	Trees in this group are extremely weak with irreversible problems such as severe decline in health, structural degradation, lethal disease or insect infestation with no hope for survival. Trees in this group will have to be removed in the near future and may pose hazardous situations.
Dead:	Trees in this group are dead, potentially hazardous and should be removed.

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER No. 36177
LICENSED PROFESSIONAL ENGINEER

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SITE PREPARATION PLAN
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK —
SHT —
DATE 2-16-17
DESIGNED BY JJW
DRAWN BY DAB
SCALE HOR: 1" = 30' VER: 1" = N/A
JOB NO. 16121
SHEET CE-2

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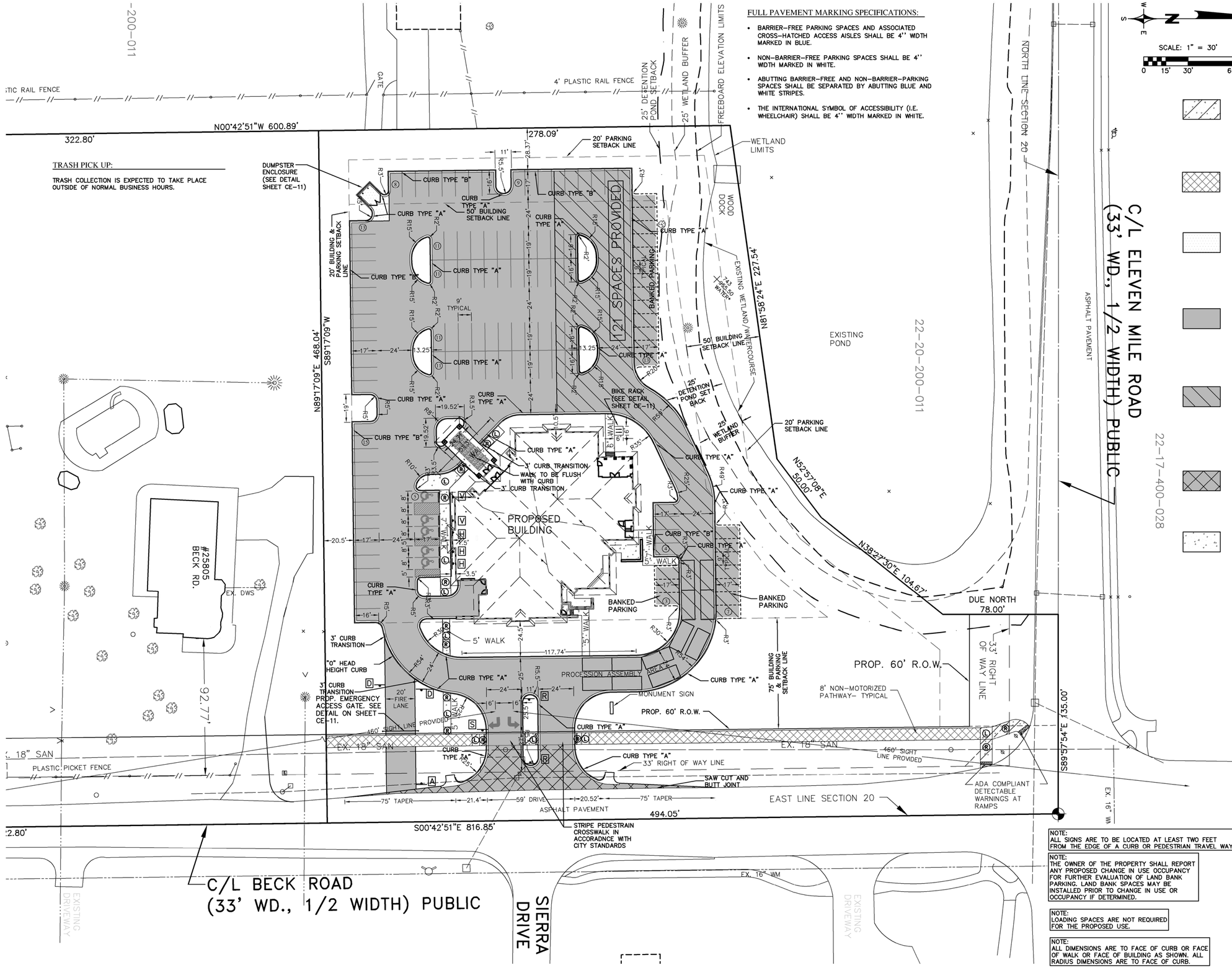
Z:\Projects\16121\DWG\16121 Ex Conditions dwg, CE-2 SITE PREPARATION PLAN, 2/23/2018 3:36:55 PM, MSmiles



FULL PAVEMENT MARKING SPECIFICATIONS:

- BARRIER-FREE PARKING SPACES AND ASSOCIATED CROSS-HATCHED ACCESS AISLES SHALL BE 4'' WIDTH MARKED IN BLUE.
- NON-BARRIER-FREE PARKING SPACES SHALL BE 4'' WIDTH MARKED IN WHITE.
- ABUTTING BARRIER-FREE AND NON-BARRIER-PARKING SPACES SHALL BE SEPARATED BY ABUTTING BLUE AND WHITE STRIPES.
- THE INTERNATIONAL SYMBOL OF ACCESSIBILITY (I.E. WHEELCHAIR) SHALL BE 4'' WIDTH MARKED IN WHITE.

RAMP LEGEND:

Ⓛ LANDING

Ⓡ RAMP

NOTE: ALL ADA-COMPLIANT SIDEWALK RAMPS SHALL BE CONSTRUCTED PER MDOT DETAIL R-28-J AND CITY OF NOVI STANDARDS. DETECTABLE WARNINGS TO BE INSTALLED AT OWNER'S DIRECTION.

PAVING LEGEND:

= 6.0" NON-REINFORCED CONCRETE (MDOT P1-3,500 PSI MIX) WITH
6.0" MDOT 21AA LIMESTONE
PREPARED SUBGRADE *

PROPOSED NON-MOTORIZED PATHWAY

= 1.5" MDOT BITUMINOUS MIXTURE 5E1
2.5" MDOT BITUMINOUS MIXTURE 3C
6.0" MDOT 21AA AGGREGATE BASE COURSE (DENSE-GRADED) COMPACTED TO 95% MAXIMUM UNIT WEIGHT
PREPARED SUBGRADE *

PROPOSED BITUMINOUS NON-MOTORIZED PATHWAY

= 8.0" CONCRETE (MDOT P1-3,500 PSI MIX) WITH 6X6 W2.9XW2.9 WIRE MESH
4.0" COMPACTED MDOT CL. II SAND
PREPARED SUBGRADE *

PROPOSED CONCRETE DUMPSTER PAD

= 1.5" MDOT BITUMINOUS MIXTURE 5E1 WEARING COURSE
2.5" MDOT BITUMINOUS MIXTURE 3C LEVELING COURSE
8.0" MDOT 21AA AGGREGATE BASE COURSE (DENSE-GRADED) COMPACTED TO 95% MAXIMUM UNIT WEIGHT
PREPARED SUBGRADE *

PROPOSED BITUMINOUS PARKING LOT AND DRIVES

= 1.5" MDOT BITUMINOUS MIXTURE 5E1 WEARING COURSE
2.5" MDOT BITUMINOUS MIXTURE 3C LEVELING COURSE
8.0" MDOT 21AA LIMESTONE BASE COURSE (DENSE-GRADED) COMPACTED TO 95% MAXIMUM UNIT WEIGHT
PREPARED SUBGRADE *

PROPOSED BITUMINOUS PARKING LOT AND DRIVES (WITH LIMESTONE BASE)

= 1.5" BITUMINOUS MIX HMA 5E1
2.5" BITUMINOUS MIX HMA 3C
10.0" MDOT 21AA AGGREGATE BASE COURSE (DENSE-GRADED) COMPACTED TO 95% MAXIMUM UNIT WEIGHT
PREPARED SUBGRADE *

PROPOSED BITUMINOUS BECK ROAD R.O.W.

= 4.0" CONCRETE 3,500 PSI MIX
4.0" MDOT 21AA LIMESTONE
PREPARED SUBGRADE *

PROPOSED WALK (2% MAX CROSS SLOPE)

*NOTE:
SUBGRADE SHALL BE PREPARED COMPACTED TO 95% MAXIMUM UNIT WEIGHT BEFORE PLACING CURB AND GUTTER AND AGGREGATE BASE IN ACCORDANCE WITH THE RECOMMENDATION OF THE GEOTECHNICAL ENGINEER.

SIGN TABLE

TYPE	MMUTCD	DESCRIPTION	QUANTITY
STOP SIGN	R1-1	30"x30" OCTOGON WITH WHITE LEGEND & BORDER ON RED BACKGROUND	1
BARRIER FREE PARKING	R7-8	12"x18" GREEN LEGEND & BORDER ON WHITE BACKGROUND WITH BLUE WHEELCHAIR SYMBOL AND WORD "ONLY" IN THE WHITE SPACE BELOW THE WHEELCHAIR	5
VAN ACCESSIBLE (PLAQUE)	R7-8P	12"x6" GREEN LEGEND & BORDER ON WHITE BACKGROUND	2
KEEP RIGHT	R4-7	24" X 18" BLACK LEGEND AND BORDER ON WHITE BACKGROUND	2
AUTHORIZED VEHICLES ONLY	R5-11	30" X 24" BLACK LEGEND AND BORDER ON WHITE BACKGROUND	1
DO NOT ENTER	R5-1	30"X30" ORED SYMBOL WITH WHITE LEGEND	2

NOTE: ALL TRAFFIC CONTROL SIGNAGE SHALL COMPLY WITH CURRENT MMUTCD STANDARDS.

NOTE:
ALL SIGNS ARE TO BE LOCATED AT LEAST TWO FEET FROM THE EDGE OF A CURB OR PEDESTRIAN TRAVEL WAY

NOTE:
THE OWNER OF THE PROPERTY SHALL REPORT ANY PROPOSED CHANGE IN USE OCCUPANCY FOR FURTHER EVALUATION OF LAND BANK PARKING. LAND BANK SPACES MAY BE INSTALLED PRIOR TO CHANGE IN USE OR OCCUPANCY IF DETERMINED.

NOTE:
LOADING SPACES ARE NOT REQUIRED FOR THE PROPOSED USE.

NOTE:
ALL DIMENSIONS ARE TO FACE OF CURB OR FACE OF WALK OR FACE OF BUILDING AS SHOWN. ALL RADIUS DIMENSIONS ARE TO FACE OF CURB.

SIGN LEGEND:

S STOP SIGN (R1-1)
H BARRIER FREE PARKING (R7-8)
V BARRIER FREE PARKING (R7-8) WITH VAN ACCESSIBLE (PLAQUE) (R7-8P)
R KEEP RIGHT (R4-7)
A AUTHORIZED VEHICLES ONLY (R5-11)
D DO NOT ENTER (R5-1)

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER
No. 36177
LICENSED PROFESSIONAL ENGINEER

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
PSP REVIEW	02/16/17	JJW	CITY REVIEW	9/11/17	JJW						
PSP REVIEW	03/10/17	JJW	FSP SUBMITTAL	10/25/17	JJW						
REV. DRIVE	08/01/17	JJW	FSP SUBMITTAL	12/12/17	JJW						
REV. ENTRANCE	8/22/17	JJW	STAMPING SET	3/2/18	JJW						

ZEIMET WOZNIAK & ASSOCIATES
Civil Engineers & Land Surveyors
55800 GRAND RIVER AVE., SUITE 100
NEW HUDSON, MICHIGAN 48165
P: (248) 437-5099 F: (248) 437-5222 www.zeimetwozniak.com

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WESTLAND, MI 48185 (734) 968-9401

PAVING AND DIMENSION PLAN
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK STAFF

DATE 2-16-17 | SCALE HOR: 1" = 30' VER: 1" = N/A
DESIGNED BY JJW | JOB NO. 16121
DRAWN BY MAS | SHEET CE-3

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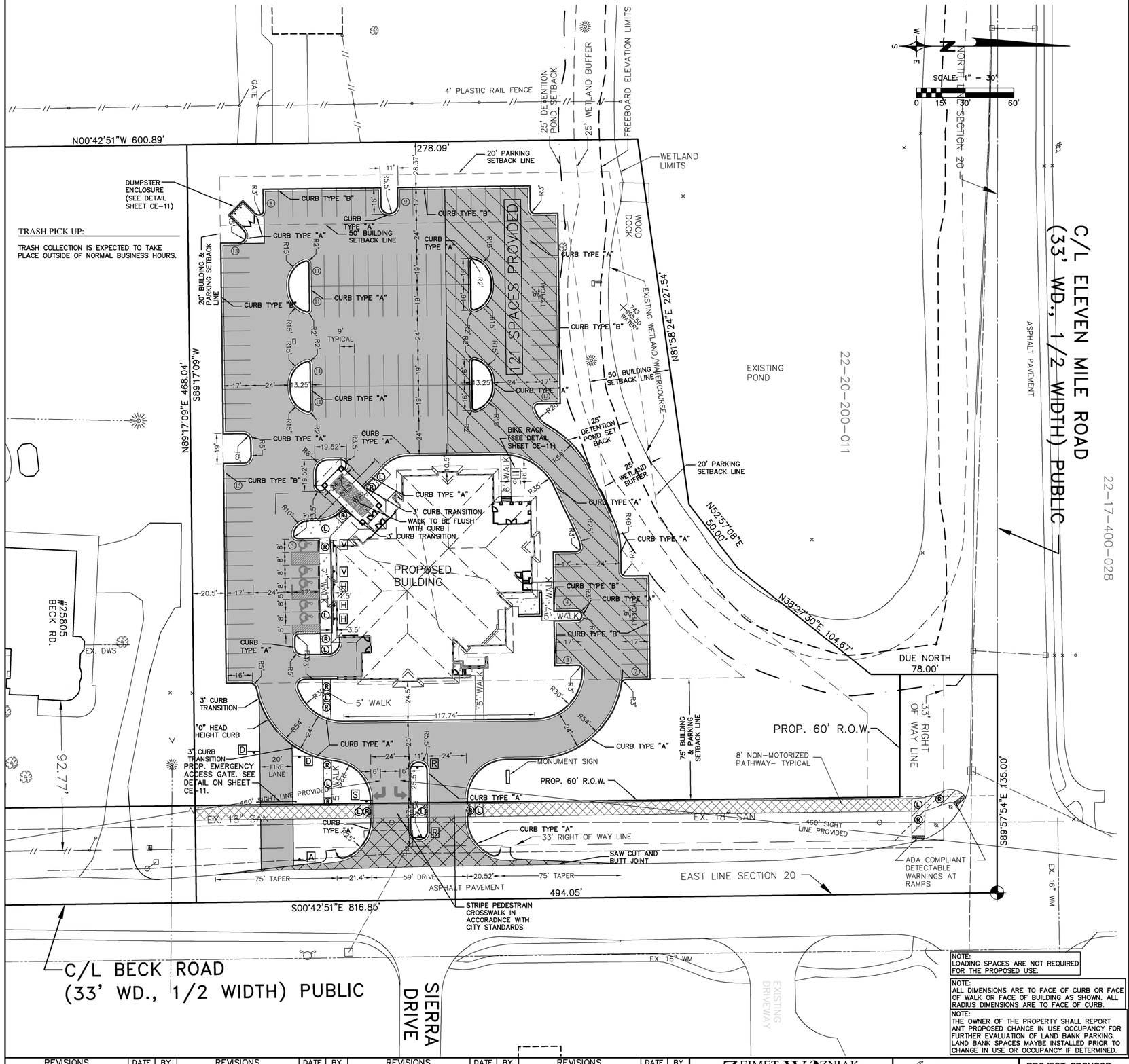
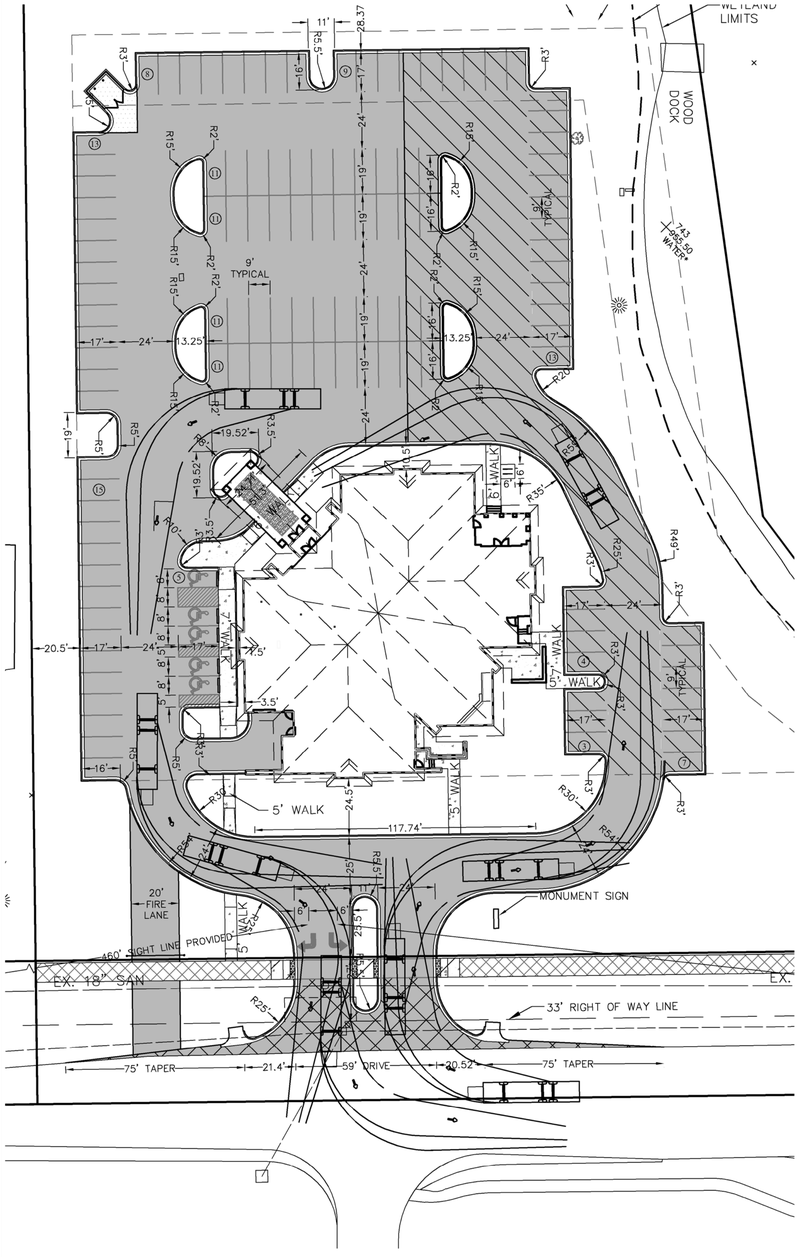


NOTE:
SEE SHEET CE-3 FOR PAVING AND SIGNING DETAILS



FIRE TRUCK TURNING TEMPLATE DETAIL
SCALE: 1"=30'

NOTE:
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NOTE:
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NOTE:
THE OWNER OF THE PROPERTY SHALL REPORT ANT PROPOSED CHANCE IN USE OCCUPANCY FOR FURTHER EVALUATION OF LAND BANK PARKING. LAND BANK SPACES MAYBE INSTALLED PRIOR TO CHANGE IN USE OR OCCUPANCY IF DETERMINED.

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER
No. 36177
LICENSED PROFESSIONAL ENGINEER

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
PSP REVIEW	02/16/17	JJW	FSP SUBMITTAL	10/25/17	JJW						
PSP REVIEW	03/10/17	JJW	FSP SUBMITTAL	12/12/17	JJW						
REV. ENTRANCE	8/22/17	JJW	STAMPING SET	3/2/18	JJW						
CITY REVIEW	9/1/17	JJW									

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BANKED PAVING AND DIMENSION PLAN
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK NO.	DATE 2-16-17	SCALE HOR: 1" = 30' VER: 1" = N/A	
	DESIGNED BY JJW	JOB NO. 16121	
	DRAWN BY MAS	SHEET CE-3.1	

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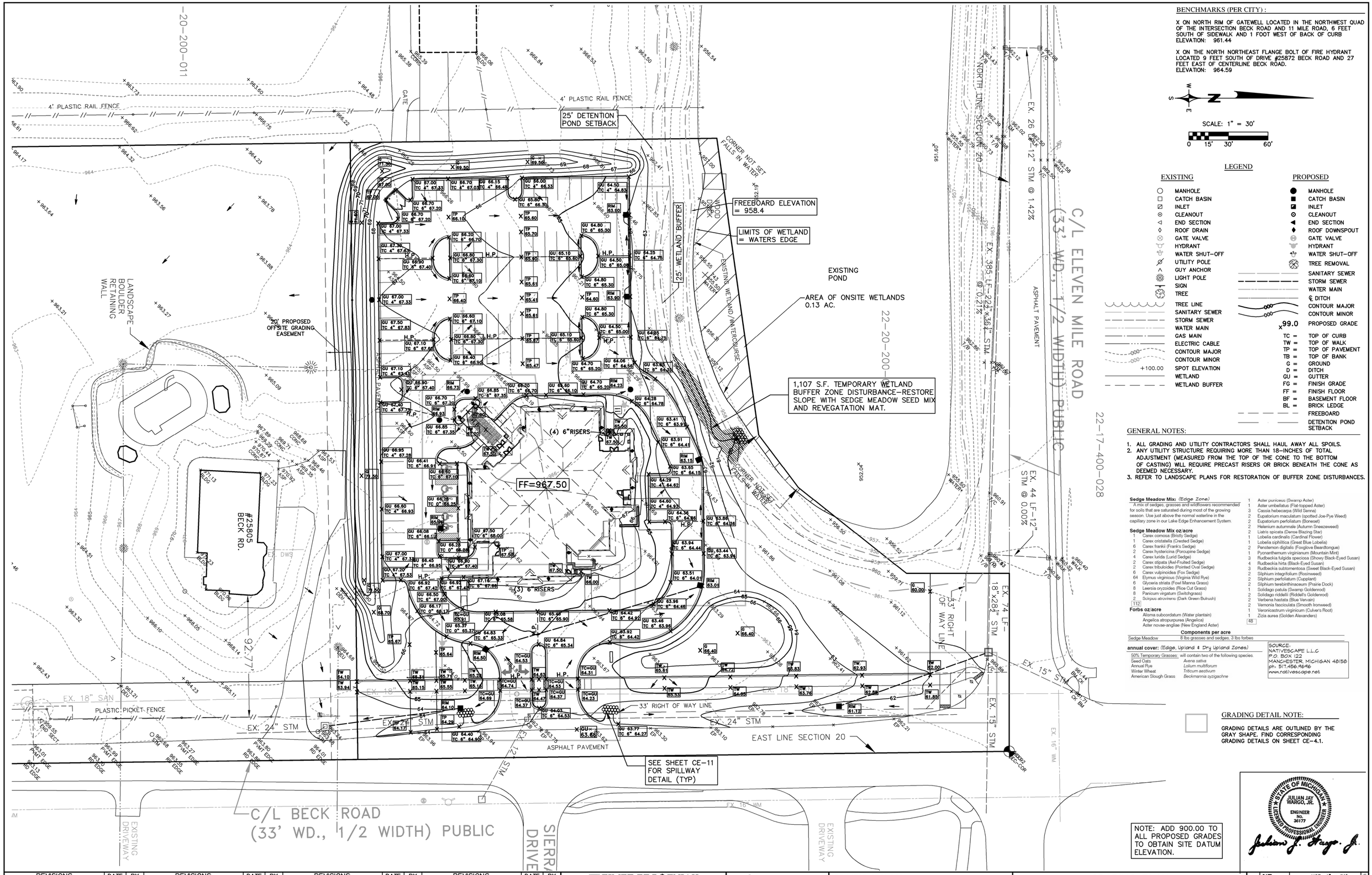

BENCHMARKS (PER CITY) :

X ON NORTH RIM OF GATEWELL LOCATED IN THE NORTHWEST QUAD OF THE INTERSECTION BECK ROAD AND 11 MILE ROAD, 6 FEET SOUTH OF SIDEWALK AND 1 FOOT WEST OF BACK OF CURB
ELEVATION: 961.44

X ON THE NORTH NORTHEAST FLANGE BOLT OF FIRE HYDRANT LOCATED 9 FEET SOUTH OF DRIVE #25872 BECK ROAD AND 27 FEET EAST OF CENTERLINE BECK ROAD.
ELEVATION: 964.59

SCALE: 1" = 30'

0 15' 30' 60'

LEGEND

EXISTING	PROPOSED
MANHOLE	MANHOLE
CATCH BASIN	CATCH BASIN
INLET	INLET
CLEANOUT	CLEANOUT
END SECTION	END SECTION
ROOF DRAIN	ROOF DOWNSPOUT
GATE VALVE	GATE VALVE
HYDRANT	HYDRANT
WATER SHUT-OFF	WATER SHUT-OFF
UTILITY POLE	TREE REMOVAL
GUY ANCHOR	SANITARY SEWER
LIGHT POLE	STORM SEWER
SIGN	WATER MAIN
TREE	G DITCH
TREE LINE	CONTOUR MAJOR
SANITARY SEWER	CONTOUR MINOR
STORM SEWER	PROPOSED GRADE
WATER MAIN	TC = TOP OF CURB
GAS MAIN	TW = TOP OF WALK
ELECTRIC CABLE	TP = TOP OF PAVEMENT
CONTOUR MAJOR	TB = TOP OF BANK
CONTOUR MINOR	G = GROUND
SPOT ELEVATION	D = DITCH
WETLAND	GU = GUTTER
WETLAND BUFFER	FG = FINISH GRADE
	FF = FINISH FLOOR
	BF = BASEMENT FLOOR
	BL = BRICK LEDGE
	FREEBOARD
	DETENTION POND SETBACK

GENERAL NOTES:

1. ALL GRADING AND UTILITY CONTRACTORS SHALL HAUL AWAY ALL SPOILS.
2. ANY UTILITY STRUCTURE REQUIRING MORE THAN 18-INCHES OF TOTAL ADJUSTMENT (MEASURED FROM THE TOP OF THE CONE TO THE BOTTOM OF CASTING) WILL REQUIRE PRECAST RISERS OR BRICK BENEATH THE CONE AS DEEMED NECESSARY.
3. REFER TO LANDSCAPE PLANS FOR RESTORATION OF BUFFER ZONE DISTURBANCES.

Sedge Meadow Mix: *(Edge Zone)*
A mix of sedges, grasses and wildflowers recommended for soils that are saturated during most of the growing season. Use just above the normal waterline in the capillary zone in our Lake Edge Enhancement System.

Sedge Meadow Mix oz/acre

1	Carex comosa (Bristly Sedge)
1	Carex cristatella (Crested Sedge)
6	Carex frankii (Frank's Sedge)
2	Carex hystericina (Porcupine Sedge)
4	Carex lurida (Lurid Sedge)
2	Carex stipata (Awl-Fruited Sedge)
2	Carex tribuloides (Pointed Oval Sedge)
6	Carex vulpinoidea (Fox Sedge)
64	Elymus virginicus (Virginia Wild Rye)
2	Glyceria striata (Fowl Manna Grass)
8	Leersia oryzoides (Rice Cut Grass)
8	Panicum virgatum (Switchgrass)
2	Scirpus atrovirens (Dark Green Bulrush)
112	

Forbs oz/acre

	Alisma subcordatum (Water plantain)
	Angelica atropurpurea (Angelica)
	Aster novae-angliae (New England Aster)
1	Aster puniceus (Swamp Aster)
1	Aster umbellatus (Flat-topped Aster)
3	Cassia hebecarpa (Wild Senna)
2	Eupatorium maculatum (spotted Joe-Pye Weed)
2	Eupatorium perfoliatum (Boneset)
2	Helenium autumnale (Autumn Sneezeweed)
2	Liatris spicata (Dense Blazing Star)
1	Lobelia cardinalis (Cardinal Flower)
1	Lobelia siphilitica (Great Blue Lobelia)
2	Penstemon digitalis (Foxglove Beardtongue)
1	Pycnanthemum virginianum (Mountain Mint)
3	Rudbeckia fulgida speciosa (Showy Black-Eyed Susan)
4	Rudbeckia hirta (Black-Eyed Susan)
3	Rudbeckia subtomentosa (Sweet Black-Eyed Susan)
2	Silphium integrifolium (Rosinweed)
2	Silphium perfoliatum (Cupplant)
2	Silphium terebinthinaceum (Prairie Dock)
1	Solidago patula (Swamp Goldenrod)
2	Solidago riddellii (Riddell's Goldenrod)
2	Verbena hastata (Blue Vervain)
2	Vernonia fasciculata (Smooth Ironweed)
1	Veronicastrum virginicum (Culver's Root)
1	Zizia aurea (Golden Alexanders)
48	

Components per acre

Sedge Meadow	8 lbs grasses and sedges, 3 lbs forbes

annual cover: *(Edge, Upland & Dry Upland Zones)*
50% Temporary Grasses: will contain two of the following species.

Seed Oats	*Avena sativa*
Annual Rye	*Lolium multiflorum*
Winter Wheat	*Triticum aestivum*
American Slough Grass	*Beckmannia syzigachne*

SOURCE:
NATIVESCAPE L.L.C
P.O. BOX 122
MANCHESTER, MICHIGAN 48158
ph. 517.456.6646
www.nativescape.net

GRADING DETAIL NOTE:

GRADING DETAILS ARE OUTLINED BY THE GRAY SHAPE. FIND CORRESPONDING GRADING DETAILS ON SHEET CE-4.1.

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER
No. 36177
LICENSED PROFESSIONAL ENGINEER

REVISIONS	DATE	BY
PSP REVIEW	02/16/17	JJW
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CITY REVIEW	9/11/17	JJW
REVISE BERM	10/18/17	JJW
FSP SUBMITTAL	10/25/17	JJW
FSP SUBMITTAL	12/12/17	JJW
STAMPING SET	3/2/18	JJW

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GRADING PLAN
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK NO.

DATE 2-16-17	SCALE	HOR: 1" = 30' VER: 1" = N/A	
DESIGNED BY JJW	JOB NO.	16121	
DRAWN BY MAS	SHEET	CE-4	

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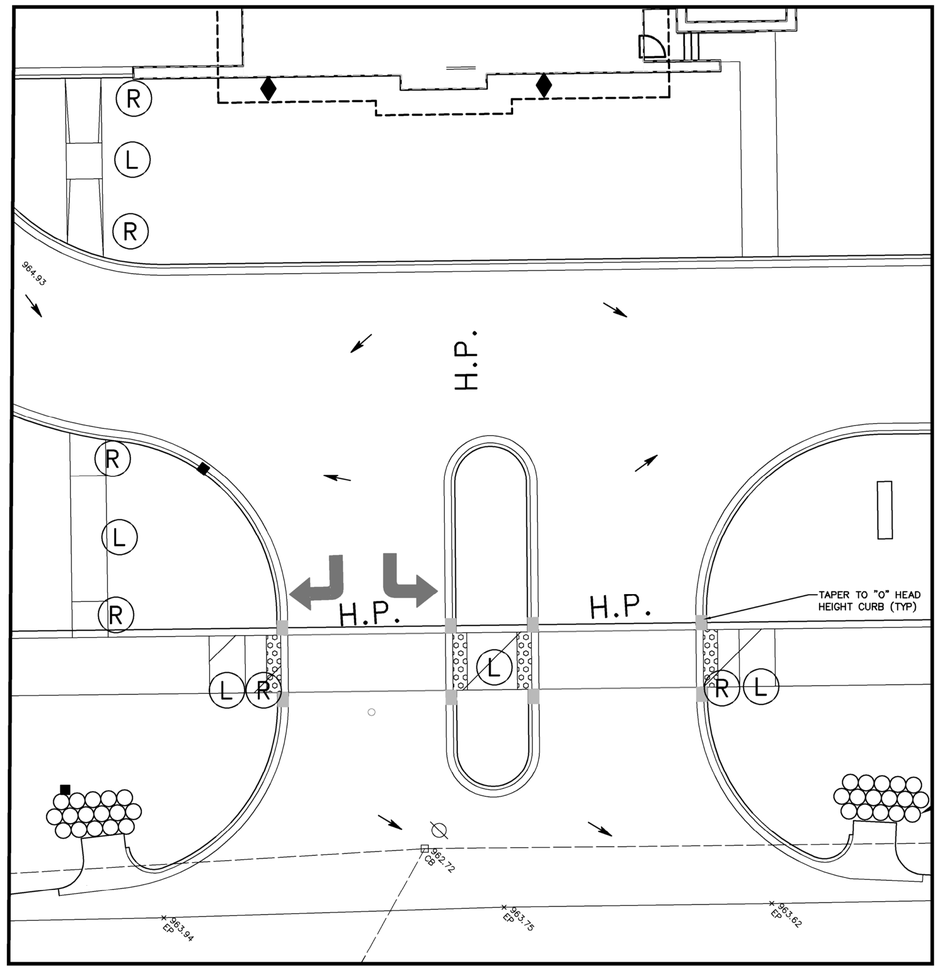
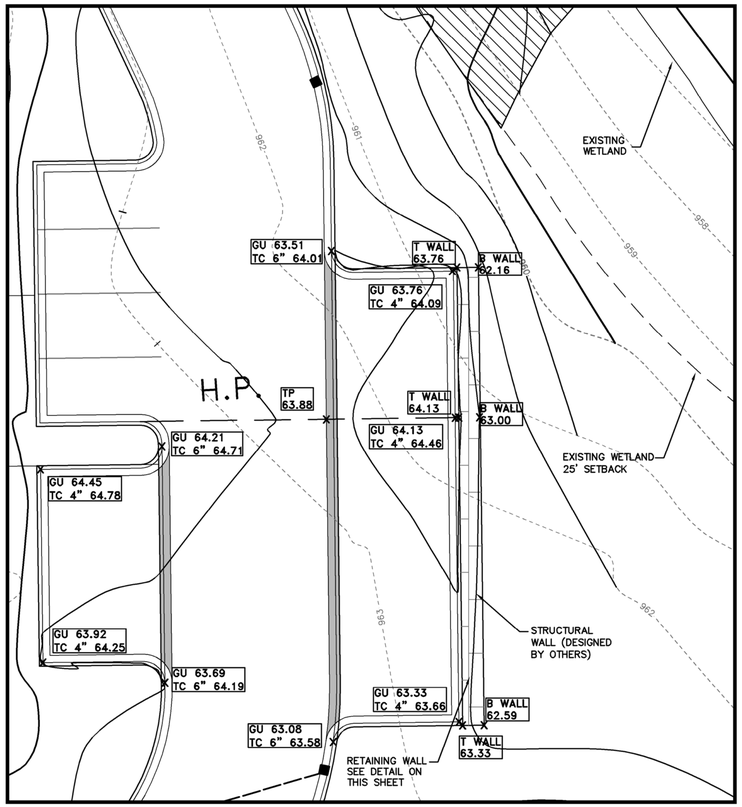
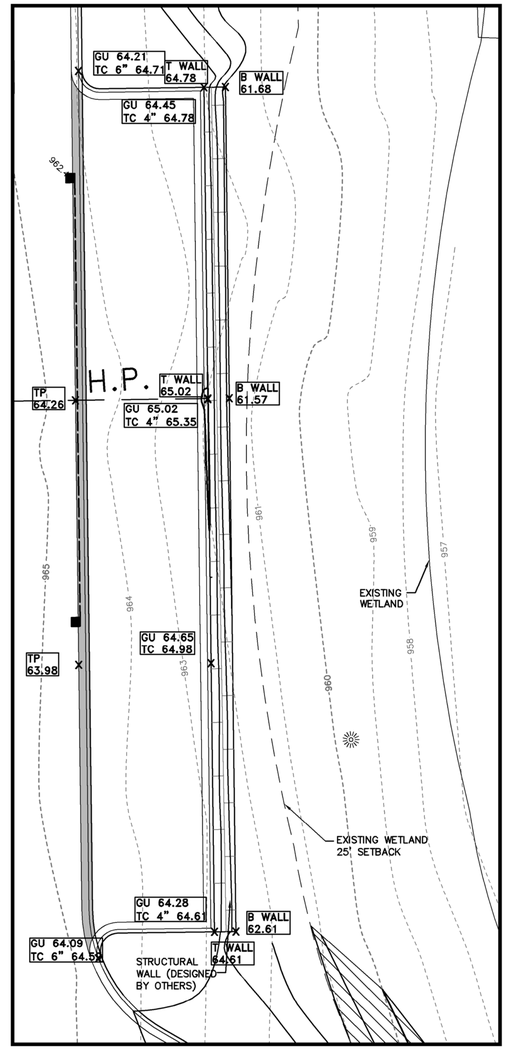


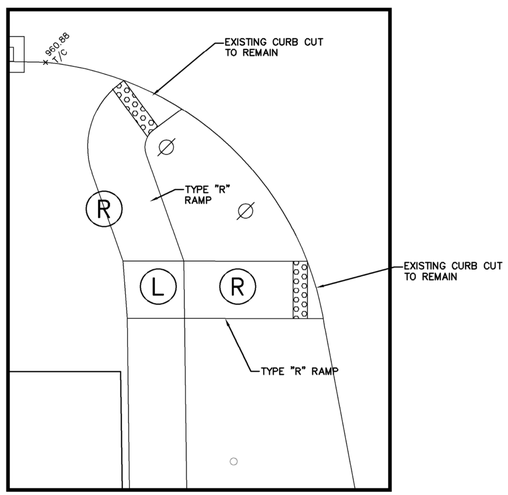
DRIVEWAY ENTRANCE GRADING DETAIL:



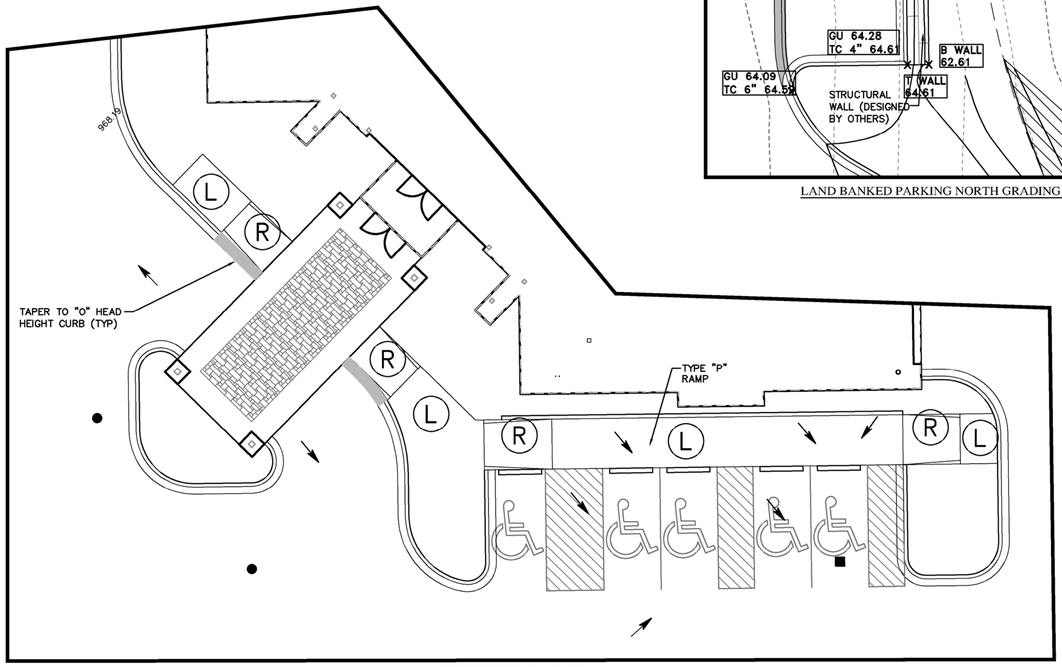
LAND BANKED PARKING SOUTH GRADING DETAIL:



LAND BANKED PARKING NORTH GRADING DETAIL:



BECK ROAD AND 11 MILE ROAD R.O.W. GRADING DETAIL:



DROP OFF GRADING DETAIL:

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ELEVATION: 961.44

X ON THE NORTH NORTHEAST FLANGE BOLT OF FIRE HYDRANT LOCATED 9 FEET SOUTH OF DRIVE #25872 BECK ROAD AND 27 FEET EAST OF CENTERLINE BECK ROAD.
ELEVATION: 964.59

SCALE: 1" = 10'

0 5' 10' 20'

LEGEND

EXISTING

- MANHOLE
- CATCH BASIN
- INLET
- CLEANOUT
- END SECTION
- ROOF DRAIN
- GATE VALVE
- HYDRANT
- WATER SHUT-OFF
- UTILITY POLE
- GUY ANCHOR
- LIGHT POLE
- SIGN
- TREE
- TREE LINE
- SANITARY SEWER
- STORM SEWER
- WATER MAIN
- GAS MAIN
- ELECTRIC CABLE
- CONTOUR MAJOR
- CONTOUR MINOR
- +100.00 SPOT ELEVATION

PROPOSED

- MANHOLE
- CATCH BASIN
- INLET
- CLEANOUT
- END SECTION
- ROOF DOWNSPOUT
- GATE VALVE
- HYDRANT
- WATER SHUT-OFF
- TREE REMOVAL
- SANITARY SEWER
- STORM SEWER
- WATER MAIN
- ℄ DITCH
- CONTOUR MAJOR
- CONTOUR MINOR
- x 99.0 PROPOSED GRADE
- TC = TOP OF CURB
- TW = TOP OF WALK
- TP = TOP OF PAVEMENT
- TB = TOP OF BANK
- G = GROUND
- D = DITCH
- GU = GUTTER
- FG = FINISH GRADE
- FF = FINISH FLOOR
- BF = BASEMENT FLOOR
- BL = BRICK LEDGE
- CURB HEAD HEIGHT TRANSITION

GENERAL NOTES:

1. ALL GRADING AND UTILITY CONTRACTORS SHALL HAUL AWAY ALL SPOILS.
2. ANY UTILITY STRUCTURE REQUIRING MORE THAN18-INCHES OF TOTAL ADJUSTMENT (MEASUREDFROM THE TOP OF THE CONE TO THE BOTTOMOF CASTING) WILL REQUIRE PRECAST RISERS OR BRICK BENEATH THE CONE AS DEEMED NECESSARY.
3. REFER TO LANDSCAPE PLANS FOR RESTORATION OF BUFFER ZONE DISTURBANCES.

RAMP LEGEND:

- (L) LANDING
- (R) RAMP

NOTE: ADD 900.00 TO ALL PROPOSED GRADES TO OBTAIN SITE DATUM ELEVATION.

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER No. 36177
LICENSED PROFESSIONAL ENGINEER

Julian J. Wargo, Jr.

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GRADING DETAILS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK 0/0

DATE 2-16-17	SCALE	HOR: 1" = 10' VER: 1" = N/A	
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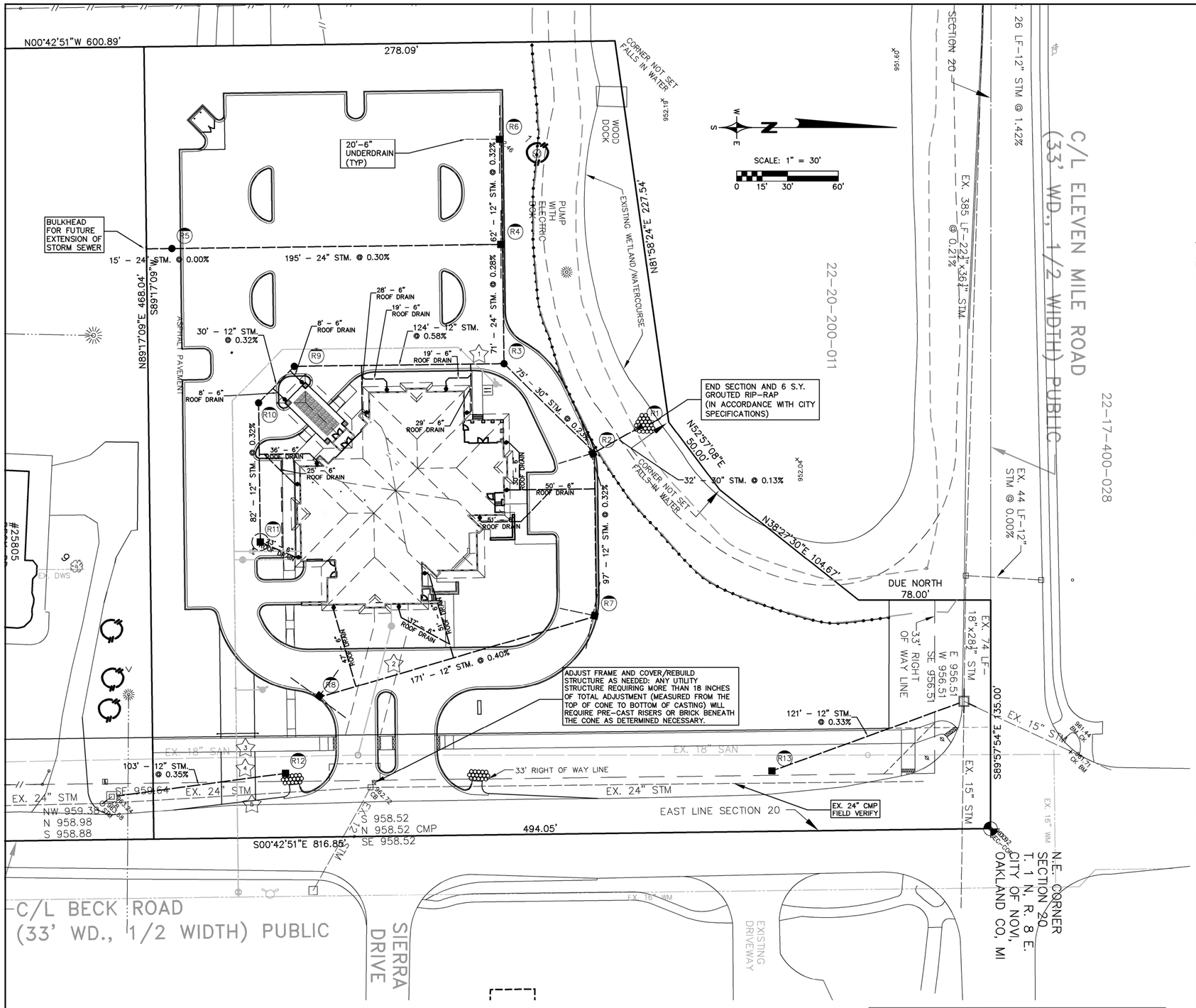

BENCHMARKS (PER CITY):

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ELEVATION: 964.59

GENERAL NOTES:

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3. REFER TO LANDSCAPE PLANS FOR RESTORATION OF BUFFER ZONE DISTURBANCES.

STORM SEWER BUILDING SERVICES NOTE:

ALL 6" ROOF CONDUCTORS (6" DS) TO BE 6" PVC SCH 40 PIPE AT A MINIMUM SLOPE OF 1.0% AND A MINIMUM DEPTH OF 36" BFF.

QUANTITIES: STORM SEWER	
12" C76–CL4 RCP	790 L.F.
24" C76–CL4 RCP	281 L.F.
30" C76–CL4 RCP	107 L.F.
18" HDPE	15 L.F.
6" SCH 40 ROOF DRAIN	445 L.F.
6" UNDERDRAIN	331 L.F.
6' DIA OUTLET CONTROL	1 EA.
6' CATCH BASIN W/ OIL/GAS SEP.	1 EA.
5' MANHOLE	1 EA.
5' CATCH BASIN	1 EA.
4' DIA. MANHOLE	3 EA.
4' DIA. CATCH BASIN	6 EA.
30" CONC. END SECTION W/ BAR SCREEN AND RIP RAP	1 EA.
REMOVE EXISTING 18" PIPE	19 FT
REMOVE EXISTING END SECTION	1 EA.
CONCRETE SPILLWAY	2 EA.
CONNECT TO EXISTING	2 EA.

NOTE:
QUANTITIES SHOWN ABOVE ARE FOR PERMIT PURPOSES ONLY. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING THE ACTUAL SCOPE OF WORK IN ACCORDANCE WITH THESE CONTRACT DOCUMENTS.

STORM SEWER COORDINATE TABLE:			
NO	RIM	NORTHING	EASTING
R1	960.38	10067.7552	7417.9633
R2	963.15	10039.7021	7433.6656
R3	964.23	9986.4106	7381.0925
R4	963.91	9985.5319	7310.5980
R5	968.67	9790.2671	7313.0320
R6	963.91	9984.7591	7248.6028
R7	963.01	10040.9050	7530.2093
R8	964.49	9876.6683	7578.2524
R9	966.73	9862.5511	7382.6365
R10	966.93	9841.4646	7404.2554
R11	965.96	9842.4880	7486.3947
R12	964.10	9857.3797	7623.1229
R13	961.10	10144.5796	7621.6316

STORM SEWER TABLE:							
NO.	NORTHING	EASTING	DESCRIPTION	RIM	PIPE	DIRECTION	INVERT
R1	10067.76	7417.96	30" CONC. END SECTION W/ BAR GRATE	960.38	30"	SE	957.51
R2	10039.70	7433.67	CB	963.15	12" 30" 30"	E NW SW	958.41 957.55 957.65
R3	9986.41	7381.09	MH	964.23	12" 24" 30"	S W NE	960.22 958.51 957.82
R4	9985.53	7310.60	CB	963.91	24" 12" 24"	S W E	958.91 959.70 958.71
R5	9790.27	7313.03	MH	968.67	24" 24"	S N	959.51 959.50
R6	9984.76	7248.60	CB	963.91	12"	E	959.90
R7	10040.90	7530.21	CB	963.01	12" 12"	S W	958.82 958.72
R8	9876.67	7578.25	CB	964.49	12"	N	959.50
R9	9862.55	7382.64	MH	966.73	12" 12"	N SE	960.94 961.04
R10	9841.46	7404.26	MH	966.93	12" 12"	E NW	961.24 961.14
R11	9842.49	7486.39	CB	965.96	12" 6"	W NE	961.50 963.00
R12	9857.38	7623.12	CB	964.10	12"	S	960.00
R13	10144.58	7621.63	CB	961.10	12"	N	957.00

CROSSING TABLE				
CROSSING	CROSSING PIPE SIZE	PIPE ELEVATION	CLEARANCE (FT)	CLEARANCE (IN)
1	B/12" STM	960.15	1.64	19.68
	T/8" WM	958.51		
2	B/12" STM	959.19	1.58	18.96
	T/6" SAN	957.61		
3	B/8" WM	958.21	15.69	188.28
	T/18 SAN	942.52		
4	B/12" STM	959.73	2.28	27.36
	T/8" WM	957.45		
5	B/24" STM	958.95	1.50	18.00
	T/8" WM	957.45		

NOTE:
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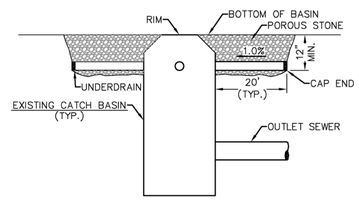
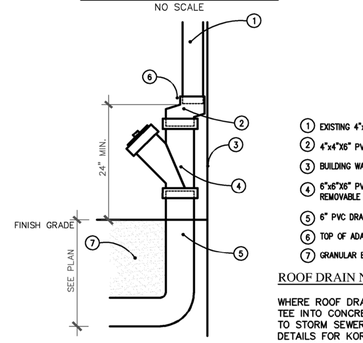
UTILITY LEGEND

PROPOSED	EXISTING
MANHOLE	MANHOLE
CATCH BASIN	CATCH BASIN
INLET	INLET
CLEANOUT	CLEANOUT
END SECTION	END SECTION
ROOF DOWNSPOUT	ROOF DRAIN
GATE VALVE	GATE VALVE
HYDRANT	HYDRANT
WATER SHUT–OFF	WATER SHUT–OFF
TREE REMOVAL	UTILITY POLE
SANITARY SEWER	GUY ANCHOR
STORM SEWER	LIGHT POLE
WATER MAIN	SIGN
℄ DITCH	TREE
	TREE LINE
	SANITARY SEWER
	STORM SEWER
	WATER MAIN
	GAS MAIN
	ELECTRIC CABLE
	UTILITY CROSSING NUMBER

UNDERDRAIN PIPE TO BE 4" PERFORATED POLYURETHANE PIPE WITH GEOTEXTILE WRAP LAID AT 1.00% SLOPE WITH UPSTREAM ENDS PLUGGED. POROUS STONE (PEA STONE) SHALL EXTEND FROM 4" BELOW UNDERDRAIN TO THE EXISTING GRADE FOR LENGTH OF UNDERDRAIN. PROTECT ALL FROM HEAVY TRAFFIC AFTER INSTALLATION.



TYPICAL UNDERDRAIN DETAIL
NO SCALE

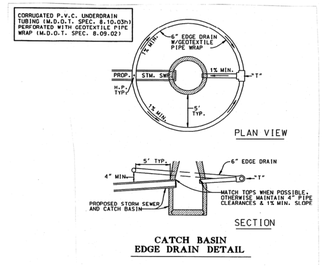


ROOF DRAIN NOTE:

WHERE ROOF DRAIN LEADS MUST TEE INTO CONCRETE PIPE, REFER TO STORM SEWER STANDARD DETAILS FOR KOR–N–TEE TAP WITH SEAL AND BOOT.

DOWNSPOUT CONNECTION DETAIL

NOT TO SCALE



CATCH BASIN EDGE DRAIN DETAIL

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER
No. 36177
LICENSED PROFESSIONAL ENGINEER

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
PSP REVIEW	02/16/17	JJW	FSP SUBMITTAL	10/25/17	JJW						
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WESTLAND, MI 48185 (734) 968–9401

STORM SEWER PLAN
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK

DATE	2–16–17	SCALE	HOR: 1" = 30' VER: 1" = N/A
DESIGNED BY	JJW	JOB NO.	16121
DRAWN BY	MAS	SHEET	CE–5

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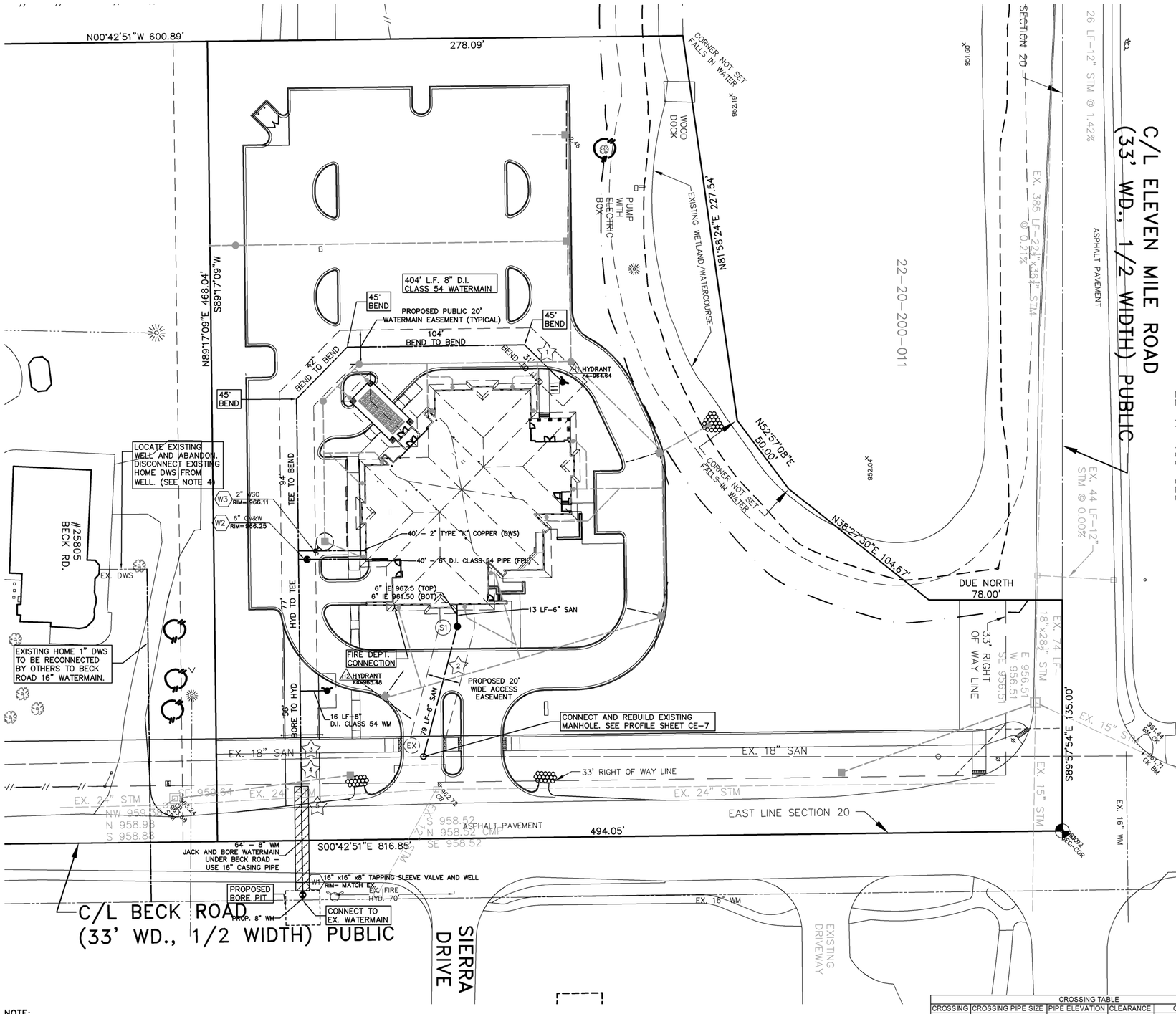

BENCHMARKS (PER CITY) :

X ON NORTH RIM OF GATEWELL LOCATED IN THE NORTHWEST QUAD OF THE INTERSECTION BECK ROAD AND 11 MILE ROAD, 6 FEET SOUTH OF SIDEWALK AND 1 FOOT WEST OF BACK OF CURB
ELEVATION: 961.44

X ON THE NORTH NORTHEAST FLANGE BOLT OF FIRE HYDRANT LOCATED 9 FEET SOUTH OF DRIVE #25872 BECK ROAD AND 27 FEET EAST OF CENTERLINE BECK ROAD.
ELEVATION: 964.59

SCALE: 1" = 30'

0 15' 30' 60'

UTILITY LEGEND

EXISTING	PROPOSED
MANHOLE	MANHOLE
CATCH BASIN	CATCH BASIN
INLET	INLET
CLEANOUT	CLEANOUT
END SECTION	END SECTION
ROOF DRAIN	ROOF DOWNSPOUT
GATE VALVE	GATE VALVE
HYDRANT	HYDRANT
WATER SHUT–OFF	WATER SHUT–OFF
UTILITY POLE	TREE REMOVAL
GUY ANCHOR	SANITARY SEWER
LIGHT POLE	STORM SEWER
SIGN	WATER MAIN
TREE	℄ DITCH
TREE LINE	UTILITY CROSSING NUMBER
SANITARY SEWER	
STORM SEWER	
WATER MAIN	
GAS MAIN	
ELECTRIC CABLE	

QUANTITIES: SANITARY SEWER	
6" SDR 23.5 ABS PIPE	92 L.F.
4' DIA MONITORING MANHOLE WITH EXTERNAL DROP CONNECTION	1 EA
CONNECT TO EXISTING MANHOLE WITH EXTERNAL DROP CONNECTION	1 EA
ADJUST EXISTING MANHOLE	1 EA

QUANTITIES: WATERMAIN	
8" D.I. CLASS 54 PIPE	404 L.F.
6" D.I. CLASS 54 PIPE	16 L.F.
8" D.I. CLASS 54 PIPE JACK AND BORE IN 16" CASING PIPE	64 L.F.
6" D.I. CLASS 54 PIPE (FPL)	40 L.F.
2" TYPE "K" COPPER (DWS)	40 L.F.
6" GV AND WELL (5' DIA)	1 EA.
HYDRANT	2 EA
16"X16"X8" TAPPING SLEEVE AND WELL	1 EA
2" SHUT OFF	1 EA

NOTE:
QUANTITIES SHOWN ABOVE ARE FOR PERMIT PURPOSES ONLY. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING THE ACTUAL SCOPE OF WORK IN ACCORDANCE WITH THESE CONTRACT DOCUMENTS.

NOTE:
1. 6" SANITARY LEADS SHALL BE A MINIMUM SDR 23.5.
2. SANITARY LEADS SHALL BE BURIED AT LEAST 5 FEET DEEP UNDER THE INFLUENCE OF PAVEMENT.

SANITARY SEWER DESIGN DATA:

NOTE: THIS FUNERAL HOME DOES NOT INCLUDE A RESIDENCE

TOTAL NUMBER OF PEOPLE = (2.2 REU/BUILDING) * (1 BUILDING) * (3.2 PEOPLE/REU) = 7.0 PEOPLE

AVG DAILY FLOW = 7.0 PEOPLE X 100 GPCPD = 700 GPD

PEAKING FACTOR = 4

MAX DAILY FLOW = 700 * 4 = 2,800 GPD = 0.0043 CFS

A 6" SANITARY SEWER AT A MINIMUM SLOPE OF 1.0% HAS A CAPACITY OF 0.50 CFS

GENERAL NOTES:

1. ALL GRADING AND UTILITY CONTRACTORS SHALL HAUL AWAY ALL SPOILS.
2. ANY UTILITY STRUCTURE REQUIRING MORE THAN 18–INCHES OF TOTAL ADJUSTMENT (MEASURED FROM THE TOP OF THE CONE TO THE BOTTOM OF CASTING) WILL REQUIRE PRECAST RISERS OR BRICK BENEATH THE CONE AS DEEMED NECESSARY.
3. REFER TO LANDSCAPE PLANS FOR RESTORATION OF BUFFER ZONE DISTURBANCES.
4. CONTRACTOR MUST OBTAIN A WELL ABANDONMENT PERMIT FROM OAKLAND COUNTY WATER RESOURCES COMMISSIONER. CONTACT JENNA DE WITTE AT OCWRC WITH ANY QUESTIONS.

CROSSING TABLE				
CROSSING	CROSSING PIPE SIZE	PIPE ELEVATION	CLEARANCE	CLEARANCE (IN)
1	B/12" STM	960.15	1.64	19.68
	T/8" WM	958.51		
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NOTE:
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WESTLAND, MI 48185 (734) 968–9401

SANITARY AND WATERMAIN PLAN
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER No. 36177
LICENSED PROFESSIONAL ENGINEER
Julian J. Wargo, Jr.

FIELD BOOK 5174
DATE 2–16–17
DESIGNED BY JJW
DRAWN BY MAS
SCALE HOR: 1" = 30' VER: 1" = N/A
JOB NO. 16121
SHEET CE–6

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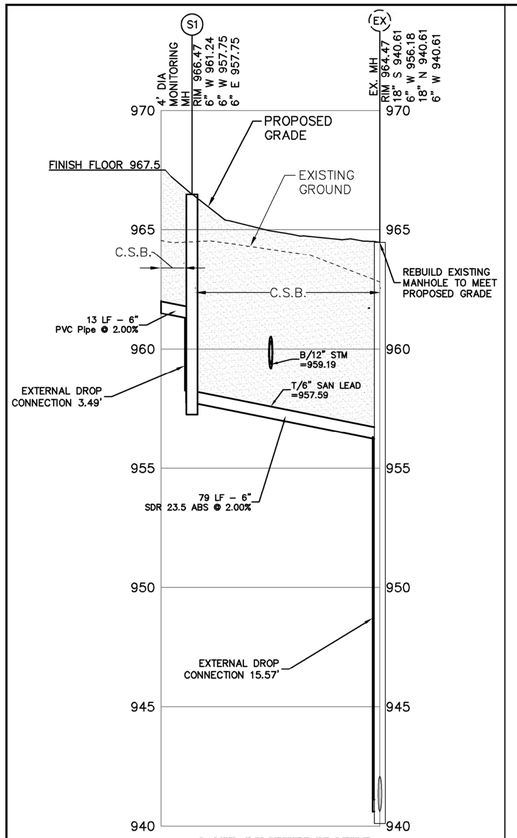
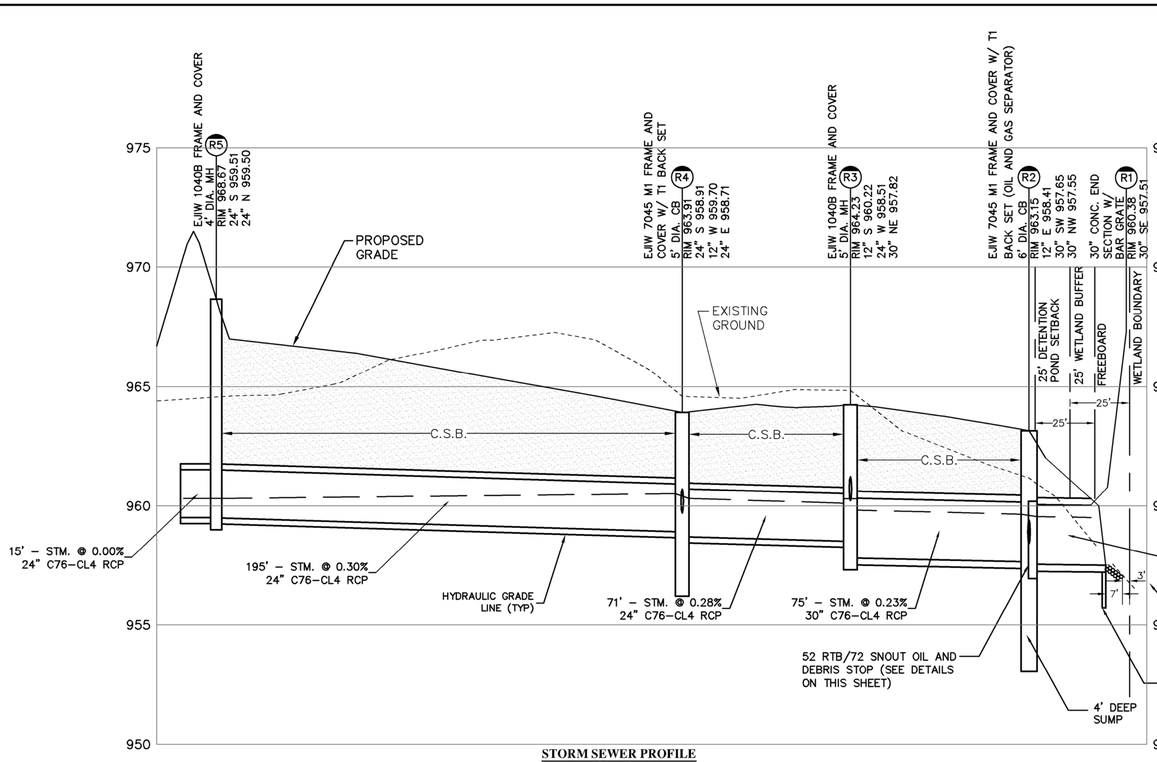
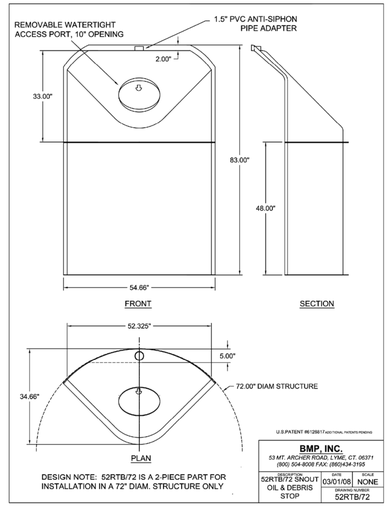


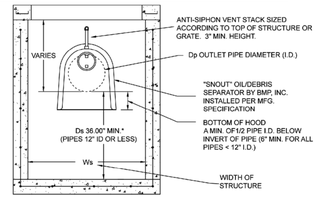
SANITARY SEWER PROFILE
SCALE: 1"= 30' HORZ.
1"= 3' VERT.



STORM SEWER PROFILE
SCALE: 1"= 30' HORZ.
1"= 3' VERT.



STRUCTURE DESIGN FOR WATER QUALITY IMPROVEMENT



RULE # 1- AT AN ABSOLUTE MINIMUM, STRUCTURE INTERNAL DIMENSIONS MUST BE AT LEAST LARGE ENOUGH TO ACCOMODATE EXTERNAL DIMENSIONS OF THE SNOUT, AND ALLOW FOR A PERSON TO INSTALL IT. REFER TO BMP, INC. CAD DETAILS FOR PART DIMENSIONS. BMP RECOMMENDS STRUCTURE WALL TO BE AT LEAST 12" WIDER THAN MAXIMUM SNOUT WIDTH. FOR TRASHSCREEN, STRUCTURE MUST BE AT LEAST 6" WIDER THAN TRASHSCREEN WIDTH.

RULE #2- USE ONLY "I" SERIES SNOUTS FOR RECTANGULAR OR SQUARE STRUCTURES, AVAILABLE IN 12", 18", 24", 30", 36", 48", 72" AND 96" SIZES. USE ONLY "R" SERIES SNOUTS FOR ROUND STRUCTURES. AVAILABLE IN 12", 18", 24", 30", 42", 52" AND 72" SIZES.

***SUMP DEPTH (Ds)-** SUMP DEPTH SHOULD BE A MINIMUM OF 36" FOR ANY NEW CONSTRUCTION FOR PIPES 12" AND LESS. FOR 15"-18" PIPE MIN. DEPTH SHOULD BE 48". OPTIMAL SIZING IS AT LEAST 2.5X TO 3X OUTLET PIPE DIAMETER (Dp) FOR MAXIMUM POLLUTANT REMOVAL EFFICIENCY AND MINIMAL CLEANOUT FREQUENCY.

STRUCTURE DIMENSIONS- ASSUMING STRUCTURE IS LARGE ENOUGH TO FIT BMP HARDWARE, PLAN AREA SHOULD BE A MINIMUM OF 4 TO 7 TIMES AREA OF OUTLET PIPE FOR MAXIMUM POLLUTANT REMOVAL EFFICIENCY AND MINIMAL CLEANOUT FREQUENCY. FOR PIPES 15" AND SMALLER, PLAN AREA SHOULD BE AT LEAST 5 TIMES PIPE AREA. FOR MANHOLES, SEE SIZING EXAMPLES BELOW FOR "R" SERIES SNOUTS.

IMPORTANT NOTICE: *DO NOT CONFUSE PIPE O.D WITH PIPE I.D.* A SNOUT FITS OVER A PIPE, NOT IN IT. THUS, SNOUT MUST BE SIZED TO FIT OVER PIPE OPENING IN STRUCTURE. SNOUTS ARE AVAILABLE FOR ROUND STRUCTURES TO ACCOMODATE PIPES OF 71.9" O.D. MAX. FOR PIPES 72" O.D. AND ABOVE, USE SQUARE OR RECTANGULAR STRUCTURES.

SIZING EXAMPLES:

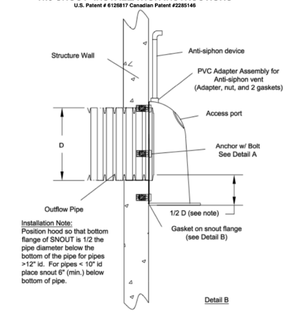
OUTLET HOLE SIZE	SNOUT SIZE
11.9" O.D. OR LESS	12 F or R (R FITS 36"-48" DIAM STRUCTURE)
12.0"-17.9" O.D.	18 F or R (R FITS 48"-60" DIAM STRUCTURE)
18.0"-23.9" O.D.	24 F or R (R FITS 48"-60" DIAM STRUCTURE)
24.0"-29.9" O.D.	30 F or R (R FITS 60"-72" DIAM STRUCTURE)
30.0"-35.9" O.D.	36FTB
30.0"-41.9" O.D.	42RTB/96 (FITS 60" DIAM STRUCTURE ONLY)
30.0"-47.9" O.D.	48 FTB
30.0"-51.9" O.D.	52RTB/72 (FITS 72" DIAM STRUCTURE ONLY)
48.0"-71.9" O.D.	72FTB OR 72RTB/96 (FITS 96" DIAM STRUCTURE ONLY)
72"-95.9" O.D.	96 FTB

NPSNOUT (FOR SMALL ID PVC STRUCTURE)

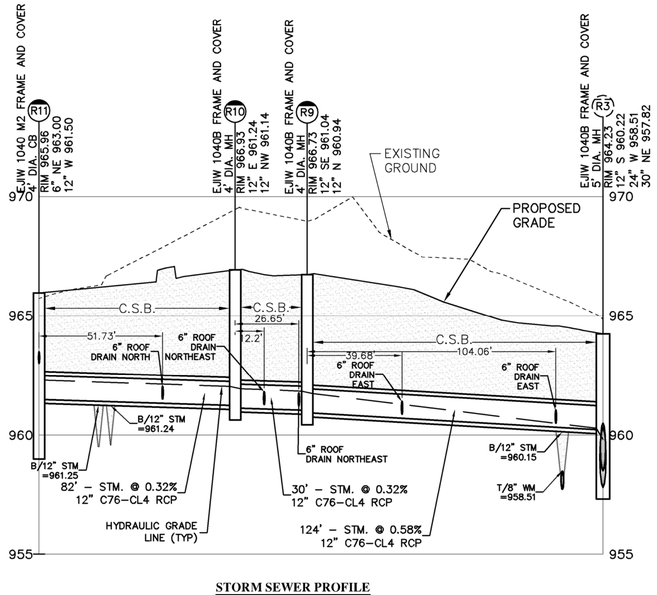
UP TO 12" PIPE IN 10" ID STRUCTURE	NP1218
UP TO 15" PIPE IN 24" ID STRUCTURE	NP1524
UP TO 18" PIPE IN 30" ID STRUCTURE	NP1830
UP TO 24" PIPE IN 30" ID STRUCTURE	NP 2430

BMP, INC.
53 MT. ARCHER ROAD, LYME, CT. 06371
(800) 504-8009 FAX: (860)434-3195
DESCRIPTION: SNOUT SIZING CHART
DATE: 09/08/15
SCALE: NONE
DRAWING NUMBER: SP-SI

BEST MANAGEMENT PRODUCTS, INC.
The SNOUT® INSTALLATION INSTRUCTIONS
U.S. Patent # 6128817 Canadian Patent #2285146



53 Mt. Archer Rd. Lyme CT 06371 800-504-8009 410-667-6757 fax 1/25/2006 5



STORM SEWER PROFILE
SCALE: 1"= 30' HORZ.
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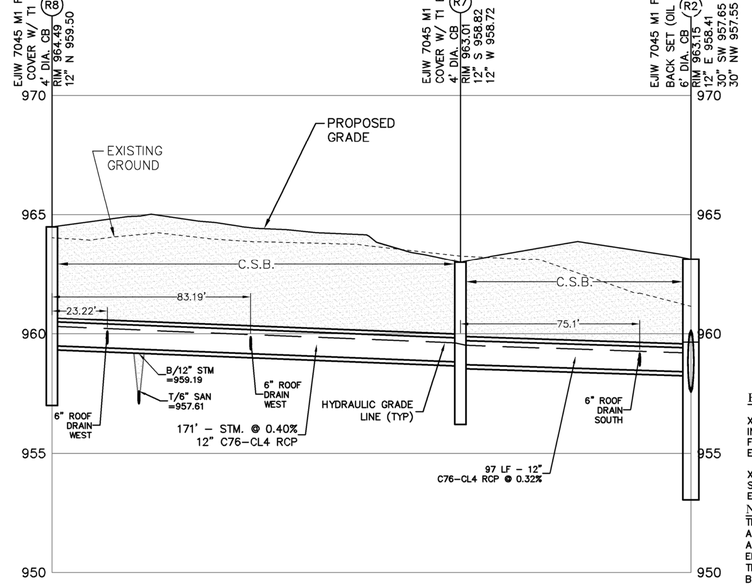

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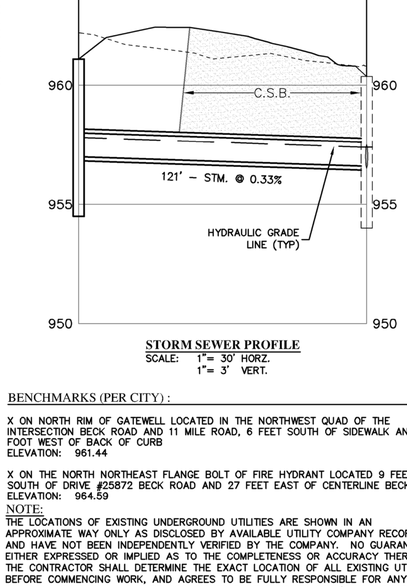

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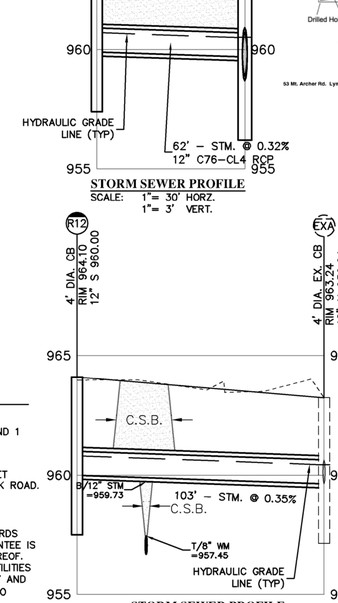

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COVER NOTE:

MAINTAIN A MINIMUM OF 3–FEET OF COVER AT ALL TIMES UNLESS OTHERWISE NOTED.

C.S.B. NOTES:

C.S.B. DENOTES SAND BACKFILL COMPACTED IN 6" LAYERS TO 95% OF MAXIMUM UNIT WEIGHT.

C.S.B. REQUIRED UNDER OR WITHIN A 1 ON 1 SLOPE OF EXISTING OR PROPOSED PAVEMENT AND AT ALL UTILITY CROSSINGS.

DEWATERING NOTE:

IF DEWATERING IS ANTICIPATED OR ENCOUNTERED DURING CONSTRUCTION, A DEWATERING PLAN MUST BE SUBMITTED TO THE CITY'S ENGINEERING DIVISION FOR REVIEW.

ROOF DRAIN NOTE:

WHERE ROOF DRAIN LEADS MUST TEE INTO CONCRETE PIPE, REFER TO STORM SEWER STANDARD DETAILS FOR KOR–N–TEE TAP WITH SEAL AND BOOT.

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER No. 36177
LICENSED PROFESSIONAL ENGINEER

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UTILITY PROFILES
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FIELD BOOK 514
DATE 2–16–17
SCALE HOR: 1" = 30' VER: 1" = 3'
DESIGNED BY JJW
JOB NO. 16121
DRAWN BY MAS
SHEET CE–7

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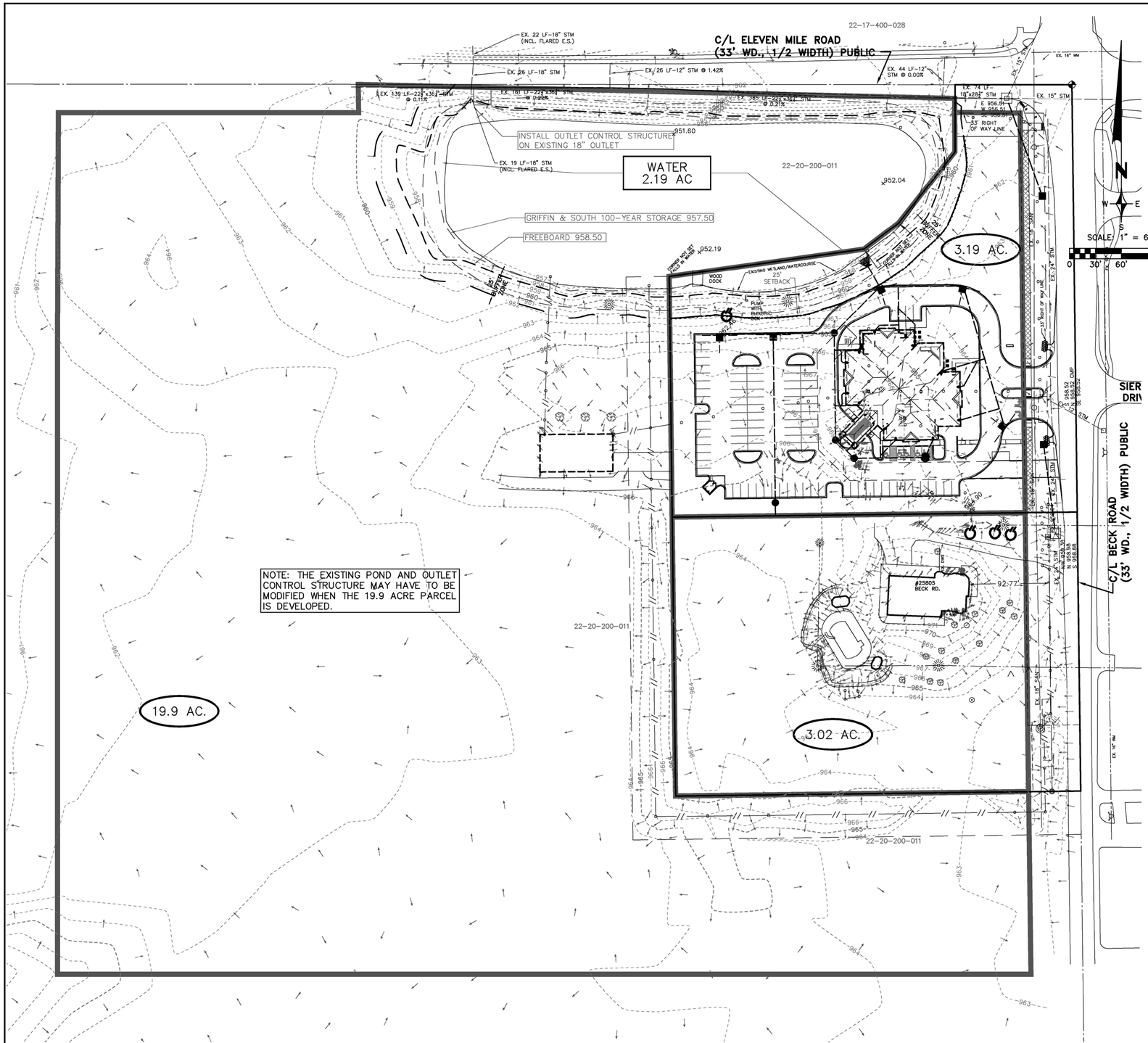

NOTES:

PRELIMINARY STORMWATER MANAGEMENT CALCULATIONS (REV. 8-9-17):

1. EXISTING POND

AN EXISTING POND IS LOCATED AT THE SOUTHWEST CORNER OF BECK AND ELEVEN MILE ROADS. IT HAS AN ENCLOSED 18" OUTLET PIPE THAT FLOWS NORTH INTO AN EXISTING 22.5"x36.25" SEWER UNDER ELEVEN MILE ROAD. THE ULTIMATE OUTLET FOR THE DRAINAGE IS THE EXISTING DITCH ON THE NORTH SIDE OF ELEVEN MILE ROAD THAT FLOWS WEST TO "TRIBUTARY C" OF THE "NOVI LYON DRAIN".

2. DETERMINE 100-YEAR STORAGE FOR GRIFFIN FUNERAL HOME

GROSS AREA	= 3.93 AC	
NET AREA	= 3.19 AC	
POND	= 2.19 AC	
TOTAL AREA	= 3.19 + 2.19 = 5.38 AC	

RUNOFF COEFFICIENT:

PAVEMENT	1.19 AC @ 0.95 =	1.13
ROOF	0.28 AC @ 0.95 =	0.27
POND	2.19 AC @ 1.00 =	2.19
LAWN	1.72 AC @ 0.35 =	0.60
	5.38	4.19

C = 4.19/5.38 = 0.77

Qa = 0.15 CFS/AC x 5.38 AC = 0.81 CFS
Qo = 0.81 CFS/(5.38 AC x 0.77) = 0.20 CFS/AC-IMP.
T100 = -25 + √(10312.5/0.20) = 202.1 MINUTES
Vs100 = (16500 x 202.1)/(25 + 202.1) - (40 x 0.20 x 202.1) = 13,066.8 CF/AC-IMP.
VT100 = 13,066.8 x 0.77 x 5.38 = 54,130 CF

3. DETERMINE 100-YEAR STORAGE FOR SOUTH PARCEL

GROSS AREA = 3.47 AC
NET AREA = 3.02 AC

C = 0.77 (ASSUME SAME AS GRIFFIN)

Qa = 0.15 CFS/AC x 3.02 AC = 0.45 CFS
Qo = 0.45 CFS/(3.02 AC x 0.77) = 0.19 CFS/AC-IMP.
T100 = -25 + √(10312.5/0.19) = 208.0 MINUTES
Vs100 = (16500 x 208.0)/(25 + 208.0) - (40 x 0.19 x 208.0) = 13,148.8 CF/AC-IMP.
VT100 = 13,148.8 x 0.77 x 3.02 = 30,576 CF

4. DETERMINE REQUIRED 100-YEAR STORAGE

TOTAL VOLUME REQUIRED FOR GRIFFIN AND SOUTH PARCELS:
VT100 = 54,130 + 30,576 = **84,706 CF**

5. DETERMINE REQUIRED BANKFULL STORAGE

TOTAL VOLUME REQUIRED FOR GRIFFIN AND SOUTH PARCELS:
VBF = 5,160 X [(5.38 X 0.77) + (3.02 X 0.77)]= **33,375 CF**

6. DETERMINE REQUIRED FIRST FLUSH STORAGE

TOTAL VOLUME REQUIRED FOR GRIFFIN AND SOUTH PARCELS:
VFF = 1,815 X [(5.38 X 0.77) + (3.02 X 0.77)] = **11,739 CF**

7. AVAILABLE STORAGE IN THE EXISTING POND

NOTE THAT THE BOTTOM OF STORAGE IS DETERMINED ABOVE THE INVERT OF THE OUTLET PIPE AT EXISTING CB #14A UNDER ELEVEN MILE ROAD (SINCE THE PIPE WILL BE EXTENDED INTO THE POND AT ELEV. 956.60).

ELEV.	AREA (SF)	AVG. AREA (SF)	DEPTH (FT)	VOLUME (CF)
956.60	95,213			
		97,961	0.4	39,184
957.00	100,709			
		105,550	1.0	105,550
958.00	110,392			
				144,734 CF

BY INTERPOLATION, A 100-YEAR VOLUME OF 90,749 CF CAN BE OBTAINED AT ELEVATION 957.50.

BY INTERPOLATION, A BANKFULL VOLUME OF 34,166 CF CAN BE OBTAINED AT ELEVATION 956.95.

BY INTERPOLATION, A FIRST FLUSH VOLUME OF 14,344 CF CAN BE PROVIDED AT ELEVATION 956.75.

THE FREEBOARD ELEVATION SHALL BE SET 1-FOOT ABOVE THE100-YEAR STORAGE ELEVATION AT 958.50.

8. PRE-TREATMENT

SINCE THE GRIFFIN AND SOUTH PARCELS DISCHARGE INTO A "WET" POND WITH MORE THAN 3-FEET DEEP OF STANDING WATER, PRE-TREATMENT OF RUNOFF IN THE FORM OF A SEDIMENT FOREBAY OR A MECHANICAL TREATMENT CHAMBER IS NOT REQUIRED. INSTEAD, A 4-FT. DEEP SUMP AND AN OIL/GAS SEPARATOR WILL BE PROVIDED IN THE LAST STORM SEWER STRUCTURE PRIOR TO DISCHARGE INTO THE POND.

9. OUTLET CONTROL

A STANDPIPE SHALL BE INSTALLED ON THE END OF THE 18-INCH DIAMETER PIPE THAT EXTENDS INTO THE POND TO RESTRICT THE FLOW TO THE ALLOWABLE RATES PER THE CITY'S STANDARDS.

THE STANDPIPE IS DESIGNED TO ACCOMMODATE THE FLOWS FROM THE GRIFFIN AND SOUTH PARCELS. THE STANDPIPE AND OUTLET PIPE MAY HAVE TO BE MODIFIED IF AND WHEN THE 19.90-ACRE SCHOOL PROPERTY IS DEVELOPED.

A. FIRST FLUSH RELEASE

HOLES SHALL BE PROVIDED AROUND THE PERIMETER TO ACT AS RESTRICTORS TO RELEASE THE FIRST FLUSH FLOW OVER A PERIOD OF 24 HOURS.

Qff = 11,739 / 86,400 = 0.14 CFS
Zff = 956.75
H = 956.75 - 956.60 = 0.15 FT
A = 0.14 / [0.62 X (2 X 32.2 X 0.15) *1/2] = 0.073 SF

A 1-INCH DIAMETER HOLE HAS AN AREA OF 0.00545 SF
USE 0.073 / 0.00545 = 13.4 >>> **USE 13 - 1" DIA. HOLES AT ELEV. 956.60.**

B. BANKFULL RELEASE

THE REQUIRED VOLUME IS TO BE RELEASED OVER A PERIOD OF LESS THAN 40 HOURS. ARE ADDITIONAL HOLES NEEDED?

Qbf = 33,375 / 144,000 = 0.23 CFS
Zbf = 956.95
H = 956.95 - 956.60 = 0.35 FT
Q = (13 X 0.00545) X [0.62 X (2 X 32.2 X 0.35) *1/2] = 0.34 CFS

ACTUAL RELEASE TIME= 27.27 HOURS. ADDITIONAL HOLES ARE NOT NEEDED.

C. MAXIMUM OUTFLOW

Qa = 0.81 + 0.45 = 1.26 CFS

H = 957.50 - 956.60 = 0.90 FT
Q = (13 X 0.00545) X [0.62 X (2 X 32.2 X 0.90) *1/2] = 0.33 CFS
Qr = 1.26 - 0.33 = 0.93 CFS

ADDITIONAL HOLES SHALL BE PROVIDED AT. ELEV. 956.95 ARE NEEDED:

H = 957.50 - 956.95 = 0.55 FT
A = 0.93 / [0.62 X (2 X 32.2 X 0.55) *1/2] = 0.2520 SF

A 2-INCH DIAMETER HOLE HAS AN AREA OF 0.0218 SF
USE 0.2520 / 0.0218 = 11.56 >>> USE 11 - 2" DIA. HOLES AT ELEV. 956.95.

10. OVERFLOW STRUCTURE

THE OUTLET CONTROL STRUCTURE SHALL BE DESIGNED TO ACT AS A WEIR.

CONTRIBUTING 100-YEAR DESIGN FLOWS AREAS:
Q = (5.38 + 3.02) X 0.77 X (275/(16.8 + 25)) = 42.55 CFS
H = 958.50 - 957.50 = 1.00 FT

CW = 3.33 FOR A SHARP CRESTED WEIR

L = 42.55 / (3.33 X 1.00 ^1.5) = 12.78 FT

A 60° HDPE PIPE (D_o= 67.3") HAS A CIRCUMFERENCE OF 17.62 FEET. IT SHALL BE TURNED ON ITS END AS THE OUTFALL STRUCTURE.

C= $2\pi r_o$ = 2 x π x 2.8 = 17.62'

THE OUTLET PIPE IS SIZED AS AN 18" HDPE PIPE WITH A SLOPE OF 0.60% BUT SHALL FLOW ON GRADIENT WHEN THE WEIR IS TOPPED.

FROM A MANNING TABLE , WE FIND THAT THE PIPE HAS A CAPACITY OF 8.20 CFS WITH A VELOCITY OF 4.6 FPS WHEN FLOWING UNDER RESTRICTED CONDITIONS.

WHEN THE WEIR IS TOPPED, HOWEVER, THE EFFECTIVE SLOPE IS:
S = [958.50 - (951.51 + (0.80 X 18/12))] / 15 = 38.60%

USING MANNING'S FORMULA, WE FIND THE CAPACITY IS:
Q = (1.49/0.013) X 1.767 X (0.375)*0.67 X (0.3860)*0.50 = 65.22 CFS (> 42.00 CFS)

11. CAPACITY OF EXISTING RECEIVING PIPE

PER CITY RECORDS, THE EXISTING 22.5"x36.25" ARCH PIPE UNDER ELEVEN MILE ROAD THAT FLOWS FROM EXISTING CB #14A WAS "AS-BUILT" WITH A SLOPE OF 0.11%. THE PIPE DISCHARGES DOWNSTREAM INTO TRIBUTARY C OF THE NOVI LYON DRAIN.

FROM A MANNING TABLE, THE PIPE HAS A CAPACITY OF 11 CFS WITH A VELOCITY OF 2.5 FPS.

PER THE USGS QUADRANGLE MAP FOR SALEM, MICHIGAN, APPROXIMATELY 1,200 LF OF THE ELEVEN MILE ROAD R.O.W. FLOWS INTO THE PIPE AT EXISTING CB #14A:
C= 0.79 (DETERMINED)
I = 175 / (20 + 25) = 3.89
Q = (1200 X 60)/43560 X 0.79 X 3.89 = 5.08 CFS

THE PROJECT CONTRIBUTES A RESTRICTED FLOW OF 1.26 CFS. THE TOTAL CONTRIBUTING FLOW INTO THE EXISTING PIPE IS:
5.08 + 1.26 = **6.34 CFS** (< 11.0 CFS)

IT APPEARS THAT THE EXISTING PIPE UNDER ELEVEN MILE ROAD IS ADEQUATE.

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER No. 36177
LICENSED PROFESSIONAL ENGINEER

Julian J. Wargo, Jr.

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
PSP REVIEW	02/16/17	JJW	FSP SUBMITTAL	12/12/17	JJW						
PSP REVIEW	03/10/17	JJW	STAMPING SET	3/2/18	JJW						
CITY REVIEW	9/1/17	JJW									
FSP SUBMITTAL	10/25/17	JJW									

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STORMWATER MANAGEMENT PLAN
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK

DATE 2-16-17	SCALE	HOR: 1" = 60' VER: 1" = N/A	
DESIGNED BY JJW	JOB NO.	16121	
DRAWN BY MAS	SHEET	CE-8	

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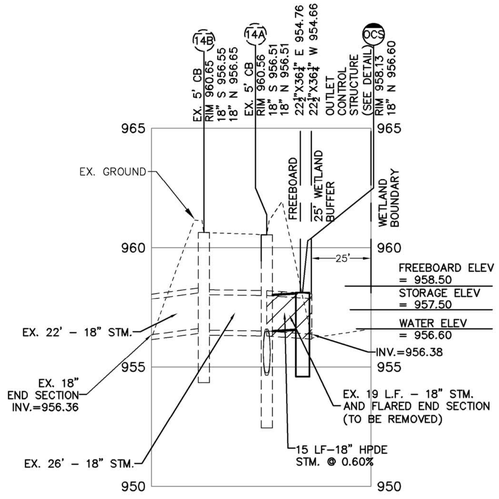
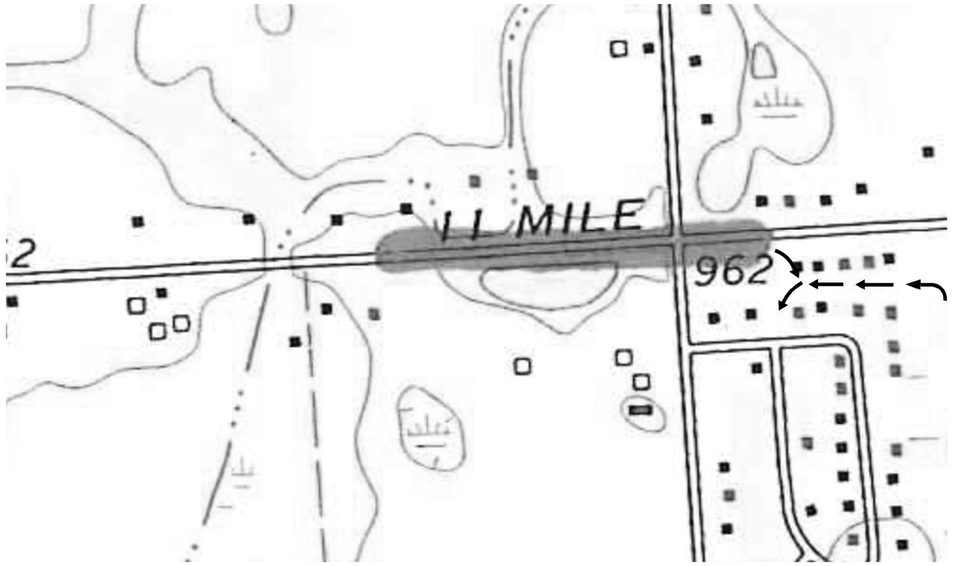


CROSS-SECTION
SCALE: 1"=30' HORZ.
1"=3' VERT.



CONTRIBUTING AREA TO 11-MILE ROAD
SOURCE: USGS QUADRANGLE FOR SALEM, MICHIGAN

OVERFLOW ROUTE
SOURCE: OAKGOV.COM MAPS

159 S.F. TEMPORARY WETLAND BUFFER ZONE DISTURBANCE–RESTORE SLOPE WITH SEDGE MEADOW SEED MIX AND REVEGATATION MAT. SEE SHEET CE–4 FOR SEED MIX.

TEMPORARY WETLAND IMPACTS:
WETLAND BUFFER ZONE: 159 SF
WETLAND:0 AC
VOLUME WETLAND: 0 CY

EX. 22 LF–18" STM (INCL. FLARED E.S.)

22–17–400–028
ZONED R–3

C/L ELEVEN MILE ROAD
(33' WD., 1/2 WIDTH) PUBLIC

ASPHALT PAVEMENT

EX. 26 LF–18" STM

EX. 26 LF–12" STM @ 1.42%

EX. 44 LF–12" STM @ 0.00%

EX. 15" STM

EX. 16" WM

N.E. CORNER SECTION 20
T. 1 N, R. 8 E.
CITY OF NOVI,
OAKLAND CO, MI

S89°57'54"E 135.00'

EX. 74 LF–18"x28½" STM

EX. 15" STM

EX. 139 LF–22½"x36½" STM @ 0.11%

EX. 161 LF–22½"x36½" STM @ 0.22%

EX. 385 LF–22½"x36½" STM @ 0.21%

25' WETLAND BUFFER ZONE

NORTH LINE SECTION 20

E 956.51
W 956.51
SE 956.51

33' RIGHT OF WAY LINE

DUE NORTH 78.00'

HIGHWAY EASEMENT L. 15423, P. 146

CONSTRUCT 15–FT WIDE GRAVEL PATH FOR ACCESS OF OUTLET CONTROL STRUCTURE (SEE SPECIFICATION THIS SHEET)

PROPOSED 20–FT WIDE INGRESS/EGRESS EASEMENT (FOR ACCESS FOR MAINTENANCE OF OUTLET CONTROL STRUCTURE).

951.60

EXISTING WETLAND/WATERCOURSE

SEE SHEET CE–10 AND CE–10.1 FOR SESC NOTES AND DETAILS

EX. 19 LF–18" STM (INCL. FLARED E.S.)

22–20–200–011

952.04

1,107 S.F. TEMPORARY WETLAND BUFFER ZONE DISTURBANCE–RESTORE SLOPE WITH SEDGE MEADOW SEED MIX AND REVEGATATION MAT. SEE SHEET CE–4 FOR SEED MIX.

N38°22'30"E 104.67'

REMOVE EX. 18" STORM SEWER AND END SECTION. INSTALL 15 LF OF NEW 18" HDPE PIPE AND OUTLET CONTROL STRUCTURE (SEE DETAIL ON SHEET CE–8.2). RESTORE DISTURBED AREA WITH MEADOW SEED MIX AND REVEGETATION MAT.

EXISTING POND (2.18 AC)
WETLAND AREA (2.18 AC)
WETLAND BUFFER AREA (0.81 AC)

TEMPORARY WETLAND IMPACTS:
WETLAND BUFFER ZONE: 1,107 SF
WETLAND:0 SFT
VOLUME WETLAND: 0 CY

N52°57'08"E 50.00'

FREEBOARD ELEVATION =958.40

25' WETLAND BUFFER

25' DETENTION POND SETBACK

CORNER NOT SET FALLS IN WATER

952.19

N81°58'24"E 227.54'

EXISTING WETLAND/WATERCOURSE

WOOD DOCK

CORNER NOT SET FALLS IN WATER

25' WETLAND BUFFER ZONE

PUMP WITH ELECTRIC BOX

R1 R2 R3 R4 R5 R6 R7

60' TAKING EASEMENT L. 20545, P. 610

EX. 24" STM

EAST LINE SECTION 20

EX. 18" SAN

33' RIGHT OF WAY LINE

494.05'

EXISTING DRIVEWAY

EX. 16" WM

33' HIGHWAY PURPOSES AND PUBLIC UTILITIES EASEMENT L. 7082, P

3.0" MDOT 23A AGGREGATE
10.0" MDOT 21AA LIMESTONE
PREPARED SUBGRADE •

PROPOSED GRAVEL ACCESS PATH (FOR STORMWATER MAINTENCE)

N
W E
S
SCALE: 1" = 30'
0 15' 30' 60'

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER No. 36177
LICENSED PROFESSIONAL ENGINEER

Julian J. Wargo, Jr.

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
PSP REVIEW	03/10/17	JJW	STAMPING SET	3/2/18	JJW						
CITY REVIEW	9/8/17	JJW									
FSP SUBMITTAL	10/25/17	JJW									
FSP SUBMITTAL	12/12/17	JJW									

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STORMWATER OUTLET PLAN
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK —

DATE 2–16–17 | SCALE HOR: 1" = 30' VER: 1" = 3'
DESIGNED BY JJW | JOB NO. 16121
DRAWN BY MAS | SHEET CE–8.1

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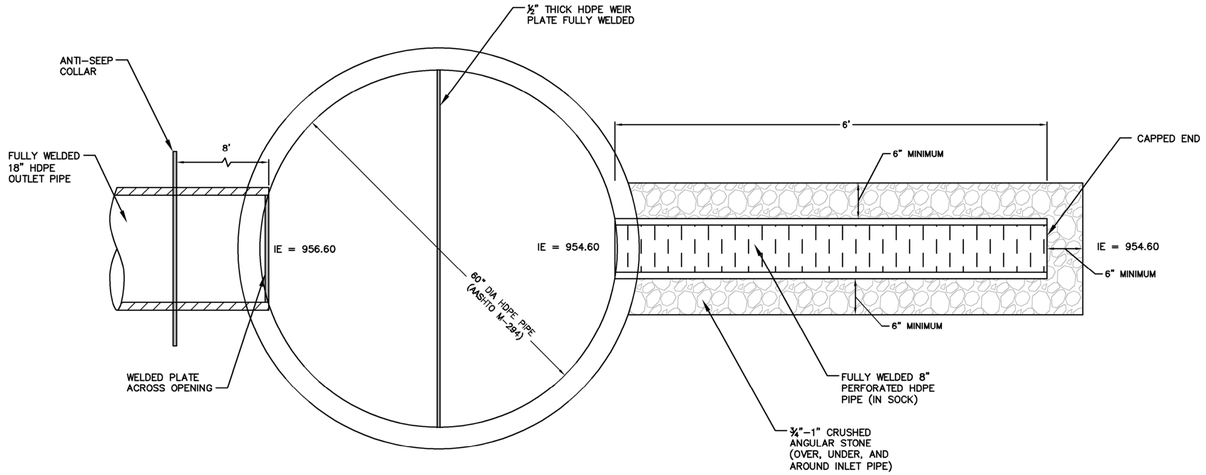
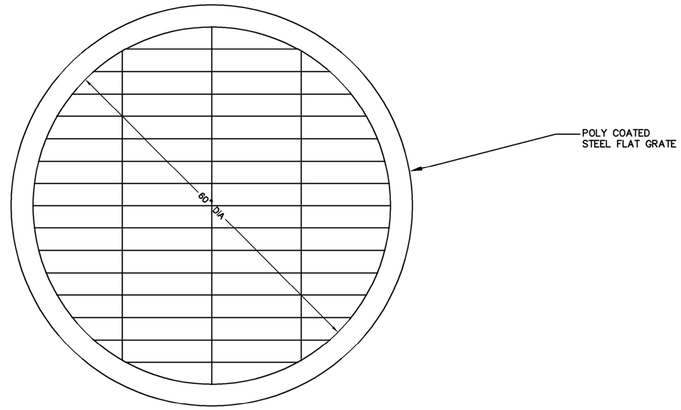


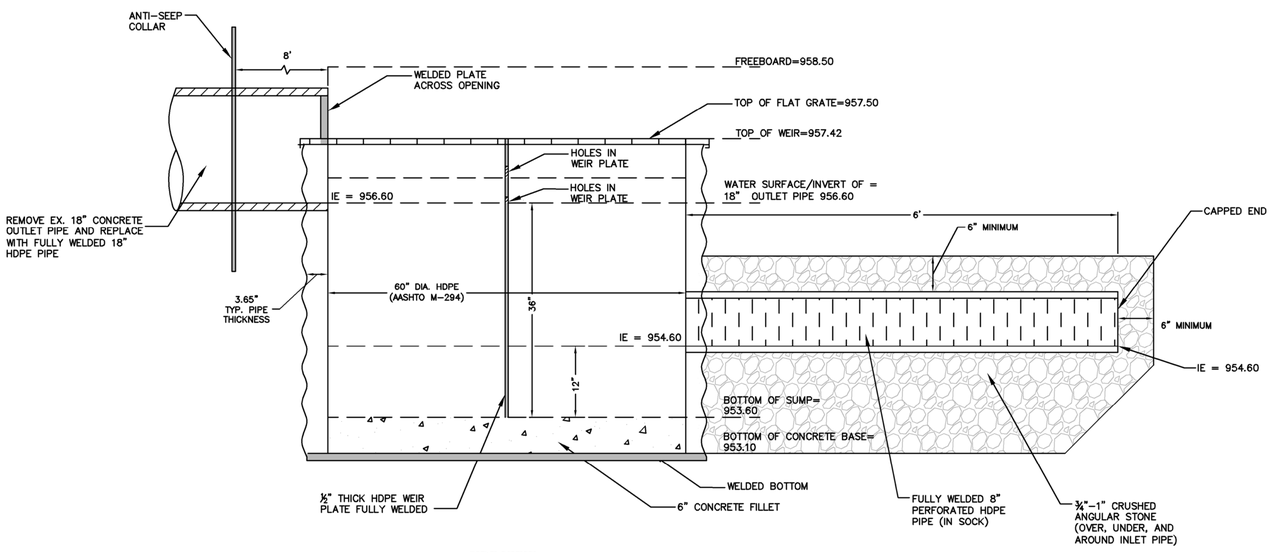
TOP VIEW
1"=1'

NOTE:

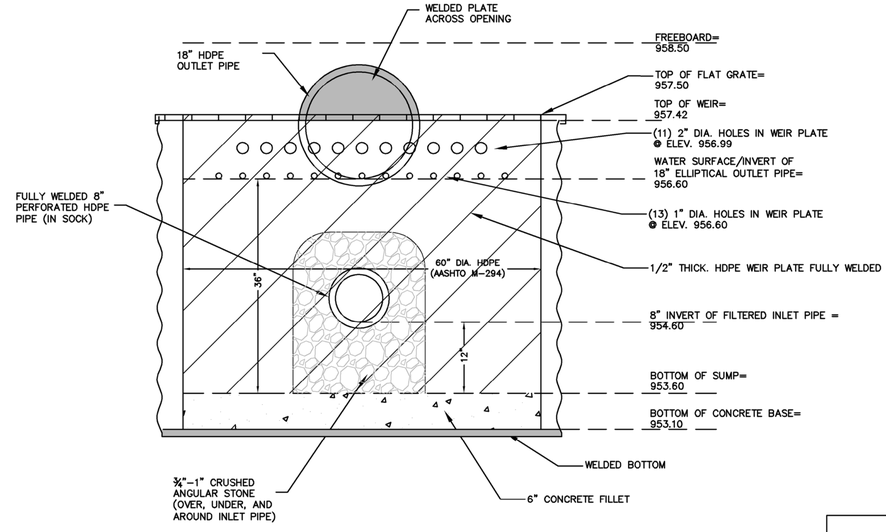
1. TOP OF STRUCTURE TO BE FITTED WITH BOLT-DOWN STEEL FLAT GRATE TO BE PRE-FABRICATED BY MANUFACTURER (FINAL DIMENSIONS MAY VARY)



STEEL FLAT GRATE
1" = 1'



SIDE VIEW
1"=1'



END VIEW
1"=1'

OUTLET CONTROL STRUCTURE

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
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LICENSED PROFESSIONAL ENGINEER

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
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STORMWATER MANAGEMENT DETAILS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK No.

DATE 2-16-17	SCALE HOR: 1" = N/A VER: 1" = N/A
DESIGNED BY JJW	JOB NO. 16121
DRAWN BY MAS	SHEET CE-8.2

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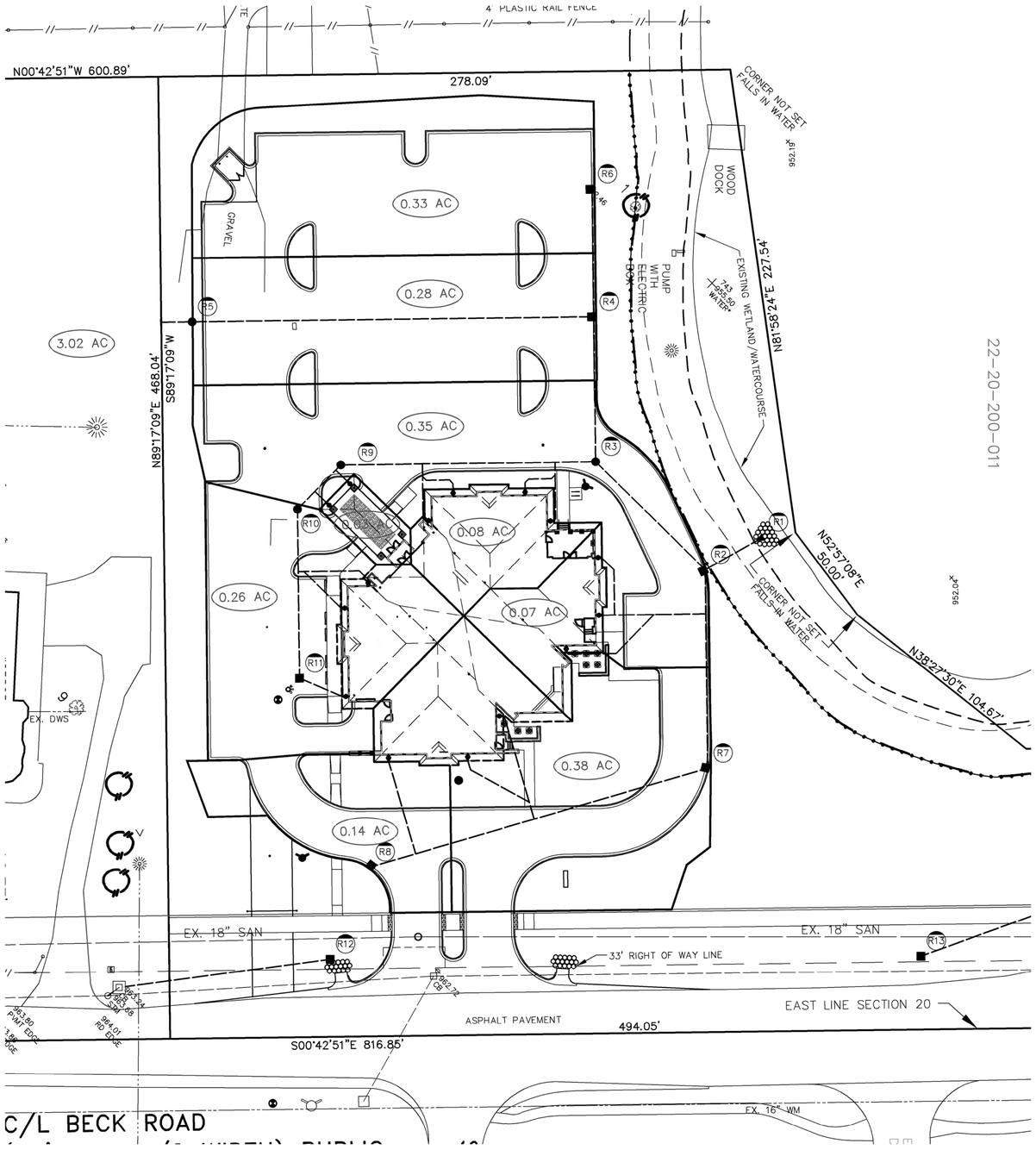

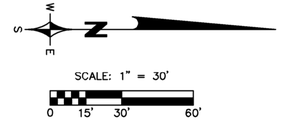

ZEIMET\WOZNIAK

I = 175/(T+25) C= 0.76 T= 15 MIN. SHEET 1 OF 1 18-Dec-17

PROJECT: GRIFFIN FUNERAL HOME 10-year storm JOB NO. 16121 COMMUNITY: NOVI COUNTY: OAKLAND

NOTE	FROM MH INPUT	TO MH	INCRE-MENT ACRES (A)	SUM OF AREAS (A)	C	EQUIV. AREA 100% ACRES CA	T TIME (MIN.)	I (IN PER HOUR)	Q=CIA C.F.S. FLOW	CAPAC-ITY OF SEWER (C.F.S.)	DIAM. OF PIPE (IN.)	LENGTH OF LINE (FT.)	SLOPE OF PIPE (%)	SLOPE OF HG (%)	VEL. FLOW FULL (FT./ SEC.)	TIME OF FLOW (MIN.)	H.G. ELEV. UPPER END	GR. ELEV. UPPER END	GR. ELEV. LOWER END	INV. ELEV. UPPER END	INV. ELEV. LOWER END
							4.00														
1	R5	R4	3.02	3.02	0.76	2.30	19.00	3.98	9.13	12.60	24	195	0.31	**0.31**	4.0	0.8	961.11	968.67	963.91	959.51	958.91
2	R4	R3	0.28	3.63	0.76	2.76	19.80	3.91	10.78	11.97	24	71	0.28	**0.28**	3.8	0.3	960.31	963.91	964.23	958.71	958.51
			0.33																		
3	R3	R2	0.00	4.00	0.76	3.04	20.10	3.88	11.80	19.67	30	75	0.23	**0.23**	4.0	0.3	959.82	964.23	963.15	957.82	957.65
			3.63																		
			0.37																		
4	R2	R1	0.35	4.87	0.76	3.70	20.40	3.85	14.27	14.79	30	32	0.13	**0.13**	3.0	0.2	959.54	963.15	957.50	957.54	957.50
			4.00																		
			0.52																		
	R11	R10	0.26	0.26	0.76	0.20	15.00	4.38	0.86	2.02	12	82	0.32	**0.32**	2.6	0.5	962.30	965.96	966.93	961.50	961.24
	R10	R9	0.03	0.29	0.76	0.22	15.50	4.32	0.95	2.02	12	30	0.32	**0.32**	2.6	0.2	961.94	966.93	966.73	961.14	961.04
	R9	R3	0.08	0.37	0.76	0.28	15.70	4.30	1.21	2.71	12	124	0.58	**0.58**	3.5	0.6	961.74	966.73	964.23	960.94	960.22
	R8	R7	0.14	0.14	0.76	0.11	15.00	4.38	0.47	2.25	12	171	0.40	**0.40**	2.9	1.0	960.30	964.49	963.01	959.50	958.82
	R7	R2	0.38	0.52	0.76	0.40	16.00	4.27	1.69	2.02	12	97	0.32	**0.32**	2.6	0.6		963.01	963.15	958.72	958.41
	R6	R4	0.33	0.33	0.76	0.25	15.00	4.38	1.10	2.02	12	62	0.32	**0.32**	2.6	0.4	960.70	963.91	963.91	959.90	959.70

NOTE:
1. R10 TO R9 INCLUDES ESTIMATED FUTURE FLOWS FROM OFFSITE
2. R9 TO R3 INCLUDES FLOWS FROM R11 TO R9
3. R3 TO R2 INCLUDES FLOWS FROM R9 TO R3
4. R2 TO R1 INCLUDES FLOWS FROM R3 TO R2 AND R7 TO R2

1. EXISTING POND

AN EXISTING POND IS LOCATED AT THE SOUTHWEST CORNER OF BECK AND ELEVEN MILE ROADS. IT HAS AN ENCLOSED 18" OUTLET PIPE THAT FLOWS NORTH INTO AN EXISTING 22.5"x36.25" SEWER UNDER ELEVEN MILE ROAD. THE ULTIMATE OUTLET FOR THE DRAINAGE IS THE EXISTING DITCH ON THE NORTH SIDE OF ELEVEN MILE ROAD THAT FLOWS WEST TO "TRIBUTARY C" OF THE "NOVI LYON DRAIN".

2. DETERMINE 10-YEAR STORAGE ELEVATION FOR GRIFFIN FUNERAL HOME

GROSS AREA	= 3.93 AC	
NET AREA	= 3.19 AC	
POND	= 2.19 AC	
TOTAL AREA	= 3.19 + 2.19 = 5.38 AC	
RUNOFF COEFFICIENT:		
PAVEMENT	1.19 AC @ 0.95 =	1.13
ROOF	0.28 AC @ 0.95 =	0.27
POND	2.19 AC @ 1.00 =	2.19
LAWN	1.72 AC @ 0.30 =	0.52
	5.38	4.11

C = 4.11/5.38 = 0.76

Qa = 0.15 CFS/AC x 5.38 AC = 0.81 CFS
Qo = 0.81 CFS/(5.38 AC x 0.76) = 0.20 CFS/AC-IMP.
T10 = -25 + √(6562.5/.20) = 156.1 MINUTES
Vs10 = (10500 x 156.1)/(25 + 156.1) - (40 x 0.20 x 156.1) = 7801.7 CF/AC-IMP.
VT10 = 7801.7 x 0.76 x 5.38 = 31,900 CF

3. DETERMINE 10-YEAR STORAGE FOR SOUTH PARCEL

GROSS AREA	= 3.47 AC	
NET AREA	= 3.02 AC	

C = 0.76 (ASSUME SAME AS GRIFFIN)

Qa = 0.15 CFS/AC x 3.02 AC = 0.45 CFS
Qo = 0.45 CFS/(3.02 AC x 0.76) = 0.20 CFS/AC-IMP.
T10 = -25 + √(6562.5/0.20) = 156.1 MINUTES
Vs10 = (10500 x 156.1)/(25 + 156.1) - (40 x 0.20 x 156.1) = 7801.7 CF/AC-IMP
VT10 = 7801.7 x 0.76 x 3.02 = 17,907 CF

4. DETERMINE REQUIRED 10-YEAR STORAGE

TOTAL VOLUME REQUIRED FOR GRIFFIN AND SOUTH PARCELS:
VT100 = 31,900 + 17,907 = **49,807 CF**

5. AVAILABLE STORAGE IN THE EXISTING POND

NOTE THAT THE BOTTOM OF STORAGE IS DETERMINED ABOVE THE INVERT OF THE OUTLET PIPE AT EXISTING CB #14A UNDER ELEVEN MILE ROAD (SINCE THE PIPE WILL BE EXTENDED INTO THE POND AT ELEV. 956.60).

ELEV.	AREA (SF)	AVG. AREA (SF)	DEPTH (FT)	VOLUME (CF)
956.60	95,213			
		97,961	0.4	39,184
957.00	100,709			
		105,550	1.0	105,550
958.00	110,392			
				144,734 CF

BY INTERPOLATION, A 10-YEAR VOLUME OF 49,807 CF CAN BE OBTAINED AT ELEVATION 957.1

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER
No. 36177
LICENSED PROFESSIONAL ENGINEER

Julian J. Wargo, Jr.

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
PSP REVIEW	02/16/17	JJW	FSP SUBMITTAL	12/12/17	JJW						
PSP REVIEW	03/10/17	JJW	STAMPING SET	3/2/18	JJW						
CITY REVIEW	9/11/17	JJW									
FSP SUBMITTAL	10/25/17	JJW									

ZEIMET WOZNIAK & ASSOCIATES
Civil Engineers & Land Surveyors
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WESTLAND, MI 48185 (734) 968-9401

STORM SEWER DRAINAGE AREAS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK 5014 | DATE 2-16-17 | SCALE HOR: 1" = 30' VER: 1" = N/A | DESIGNED BY JJW | JOB NO. 16121 | DRAWN BY MAS | SHEET CE-9

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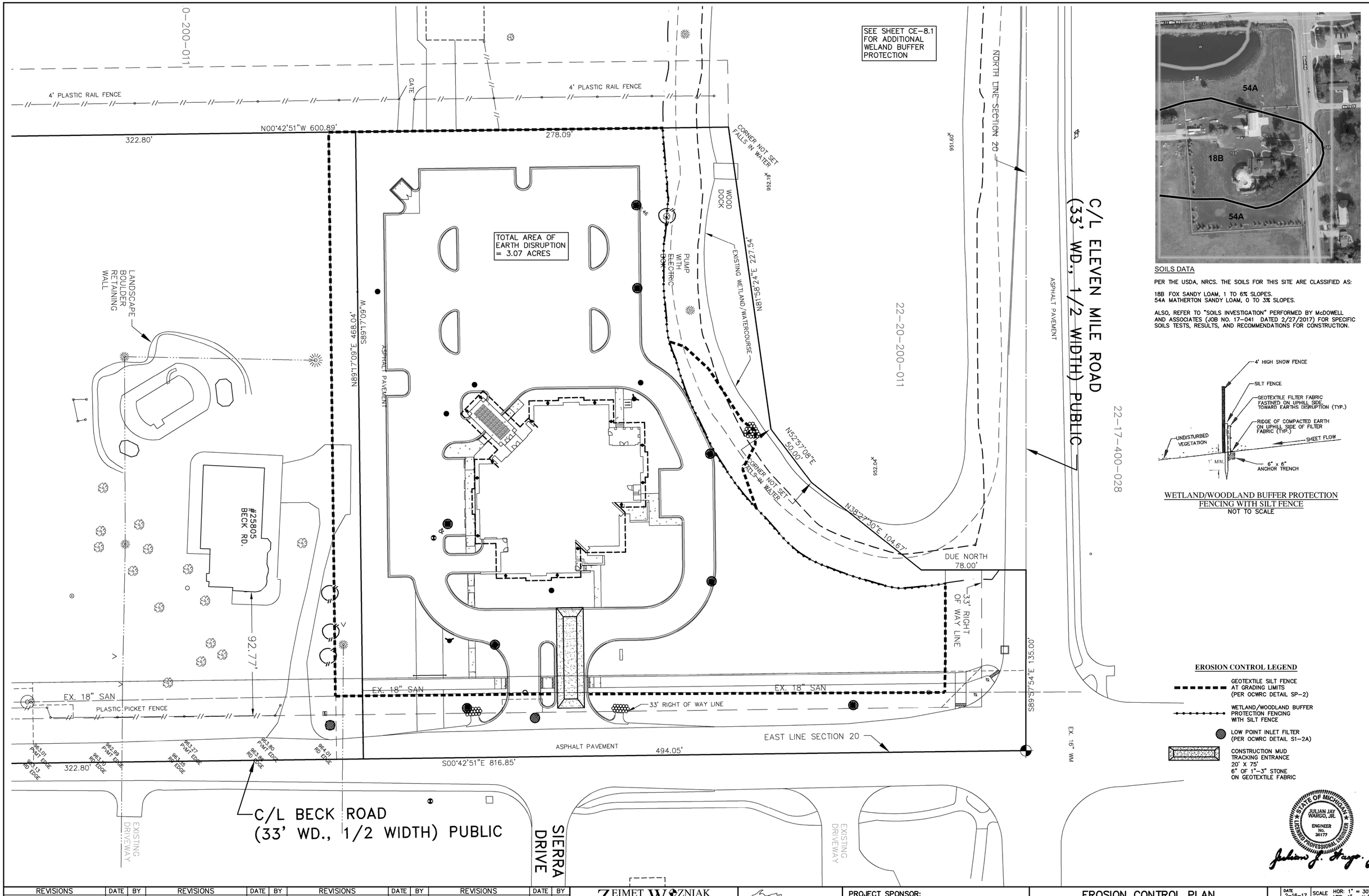

SOILS DATA

PER THE USDA, NRCS. THE SOILS FOR THIS SITE ARE CLASSIFIED AS:

18B FOX SANDY LOAM, 1 TO 6% SLOPES.
54A MATHERTON SANDY LOAM, 0 TO 3% SLOPES.

ALSO, REFER TO "SOILS INVESTIGATION" PERFORMED BY McDOWELL AND ASSOCIATES (JOB NO. 17-041 DATED 2/27/2017) FOR SPECIFIC SOILS TESTS, RESULTS, AND RECOMMENDATIONS FOR CONSTRUCTION.

WETLAND/WOODLAND BUFFER PROTECTION
FENCING WITH SILT FENCE
NOT TO SCALE

EROSION CONTROL LEGEND

- GEOTEXTILE SILT FENCE AT GRADING LIMITS (PER OCWRC DETAIL SP-2)
- WETLAND/WOODLAND BUFFER PROTECTION FENCING WITH SILT FENCE
- LOW POINT INLET FILTER (PER OCWRC DETAIL S1-2A)
- CONSTRUCTION MUD TRACKING ENTRANCE 20' X 75' 6" OF 1"-3" STONE ON GEOTEXTILE FABRIC

STATE OF MICHIGAN — JULIAN JAY WARGO, JR. — ENGINEER NO. 36177 — LICENSED PROFESSIONAL ENGINEER

Julian J. Wargo, Jr.

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
PSP REVIEW	02/16/17	JJW	FSP SUBMITTAL	10/25/17	JJW						
PSP REVIEW	03/10/17	JJW	FSP SUBMITTAL	12/12/17	JJW						
REV. ENTRANCE	8/22/17	JJW	STAMPING SET	3/2/18	JJW						
CITY REVIEW	9/11/17	JJW									

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EROSION CONTROL PLAN
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK

DATE 2-16-17	SCALE HOR: 1" = 30' VER: 1" = N/A
DESIGNED BY JJW	JOB NO. 16121
DRAWN BY MAS	SHEET CE-10

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TEMPORARY MAINTENANCE AND INSPECTION TASKS AND SCHEDULE (DURING CONSTRUCTION)

Note: The contractor shall maintain a log of all inspection and maintenance actives and shall make the log available to city personnel as needed.

Tasks	Pavement	Storm Sewer pipes	Catch Basin Sumps	Catch Basin Inlet Castings	Outflow Control Structures	Rip-Rap	Storm Detention Basins	Wetlands	Emergency Overflow	Schedule
Inspect for sediment accumulation		X	X		X		X			Weekly
Removal of sediment accumulation		X	X		X		X			As needed and prior to turnover
Inspect for floatables and debris				X	X		X			Quarterly
Cleaning of floatables and debris				X	X		X			Quarterly and prior to turnover
Inspection for erosion					X		X		X	Weekly
Re-establish permanent vegetation on eroded slopes							X		X	As needed and prior to turnover
Replacement of stone (if it cannot be adequately cleaned)					X	X			X	As needed
Clean Streets	X									Daily
Mowing/remove invasive species							X			As needed and 0-2 times per year
Inspect storm water system components during wet weather and compare to as-built plans (by professional engineer reporting to condo assoc.)		X	X	X	X	X	X	X		Prior to turnover
Make adjustments or replacements as determined by annual wet weather inspection		X	X	X	X	X	X	X	X	Prior to turnover
Keep records of all inspections and maintenance activities and report to facilities manager	X	X	X	X	X	X	X	X	X	Prior to turnover
Keep records of all costs for inspections, maintenance and repairs report to facilities manager	X	X	X	X	X	X	X	X	X	Prior to turnover

PERMANENT MAINTENANCE AND INSPECTION TASKS AND SCHEDULE (POST CONSTRUCTION)

Note: The owner and/or facilities manager shall maintain a log of all inspection and maintenance actives and shall make the log available to city personnel as needed.

Tasks	Pavement	Storm Sewer pipes	Catch Basin Sumps	Catch Basin Inlet Castings	Outflow Control Structures	Rip-Rap	Storm Detention Basins	Wetlands	Emergency Overflow	Schedule
Inspect for sediment accumulation		X	X		X		X			Annually
Removal of sediment accumulation		X	X		X		X			Every 2 years as needed
Inspect for floatables and debris				X	X		X			Annually
Cleaning of floatables and debris				X	X		X			Annually
Inspection for erosion					X		X		X	Annually
Re-establish permanent vegetation on eroded slopes							X		X	As needed
Replacement of stone (if it cannot be adequately cleaned)					X	X			X	Every 3-5 years as needed
Clean Streets	X									Semi-Annually
Mowing/remove invasive species							X			0-2 times per year
Inspect storm water system components during wet weather and compare to as-built plans (by professional engineer reporting to condo assoc.)		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	As needed
Keep records of all inspections and maintenance activities and report to facilities manager	X	X	X	X	X	X	X	X	X	Annually
Keep records of all costs for inspections, maintenance and repairs report to facilities manager	X	X	X	X	X	X	X	X	X	Annually

GENERAL EROSION CONTROL SEQUENCE:

1. INSTALL SILT FENCE AS INDICATED ON PLANS. ADDITIONAL AREAS MAY BE REQUIRED.
   - A. TREE PROTECTION FENCE SHOULD BE INSTALLED AS INDICATED ON PLANS.
   - B. REMOVE BUILT-UP SEDIMENT WHEN IT ACCUMULATES TO 1/3 TO 1/2 OF THE HEIGHT OF THE SILT FENCE AND AFTER STORM EVENTS.
   - C. IF THE SILT FENCE FABRIC DECOMPOSES OR BECOMES INEFFECTIVE PRIOR TO THE END OF THE EXPECTED LIFE SPAN, AND IT IS STILL REQUIRED TO BE IN PLACE, THE FABRIC SHALL BE REPLACED IMMEDIATELY.
   - D. INSPECTIONS OF SILT FENCE SHALL BE MADE WEEKLY UNDER NORMAL CONDITIONS, WITHIN 24 HOURS OF RAINFALL AND DAILY DURING PROLONGED RAIN. ANY MAINTENANCE SHALL BE DONE IMMEDIATELY.
2. CLEAR AND GRUB SITE FOR MASS GRADING. STRIP TOPSOIL AND REMOVE IT FROM THE SITE.
3. MASS GRADE SITE. IMMEDIATELY INSTALL ADDITIONAL SILT FENCE AS SHOWN.
4. INSTALL UNDERGROUND UTILITIES (SANITARY, STORM AND WATERMAIN).
5. INSTALL INLET FILTERS ON ALL PAVEMENT CATCH BASINS PER CURRENT DETAILS.
   - A. INLET FILTERS SHALL BE INSPECTED WEEKLY UNDER NORMAL CONDITIONS, WITHIN 24 HOURS OF RAINFALL, AND DAILY DURING PROLONG RAINFALL.
   - B. PROMPTLY REMOVE SEDIMENT AND DEBRIS FROM INLET FILTERS.
   - C. IF THE FILTER FABRIC DECOMPOSES OR BECOMES INEFFECTIVE PRIOR TO ITS EXPECTED LIFE, REPLACE FABRIC PROMPTLY.
6. INSTALL UTILITIES (GAS, ELECTRIC, PHONE, ETC.).
7. INSTALL PAVEMENT COMPLETE, INCLUDING CURB AND GUTTER. RE-INSTALL ANY PAVEMENT FILTERS THAT WERE DISTURBED DURING INSTALLATION.
8. FINE GRADE SITE. ESTABLISH TEMPORARY VEGETATION AND/OR LANDSCAPE ALL DISTURBED AREAS NOT BUILD UPON OR PAVED WITHIN 5 DAYS OF FINAL GRADE.
9. REMOVE ALL TEMPORARY SOIL EROSION CONTROL MEASURES AFTER PERMANENT LANDSCAPING IS INSTALLED AND FULL STABILIZATION IS ACHIEVED.

EROSION CONTROL NOTES:

1. DURING DRY PERIODS ALL DISTURBED AREAS SHALL BE WATERED FOR DUST CONTROL.
2. ALL DIRT AND MUD TRACKED ONTO ROADWAYS SHALL BE REMOVED IMMEDIATELY.
3. ALL SOIL EROSION CONTROL MEASURES SHALL CONFORM TO THE LATEST CITY OF NOVI STANDARDS.
4. IT IS THE GENERAL CONTRACTOR'S RESPONSIBILITY TO ENSURE ALL SOIL EROSION CONTROL MEASURES ARE MAINTAINED AND IN PLACE UNTIL SITE IS COMPLETELY STABILIZED.
5. THE ULTIMATE OUTLET FOR THIS PROJECT'S STORM DRAINAGE DISCHARGE IS THE NOVI LYON DRAIN.
6. UPON COMPLETION OF THE BUILDING CONSTRUCTION, CLEAN STORM SEWERS OF ANY ACCUMULATED SEDIMENT AND DEBRIS.
7. NO STOCKPILING OF MATERIAL IS PERMITTED.
8. THIS PLAN DESCRIBES THE MINIMUM EROSION CONTROL MEASURES NEED TO PREVENT SILT AND SEDIMENT FROM LEAVING THE SITE. ADDITIONAL SESC MEASURES MAY BE REQUIRED AS CONDITIONS IN THE FIELD WARRANT.
9. IF DEWATERING IS ANTICIPATED OR ENCOUNTERED DURING CONSTRUCTION, A DEWATERING PLAN MUST BE SUBMITTED TO THE CITY'S ENGINEERING DIVISION FOR REVIEW.
10. IT IS THE DEVELOPMENTS RESPONSIBILITY TO GRADE AND STABILIZE DISTRUBANCES DUE TO THE INSTALLATION OF PUBLIC UTILITY.
11. STREET SWEEPING AND DUST CONTROL IS THE RESPONSIBILITY OF THE CONTRACTOR.

PERMIT NOTE:

1. THIS PROJECT SHALL BE CONSTRUCTED IN COMPLIANCE WITH PART 91 OF ACT 451, OF 1994 AS AMENDED, THE SOIL EROSION AND SEDIMENT CONTROL ACT. AN NPDES NOTICE OF COVERAGE SHALL BE OBTAINED FROM THE MDEQ.
2. INSTALLATION OF SILT FENCE AND TREE PROTECTION FENCE SHALL NOT OCCUR PRIOR TO THE INITIAL PRE-CONSTRUCTION MEETING WITH THE CITY. WHEN NATURAL FEATURES EXIST ON THE SITE, INSPECTION OF THE STAKING MAY BE REQUIRED PRIOR TO INSTALLATION OF THE FENCE.

STREET CLEANING SCHEDULE*

	S	M	T	W	T	F	S
SCRAPE STREET		X	X	X	X	X	X
SWEEP STREET				X			

*STREET SWEEPING AND DUST CONTROL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER NO. 36177
LICENSED PROFESSIONAL ENGINEER

Julian J. Wargo, Jr.

REVISIONS	DATE	BY
PSP REVIEW	03/10/17	JJW
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STAMPING SET	3/2/18	JJW

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EROSION CONTROL MAINTENANCE SCHEDULES
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK

DATE	2-16-17
SCALE	HOR: 1" = N/A VER: 1" = N/A
DESIGNED BY	JJW
JOB NO.	16121
DRAWN BY	MAS
SHEET	CE-10.1

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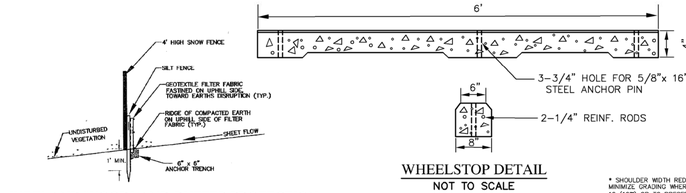
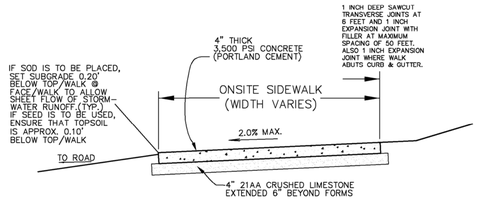
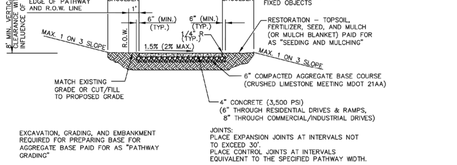


WETLAND/WOODLAND BUFFER PROTECTION
FENCING WITH SILT FENCE
NOT TO SCALE

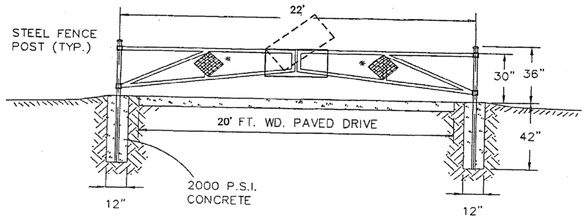
WHEELSTOP DETAIL
NOT TO SCALE



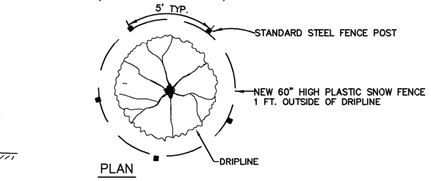
ON-SITE CONCRETE SIDEWALK
NOT TO SCALE



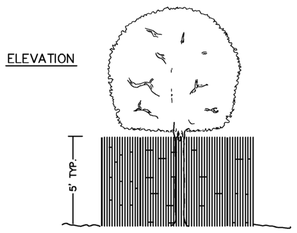
NON-MOTORIZED PATHWAY CONCRETE SECTION
NO SCALE



* AT EACH LOCATION, 2-12"x12" RED REFLECTORIZED DIAMOND PANELS, PLACED BACK TO BACK.



PLAN



FULL PAVEMENT MARKING SPECIFICATIONS:

1. BARRIER-FREE PARKING SPACES AND ASSOCIATED CROSS-HATCHED ACCESS AISLES SHALL BE MARKED IN BLUE.
2. NON-BARRIER-FREE PARKING SPACES SHALL BE MARKED IN WHITE.
3. ABUTTING BARRIER-FREE AND NON-BARRIER-PARKING SPACES SHALL BE SEPARATED BY ABUTTING BLUE AND WHITE STRIPES.
4. THE INTERNATIONAL SYMBOL OF ACCESSIBILITY (I.E. WHEELCHAIR) SHALL BE MARKED IN WHITE.

WATER MAIN NOTES:

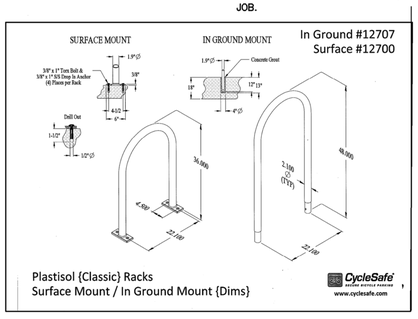
1. ALL WATER MAIN SHALL BE INSTALLED WITH A MINIMUM COVER OF 5.5' BELOW FINISH GRADE. WHEN WATER MAINS MUST DIP TO PASS UNDER A STORM SEWER OR SANITARY SEWER, THE SECTIONS WHICH ARE DEEPER THAN NORMAL SHALL BE KEPT TO A MINIMUM LENGTH BY THE USE OF VERTICAL TWENTY TWO AND A HALF (22.5°) DEGREE BENDS, PROPERLY ANCHORED.
2. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF NOVI.
3. ALL TRENCHES UNDER OR WITHIN THREE (3) FEET OR THE FORTY FIVE (45°) DEGREE ZONE OF INFLUENCE LINE OF EXISTING AND/OR PROPOSED PAVEMENT, BUILDING PAD OR DRIVE APPROACH SHALL BE BACKFILLED WITH SAND COMPACTED TO AT LEAST NINETY-FIVE (95%) PERCENT OF MAXIMUM UNIT WEIGHT (ASTM D-1557). ALL OTHER TRENCHES TO BE COMPACTED TO 90% OR BETTER.
4. ALL TEE'S, BENDS, CONNECTIONS, ETC. ARE CONSIDERED INCIDENTAL TO THE JOB.
5. PHYSICAL CONNECTIONS SHALL NOT BE MADE BETWEEN EXISTING AND NEW WATER MAINS UNTIL TESTING IS SATISFACTORILY COMPLETED.
6. MAINTAIN 10' HORIZONTAL CLEARANCE BETWEEN OUTER EDGE OF WATER MAIN AND ANY SANITARY SEWER OR STRUCTURE.
7. ALL WATER MAIN SHALL BE DUCTILE IRON CLASS 54 WITH POLYETHYLENE WRAP.
8. REFER TO CITY OF NOVI WATER MAIN DETAIL SHEETS FOR ADDITIONAL INFORMATION.

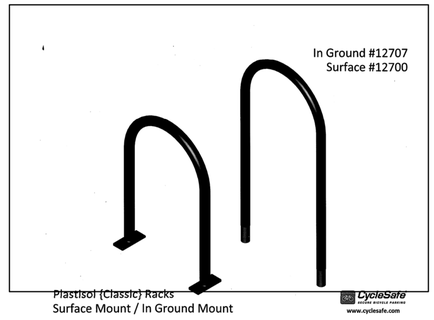
SANITARY SEWER NOTES:

1. DOWNSPOUTS, WEEP TILE, FOOTING DRAINS OR ANY CONDUIT THAT CARRIES STORM OR GROUND WATER SHALL NOT BE ALLOWED TO DISCHARGE INTO A SANITARY SEWER.
2. ALL SANITARY LEADS SHALL BE CONSTRUCTED OF PVC SDR 23.5 AT 1.00% MINIMUM SLOPE.
3. REFER TO CITY OF NOVI STANDARD DETAILS FOR PIPE BEDDING DETAILS.
4. REFER TO CITY OF NOVI SANITARY SEWER DETAIL SHEETS FOR ADDITIONAL INFORMATION.

PAVING NOTES:

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF NOVI AND M.D.O.T.
2. IN AREAS WHERE NEW PAVEMENTS ARE BEING CONSTRUCTED, THE TOPSOIL AND SOIL CONTAINING ORGANIC MATTER SHALL BE REMOVED PRIOR TO PAVEMENT CONSTRUCTION.
3. SUBGRADE UNDERCUTTING, INCLUDING BACKFILLING SHALL BE PERFORMED TO REPLACE MATERIALS SUSCEPTIBLE TO FROST HEAVING AND UNSTABLE SOIL CONDITIONS. ANY EXCAVATIONS THAT MAY BE REQUIRED BELOW THE TOPSOIL IN FILL SECTIONS OR BELOW SUBGRADE IN CUT SECTIONS, WILL BE CLASSIFIED AS SUBGRADE UNDERCUTTING.
4. SUBGRADE UNDERCUTTING SHALL BE PERFORMED WHERE NECESSARY AND THE EXCAVATED MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ANY SUBGRADE UNDERCUTTING SHALL BE BACKFILLED WITH SAND OR OTHER SIMILIAR APPROVED MATERIAL. BACKFILL SHALL BE COMPACTED TO 95% OF THE MAXIMUM UNIT WEIGHT (PER ASTM D-1557) UNLESS OTHERWISE SPECIFIED.
5. BACKFILL UNDER PAVED AREAS SHALL BE AS SPECIFIED ON DETAILS
6. ANY SUB-GRADE WATERING REQUIRED TO ACHIEVE REQUIRED DENSITY SHALL BE CONSIDERED INCIDENTAL TO THE JOB.





GENERAL NOTES:

THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THE PROJECT.

1. ALL DIMENSIONS SHOWN ARE TO BACK OF CURB, FACE OF SIDEWALK, OUTSIDE FACE OF BUILDING, PROPERTY LINE, CENTER OF MANHOLE/CATCH BASIN OR CENTERLINE OF PIPE UNLESS OTHERWISE NOTED.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF NOVI CURRENT STANDARDS AND REGULATIONS.
3. THE CONTRACTOR SHALL NOTIFY THEY CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR OF THE BEGINNING OF CONSTRUCTION.
4. ANY WORK WITHIN THE PUBLIC STREET RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AGENCIES HAVING JURISDICTION AND SHALL NOT BEGAN UNTIL ALL NECESSARY PERMITS HAVE BEEN ISSUED FOR THE WORK.
5. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ADJUST THE TOP OF ALL EXISTING AND PROPOSED STRUCTURES (MANHOLES, CATCH BASINS, INLETS, GATE WELLS ETC.) WITHIN GRADED AND /OR PAVED AREAS TO FINAL GRADE SHOWN ON THE PLANS. ALL SUCH ADJUSTMENTS SHALL BE INCIDENTAL TO THE JOB AND NOT BE PAID FOR SEPARATELY.

GRADING NOTES:

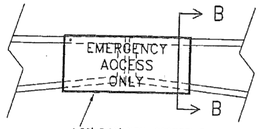
1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF NOVI.
2. ALL NECESSARY PERMITS, TESTING, BONDS AND INSURANCE ETC., SHALL BE PAID FOR BY THE CONTRACTOR. THE OWNER SHALL PAY FOR ALL THE CITY INSPECTION FEES.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL DURING THE PERIODS OF CONSTRUCTION. THIS SHALL BE CONSIDERED INCIDENTAL TO THE JOB.
4. PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL CONTACT MISS DIG (811) TO VERIFY THE LOCATION OF ANY EXISTING UNDERGROUND UTILITIES AND SHALL NOTIFY OTHER REPRESENTATIVES OF OTHER UTILITIES IN THE VICINITY OF THE WORK.
5. ALL PROPERTIES OR FACILITIES IN THE SURROUNDING AREAS, PUBLIC OR PRIVATE, DESTROYED OR OTHERWISE DISTURBED DUE TO CONSTRUCTION SHALL BE REPLACED AND/OR RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR.
6. MANHOLE, CATCH BASIN, GATE VALVES AND HYDRANT FINISH GRADES MUST BE CLOSELY CHECKED AND APPROVED BY THE ENGINEER BEFORE THE CONTRACTOR'S WORK IS CONSIDERED COMPLETE.
7. CONTRACTOR SHALL REMOVE AND DISPOSE OF OFF-SITE ANY TREES, BRUSH, STUMPS, TRASH OR OTHER UNWANTED DEBRIS AT THE OWNER'S DIRECTION, INCLUDING OLD BUILDING FOUNDATIONS AND FLOORS. BURNING OF TRASH, STUMPS OR OTHER DEBRIS SHALL NOT BE PERMITTED.
8. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADING, LIGHTS AND TRAFFIC CONTROL DEVICES TO PROTECT THE WORK AND SAFELY CONTAIN TRAFFIC IN ACCORDANCE WITH ''MMUTCD''.
9. ALL EXCAVATIONS SHALL BE SLOPED, SHORED OR BRACED IN ACCORDANCE WITH MI-OSHA REQUIREMENTS. THE CONTRACTOR SHALL PROVIDE AN ADEQUATELY CONSTRUCTED AND BRACED SHORING SYSTEM FOR EMPLOYEES WORKING IN AN EXCAVATION THAT MAY EXPOSE EMPLOYEES TO THE DANGER OF MOVING AROUND.
10. ALL REFERENCES TO M.D.O.T. SPECIFICATIONS ARE TO BE IN ACCORDANCE WITH THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

GENERAL UTILITY NOTES:

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE CITY OF NOVI.
2. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO VERIFY AND/OR OBTAIN ANY INFORMATION NECESSARY REGARDING THE PRESENCE OF UNDERGROUND UTILITIES, WHICH MIGHT AFFECT THIS JOB.
3. ALL TRENCHES UNDER OR WITHIN THREE (3) FEET OR THE FORTY-FIVE (45) DEGREE ZONE OF INFLUENCE LINE OF EXISTING AND/OR PROPOSED PAVEMENT, BUILDING PAD OR DRIVE APPROACH SHALL BE BACKFILLED WITH SAND COMPACTED TO AT LEAST NINETY-FIVE (95) PERCENT OF MAXIMUM UNIT WEIGHT (ASTM D-1557). ALL OTHER TRENCHES TO BE COMPACTED TO 90% OR BETTER.
4. WHENEVER EXISTING MANHOLES OR SEWER PIPE ARE TO BE TAPPED, DRILL HOLES 4'' CENTER TO CENTER, AROUND PERIPHERY OF OPENING TO CREATE A PLANE OF WEAKNESS JOINT BEFORE BREAKING SECTION OUT.
5. EXACT GRADES AND DEPTHS OF UTILITIES ARE TO BE CHECKED CLOSELY BY THE CONTRACTOR PRIOR TO INSTALLATION. FURNISH PIPE LOCATIONS AND ELEVATIONS TO DESIGN ENGINEER TO CONFIRM OR RE-DESIGN.
6. REFER TO CITY OF NOVI STANDARD DETAIL SHEETS FOR ADDITIONAL INFORMATION.

STORM SEWER NOTES:

1. ALL STORM SEWER 12'' AND LARGER SHALL BE RCP CLASS IV UNLESS OTHERWISE NOTED. REFER TO CITY OF NOVI STANDARD DETAILS SHEET FOR STANDARD BEDDING DETAILS.
2. JOINTS FOR ALL STORM SEWER 12'' AND LARGER SHALL BE MODIFIED TONGUE AND GROOVE JOINT WITH RUBBER GASKETS UNLESS SPECIFIED OTHERWISE (ASTM C-443).
3. ALL STORM SEWER LEADS SHALL BE CONSTRUCTED OF PVC SCHEDULE 40 PIPE AT 1.00% MINIMUM SLOPE WITH GLUED JOINTS, UNLESS OTHERWISE NOTED. REFER TO CITY OF NOVI DETAILS FOR BEDDING DETAILS.
4. REFER TO CITY OF NOVI STORM SEWER DETAIL SHEETS FOR ADDITIONAL INFORMATION.



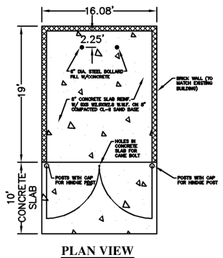
SECTION B-B

NOTE: IF LOCKING GATE IS REQUIRED, CONTACT NOVI FIRE DEPARTMENT FOR KNOX BOX INFORMATION.

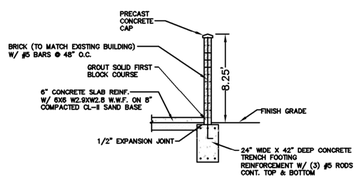
EMERGENCY ACCESS GATE DETAIL
NOT TO SCALE

NOTES:
1. *TREE PROTECTION FENCING IS TO BE ERECTED PRIOR TO ANY EARTHWORK OR CONSTRUCTION AND IS TO REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.*
2. *FENCE SHALL BE LOCATED AT THE OUTER PERIMETER OF THE SPREAD OF THE BRANCHES OR CLOSER ONLY AT THE DIRECTION THE LANDSCAPE ARCHITECT.*
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.*

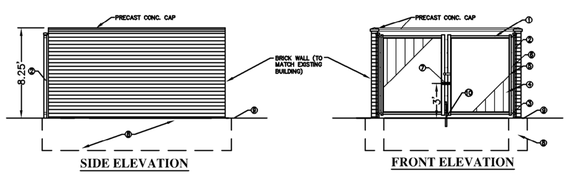
TREE PROTECTION DETAIL
NOT TO SCALE



PLAN VIEW



SCREEN WALL SECTION

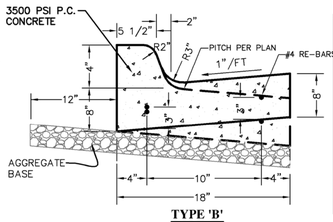


SIDE ELEVATION | **FRONT ELEVATION**

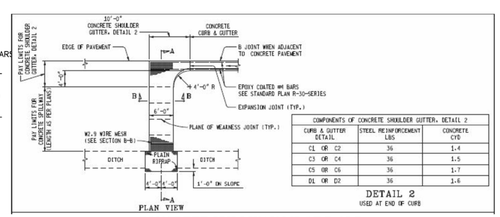
DUMPSTER ENCLOSURE DETAILS
NOT TO SCALE

① FRAME WITH 2" O.D. PIPE. ALL JOINTS ARE WELDED TO MAKE A RIGID FRAME.
② 3" O.D. POSTS WITH CAP TYP. FOR HINDGE POST.
③ HINGE, TYP.
④ WOOD
⑤ TENSION BAR, TYP.
⑥ TENSION CLIPS, 15" O.C. TYP.
⑦ LATCH WITH PROVISIONS FOR PADLOCK.
⑧ 24" WIDE X 42" DEEP CONCRETE TRENCH FOOTING REINFORCEMENT W/ (3) #5 RODS CONT. TOP & BOTTOM
⑨ FINISH GRADE, SEE PLANS.
⑩ 1" DIA. GALV. PIPE CAST INTO 12" DIA. CONC. FOOTING TO ACCEPT CANE BOLT.

NOTE:
ALL POSTS, PIPE, FABRIC AND FITTINGS TO BE GALV. STL. CONTRACTOR TO PROVIDE COMPLETE SHOP DRAWINGS FOR APPROVAL.

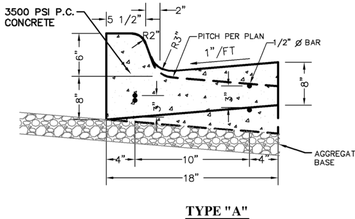


TYPE 'B'
4" CURB AND GUTTER DETAIL
NOT TO SCALE

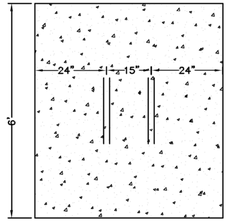


COMPONENTS OF CONCRETE SHOULDER GUTTER, DETAIL 2		
CURB & GUTTER DETAIL	STEEL REINFORCEMENT LBS	CONCRETE CYD
C1 OR C2	36	1.4
C3 OR C4	36	1.5
C5 OR C6	36	1.7
D1 OR D2	36	1.6

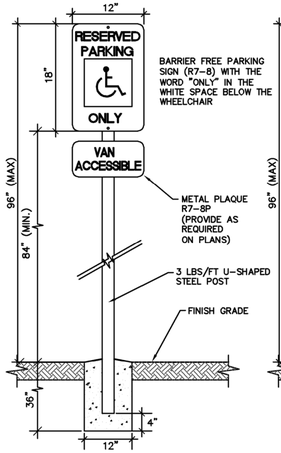
CONCRETE SPILLWAY MDOT R-35-D
NOT TO SCALE



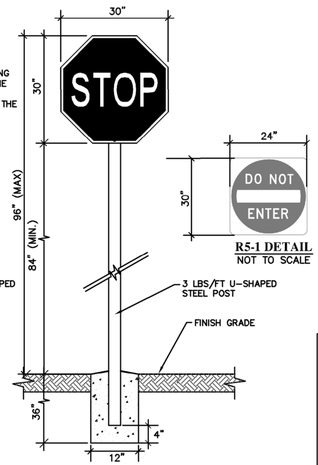
TYPE "A"
6" CURB AND GUTTER DETAIL
NO SCALE



BICYCLE PARKING LAYOUT DETAIL
NOT TO SCALE

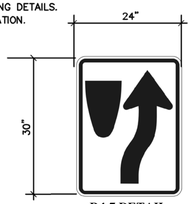


BARRIER FREE PARKING SIGN DETAIL
NOT TO SCALE

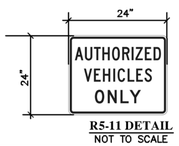


STOP SIGN DETAIL
NOT TO SCALE

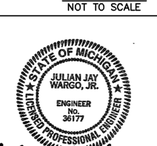
R5-1 DETAIL
NOT TO SCALE



R4-7 DETAIL
NOT TO SCALE



R5-11 DETAIL
NOT TO SCALE



REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
PSP REVIEW	02/16/17	JJW	FSP SUBMITTAL	12/12/17	JJW						
PSP REVIEW	03/10/17	JJW	STAMPING SET	3/2/18	JJW						
CITY REVIEW	9/11/17	JJW									
FSP SUBMITTAL	10/25/17	JJW									

ZEIMET WOZNIAK & ASSOCIATES
Civil Engineers & Land Surveyors
55800 GRAND RIVER AVE., SUITE 100
NEW HUDSON, MICHIGAN 48165
P: (248) 437-5099 F: (248) 437-5222 www.zeimetwozniak.com

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NOVI FUNERAL HOME, L.L.C.
7707 MIDDLEBELT RD.
WESTLAND, MI 48185 (734) 968-9401

CONSTRUCTION NOTES AND DETAILS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK

DATE	2-16-17
SCALE	HOR: 1" = N/A VER: 1" = N/A
DESIGNED BY	JJW
JOB NO.	16121
DRAWN BY	MAS
SHEET	CE-11

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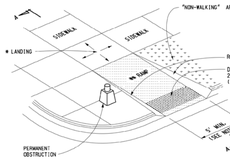
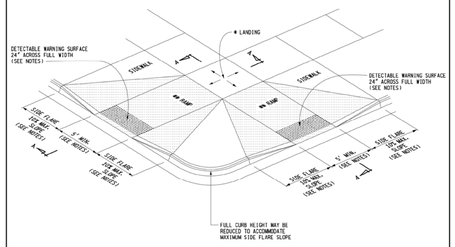
Z:\Projects\16121\DWG\16121 NOTES AND DETAILS.dwg, CE-11 CONSTRUCTION NOTES AND DETAILS, 2/26/2018 7:03:18 AM, MSmales

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE R
(ROLLED SIDES)



SIDEWALK RAMP TYPE F
(FLARED SIDES, TWO RAMPS SHOWN)

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT

PREPARED BY DESIGN DIVISION
DRAWN BY: R.L.V.
CHECKED BY: R.T.P.

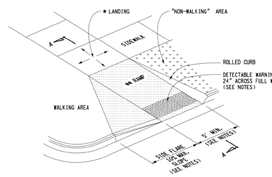
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

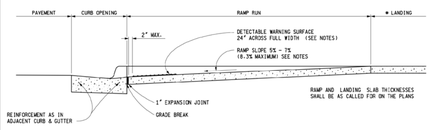
T.R.N.S. APPROVAL	3-15-2016 PLAN DATE	R-28-J	SHEET 1 OF 7

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

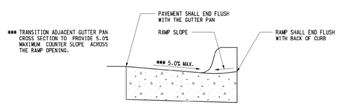
** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE RF
(ROLLED / FLARED SIDES)



SECTION A-A



SECTION THROUGH CURB OPENING
(TYPICAL ALL RAMP TYPES)

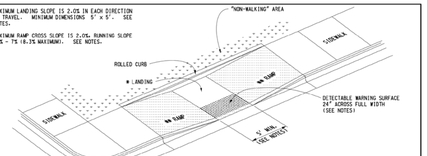
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

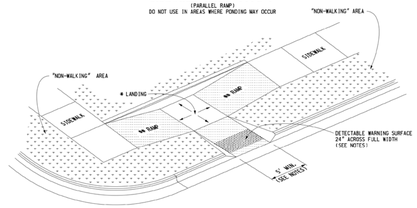
T.R.N.S. APPROVAL	3-15-2016 PLAN DATE	R-28-J	SHEET 2 OF 7

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

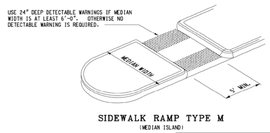
** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE P
(PARALLEL RAMP)
DO NOT USE IN AREAS WHERE PONDING MAY OCCUR



SIDEWALK RAMP TYPE C
(COMBINATION RAMP)



SIDEWALK RAMP TYPE M
(MEDIAN ISLAND)

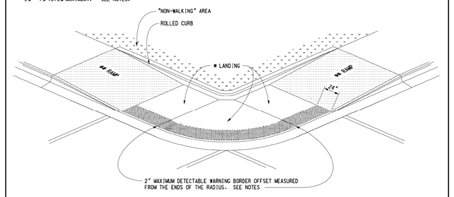
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

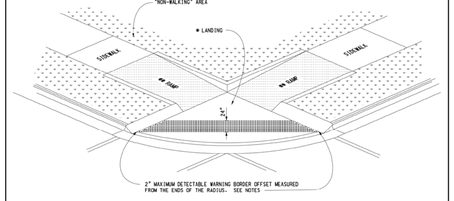
T.R.N.S. APPROVAL	3-15-2016 PLAN DATE	R-28-J	SHEET 3 OF 7

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



(RADIAL DETECTABLE WARNING SHOWN)



(TANGENT DETECTABLE WARNING SHOWN)

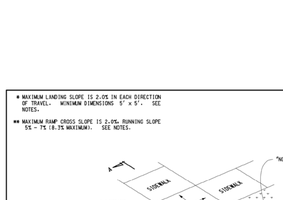
SIDEWALK RAMP TYPE D
(DEPRESSED CORNER)
USE ONLY WHEN INDEPENDENT DIRECTIONAL RAMPS CAN NOT BE CONSTRUCTED FOR EACH CROSSING DIRECTION

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

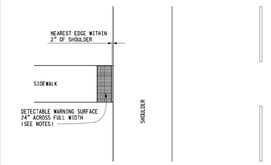
SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

T.R.N.S. APPROVAL	3-15-2016 PLAN DATE	R-28-J	SHEET 4 OF 7

* THE DETECTABLE WARNING SURFACE SHALL BE LOCATED SO THAT THE EDGE NEAREST THE RAIL CROSSING IS 6' MINIMUM AND 15' MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. DO NOT PLACE DETECTABLE WARNING ON RAILROAD CROSSING MATERIAL.



DETECTABLE WARNING AT RAILROAD CROSSING

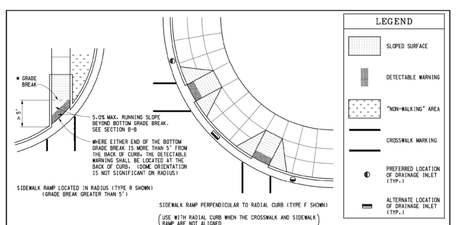


DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

T.R.N.S. APPROVAL	3-15-2016 PLAN DATE	R-28-J	SHEET 5 OF 7

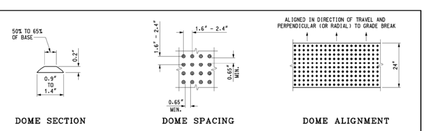


SECTION D-D
SIDEWALK RAMP ORIENTATION

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

T.R.N.S. APPROVAL	3-15-2016 PLAN DATE	R-28-J	SHEET 6 OF 7



DETECTABLE WARNING DETAILS

NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.

SIDEWALK RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE RUNNING SLOPE.

SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

WHEN 5' MINIMUM WIDTHS ARE NOT FEASIBLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4' AND LANDINGS TO NOT LESS THAN 4' x 4'.

DETECTABLE WARNING SURFACE COVERAGE IS 24" MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURBED OR FLARED CURB TRANSITION AREAS. A BORDER OFFSET NOT GREATER THAN 2" MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING IS ALLOWABLE FOR RADIAL CURB THE OFFSET IS MEASURED FROM THE ENDS OF THE RADIUS.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE, MAY NOT EXCEED 2.0%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.

THE MAXIMUM RUNNING SLOPE OF 8.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER'S, ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN ½". ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOWNWARD DIRECTION OF TRAVEL.

TRANSITION THE GUTTER PAN CROSS SECTION SUCH THAT THE COUNTER SLOPE IN THE DIRECTION OF RAMP TRAVEL IS NOT GREATER THAN 5.0%. MAINTAIN THE NORMAL GUTTER PAN CROSS SECTION ACROSS DRAINAGE STRUCTURES.

THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES".

FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.

DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

T.R.N.S. APPROVAL	3-15-2016 PLAN DATE	R-28-J	SHEET 7 OF 7

STATE OF MICHIGAN
JULIAN JAY WARGO, JR.
ENGINEER
No. 36177
LICENSED PROFESSIONAL ENGINEER

Julian J. Wargo, Jr.

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
PSP REVIEW	03/10/17	JJW	STAMPING SET	3/2/18	JJW						
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SIDEWALK RAMP DETAILS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK 0/0

DATE 2-16-17
DESIGNED BY JJW
DRAWN BY MAS
SCALE HOR: 1" = N/A VER: 1" = N/A
JOB NO. 16121
SHEET CE-12

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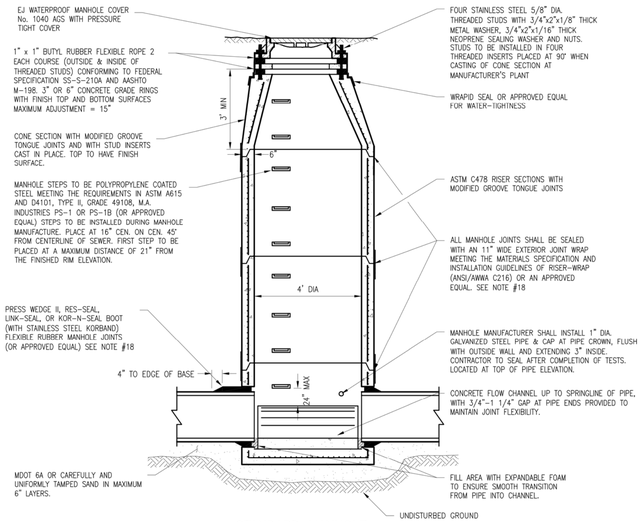
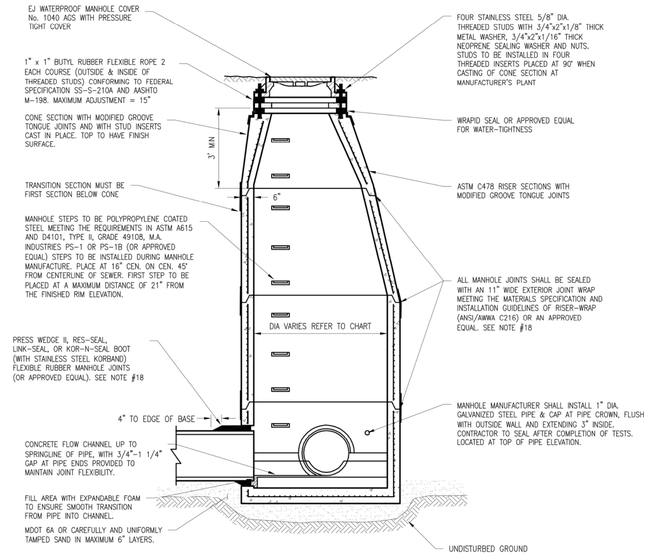


STANDARD MANHOLE

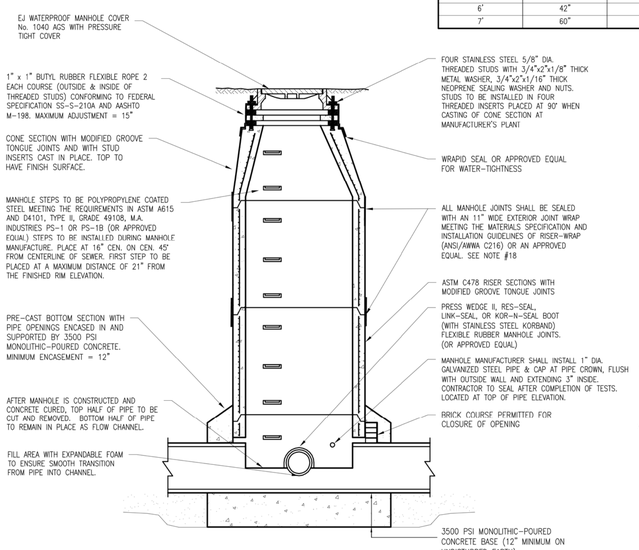
SEE NOTE #30



STANDARD OVERSIZED MANHOLE

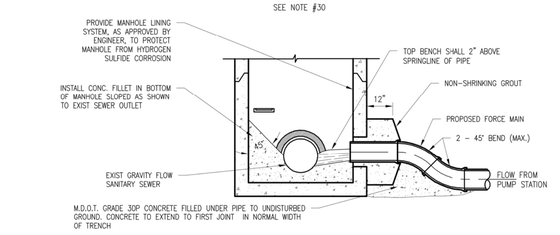
SEE NOTE #30

MANHOLE SIZING CHART		
MANHOLE DIAMETER	MAX PIPE SIZE FOR STRAIGHT THRU INST.	MAX PIPE SIZE FOR RIGHT ANGLE INST.
4'	24"	18"
5'	36"	24"
6'	42"	36"
7'	60"	42"

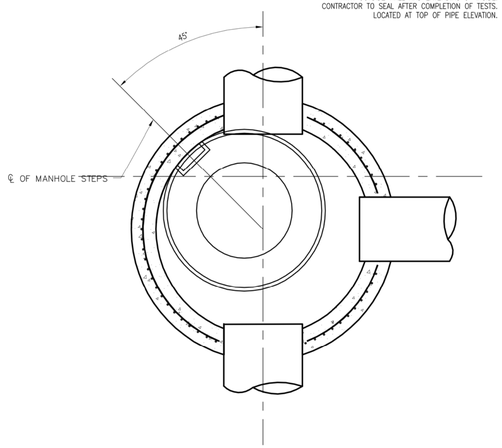


MINIMUM MANHOLE REQUIREMENTS ON MANHOLES CONSTRUCTED OVER EXISTING SEWERS

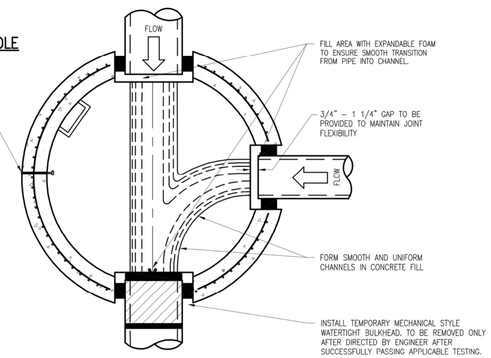
FOR LOCAL SANITARY SEWER EXTENSIONS CONNECTING DIRECTLY OR INDIRECTLY TO OAKLAND COUNTY DEPT. OF PUBLIC WORKS SEE NOTE #37

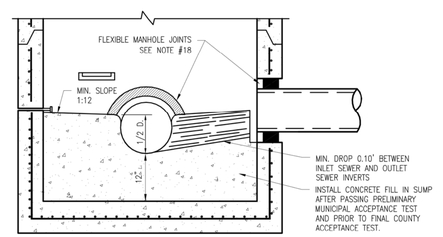


FORCEMAIN DISCHARGE TO EXISTING MANHOLE



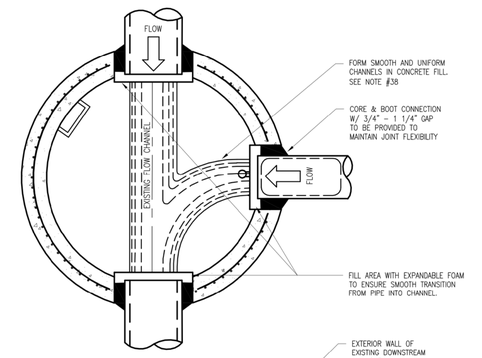
TOP VIEW OF MANHOLE

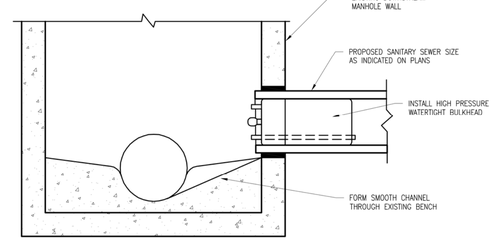




SUMP MANHOLE FOR TESTING, CLEANING & DEWATERING

SEE NOTE #7

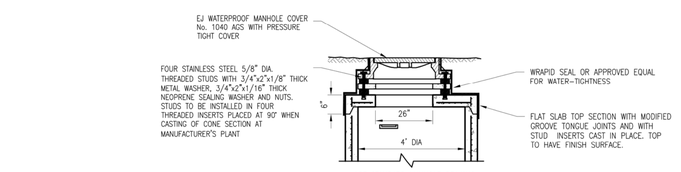




TESTING BULKHEAD WITH PIPE TAP

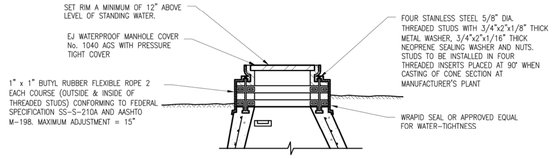
SEE NOTE #7

NOTE:
REMOVAL AND/OR REPLACEMENT OF ANY INSTALLATION WHICH DOES NOT MEET THE CITY OF NOVI DESIGN MANUAL OR THESE STANDARD DETAILS MAY BE REQUIRED AT THE PROPERTY OWNER'S EXPENSE.



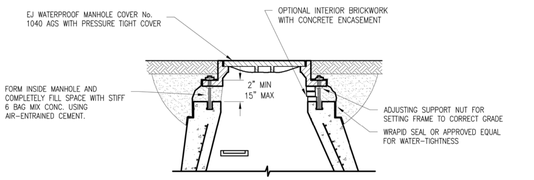
SEE STANDARD MANHOLE DRAWING FOR OTHER MANHOLE DETAILS.

FLAT TOP MANHOLE FOR SHALLOW MANHOLE INSTALLATIONS



SEE STANDARD MANHOLE DRAWING FOR OTHER MANHOLE DETAILS.

CONSTRUCTION DETAILS FOR MANHOLE TOPS WITHIN FLOOD PRONE AREAS



CONSTRUCTION DETAILS FOR MANHOLE TOPS WITHIN PAVEMENT AREAS

NOTES:
A. RUBBER "O-RINGS" NOT ALLOWED FOR MANHOLES IN PAVEMENT AREAS.
B. SEE STANDARD MANHOLE DRAWING FOR OTHER MANHOLE DETAILS.

CITY OF NOVI
SANITARY SEWER
STANDARD DETAILS

SHEET 1 OF 3

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TOWN: 1N RANGE: 8E
DATE: 3/2014 REVISIONS:

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SECTION 20, NOVI, MICHIGAN

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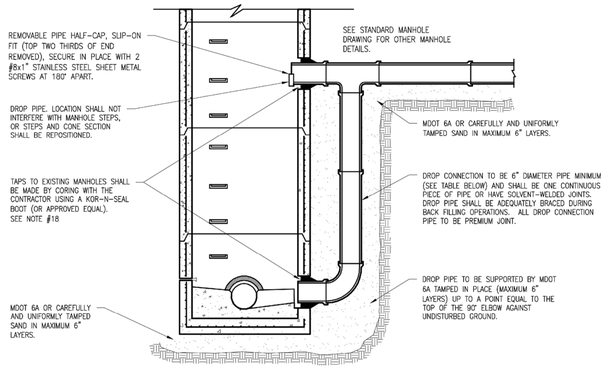
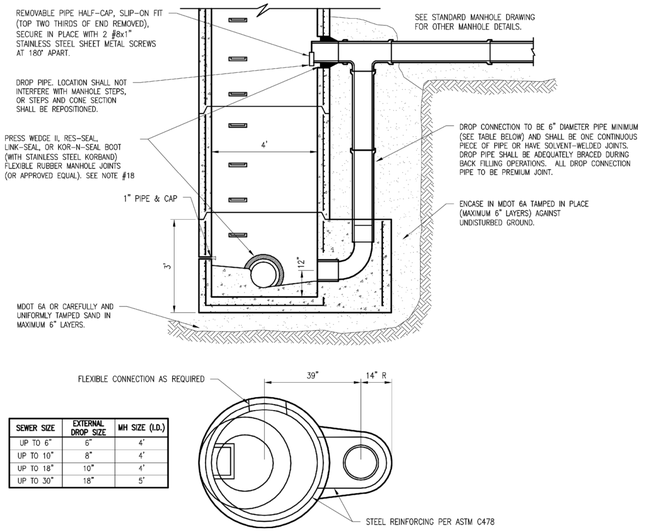


EXISTING MANHOLE EXTERNAL DROP CONNECTION FOR DROP CONNECTIONS BETWEEN 18" AND 20' IN DEPTH

(ONLY AS APPROVED BY O.C.W.R.C. AND NOVI D.P.S.)
SEE NOTES #31, #32 AND #33

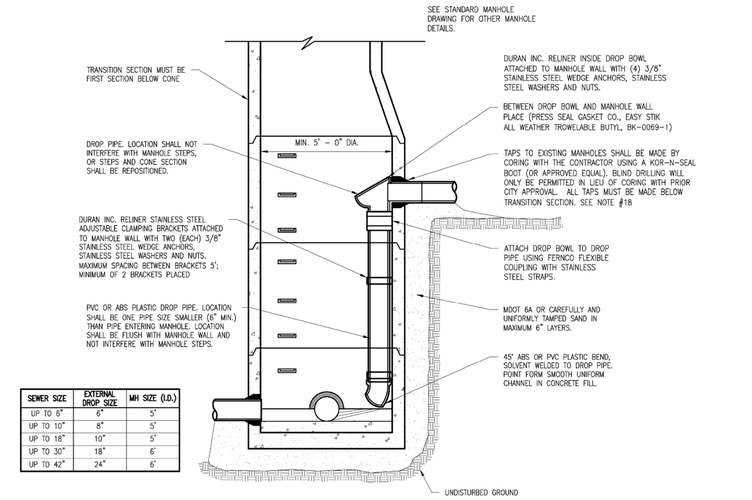
SEWER SIZE	EXTERNAL DROP SIZE	MH SIZE (I.D.)
UP TO 6"	6"	4'
UP TO 10"	8"	4'
UP TO 18"	10"	4'
UP TO 30"	18"	5'



SEWER SIZE	EXTERNAL DROP SIZE	MH SIZE (I.D.)
UP TO 6"	6"	4'
UP TO 10"	8"	4'
UP TO 18"	10"	4'
UP TO 30"	18"	5'

EXTERNAL DROP MANHOLE CONNECTION WITH PRECAST BASE FOR NEW SEWER SYSTEM CONSTRUCTION

SEE NOTES #31, #32 AND #32

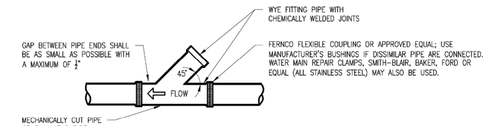


SEWER SIZE	EXTERNAL DROP SIZE	MH SIZE (I.D.)
UP TO 6"	6"	5'
UP TO 10"	8"	5'
UP TO 18"	10"	5'
UP TO 30"	18"	6'
UP TO 42"	24"	6'

INTERNAL DROP MANHOLE CONNECTION FOR DROP CONNECTIONS GREATER THAN 20 FEET DEPTH

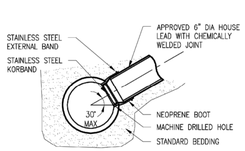
(ONLY AS APPROVED BY O.C.W.R.C. AND NOVI D.P.S.)

SEE NOTE #31

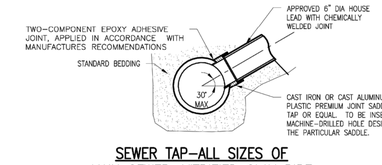


WYE PIPE INSERTION WITH FLEXIBLE COUPLINGS (RIDGID PIPE)

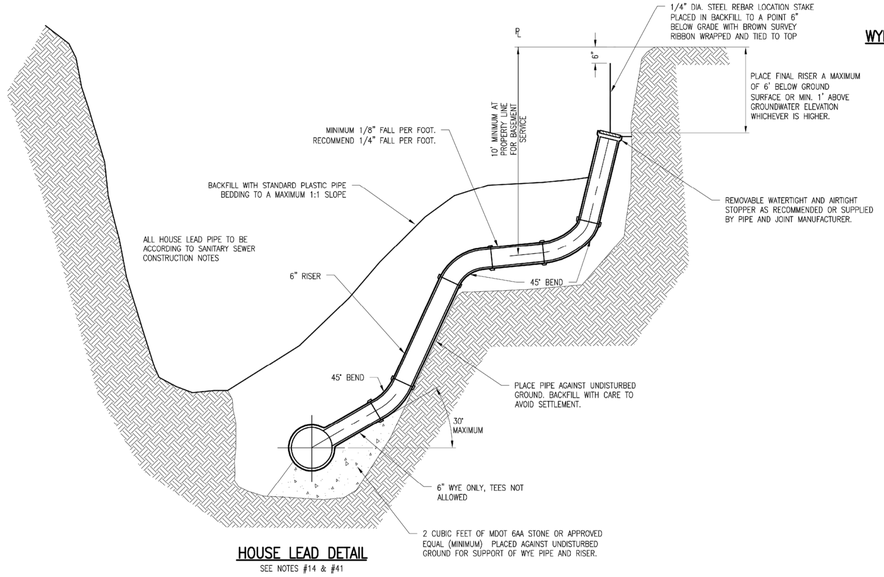
SEE NOTE #43



KOR-N-TEE TAP FOR CONCRETE PIPE

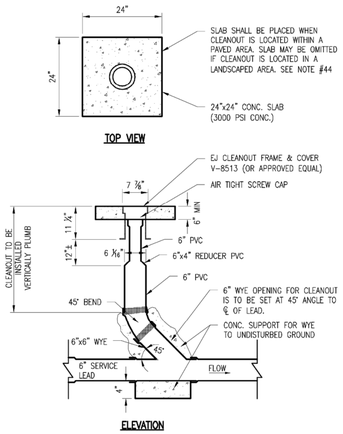


SEWER TAP-ALL SIZES OF MAIN SEWER, VITRIFIED CLAY PIPE



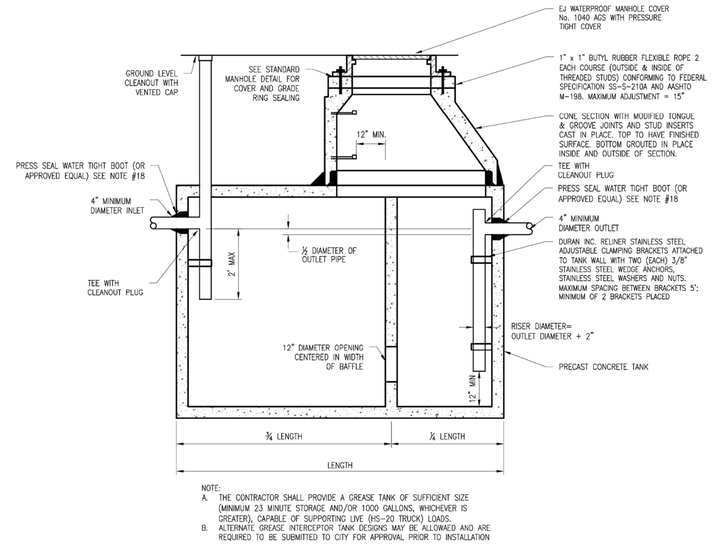
HOUSE LEAD DETAIL

SEE NOTES #14 & #41



DETAIL OF SANITARY SEWER CLEANOUT

NOTE:
PROVIDE EXPANSION PAPER AROUND PERIMETER OF CLEANOUT FRAME TO PREVENT CONCRETE FROM BONDING TO FRAME.



NOTE:
A. THE CONTRACTOR SHALL PROVIDE A GREASE TANK OF SUFFICIENT SIZE (MINIMUM 23 MINUTE STORAGE AND/OR 1000 GALLONS, WHICHEVER IS GREATER), CAPABLE OF SUPPORTING LIVE (HS-20 TRUCK) LOADS.
B. ALTERNATE GREASE INTERCEPTOR TANK DESIGNS MAY BE ALLOWAED AND ARE REQUIRED TO BE SUBMITTED TO CITY FOR APPROVAL PRIOR TO INSTALLATION

DOUBLE-COMPARTMENT GREASE INTERCEPTOR TANK FOR OUTLET PIPE BURIAL 42" AND DEEPER

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REVISIONS: DATE:
COUNTY: OAKLAND COUNTY
DATE:
TOWN 1N RANGE 8E
DATE 3/20/14 REVISIONS:

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STANDARD DETAILS

SHEET 2 OF 3

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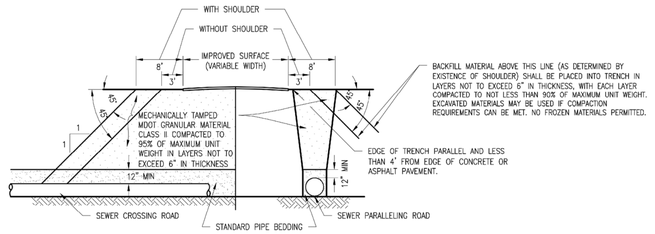
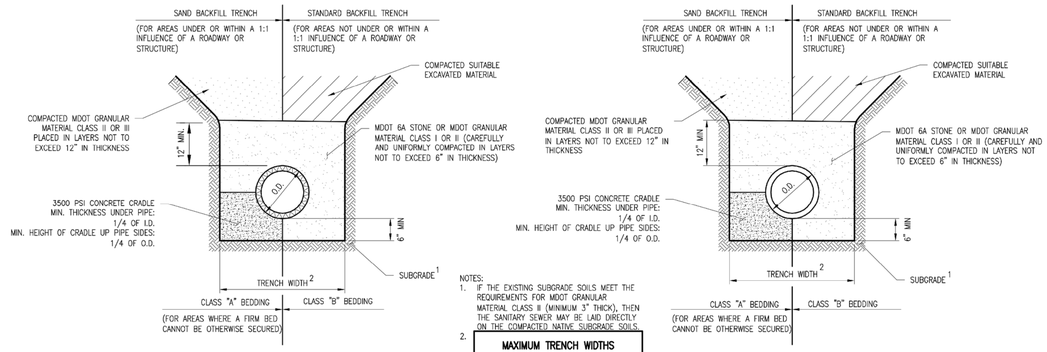


SAND OR GRAVEL BACKFILL DETAILS FOR SEWERS UNDER GRAVEL, CONCRETE OR ASPHALT PAVEMENTS, SIDEWALKS, DRIVEWAYS AND PARKING AREAS



NOTES:
1. IF THE EXISTING SUBGRADE SOILS MEET THE REQUIREMENTS FOR MDOT GRANULAR MATERIAL CLASS II (MINIMUM 3" THICK), THEN THE SANITARY SEWER MAY BE LAID DIRECTLY ON THE COMPACTED NATIVE SUBGRADE SOILS.
2.

MAXIMUM TRENCH WIDTHS	
I.D. PIPE SIZE	TRENCH WIDTH
UP TO 15"	30"
18" TO 36"	O.D. + 16"
42" OR LARGER	O.D. + 24"

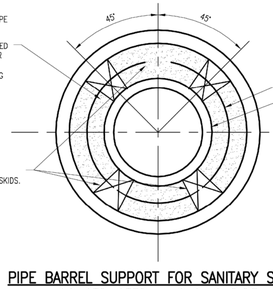
BEDDING AND TRENCH BACKFILL DETAIL

SEE NOTES #20 THRU #25

DETAILS ARE TYPICAL FOR SANITARY SEWER CONSTRUCTED IN CASING PIPE

8" BRICK BULKHEAD SHALL BE PLACED AT EACH END OF CASING PIPE AFTER PIPE INSTALLATION. SKIDS SHALL TERMINATE 12" FROM END OF CASING TO ALLOW BULKHEADING OF ENTIRE PIPE CIRCUMFERENCE

SANITARY SEWER PIPE SHALL BE STRAPPED TO 4" x 4" WOLMANIZED SKIDS.



O.D. OF SANITARY SEWER JOINT

SANITARY SEWER (CARRIER PIPE)

DIA OF SEWER	SEWER MATERIAL	MIN (ID) "A"	ROAD CROSSING MIN "B"	RAILROAD CROSSING MIN "B"
10"	TRUSS	20"	.312	.312
12"	TRUSS	24"	.312	.375
15"	TRUSS	30"	.312	.438
18"	CONC	36"	.375	.500
21"	CONC	36"	.375	.500
24"	CONC	42"	.375	.500

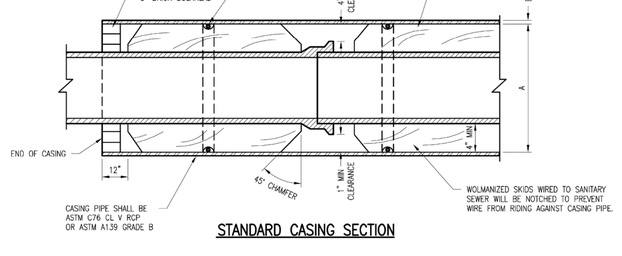
A=INSIDE DIAMETER
B=WALL THICKNESS

4" MINIMUM CLEARANCE BETWEEN MAX. O.D. OF THE SEWER AND THE I.D. OF THE CASING PIPE FOR THE TOP 90° ARC OF THE CASING. (SEE DETAIL)

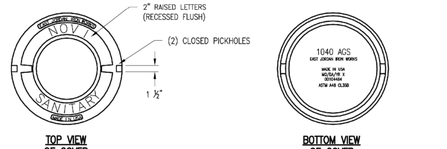
PIPE BARREL SUPPORT FOR SANITARY SEWER CONSTRUCTED IN CASING PIPE

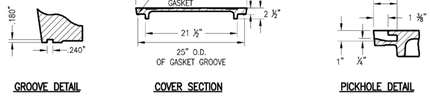
THE CONTRACTOR SHALL SUBMIT IN WRITING THE DETAILS OF THE APPROPRIATE PIPE CASING INSTALLATION FOR THE REVIEW AND APPROVAL BY THE ENGINEER BEFORE INSTALLATION OF ANY CASING STARTS. ALTERNATE METHODS OF SUPPORTING AND MAINTAINING THE POSITION OF THE CARRIER PIPE WITH RESPECT TO THE CASING PIPE (IN LIEU OF THE USE OF TIMBERS) WILL BE CONSIDERED.

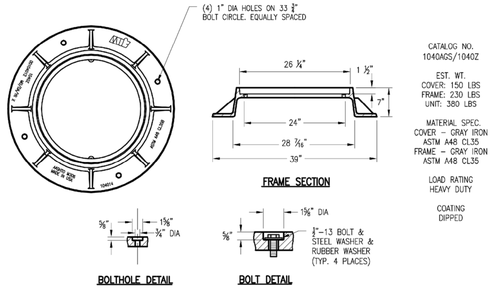
PLACE WOLMANIZED SKID ALONG THE TOP OF THE CARRIER PIPE IN ORDER TO PREVENT THE CARRIER PIPE FROM ROLLING OVER OR FLOATING. SAND OR GROUT SHALL BE PLACED BETWEEN THE CASING PIPE AND CARRIER PIPE IN ACCORDANCE WITH THE CONTROLLING AGENCY PERMIT SPECIFICATIONS. GROUT PLACEMENT MUST BE ACHIEVED BY MEANS OF PRESSURE GROUTING; GRAVITY FLOW INSTALLATION OF GROUT WILL NOT BE PERMITTED.



STANDARD CASING SECTION







CAST IRON MANHOLE FRAME AND COVER

SANITARY SEWER CONSTRUCTION NOTES

GENERAL NOTES:

1. All construction shall conform to the current standards and specifications of the City of Novi and the Oakland County Water Resource Commissioner (O.C.W.R.C.). All sanitary sewer construction shall have full-time inspection supervised by a State of Michigan professional engineer provided by, or caused to be provided by, the City of Novi. The Contractor shall contact the City of Novi to schedule inspection two (2) full working days prior to the start of construction.
2. At all connections to O.C.W.R.C. sewers or to extensions thereto, and before the start of construction, the Contractor must request and have in his possession an approved Sewer Inspection Permit issued by the O.C.W.R.C. The Contractor shall be responsible for all O.C.W.R.C. charges and shall contact O.C.W.R.C. for their fees, bonds and deposit requirements. The Contractor shall notify the City of Novi and the O.C.W.R.C. ((248) 858–1110) three (3) full working days prior to the beginning of any construction. Final air test must be witnessed by the O.C.W.R.C. personnel and must be scheduled in advance.
3. Three (3) working days prior to construction, the Contractor shall telephone MISS DIG (811 or 1–800–482–7171) for underground facilities locations and shall also notify representatives of other utilities located in the vicinity of the work.
4. No ground water, storm water, construction water, downspout drainage or weep tile drainage shall be allowed to enter any sanitary sewer.
5. 18 inch minimum vertical separation and 10 foot minimum horizontal separation must be maintained between sanitary sewer and water main.
6. No sewer installation shall have an infiltration exceeding 100 gallons per inch diameter per mile of pipe per 24 hour period and no single run of sewer between manholes shall exceed 100 gallons per inch diameter per mile. Air tests in lieu of infiltration tests shall be as specified in O.C.W.R.C. Standards. All testing gauges shall be calibrated every six (6) months, with the last certification date provided to O.C.W.R.C. prior to testing. Only Modified Groove Tongue, O–Ring, Uniloc, Amvit, Nobel, Ring–Tite, Fluid–Tite or equal, as approved by O.C.W.R.C./City of Novi may be used for sewer joints. All joints shall meet requirements of ASTM C425 or C443.
7. At all connections to an existing O.C.W.R.C. sewer or to extensions there to, a temporary watertight bulkhead with a threaded, capped or valved 1 inch diameter pipe to permit measuring infiltration shall be provided to be removed only after directed by the engineer. A 12 inch temporary sump and a watertight mechanical bulkhead shall be installed on the first manhole upstream of the proposed connection. The temporary sump shall be filled in after successful completion of any infiltration test up to the standard fillet provided for the flow channel, and the bulkhead shall be removed after directed by engineer. Infiltration testing is required for all sewers twenty–four (24) inch diameter and greater, or for all sewer pipe diameters where the ground water level is seven (7) feet above the top of the sewer pipe.
8. When connections are made to sewers carrying fluids, special care must be taken that no part of the work is built under water. A flume or dam must be installed and pumping maintained, if necessary, and the new work kept dry until completed and any concrete or mortar has set up.
9. A NASSCO PACP formatted video of the interior of sanitary sewer 8" or greater in diameter (with lag and lead locations) shall be submitted to and approved by the City prior to final acceptance. Said video shall be obtained a minimum of 30 days after construction is completed and by a NASSCO PACP Certified CCTV Contractor. Typical items to be reviewed on the videotape will include pipe deflections, pipe settlement, lead connections, joints and pipe cleanliness. If the video review reveals unsatisfactory conditions, the Contractor shall correct the condition at his own cost and shall then re–video the affected pipe for review by the City.
10. The completed installation shall at no point have out–of–round pipe deflections greater than 5%. Deflectometer or go/no–go gauging tests will be required prior to sewer acceptance.
12. The materials specified below may be substituted with an approved equal as determined by the City. It is at the sole discretion of the City to determine if a material is acceptable and can be utilized. Written authorization must be obtained prior to ordering or installing the approved equal.

SANITARY SEWER NOTES:

MATERIALS AND CERTIFICATIONS

13. Truss Pipe and Fittings shall be as described under the current ASTM D2680. Appendix X1 of said specification shall be as modified by the bedding requirements outlined below.
14. Solid wall pipe for 6" house connection sewers shall be PVC SDR 23.5 conforming to ASTM D3034 or PVC Schedule 40 conforming to the current ASTM D2665. Solid wall pipe shall be installed in accordance with bedding requirements outlined below.
15. Pipe material utilized for force main shall submitted to and approved by the City prior to installation.
16. All pipe shall be certified by the manufacturer to meet the applicable ASTM specification requirements. Certification forms, together with a report of the test results, shall be provided to the inspector with pipe deliveries and copies shall be forwarded to the Engineer or the Owner. Certification forms shall include project name, location, Contractor, and test lot number. Lot sizes shall be acceptable to the Engineer.
17. All pipe and fittings shall be suitably marked to provide manufacturer's name, extrusion code (including date and location of manufacture), ASTM designation, type of plastic, nominal diameter, and SDR number, where applicable. Fittings however, need not contain the extrusion code. Pipe shall have a "home" mark. Truss Pipe with an absence of filler material at the ends greater than 1/4" deep shall be subject to rejection or acceptable repair.
18. O.C.W.R.C./City of Novi approved flexible manhole joints shall be used. Where adaptors to other materials are required, only approved adaptors and joints may be used. Where the connections are made to existing manholes, a rubber waterstop shall be used around the pipe.
19. No clay pipe will be allowed for main line sanitary sewer or for sanitary sewer leads.

BEDDING

20. Bedding for Truss Pipe and solid wall pipe shall be in accordance with the current ASTM D2321, except, (1) only MDOT Class I and Class II granular materials or MDOT 6A stone may be used, (2) embedment shall extend to minimum 12" above top of pipe, and (3) flooding or puddling shall not be used. The use of flexible and semi–flexible pipe requires that the bedding provide unyielding side support and complete bedding contact under pipe haunches. Bedding material must be properly placed and compacted to provide lateral restraint against deflection in the pipe diameter. Pipe must be bedded to the true line and grade throughout its length. Bell holes shall be provided where required.
21. Where unstable bottoms are encountered, the Contractor shall undercut to stable ground and construct a foundation consisting of MDOT 6A stone to act as an impervious mat to prevent migration or vertical movement of unstable soils or bedding materials. Where trench sheeting, plates, or a trench box are used due to severe ground conditions, all voids to the side and below the top of the pipe caused by the sheeting, plates, or box withdrawal shall be completely filled or the supports left in place below the top of the pipe.
22. Concrete cradle bedding shall not be used where allowable trench widths are exceeded. In lieu of concrete cradle bedding, standard pipe bedding shown shall be provided to the full width between undisturbed trench walls or at least 2.5 pipe diameters on both sides of the pipe.
23. Due to potential damage to exterior walls of Truss Pipe or solid wall pipe, particularly under cold weather conditions, if rocks, frozen material, or large objects strike the pipe, the Contractor shall carefully avoid dumping any materials other than approved bedding sand or stone on the pipe until 12" cover is placed on it, particularly under cold weather conditions. Pipe walls and ends shall also be protected from abrasion and damage during handling, and shall be fully inspected just prior to placing in the trench.
24. Care shall be taken during bedding compaction to avoid distorting the shape of the pipe or damaging its exterior wall. Mobile equipment shall not be used over the pipe trench until 48" of cover has been placed.

BACKFILL

25. Backfill shall be compacted above pipe or as indicated on construction drawings. Trench backfill shall be a suitable material and shall be free of any organic materials and rocks larger than 3" in size. Under road surfaces, pavement, sidewalks, curbs, driveways and areas where trench is within a 1:1 influence of the pavement, sand backfill shall be used which shall consist of MDOT granular material Class II or III compacted in layers not to exceed 6" in thickness to a density of 95% as determined by AASHTO T99. All backfill placed within a 1:1 influence of structures shall be approved sand, placed in 6" layers and compacted. Trenches which are to be left open overnight shall be enclosed with suitable fencing and lighted barricades, unless otherwise approved by the city.

JOINTS

26. Joints for ABS Truss Pipe and ABS solid wall pipe shall be chemically welded in accordance with the manufacturer's recommendation and the current ASTM D2680 and D2235. Additionally, all exposed ends of Truss Pipe shall be fully and thoroughly coated with plastic jointing cement prior to making joints so as to seal ends to eliminate the possibility of false low pressure air tests. Care shall be taken to insure all joints being pushed to the full "home" position and held tightly in the "home" position during any grade or line adjustments. Pipe shall be rotated during joint insertion to insure a complete spread of jointing cement. ABS Plastic Cement Primer and ABS Plastic Pipe Cement shall arrive at the job site in sealed and labeled containers. "Johnny Mops" or similar swab type applicators shall be used to apply primer and cement. Opened containers in the trench shall be protected from dirt, water, and other contaminants.
27. Joints for PVC Truss Pipe, PVC solid wall pipe and fittings shall be of the elastomeric gasket push–on type. Such joints shall conform to the current ASTM D3212 and the pipe manufacturer shall file with the O.C.W.R.C. a copy of certified test results of its jointing system prior to use. Gasket joints shall be installed in accordance with procedures specified by the pipe manufacturer, such that the gasket will be compressed (not displaced) in the joint to form a positive seal. Care shall be taken to insure all joints be pushed to the full "home" position and held together in the "home" position during any grade or line adjustments.

CUTTING AND HANDLING

28. Cutting of pipe lengths, where required, shall be performed with tools or equipment that will provide a neat, perpendicular cut without damage to the plastic or the filler material. All burrs shall be removed by the use of a file, knife, or abrasive paper. Spigot ends on cut pipe shall be beveled similar to factory beveling to prevent gasket damage.
29. Bowing or warping of Truss Pipe or solid wall pipe can occur with temperature fluctuations. The Contractor shall store and protect the pipe to minimize bowing. Nominal 12'6" or longer pipe lengths having deviations from straight greater than 1", as measured along a straight line, shall not be used.

STRUCTURE NOTES:

30. All new manholes shall have O.C.W.R.C./City of Novi approved flexible, watertight seals where pipes pass through walls. Manholes shall be precast sections with modified tongue and groove joints with rubber gaskets and shall conform to ASTM C478. Precast manhole sections shall be O.C.W.R.C./City of Novi approved modified eccentric cone type. All manholes shall be provided with watertight covers.
31. At all connections to manholes on O.C.W.R.C. sewers or extensions thereto, drop connections will be required when there is a difference in invert elevations. Only outside drop connections will be approved for drops less than 20 feet. However, for special conditions, such as poor soils or manhole depths greater than 20 feet, the Novi DPS and/or O.C.W.R.C. may allow an internal drop connection. To maintain the flexibility of the pipe materials, concrete encasement of drop connections shall not be used.
32. The difference in the invert elevations at a drop connection must be a minimum of 18". If an 18" minimum cannot be obtained, the sewer must be made steeper in order to achieve matching invert elevations for all incoming and outgoing sewers.
32. All new manholes requiring a drop connection shall be constructed using a manhole base with a precast drop as shown on sheet 2 of these details.
33. Wherever existing manholes are to be tapped, the tap shall be made by coring. The contractor shall place a KOR–N–SEAL boot (or approved equal) after coring is completed. Blind drilling will only be permitted in lieu of coring with prior approval from both O.C.W.R.C. and City of Novi.
34. All manholes constructed or adjusted as part of the system maintained by the City of Novi shall be provided with watertight covers as depicted on this detail sheet.
35. New manholes constructed directly on O.C.W.R.C. sewers shall be provided with covers reading "Oakland County Water Resources Commissioner – Sanitary" in raised letters per detail in the O.C.W.R.C. specifications.
36. New manholes built over any existing sanitary sewers shall have monolithic poured bottoms.
37. A proper channel shall be constructed within the existing structure at the connection point to the existing system. Channel shall be constructed to create the least amount of turbulence. Any portion of the existing structure which would interfere with such construction shall be removed. When forming a concrete channel in a precast structure that utilizes a flexible joint pipe connector, the channel shall be placed so as not to interfere in any way with the flexibility of the joint. The channel shall be constructed the same size as the inside diameter of the existing pipe.

SANITARY SEWER LEAD NOTES:

38. All building lead work must be performed under City of Novi inspection. The Department of Public Service conducts inspection of lead from main sewer to ROW line. The Building Department conducts inspection of lead from ROW line to building connection.
39. No sanitary sewer may be used as a dewatering outlet.
40. All building leads and risers shall be 6 inch S.D.R. 23.5 ABS pipe with chemically fused joints (ASTM D2751), S.D.R. 23.5 PVC with rubber gasket joint (ASTM D2665 and ASTM D3034, respectively), or an City of Novi approved equal pipe and joint. Sewer pipe wye openings shall contain factory installed premium joint material of the type identical to that of the building lead pipe used. Building leads to be furnished with removable cirtight and watertight stoppers. Taps to existing PVC or Truss Pipe shall be made with wye saddle taps.
41. Where an existing building lead is being extended, dissimilar types and sizes of pipe shall be joined using an O.C.W.R.C./City of Novi approved adapter. Allowable types of sewer pipe adapters are the Fernco Adapter or the Fernco Flexible Coupling.
42. Field taps of existing sanitary sewers shall be made by installing a wye fitting for house connections. Fernco fittings with stainless steel bands shall be used to secure the wye fitting to the sanitary sewer pipe. Bedding for house connection sewers shall be equal to that of the main sewer bedding. Risers in deep and unstable trenches should be bedded in MDOT 6A stone, or an approved equal, to avoid settlement. Concrete shall not be used for bedding. End caps or plugs shall be braced or anchored to withstand air test pressures. Caps or plugs shall not be chemically welded in place.
43. Where sanitary sewer cleanouts fall within a paved area (parking lot, service drive area, etc.), the cleanout shall have a cast iron cover that is centered in a 2'x2'x6" (min.) concrete slab having a compressive strength of 3000 psi at 28–day cure time.

DRAWING PATH: P:\0126_016501\63110100_Engineering Design Manual\Standard Detail Revision\Sanitary.dwg May 01, 2014 - 11:04am

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CITY OF NOVI | 45175 WEST 10 MILE ROAD | NOVI, MI 48375 | P (248) 347-0456 | WWW.CITYOFNOVI.ORG

SCALE V: N.T.S. H: N.T.S. | DATE | REVISIONS

COUNTY OAKLAND COUNTY | DATE | TOWN 1N | RANGE 8E | DATE 3/2014 | REVISIONS

CITY OF NOVI
SANITARY SEWER
STANDARD DETAILS

SHEET 3 OF 3

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
CITY REVIEW	9/11/17	JJW									
FSP SUBMITTAL	10/25/17	JJW									
FSP SUBMITTAL	12/12/17	JJW									
STAMPING SET	3/2/18	JJW									

ZEIMET WOZNIAK & ASSOCIATES
Civil Engineers & Land Surveyors
55800 GRAND RIVER AVE., SUITE 100
NEW HUDSON, MICHIGAN 48165
P: (248) 437-5099 F: (248) 437-5222 www.zeimetwozniak.com

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CITY OF NOVI SANITARY SEWER DETAILS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK 5174

DATE	2–16–17	SCALE	HOR: 1" = N/A VER: 1" = N/A
DESIGNED BY	JJW	JOB NO.	16121
DRAWN BY	MAS	SHEET	CE–15

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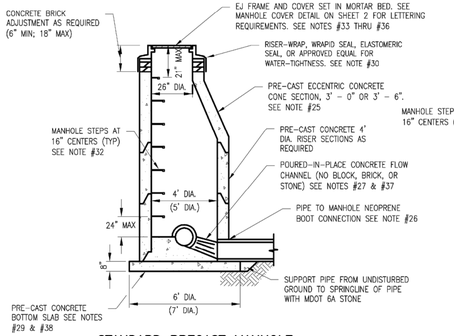
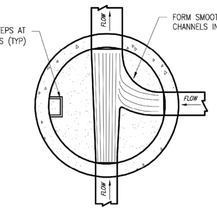


STANDARD PRECAST MANHOLE

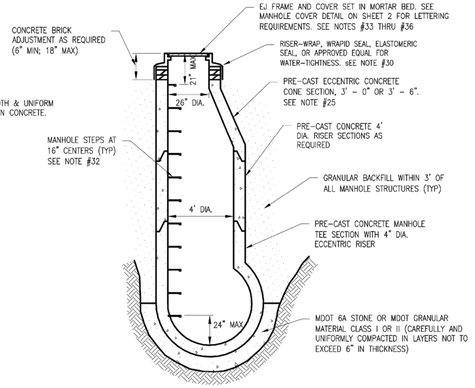
SEE NOTE #24

NOTE:
STRUCTURE DIAMETER SHALL BE AS SHOWN ON APPROVED PLANS AND SHALL BE DETERMINED BY THE DIAMETER AND ANGLES OF THE SEWER. SEE MANHOLE SIZING CHART ON THIS SHEET.



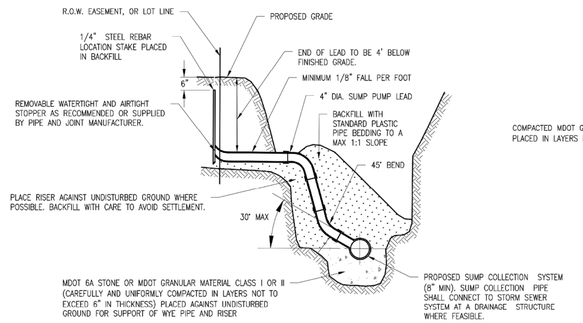
CHANNEL DETAIL

SEE NOTE #37

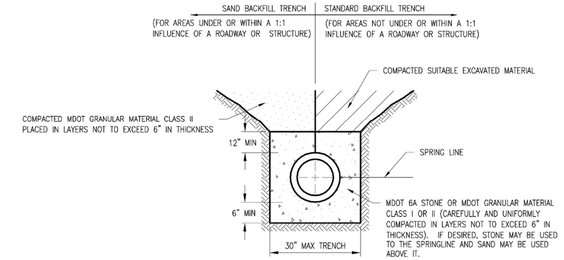


PRE-CAST TEE MANHOLE DETAIL

SEE NOTE #24

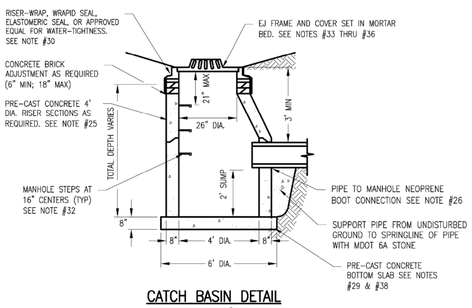


HOUSE LEAD DETAIL FOR 4" DIA. PLASTIC SUMP PUMP LEADS



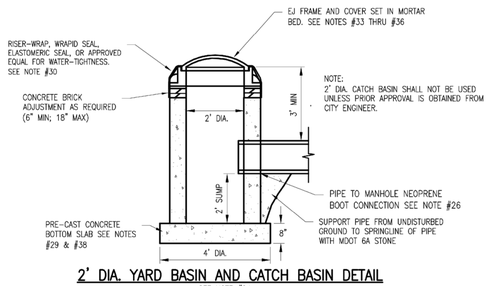
BEDDING AND TRENCH BACKFILL DETAIL FOR 12" DIAMETER AND SMALLER PIPE (PVC AND HDPE PIPE)

SEE NOTES #18 THRU #23



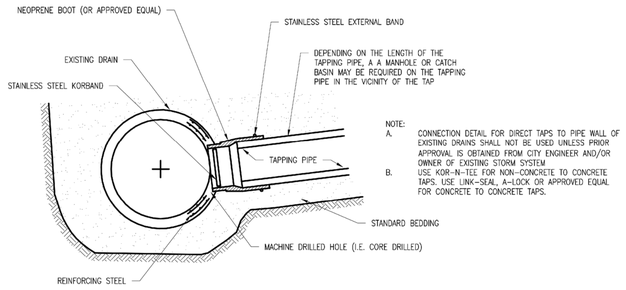
CATCH BASIN DETAIL

SEE NOTE #24

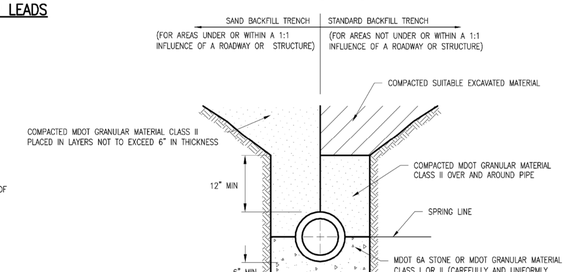


2' DIA. YARD BASIN AND CATCH BASIN DETAIL

SEE NOTE #24



KOR-N-TEE TAP FOR CONCRETE PIPE



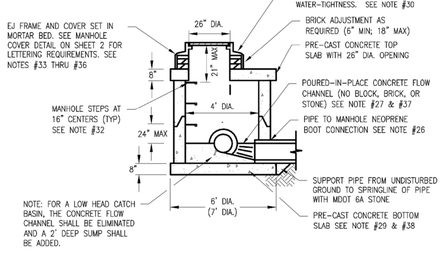
BEDDING AND TRENCH BACKFILL DETAIL FOR 24" DIAMETER AND SMALLER PIPE (CONCRETE AND METAL PIPE)

SEE NOTES #18 THRU #23

INSIDE DIAMETER	MAXIMUM PIPE SIZE FOR STRAIGHT THRU INSTALLATION	MAXIMUM PIPE SIZE FOR RIGHT ANGLE INSTALLATION
4' - 0"	24" 24"	18" 18"
5' - 0"	36" 36"	24" 24"
6' - 0"	42" 42"	36" 36"
8' - 0"	60" 60"	42" 42"

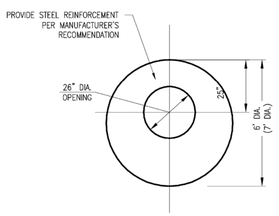
MANHOLE SIZING CHART

SEE NOTES #28 & #31

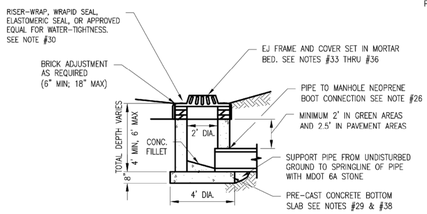


LOW HEAD MANHOLE AND CATCH BASIN DETAIL

SEE NOTE #24

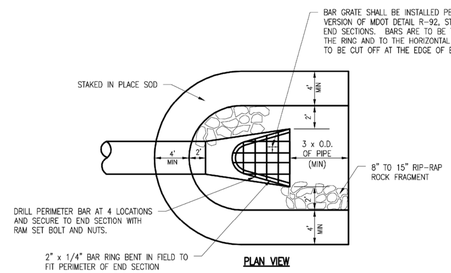


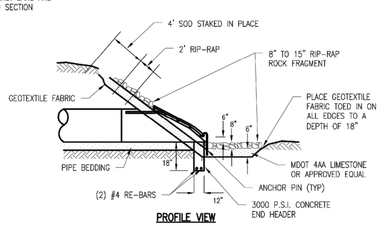
PRE-CAST CONCRETE TOP SLAB DETAIL, 8" THICK

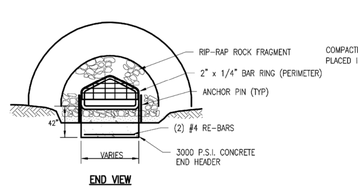


PRECAST 2' DIA. INLET DETAIL

SEE NOTE #24

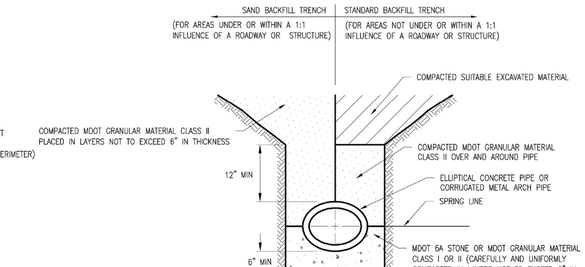






END SECTION AND BAR SCREEN DETAIL

NOTES:
A. BAR GRATE SCREEN SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION IS COMPLETE.
B. HINGED BAR GRATES WILL BE REQUIRED FOR HEADWALLS PER OCWRC OR MDOT STANDARDS, WHICHEVER IS STRICTER.
C. RIP-RAP MAY NOT CONTAIN ANY BROKEN CONCRETE. STANDARD RIP-RAP: 8" TO 15" ROCK; HEAVY DUTY RIP-RAP: 16" TO 24" ROCK



BEDDING AND TRENCH BACKFILL DETAIL FOR ELLIPTICAL CONCRETE PIPE OR CORRUGATED METAL ARCH PIPE

SEE NOTES #18 THRU #23

DRAWING PATH: P:\0126_0165\0163110100_Engineering Design Manual\Standard Detail Revisions\Storm.dwg May 01, 2014 - 11:05am

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H: N.T.S. V: N.T.S. SCALE

REVISIONS: DATE:

REVISIONS: DATE:

COUNTY OAKLAND COUNTY DATE:

RANGE 8E TOWN 1N

DATE JUNE 2012 REVISIONS

CITY OF NOVI STORM SEWER STANDARD DETAILS

SHEET 1 OF 2

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
CITY REVIEW	9/11/17	JJW									
FSP SUBMITTAL	10/25/17	JJW									
FSP SUBMITTAL	12/12/17	JJW									
STAMPING SET	3/2/18	JJW									

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CITY OF NOVI STORM SEWER DETAILS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK SHT

DATE 2-16-17 | SCALE HOR: 1" = N/A VER: 1" = N/A
DESIGNED BY JJW | JOB NO. JJW
DRAWN BY MAS | SHEET CE-16

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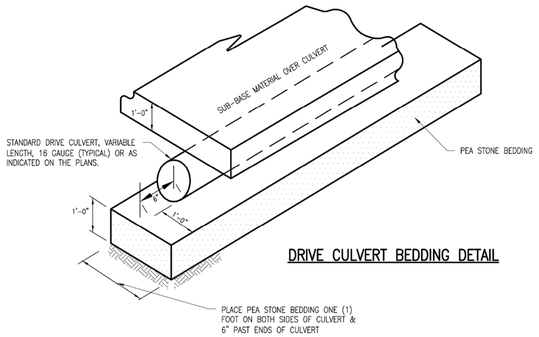
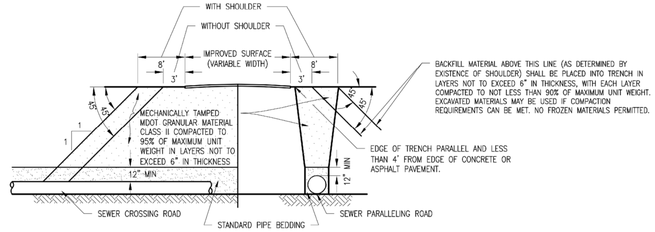
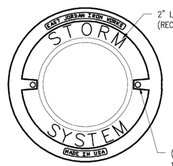


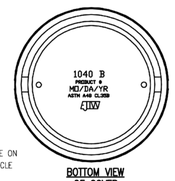
DRIVE CULVERT BEDDING DETAIL



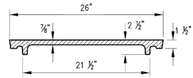
SAND OR GRAVEL BACKFILL DETAILS FOR SEWERS UNDER GRAVEL, CONCRETE OR ASPHALT PAVEMENTS, SIDEWALKS, DRIVEWAYS AND PARKING AREAS



TOP VIEW OF COVER



BOTTOM VIEW OF COVER



COVER SECTION

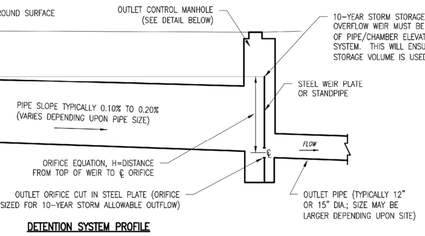
CATALOG NO. 1040B

EST. WT. COVER: 150 LBS

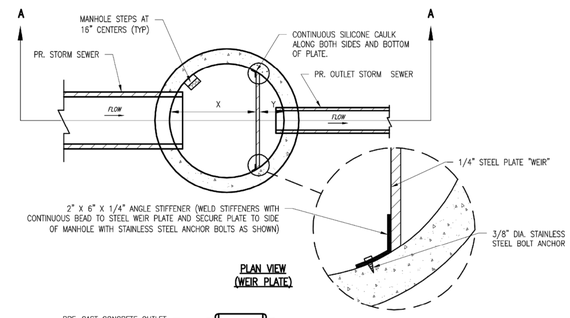
MAT'L SPEC. COVER – GRAY IRON ASTM A48 CL35B

LOAD RATING HEAVY DUTY

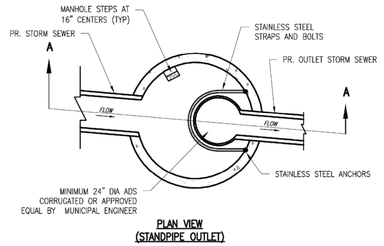
COATING DIPPED



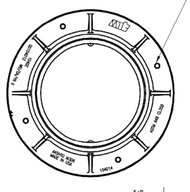
DETENTION SYSTEM PROFILE

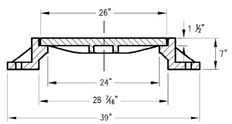


PLAN VIEW (WEIR PLATE)



PLAN VIEW (STANDPIPE OUTLET)





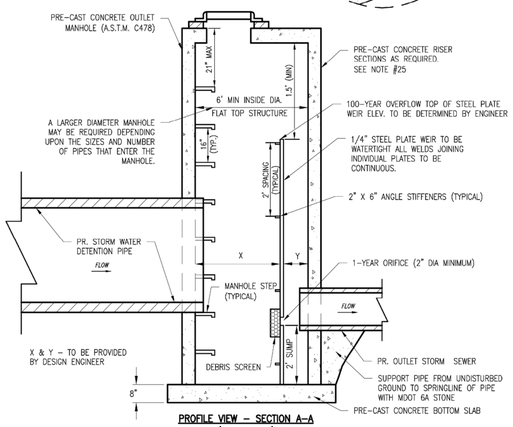
FRAME SECTION

BOLTHOLE DETAIL

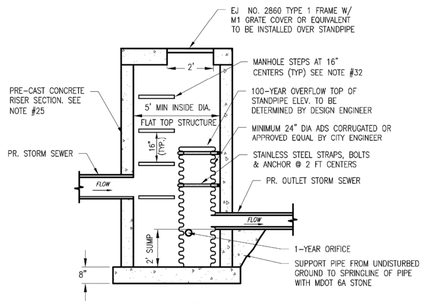
BOLT DETAIL

CAST IRON MANHOLE COVER

SEE NOTE #33



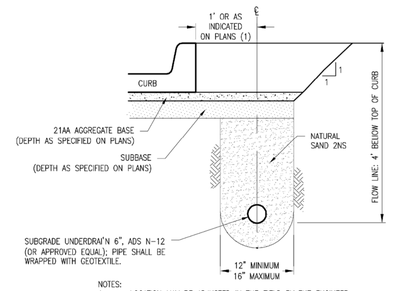
PROFILE VIEW – SECTION A–A (WEIR PLATE)



PROFILE VIEW – SECTION A–A (STANDPIPE OUTLET)

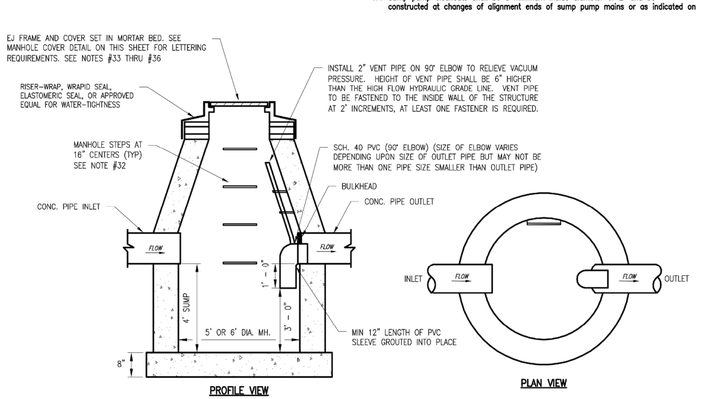
TYPICAL UNDERGROUND DETENTION AND OUTLET MANHOLE DETAILS

SEE NOTE #24



NOTES:
A. LOCATION MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
B. ALL UNDERDRAIN SHALL BE APPROVED PLASTIC PIPE PER MDOT SECTION 909.07. METAL PIPE SHALL NOT BE USED.
C. ALL UNDERDRAIN SHALL OUTLET TO DRAINAGE STRUCTURE.
D. UNDERDRAIN CONNECTIONS (AT LOW POINTS) SHALL BE MADE AS CLOSE TO THE STRUCTURE INVERT AS PRACTICAL WITH A SPIRAL WRAP OF THE STRUCTURE USED TO MAKE THE TRANSITION FROM THE REQUIRED FLOW LINE DEPTH TO STRUCTURE INVERT.

SUBGRADE UNDERDRAIN, 6"



PROFILE VIEW

PLAN VIEW

OIL/GAS SEPARATOR DETAIL FOR 18" DIAMETER AND SMALLER OUTLET PIPE

(FOR OUTLET PIPES LARGER THAN 18" IN DIAMETER AN ALTERNATE DESIGN MUST BE APPROVED BY THE CITY ENGINEER)
SEE NOTE #41

STORM SEWER CONSTRUCTION NOTES

GENERAL NOTES:
1. All materials and workmanship shall be in accordance with the standards and specifications of the City of Novi.
2. No storm sewer is to be installed without the City's inspector present.
3. Three (3) working days prior to construction, the Contractor shall telephone MISS DIG (811 or 1-800-482-7171) for underground facilities locations and shall also notify representative of other utilities located in the vicinity of the work.
4. Trenches that are to be left open overnight shall be enclosed with suitable fencing and lighted barricades.
5. The materials specified below may be substituted with an approved equal as determined by the City. It is at the sole discretion of the City to determine if a material is acceptable and can be utilized. Written authorization must be obtained prior to ordering or installing the approved equal.

STORM SEWER NOTES:
6. Type and class of pipe shall be as specified on plans.

Concrete Pipe Requirements
7. All round reinforced concrete pipe (RCP) shall meet the requirements of ASTM C76 with modified tongue and groove joints with rubber gaskets manufactured to meet the requirements of ASTM C443. Catch basin sewers shall be Class IV RCP.
8. The inside joint of pipe over 36" diameter shall be pointed with mortar upon completion of backfilling operations.
9. All elliptical reinforced concrete pipe shall meet the requirements of ASTM C507 with tongue and groove joints with bituminous (DeWitt #10) joint material meeting the requirements of C443. Elliptical concrete pipe joints shall also be wrapped per ASTM C877. In addition, elliptical concrete pipe of 42" equivalent size and larger shall require inside concrete pointing.
10. Video of the interior of storm sewer 12" or greater in diameter shall be submitted to the City prior to final acceptance. Said video shall be obtained a minimum of 30 days after construction is completed. Typical items to be reviewed on the video will include pipe deflections, pipe settlement, lead connections, joints and pipe cleanliness. If the videotape review reveals unsatisfactory conditions, the Contractor shall correct the condition at his own cost and shall then re-video the affected sewer for review by the City.

Plastic Pipe Requirements
11. Per City standards, the maximum allowable pipe size for plastic storm sewer is 12" diameter. Larger diameter plastic storm sewer may be approved by the City, depending on site conditions.
12. All plastic storm sewer pipe shall have a smooth interior.
13. PVC pipe shall meet the requirements of ASTM D3034 and F949 with push-on type joints meeting the requirements of ASTM D3212 and F477.
14. ABS Truss pipe shall meet the requirements of ASTM D2680 with push-on type joints meeting the requirements of ASTM D3212 and F477.
15. HDPE pipe shall meet the requirements of AASHTO M294 and ASTM D3350 with push-on type joints meeting the requirements of ASTM D3212 and F477.
16. The completed installation of all plastic pipe shall at no point have out-of-round pipe deflections greater than 5% of normal diameter of pipe. Deflection testing shall be performed with a nine point mandrel a minimum of 30 days after installation and again 1 year after installation. Video of the interior of the storm sewer will also be required at those time intervals. A proving ring to verify the mandrel must be provided prior to testing.
17. Plastic pipe will not be permitted under roadways.

Bedding Requirements
18. Bedding shall be used as called for on the details.
19. Where unstable ground conditions are encountered, stone bedding shall be used as directed by the Engineer in order to provide a stable foundation for pipe and manholes.

Backfill Requirements
20. Backfill shall be compacted above pipe or as indicated on construction drawings. Trench backfill shall be of a suitable material and shall be free of any organic materials and rocks larger than 3" in size. Backfill shall be ramped into trench and compacted with a small dozer or other approved method.
21. Where trench is within a 1:1 influence of streets, alleys, sidewalks, driveways, parking areas and structures, sand backfill shall be used which shall consist of MDOT granular material Class II compacted in layers not to exceed 6" in thickness to a density of 95% as determined by AASHTO T99.
22. When backfilling trench of PVC pipe, manufacturer's specifications must be strictly adhered to.
23. No frozen material shall be buried more than 4' below the final elevation of the ground.

DRAINAGE STRUCTURE REQUIREMENTS:
24. Shop drawings shall be submitted to and approved by the City for each proposed structure prior to installation.
25. Precast reinforced concrete sections with modified tongue and groove joint and rubber gaskets shall conform to ASTM C-478. Cone section shall be eccentric and have stud inserts cast in place with a flush top surface.
26. All storm structures shall have OCWRC/City of Novi approved flexible, watertight seals where pipes pass through walls. Flexible rubber manhole joints shall be Res-Seal, Press-Wedge, Link-Seal, Kor-N-Seal boot (with stainless steel korband), or approved equal.
27. Pipe shall be flush with the inside wall of structure and shall not protrude more than 1" into the structure. Pipe shall be pointed up with a smooth finish at its intersection with the structure wall.
28. No openings shall be made in precast units which would leave less than 12" of undisturbed precast structure wall between pipes (as measured between outside pipe walls) or would remove more than 40% of the circumference along any horizontal plane.
29. Precast riser placed on the concrete base shall be set in a full bed of mortar. All joints & liftholes shall be pointed up with mortar on the outside and inside.
30. Plaster all outside masonry surfaces with 1:2½ masonry cement (type II) 1/2" thick.
31. All manholes and catch basins shall be 4' or 5' in diameter unless otherwise indicated on construction drawings. Larger diameter drainage structures (6', 7', 8', 10', and 12' diameter) may be needed for large storm sewer pipe or for situations where the angles between entering pipes require a larger diameter structure in order to maintain at least 1' of structure wall between the pipes. 2' diameter catch basins and inlets may be used where approved by the City Engineer.
32. Structure steps are to be installed at the plant by the manufacturer of the structure. The steps are to be 16 inches on center located 90° from the centerline of the main sewer line. The steps shall be made of No. 4 deformed steel rod encased with copolymer polypropylene plastic and meet the requirements of ASTM D4101, Type II, Grade 49108 or approved equal.
33. Manhole frame and cover shall be EJ 1040, type "B" solid cover or as per construction drawings. Lettering shall be used only for public storm system. All others shall have no lettering.
34. Catch Basin and Inlet frame and cover shall be:
    34.1. EJ 7045, type "M1" cover and type "T1" back set (with "Dump No Waste" logo) with straight face curb and gutter.
    34.2. EJ 7065, type "M1" cover and 7060 "T1" back set (with "Dump No Waste" Logo) with mountable curb and gutter and integral curb and gutter.
    34.3. EJ 1040, type "O2" cover (beehive grate) to be used on structures located in ditches, swales and rear yard catch basins. If within 8' of road, type "N" cover (oval grate) shall be used.
    34.4. EJ 1030, type "A" cover to be used on all 2' cleanouts and structures not located at storm water collection points. EJ 1070, type "A" cover may also be used on sump pump cleanout structures.
    34.5. EJ 1030, type "O1" cover (beehive grate) to be used on all 2' structures located in ditches, swales and rear yard catch basins.
35. The City reserves the right to require a change in structure covers upon final grade and walk-through inspection if deemed necessary due to site conditions.
36. Frames shall be set in full bed of mortar and the side shall be overlapped to prevent leakage.
37. A proper channel shall be constructed within the existing manhole or other structure at which the connection is to be made to direct the flow to the existing outlet in a manner that will tend to create the least amount of turbulence. The channel shall be constructed to the same size as the inside diameter of the existing pipes, and shall be built to height of 1/3 the existing pipe diameter with a minimum of 2% slope on the benches.
38. Concrete base for manhole, catch basin, and inlet shall be MDOT grade 30P, 8" thick, 3000 psi.
39. When tapping into an existing structure a brick collar shall be placed 12" thick around the pipe and extended 12" beyond the opening. If pre-cast section is tapped, bend mesh and use as reinforcement with brick collar. Taps through structure joints or cone sections are prohibited unless approved by the City.
40. The final accessible structure prior to discharge into a forebay or detention basin shall contain a permanent 4' deep sump.
41. A 4' diameter Oil/Gas Separator Structure shall be installed prior to discharge into a forebay, detention basin or open drainage course as directed by the City.

SUMP PUMP LEAD REQUIREMENTS:
42. All sump pump leads connected to a drain shall be pre-manufactured.
43. Sump pump leads shall be (1) SDR 35, non-perforated, solid wall PVC, (2) ARMCO Truss Pipe, or (3) approved equal, with premium joints.
44. Sump collection system pipes shall be connected at drainage structures and shall be cored and booted. However, if approved by the engineer, taps to 12" storm sewer may be made with a Fernco EZ Tap or approved equal. Taps to other size storm sewer may be made with a Romac saddle, KOR-N-TEE lateral connector for concrete pipe, or approved equal.
45. Ends of all 4" sump pump leads shall be temporarily capped and their location staked, witnessed and recorded.
46. All sump pump leads are to be taken to the property line, easement line or as indicated on the plan.
47. Sump pump cleanouts shall be a minimum inside diameter of 2' and be constructed at changes of alignment ends of sump pump mains or as indicated on the p

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H. N.T.S. SCALE V: N.T.S.

COUNTY: OAKLAND COUNTY DATE:

TOWN 1N RANGE 8E DATE: JUNE 2012 REVISIONS:

CITY OF NOVI STORM SEWER STANDARD DETAILS

SHEET 2 OF 2

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CITY REVIEW	9/11/17	JJW									
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CITY OF NOVI STORM SEWER DETAILS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK NO.

DATE 2-16-17 SCALE HOR: 1" = N/A VER: 1" = N/A
DESIGNED BY JJW JOB NO. 16121
DRAWN BY MAS SHEET CE–17

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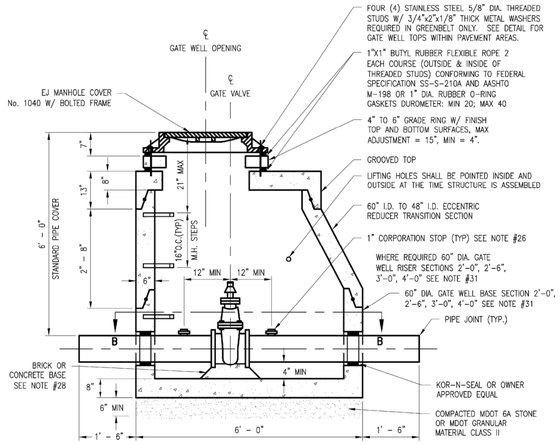
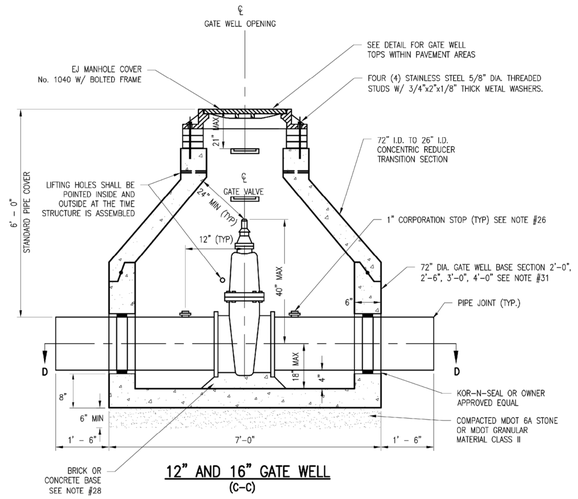
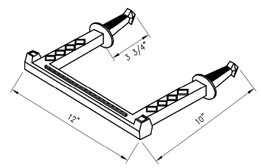


6", 8" AND 10" GATE WELL
(A-A)
(SEE NOTE #29)

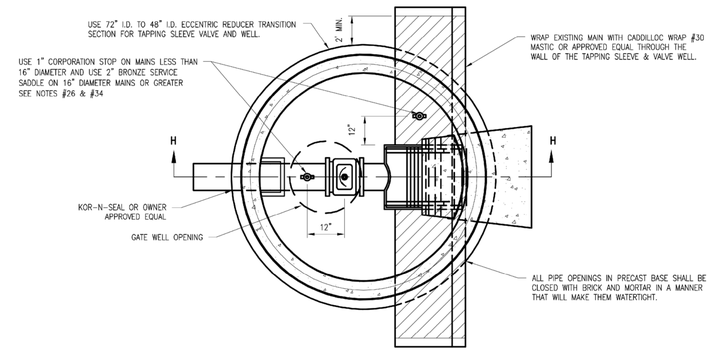


12" AND 16" GATE WELL
(C-C)

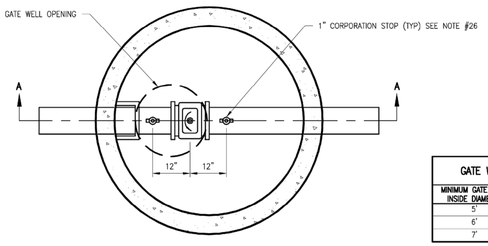


MANHOLE STEP

NOTE:
MANHOLE STEPS TO BE POLYPROPYLENE COATED STEEL MEETING THE REQUIREMENTS IN ASTM A615 AND D4101, TYPE II, GRADE 49108, M.A. INDUSTRIES PS-1 OR PS-1B (OR APPROVED EQUAL) STEPS TO BE INSTALLED DURING MANHOLE MANUFACTURE. PLACE AT 16" CEN. ON CEN. 45° FROM CENTERLINE OF WATER MAIN. FIRST STEP TO BE PLACED AT A MAXIMUM DISTANCE OF 21" FROM THE FINISHED RIM ELEVATION.

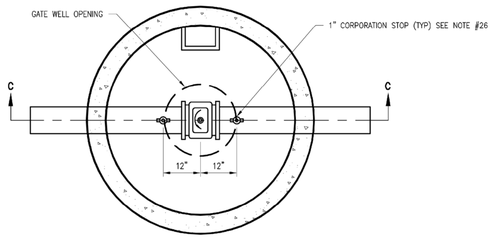


TAPPING SLEEVE VALVE & WELL TYPICAL
(PLAN VIEW, I-I)
(SEE NOTE #33)

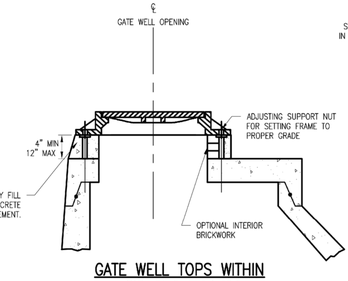


6", 8" AND 10" GATE WELL TYPICAL
(PLAN VIEW, B-B)

GATE WELL SIZING CHART	
MINIMUM GATE WELL INSIDE DIAMETER	WATER MAIN DIAMETER
5'	6" - 10"
6'	12" - 16"
7'	> 16"

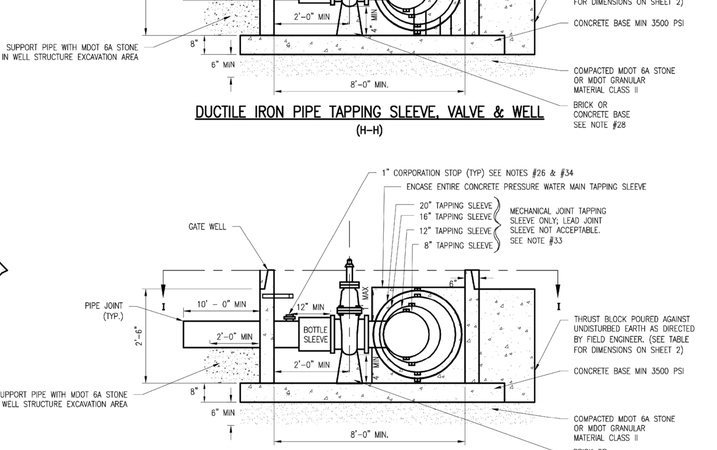


12" AND 16" GATE WELL TYPICAL
(PLAN VIEW, D-D)



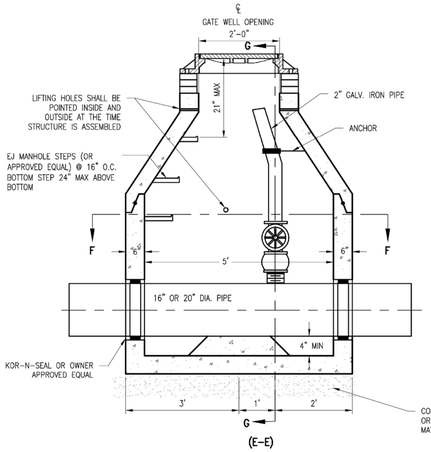
GATE WELL TOPS WITHIN PAVEMENT AREAS

NOTE:
RUBBER O-RINGS SHALL NOT BE USED IN PAVEMENT.

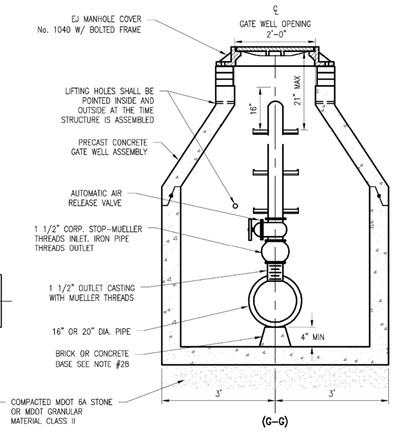


DUCTILE IRON PIPE TAPPING SLEEVE, VALVE & WELL
(H-H)

CONCRETE PIPE TAPPING SLEEVE, VALVE & WELL
(H-H)



(E-E)



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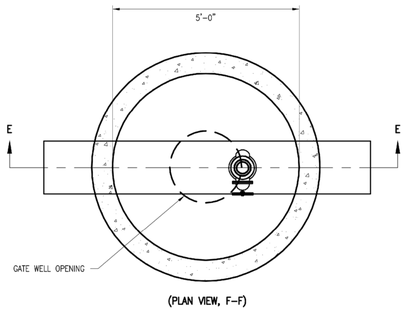
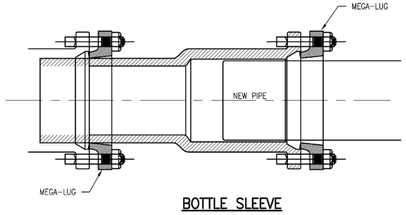


(PLAN VIEW, F-F)

STANDARD AIR RELEASE VALVE & WELL FOR 16" & 20" WATER MAIN

NOTE:
ALL AIR RELEASE VALVES SHALL BE AUTOMATIC PER CITY OF NOVI DPS REQUIREMENTS.



BOTTLE SLEEVE

NOTE:
TYLER UNION MJ x PE DUAL-PURPOSE CUTTING-IN SLEEVE OR APPROVED EQUAL

DRAWING PATH: P:\0126_016501\63110100_Engineering Design Manual\Standard Detail Revisions\Water.dwg May 01, 2014 - 11:08am

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CITY OF NOVI
WATER MAIN
STANDARD DETAILS

SHEET 1 OF 5

CITY OF NOVI | 45175 WEST 10 MILE ROAD | NOVI, MI 48375 | P: (248) 347-0456 | WWW.CITYOFNOVI.ORG
DATE:
REVISIONS:
SCALE H: N.T.S. V: N.T.S
COUNTY: OAKLAND COUNTY
DATE: 2/2014
TOWN 1N RANGE 8E

REVISIONS	DATE	BY
CITY REVIEW	9/11/17	JJW
FSP SUBMITTAL	10/25/17	JJW
FSP SUBMITTAL	12/12/17	JJW
STAMPING SET	3/2/18	JJW

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Civil Engineers & Land Surveyors
55800 GRAND RIVER AVE., SUITE 100
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P: (248) 437-5099 F: (248) 437-5222 www.zeimetwozniak.com

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CITY OF NOVI WATERMAIN DETAILS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK 5014
DATE 2-16-17
DESIGNED BY JJW
DRAWN BY MAS
SCALE HOR: 1" = N/A VER: 1" = N/A
JOB NO. 16121
SHEET CE-18

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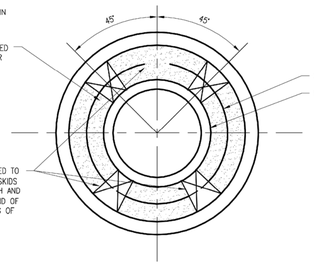
DETAILS ARE TYPICAL FOR WATER MAIN CONSTRUCTED IN CASING PIPE

8" BRICK BULKHEAD SHALL BE PLACED AT EACH END OF CASING PIPE AFTER PIPE INSTALLATION.



O.D. OF WATER MAIN JOINT

WATER MAIN (CARRIER PIPE)

WATER MAIN SHALL BE STRAPPED TO 4" x 4" WOLMANIZED SKIDS. SKIDS SHALL BE 85% OF PIPE LENGTH AND SHALL TERMINATE 12" FROM END OF CASING TO ALLOW BULKHEADING OF ENTIRE PIPE CIRCUMFERENCE.

DIA OF WATER MAIN	MIN (ID) "A"	ROAD CROSSING MIN "B"	RAILROAD CROSSING MIN "B"
6"	16"	.375	.375
8"	16"	.375	.375
12"	20"	.375	.500
16"	24"	.375	.500
20"	30"	.375	.500
24"	36"	.375	.500

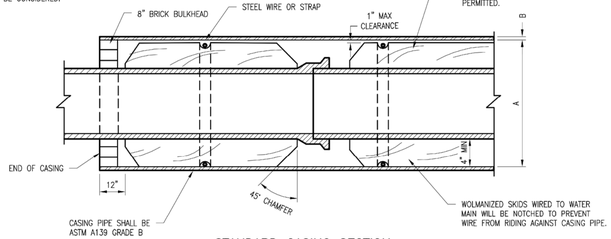
A=INSIDE DIAMETER
B=WALL THICKNESS

4" MINIMUM CLEARANCE BETWEEN MAX O.D. OF THE WATER MAIN AND THE I.D. OF THE CASING PIPE FOR THE TOP 90° ARC OF THE CASING. (SEE DETAIL)

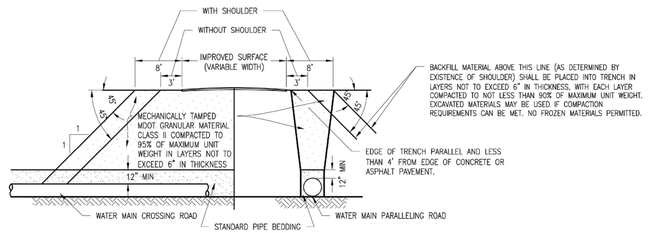
PIPE BARREL SUPPORT FOR WATER MAIN CONSTRUCTED IN CASING PIPE

THE CONTRACTOR SHALL SUBMIT IN WRITING THE DETAILS OF THE APPROPRIATE PIPE CASING INSTALLATION FOR THE REVIEW AND APPROVAL BY THE ENGINEER BEFORE INSTALLATION OF ANY CASING STARTS. ALTERNATE METHODS OF SUPPORTING AND MAINTAINING THE POSITION OF THE CARRIER PIPE WITH RESPECT TO THE CASING PIPE (IN LIEU OF THE USE OF TIMBERS) WILL BE CONSIDERED.

PLACE WOLMANIZED SKID ALONG THE TOP OF THE CARRIER PIPE IN ORDER TO PREVENT THE CARRIER PIPE FROM ROLLING OVER OR FLOATING. SAND OR GROUT SHALL BE PLACED BETWEEN THE CASING PIPE AND CARRIER PIPE IN ACCORDANCE WITH THE CONTROLLING AGENCY PERMIT SPECIFICATIONS. GROUT PLACEMENT MUST BE ACHIEVED BY MEANS OF PRESSURE GROUTING; GRAVITY FLOW INSTALLATION OF GROUT WILL NOT BE PERMITTED.

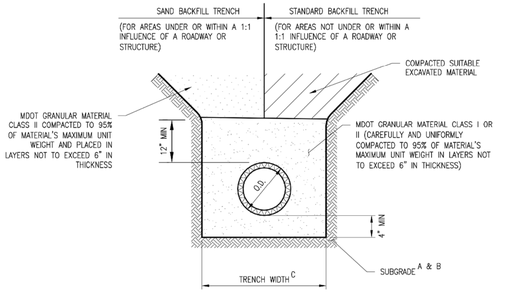


STANDARD CASING SECTION



SAND OR GRAVEL BACKFILL DETAILS FOR WATER MAINS UNDER GRAVEL, CONCRETE OR ASPHALT PAVEMENTS, SIDEWALKS, DRIVEWAYS AND PARKING AREAS

(SEE NOTE #24)

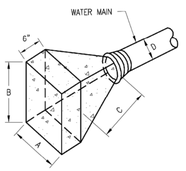


NOTES:
A. IF THE EXISTING SUBGRADE SOILS MEET THE REQUIREMENTS FOR MDOT GRANULAR MATERIAL CLASS II (MINIMUM 4" THICK), THEN THE WATER MAIN MAY BE LAID DIRECTLY ON THE COMPACTED NATIVE SUBGRADE SOILS.
B. FIELD CONDITIONS MAY REQUIRE UP TO 18" OF MDOT 6A STONE IN ORDER TO SECURE A FIRM TRENCH BOTTOM. ADDITIONAL DEPTH OF TRENCH UNDERCUT SHALL BE DIRECTED BY A GEOTECHNICAL ENGINEER AND SHALL BE REFILLED WITH 1" X 3" STONE.
C.

MAXIMUM TRENCH WIDTHS	
I.D. PIPE SIZE	TRENCH WIDTH
UP TO 12"	30"
15" TO 36"	O.D. + 12"
42" OR LARGER	O.D. + 24"

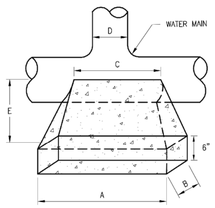
BEDDING AND TRENCH BACKFILL DETAIL

(SEE NOTE #24)



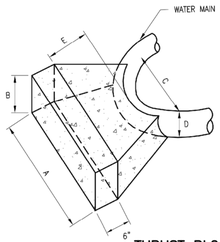
FOR PLUGS

D	A	B	C MIN
20"	7'	5'	2.5'
16"	4'-10"	4'-10"	2'
12"	4'-4"	3'	1'-9"
10"	3'	2'	1'-6"
8"	2'-10"	2'-6"	1'-6"
6"	1'-8"	1'-6"	3"



FOR TEES AND TAPPING SLEEVES

D	A	B	C	E MIN
20"	6.5'	4.5'	3.5'	3'
16"	4'-8"	4'-8"	2.5'	2.75'
12"	4'	3'	2.5'	2.5'
10"	3'	2'	2'	2.25'
8"	2'-6"	2'	2'	2.25'
6"	2'	2'	2'	2.25'

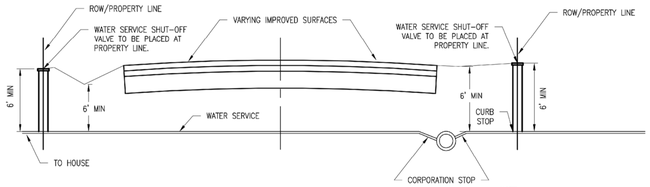


FOR 90° BENDS OR SMALLER

D	A	B	C	E MIN
20"	8'	6.5'	3.5'	2.5'
16"	6'	4'	2.5'	2'
12"	4'	3'	2'	1.75'
10"	3'	3'	2'	1.75'
8"	3'	2'	2'	1.5'
6"	2'	1.5'	2'	1.25'

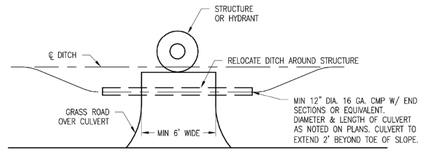
THRUST BLOCK DETAILS

NOTE:
A. 3000 PSI CONCRETE TO BE USED. THRUST BLOCK TO ABUT & REST AGAINST UNDISTURBED SOIL OR EARTH COMPACTED TO 95% MODIFIED PROCTOR.
B. THRUST BLOCKS NOT PERMITTED ON THEIR OWN, MUST BE USED IN COMBINATION WITH MEGALUG RESTRAINTS. SEE NOTE #19

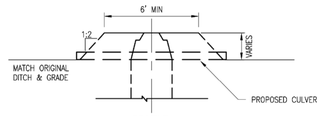


TYPICAL PUBLIC ROAD WATER SERVICE CONNECTION

NOTE:
LATERAL LOCATION SHALL BE AS REQUESTED BY THE ABUTTING PROPERTY OWNER.

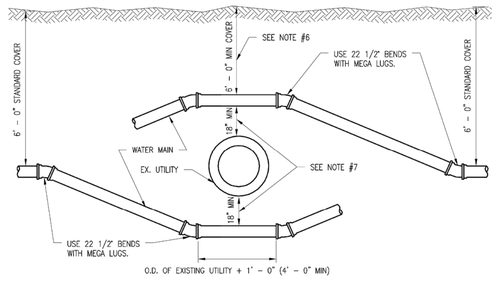


PLAN



PROFILE

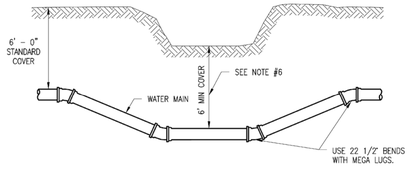
DITCH ENCLOSURE AT GATE WELL OR HYDRANT



TYPICAL WATER MAIN UTILITY CROSSING

(SEE NOTE #17)

NOTE:
COMPACTED SAND BACKFILL SHALL EXTEND 9" EACH SIDE OF EXISTING PIPE, 12" ABOVE EXISTING PIPE AND SHALL SLOPE AT A ONE ON ONE SLOPE TO THE BOTTOM OF THE TRENCH OR TO FINAL TOP GRADE IF UNDER PAVEMENT.



DITCH, STREAM OR WETLAND CROSSING

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Z:\Projects\16121\DWG\16121 NOVI DETAILS.dwg, WM 2, 2/26/2018 7:14:21 AM, MSmiles

CITY OF NOVI | 45175 WEST 10 MILE ROAD | NOVI, MI 48375 | P (248) 347-0456 | WWW.CITYOFNOVI.ORG

SCALE H: N.T.S. V- N.T.S.
REVISIONS:
DATE:
COUNTY OAKLAND COUNTY
DATE:
TOWN 1N RANGE 8E
DATE 3/2014
REVISIONS:

CITY OF NOVI
WATER MAIN
STANDARD DETAILS

SHEET 2 OF 5

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
CITY REVIEW	9/11/17	JJW									
FSP SUBMITTAL	10/25/17	JJW									
FSP SUBMITTAL	12/12/17	JJW									
STAMPING SET	3/2/18	JJW									

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CITY OF NOVI WATERMAIN DETAILS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK NO.

DATE 2-16-17
DESIGNED BY JJW
DRAWN BY MAS
SCALE HOR: 1" = N/A VER: 1" = N/A
JOB NO. 16121
SHEET CE-19

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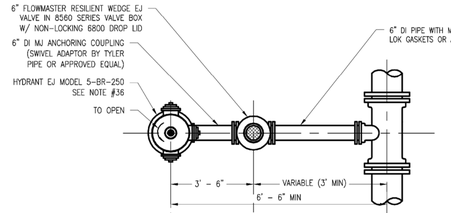
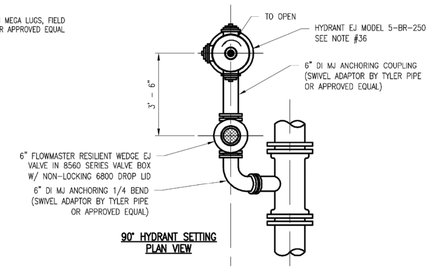
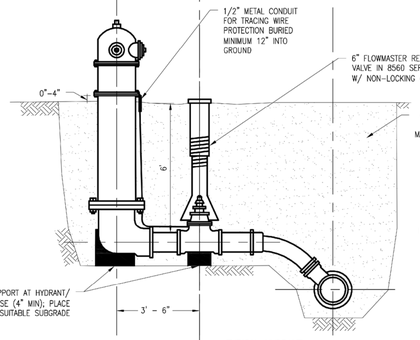


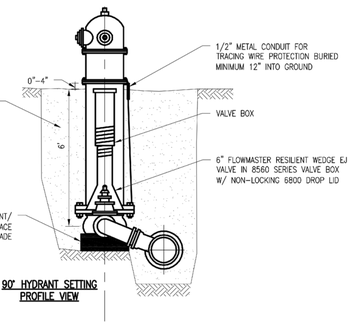
TYPICAL HYDRANT SETTING PLAN VIEW



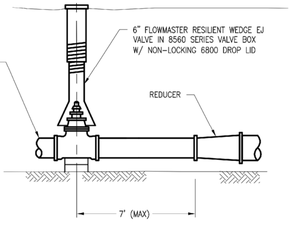
90° HYDRANT SETTING PLAN VIEW



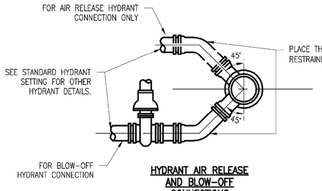
TYPICAL HYDRANT SETTING PROFILE VIEW



90° HYDRANT SETTING PROFILE VIEW

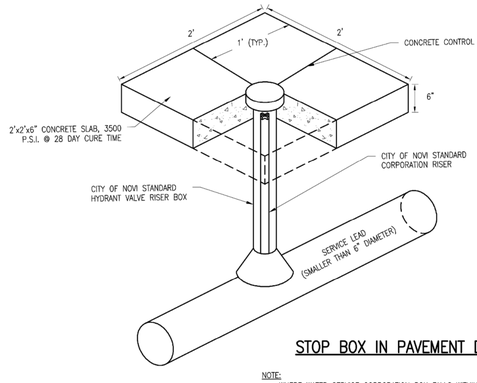


TYPICAL HYDRANT, VALVE & BOX CONNECTION AT END OF WATER MAIN



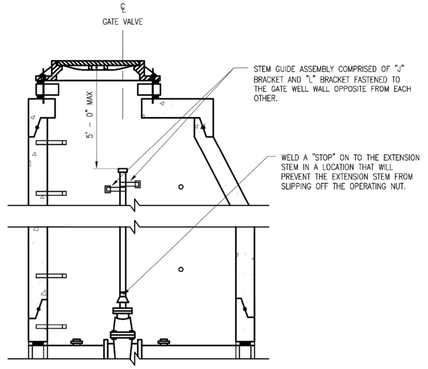
HYDRANT AIR RELEASE AND BLOW-OFF CONNECTIONS

DETAIL OF HYDRANT SETTINGS



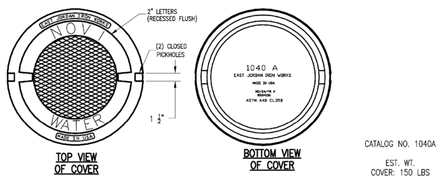
STOP BOX IN PAVEMENT DETAIL

NOTE:
WHERE WATER SERVICE CORPORATION BOX FALLS WITHIN A PAVED AREA (PARKING LOT, SERVICE DRIVE AREA, ETC.) THE STOP BOX SHALL BE PLACED IN A STANDARD HYDRANT VALVE BOX. THE VALVE BOX SHALL BE CENTERED IN A 2'x2'x6" CONCRETE SLAB. CONCRETE CONTROL JOINTS SHALL BE PLACED IN SLAB AT 1' INTERVALS.



STEM EXTENSION DETAIL

NOTE:
STEM EXTENSIONS SHALL BE PROVIDED AT ALL GATE VALVES WITH OPERATING NUTS AT A DISTANCE GREATER THAN 5' BELOW THE GROUND SURFACE.



TOP VIEW OF COVER

BOTTOM VIEW OF COVER

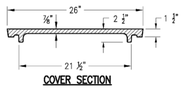
CATALOG NO. 1040A

EST. WT. COVER: 150 LBS

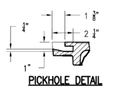
MAT'L SPEC. COVER – GRAY IRON ASTM A48 CL35B

LOAD RATING HEAVY DUTY

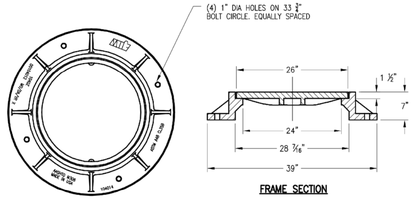
COATING DIPPED



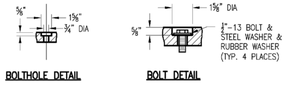
COVER SECTION



PICKHOLE DETAIL



FRAME SECTION



BOLTHOLE DETAIL

BOLT DETAIL

CAST IRON GATE WELL FRAME AND COVER

(SEE NOTE #32)

WATER MAIN CONSTRUCTION NOTES

GENERAL NOTES:

1. All construction procedures and materials used on all water main projects shall conform to AWWA, Detroit Water and Sewerage Department and The City of Novi current Standards and Specifications.
2. No water main is to be installed without City inspection.
3. Three (3) working days prior to construction, the Contractor shall telephone MISS DIG (811 or 1-800-482-7171) for underground facilities locations and shall also notify representatives of other utilities located in the vicinity of the work.
4. Where work is to be performed in the vicinity of a City of Detroit water main, contractor shall notify the Detroit Metropolitan Water Services Inspection Department ((313) 833-4682) three (3) working days prior to start of construction and request an inspection of the job.
5. All pipe and all pipe fittings shall be made in the U.S.A. — NEED CITY APPROVAL
6. Unless otherwise specified on plans, top of all water mains shall be six (6) feet below existing or proposed road centerline, or six (6) feet below existing or proposed ground, whichever results in lower elevation. A minimum cover of six (6) feet shall be maintained when crossing a ditch; water mains shall have a minimum of 5.5 feet of cover when installed parallel to a ditch, as measured from the nearest point in the ditch cross section.
7. Whenever a water main is installed under existing utility line, provisions shall be made to properly support or distribute any concentrated loads to avoid any settlement and all possible failure of the lower main. A vertical separation of at least 18 inches between the utility and the water main shall be provided (measured barrel to barrel).
8. All required cross connection devices shall be installed as required by the local plumbing code and in accordance with the standards of the Michigan Department of Environmental Quality Water Resources Division and the Michigan Department of Public Health.
9. Tracing wire shall be provided for all water main, regardless of pipe material. Brass wedges are not permitted. When PVC is installed for a service line, tracing wire shall be run from the meter setup to the curb box. Wire shall be copper, 8-gage stranded, blue insulated per City requirements. Connection is required at all service leads, hydrants, and gate wells. Wire shall be brought through each gate well and connected to the top step. All wire exposed above ground surface shall be encased in ¾" metal conduit. The conduit should extend 6" below the ground surface. Conductivity shall be tested by the City prior to acceptance of the main. All splices shall be made using a gel-cap product which provides a water proof seal, such as 3M's Direct Bury Splice kit or approved equal.
10. Connection to an existing water main shall be made only after pressure and bacteriological test have been successfully completed. The city engineer must be present for the test and review the results. Testing and disinfection procedures shall meet the requirements of ANSI/AWWA-C600/C651. The water main shall pass a test of 150 psi for a two (2) hour period. Water loss shall not exceed a rate of 11.65 U.S. gallons per inch diameter per mile of water main in twenty-four (24) hours.
11. The City of Novi must witness the connection of the water main to the existing water main. After the connection is made, residential and commercial taps will be allowed. All water service connections two (2) inches and smaller shall be made by the City of Novi DPS after water main acceptance.
12. Contractor supplied gauges are required for testing. The minimum size shall be 3.5" diameter graduated in one (1) or two (2) pound increments from 1 to 160 psi (minimum range).
13. When temporary water main jumpers are used during water main construction, a testable double check valve backflow preventer with current certification (A.S.S.E. Std. #1024) shall be placed on the jumper hose that is connected to the new water main.
14. The materials specified below may be substituted with an approved equal as determined by the City. It is at the sole discretion of the City to determine if a material is acceptable and can be utilized. Written authorization must be obtained prior to ordering or installing the approved equal.

WATER MAIN NOTES:

15. All water main shall be ductile iron or concrete. HDPE water main may be permitted upon city approval. Water main shall be per the following specifications:
    - 15.a. Ductile Iron pipe shall be ANSI/AWWA C151/A21.51 cement lined with bituminous seal coat Class 54 for sizes 3" through 16" and Class 55 for 20" through 24" pipe. All 6" pipe MUST be ductile iron. Ductile Iron pipe shall be designed for a minimum working pressure of 150 psi.
    - 15.b. Pre-stressed Concrete Cylinder pipe (P.C.C.P.) shall be AWWA C-301 specification for sizes larger than 24".
    - 15.c. High Density Polyethylene (HDPE) pipe shall meet the requirements of AWWA C906 (SDR 11) with blue shell or blue stripe.
16. Water services up to 2" shall be either Type K soft copper or PVC with tracing wire meeting the requirements of ANSI/AWWA C909 for a pressure class of 200 psi. If PVC is used, a tracing wire shall be run from the meter setup to the curb box (See Item #9 for tracing wire requirements). All water services greater than 2" shall follow the standards listed in Item #15.
17. The maximum allowable deflection at joints for ductile iron water main shall be per manufacturers standards (i.e. 4" – 36" water main – 5° per 20').
18. Poly-wrap may be required by the city and shall be placed around the water main per manufacturers specifications.
19. MEGALUG shall be placed at all valves, bends, tees, plugs, hydrants and mechanical fittings. Surrounding joints shall be restrained using U.S. Pipe Field Lok gaskets or approved equal and shall be per the manufacturer's joint restraining schedule and the latest edition of DIPRA's Thrust Restraint Design for Ductile Iron Pipe.
20. Water main joints shall be Tyton, Fastite, Mechanical, or approved equal in accordance with ANSI/AWWA C111/A21.11.
21. Restrained joints are required in lieu of thrust blocks. Restrained joints for pipe sizes up to 16" shall be Fast Grip Gaskets, Mega Lug or approved equal. Restrained joints for pipe sizes over 16" shall be American Ductile Iron Flex-Ring Joint Pipe or approved equal boltless system.
22. Thrust restraint design shall be per the Ductile Iron Pipe Research Association's Handbook of Thrust Restraint Design for Ductile Iron Pipe, current edition.
23. All bolts on all flanged and mechanical joint fittings shall be domestic origin high strength, low alloy COR-BLUE steel bolts or approved equal. These bolts shall meet the current provisions of American National Standard ANSI/AWWA C111/A21.11 for rubber gasket joints for ductile iron pressure pipes and fittings. Bolt manufacturer's certificate of compliance must accompany each shipment. All buried bolts, nuts and washers shall be poly-wrapped.
24. Backfill shall be compacted above pipe as indicated on construction drawings. Trench backfill shall be a suitable material and shall be free of any organic materials and rocks larger than 3" in size. Under road surfaces, pavement, sidewalks, curbs, driveways and areas where trench is within a 1:1 influence of the pavement, sand backfill shall be used which shall consist of MDOT granular material Class II or III and shall be compacted in layers not to exceed six (6) inches in thickness to a density of 95% as determined by MSHTO T99. Where water main is to be placed on fill material, all fill material below the pipe must also be compacted to 95% maximum unit density. All backfill placed within a 1:1 influence of structures shall be approved sand, placed in six (6) inch layers and compacted. Trenches that are to be left open overnight shall be enclosed with suitable fencing and lighted barricades, unless otherwise approved by the City.

VALVE & SLEEVE NOTES:

25. Gate Valves shall be EJ ductile iron body, fully bronze-mounted, resilient-wedge, non-rising stem (ANSI/AWWA C509), opening counterclockwise conforming to City of Detroit Water Department specifications.
26. Corporation Stops shall be 1-inch Mueller #H-15000, or approved equal. Corporation stops shall be securely capped after testing.
27. All service lead corporation stops installed outside of gate wells shall be made with bronze double-strap tapping saddle (CLOW F-1280 or approved equal).
28. Gate valves and fittings shall be supported by formed concrete or mortared brick bearing on the floor (minimum four (4) inches of clearance between floor and bottom of gate valve).
29. All gate valves 6" or larger shall be placed in a well. Additionally, a valve shall be placed in a well for all water main larger than 2" and smaller than 6" when a tapping sleeve will be utilized. Otherwise, a valve may be placed in a box for water main smaller than 6". A small box is required for services up to 1", a large box is required for services between 1 1/2" and 2" and a hydrant valve box is required for services up to 6". If the box falls within a paved area, a hydrant valve box is required for all service sizes.
30. Butterfly valves shall be used for valves 16" and larger in diameter and shall be Dezurik AWWA style, or approved equal, manufactured in accordance with ANSI/AWWA C504 and conforming to NSF Standard 61.
31. All precast concrete gate well sections shall be manufactured to conform with ASTM C478, except wall thickness shall be as shown on these details. Precast concrete gate well sections shall be modified tongue and groove with premium rubber gasket-type joints manufactured to conform with ASTM C443.
32. All gate well covers shall be EJ #1040A with bolted frame and with lettering per detail on this sheet. All cover bolts shall be stainless steel.
33. Tapping sleeves shall be manufactured by JCM Industries, Romac Industries, Mueller, EJ, Smith-Blair or approved equal and shall be mechanical joint with DWS Mechanical Joint Tapping Gate Valve. Lead joint sleeves shall not be used. Like size tapping sleeves can only be used when the existing main is ductile iron and equal to/less than 12-inch in diameter. For like size connections greater than 12-inch, a cut-in-tee is required. All tapping sleeves must be mechanical tapping sleeves.
34. No tapping of any water main fitting will be permitted.
35. No water main fittings that come in contact with potable water shall contain lead.

HYDRANT NOTES:

36. All hydrants shall be EJ #5BR-250-Traffic Model and shall conform to ANSI/AWWA C502, and shall have a minimum 5 1/4" valve opening that closes with the water pressure. Hydrants shall be traffic style with breakable flange and coupling.
37. Hydrants shall have a swivel flange to allow bonnet to be turned 360 degrees without removing the bonnet, and barrel flanges shall be integrally cast with the barrel. Inlet shoe shall have a bronze valve seat, which can be removed without digging.
38. Inlet connection shall be 6" mechanical joint, conforming to AWWA C111 and ASA-A21.11. Stem threads shall be sealed with double "O" rings and shall be permanently lubricated with all weather grease.
39. Hose connections: One (1) 4 1/2" pumper nozzle and two (2) 2 1/2" hose nozzles, with National Standard Thread (NST) threads. Final orientation of the hydrant steamer connection to be determined by City Engineer or Fire Department.
40. Operating Nut: (1) 1 1/2" P-F pentagon, open left with six (6) feet of cover or specified on plans. A suitable nozzle lock shall be in place to prevent inadvertent nozzle removal. Wedge locks and/or ductile iron retainer rings to secure nozzles shall not be allowed.
41. Hydrants shall be factory painted by spray application red above the ground and black below, with a finish coat of Glamortex 501 enamel, color 314 Vermillion, or approved equal.
42. Prior to acceptance, hydrants shall be charged, tested and any leaks are to be repaired. Hydrants and valve boxes shall be plumbed and set to finished grade. Valve boxes shall be in line with the valve.

CITY OF NOVI
WATER MAIN
STANDARD DETAILS

SHEET 3 OF 5

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CITY OF NOVI WATERMAIN DETAILS
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SECTION 20, NOVI, MICHIGAN

FIELD BOOK NO.

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COUNTY OAKLAND COUNTY

TOWN 1N RANGE 8E

DATE 3/20/14 REVISIONS

TABLE 23.6.5.A
DUCTILE IRON WATER MAIN PIPE
THRUST RESTRAINT LENGTH FOR HORIZONTAL BENDS

BEND ANGLES (degrees)	PIPE DIAMETER (inches)													
	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"
11.25°	1	2	2	3	4	4	5	6	7	7	9	11	13	15
22.5°	3	3	5	6	8	9	10	12	13	15	17	21	25	29
30°	4	4	6	8	10	12	14	16	18	20	23	29	34	40
45°	6	7	10	13	16	19	22	25	28	31	36	45	53	61
60°	8	10	14	18	22	26	30	34	39	43	51	62	74	85
90°	14	17	24	31	38	46	53	60	67	74	88	108	128	148
Unit Frictional Force (ft/lbs)	124	151	217	284	349	415	481	547	613	679	811	1,005	1,203	1,398
Unit Bearing Resistance (ft/lbs)	152	185	268	354	437	523	611	699	789	879	1,064	1,344	1,639	1,939

Assumptions: Cover = 6.0 feet
Design Pressure = 150 psi
Safety Factor = 1.5
Laying Condition = Type 3
Soil Designation = Clay 1
Non-Polywrapped Pipe

= Not Permitted (for 60°, use two 30° bends; for 90°, use two 45° bends)

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

TABLE 23.6.5.B
DUCTILE IRON WATER MAIN PIPE
THRUST RESTRAINT LENGTH FOR VERTICAL UP BENDS

BEND ANGLES (degrees)	PIPE DIAMETER (inches)													
	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"
11.25°	1	2	2	3	4	4	5	6	7	7	9	11	13	15
22.5°	3	3	5	6	8	9	10	12	13	15	17	21	25	29
30°	4	4	6	8	10	12	14	16	18	20	23	29	34	40
45°	6	7	10	13	16	19	22	25	28	31	36	45	53	61
60°	8	10	14	18	22	26	30	34	39	43	51	62	74	85
90°	14	17	24	31	38	46	53	60	67	74	88	108	128	148
Unit Frictional Force (ft/lbs)	124	151	217	284	349	415	481	547	613	679	811	1,005	1,203	1,398
Unit Bearing Resistance (ft/lbs)	152	185	268	354	437	523	611	699	789	879	1,064	1,344	1,639	1,939

Assumptions: Cover = 6.0 feet
Design Pressure = 150 psi
Safety Factor = 1.5
Laying Condition = Type 3
Soil Designation = Clay 1
Non-Polywrapped Pipe

= Not Permitted (for 60°, use two 30° bends; for 90°, use two 45° bends)

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

TABLE 23.6.5.C
DUCTILE IRON WATER MAIN PIPE
THRUST RESTRAINT LENGTH FOR VERTICAL DOWN BENDS

BEND ANGLES (degrees)	PIPE DIAMETER (inches)													
	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"
11.25°	2	3	4	5	6	7	8	10	11	12	14	18	21	25
22.5°	4	5	8	10	12	15	17	19	22	24	29	36	43	50
30°	6	7	10	14	17	20	23	26	29	33	39	48	58	67
45°	9	11	16	21	26	31	36	41	45	50	60	75	89	104
60°	13	16	22	29	36	43	50	57	63	70	84	104	124	145
90°	22	27	39	51	62	74	86	98	110	122	145	180	215	250
Unit Frictional Force (ft/lbs)	124	151	217	284	349	415	481	547	613	679	811	1,005	1,203	1,398
Unit Bearing Resistance (ft/lbs)	152	185	268	354	437	523	611	699	789	879	1,064	1,344	1,639	1,939

Assumptions: Cover = 6.0 feet
Design Pressure = 150 psi
Safety Factor = 1.5
Laying Condition = Type 3
Soil Designation = Clay 1
Non-Polywrapped Pipe

= Not Permitted (for 60°, use two 30° bends; for 90°, use two 45° bends)

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

TABLE 23.6.5.D
DUCTILE IRON WATER MAIN PIPE
THRUST RESTRAINT LENGTH FOR TEES

PIPE DIAMETER OF BRANCH RUN (inches)	PIPE DIAMETER OF MAIN PIPE RUN (inches)													
	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"
3"	8	7	6	4	2	1	0	0	0	0	0	0	0	0
4"		10	9	8	6	5	3	2	0	0	0	0	0	0
6"			16	15	14	13	12	11	10	9	7	4	1	0
8"				22	22	21	20	19	19	18	16	14	11	8
10"					28	27	27	26	26	25	24	22	19	17
12"						34	33	33	32	32	31	29	27	25
14"							40	39	39	38	37	36	35	33
16"								46	45	45	44	43	41	40
18"									52	51	51	49	48	47
20"										58	57	56	55	54
24"											69	68	68	67
30"												87	86	85
36"													104	104
42"														122
Unit Frictional Force (ft/lbs)	249	302	434	569	697	829	961	1,093	1,225	1,357	1,621	2,011	2,406	2,796
Unit Bearing Resistance (ft/lbs)	152	185	268	354	437	523	611	699	789	879	1,064	1,344	1,639	1,939

Assumptions: Cover = 6.0 feet
Design Pressure = 150 psi
Safety Factor = 1.5
Laying Condition = Type 3
Soil Designation = Clay 1
Non-Polywrapped Pipe

= Not Applicable

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

TABLE 23.6.5.E
DUCTILE IRON WATER MAIN PIPE
THRUST RESTRAINT LENGTH FOR REDUCERS

DIAMETER OF SMALLER PIPE (inches)	DIAMETER OF LARGER PIPE (inches)													
	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"
3"		4	13	21	27	34	40	46	53	59	71	89	107	124
4"			10	18	25	32	39	45	52	58	70	88	106	124
6"				11	19	27	34	41	48	55	67	86	104	122
8"					11	20	29	37	45	50	64	83	102	120
10"						11	20	29	37	45	59	79	99	117
12"							11	21	30	38	54	75	95	114
14"								11	21	30	47	69	91	110
16"									11	21	40	63	85	106
18"										11	31	57	80	101
20"											22	49	73	96
24"												31	59	83
30"													33	60
36"														32
42"														
Unit Frictional Force (ft/lbs)		302	434	569	697	829	961	1,093	1,225	1,357	1,621	2,011	2,406	2,796

Assumptions: Cover = 6.0 feet
Design Pressure = 150 psi
Safety Factor = 1.5
Laying Condition = Type 3
Soil Designation = Clay 1
Non-Polywrapped Pipe

= Not Applicable
= Not Probable

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

TABLE 23.6.5.F
DUCTILE IRON WATER MAIN PIPE
THRUST RESTRAINT LENGTH FOR DEAD ENDS

Pipe Diameter (inches)	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"
Restraint Length (feet)	11	14	19	25	31	37	43	49	55	61	73	90	108	125
Unit Frictional Force (ft/lbs)	249	302	434	569	697	829	961	1,093	1,225	1,357	1,621	2,011	2,406	2,796

Assumptions: Cover = 6.0 feet
Design Pressure = 150 psi
Safety Factor = 1.5
Laying Condition = Type 3
Soil Designation = Clay 1
Non-Polywrapped Pipe

* Data Table acquired from the Ductile Iron Pipe Research Association (DIPRA)

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TOWN 1N
DATE 3/20/14
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CITY OF NOVI
WATER MAIN
STANDARD DETAILS

SHEET
4
OF 5

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GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK STK

DATE 2-16-17
DESIGNED BY JJW
DRAWN BY MAS
SCALE HOR: 1" = N/A VER: 1" = N/A
JOB NO. 16121
SHEET CE-21

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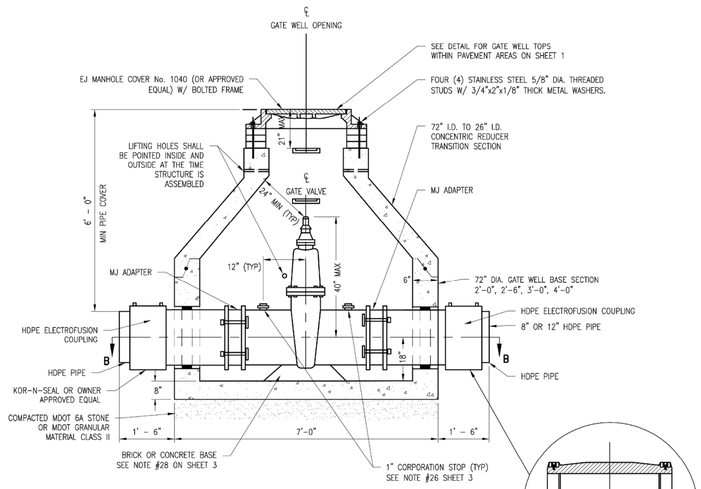
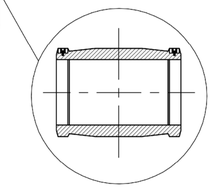


8" AND 12" GATE WELL FOR HDPE WATER MAIN
(PROFILE VIEW, A-A)



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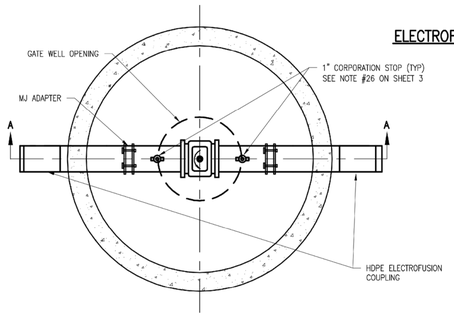
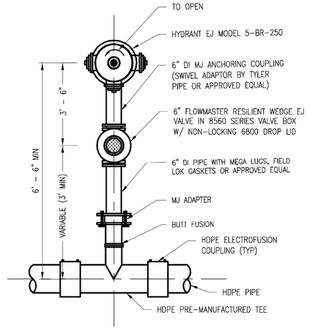
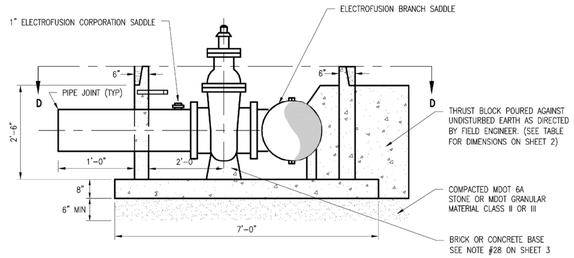


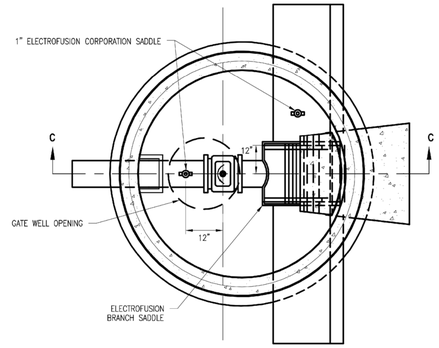
8" AND 12" GATE WELL TYPICAL FOR HDPE WATER MAIN
(PLAN VIEW, B-B)



FIRE HYDRANT ASSEMBLY
WITH HDPE PRE-MANUFACTURED TEE



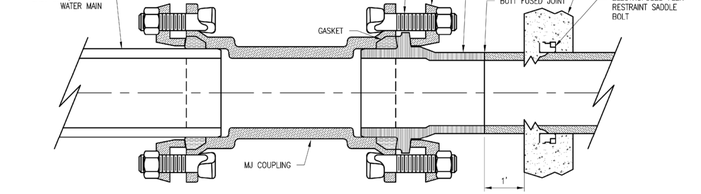
(PROFILE VIEW, C-C)



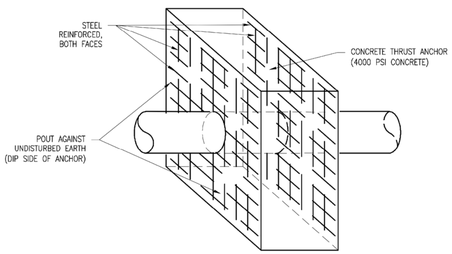
(PLAN VIEW, D-D)

HDPE BRANCH SADDLE, VALVE & WELL TYPICAL

EQUIVALENT DUCTILE IRON PIPE SIZES (DIPS)		
NOMINAL PIPE SIZE (DIPS)	O.D. SIZE (INCHES)	MIN WALL THICKNESS SDR 11 (160 PSI) (INCHES)
6"	6.90	0.627
8"	9.05	0.823
12"	13.20	1.200
16"	17.40	1.582
20"	21.60	1.964
24"	25.60	2.345



MJ ADAPTER FOR HDPE PIPE



NOTES:
A. PROVIDE 2" MINIMUM CONCRETE COVER OVER ALL REINFORCING STEEL.
B. ADEQUATE CURING TIME OR USE OF HIGH EARLY CONCRETE TO ACHIEVE THE REQUIRED 4,000 PSI STRENGTH SHALL BE PROVIDED FOR ALL THRUST ANCHORS PRIOR TO TESTING MAIN.
C. ALL CONCRETE THRUST ANCHORS MUST BE DESIGNED FOR THE SITE SPECIFIC SOIL, GROUNDWATER AND SYSTEM PRESSURE CONDITIONS. THE DESIGN ENGINEER WILL BE REQUIRED TO SUBMIT CALCULATIONS SUPPORTING THE SIZE AND REINFORCEMENT. DIMENSIONS OF THE THRUST ANCHOR SHALL BE SPECIFIED BY THE DESIGN ENGINEER AND DESIGNED BASED ON WATER MAIN PRESSURE AND SIZE AND SOIL CONDITIONS.
D. ALL HARDWARE SHALL BE STAINLESS STEEL.
E. A MINIMUM OF 48 HOURS TIME SHALL BE PROVIDED AFTER INSTALLATION IS COMPLETE PRIOR TO CONSTRUCTING AND INSTALLING THE THRUST ANCHORS TO ALLOW HDPE PIPE TO ADJUST TO GROUND TEMPERATURE.

CONCRETE THRUST ANCHOR FOR HDPE PIPE

HDPE WATER MAIN JOINT RESTRAINT
(FOR CONNECTING HDPE PIPE TO DUCTILE IRON PIPE)

HIGH-DENSITY POLYETHYLENE (HDPE) WATER MAIN NOTES

In addition to the water main notes listed on sheet 3 of the standard details, the following notes will apply to construction projects using HDPE water main:

MATERIALS

1. HDPE pipe, appurtenances, and installation methods shall conform to the most current edition of AWWA standard C906.
2. HDPE pipe shall be manufactured out of virgin material as defined in ASTM D3350. The pipe shall be made from high density PE 3408 polyethylene resin and the materials used must be listed and approved for use under NSF/ANSI Standard 14 and 61. HDPE pipe shall have a standard dimension ratio (SDR) of 11 or less, a hydrostatic design basis (HDB) of 1600 psi for water at 73.4LF and a minimum working pressure rating of 160 psi. No rework except that obtained from the manufacturer's own production of the same formulation shall be used. The pipe shall be homogeneous throughout and shall be free of visible cracks, holes, foreign materials, blisters, or other deleterious faults. A "Certificate of Compliance" shall be furnished for all materials supplied.
3. The physical appearance of the pipe having deformities such as concentrated ridges, discoloration, excessive spot roughness, pitting, varying wall thickness, etc., shall constitute sufficient basis for rejection. Pipe with gashes, nicks, abrasions or any physical damage that occurred during storage and/or handling which are wider or deeper than 10% of the wall thickness shall not be used and must be removed from the construction site. Any pipe that has been damaged or does not meet the City's approval shall be replaced at the Contractor's expense.
4. Mechanical fittings used with HDPE pipe shall be specifically designed for or tested and found to be acceptable for use with HDPE by the fitting manufacturer. Mechanical fittings designed for other materials shall not be used.
5. Water service saddles on HDPE water main shall be "VA" Eletrofusion Service Saddles by Friatec, Inc. or approved equal.
6. The mechanical joint fittings must conform to outside diameter requirements of ANSI/AWWA C111/A21 or ANSI/AWWA C153/A21.53 depending size. Butt fusion fittings shall meet AWWA C906 dimensional requirements.
7. Bolts, nuts, gaskets, and glands meeting ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 are required. Mechanical joint components shall be installed in accordance with manufacturer's recommendations.
8. Pipe and fittings must be marked as prescribed by AWWA C906 and NSF. Pipe markings shall include nominal size, OD base, dimension ratio, pressure class, working pressure rating, AWWA C906, material code designation PE 3408, manufacturer's name, manufacturer's production code including day, month, year extruded, and manufacturer's plant and extrusion line; and NSF logo. Permanent identification of piping shall be provided by co-extruding longitudinal blue stripes into the outside surface of the pipe (stripes printed or painted shall not be acceptable) or the pipe material shall be black with a blue shell.

INSTALLATION

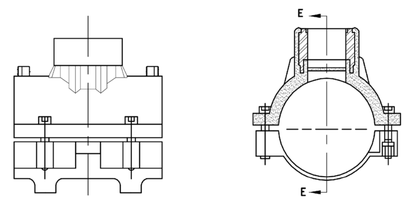
9. Tracing wire shall be provided per the City's specifications and details for all water mains. Wire shall be copper, 8 gage stranded, blue insulated per City's requirements and shall be brought through each gate well and connected to the top step. In addition, an approved continuous marking tape shall be placed one foot above the HDPE pipe. Underground marking tape shall be Magnatech, 3" wide, foil-backed tape, #31-022 by Empire Level Manufacturing Corp., or approved equal.
10. Personnel trained in the use of butt-fusion equipment shall perform the joining of polyethylene pipe by methods recommended for new pipe connections. Personnel directly involved with installing the new pipe shall have received training in the proper methods for handling and installing the HDPE pipe by a qualified representative and certification of this training shall be provided to the City.
11. Connections to HDPE pipe shall not be mode immediately after the pipe has been installed. The fused pipe should be laid in the trench and be allowed to reach an equilibrium temperature overnight (24-hour period) in its surrounding environment.
12. The HDPE pipe must be properly aligned at all transitions to conventional or HDPE water main and appurtenances.

TESTING

13. The polyethylene pipe shall be pressure tested after the line and all fittings and valves have been installed. Connections may be left exposed for visual leak inspection. Under no circumstances shall HDPE pipe be pressure tested when the temperature of the pipe is above 80°F.
14. The newly installed polyethylene water main shall be disinfected by the Contractor and samples checked for complete disinfection by the City of Novi DPS. The number of samples and sampling points will be determined by the City.

PIPE BURSTING PROJECTS

15. The method approved for rehabilitation of existing water mains by pipe bursting and installation of new HDPE pipe is T.T. Technologies GRUNDOCRACK SYSTEMS, 8(00-533-2078) or approved equal. All contractors must be licensed to use the particular technology proposed for this work.
16. The pipe-bursting tool shall be designed and manufactured to force its way through existing pipe materials by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The bursting unit shall be pneumatic and shall generate enough force to burst and compact the existing pipeline.
17. The Manufacturer's specifications shall dictate what size tool should be used in what diameter pipe, as well as parameters of what size tool for percentage of upsize allowed.
18. Prior to construction, the Contractor shall develop and provide to the City of Novi for review and approval a temporary water system plan to supply water services to area residents and businesses during pipe bursting operations. It is anticipated that the temporary system will be fed from existing fire hydrants. The temporary system and hydrants shall have passed bacteriological testing prior to use.
19. All service connections on the existing water main that is to be burst, or will be taken out of service, shall be connected to the temporary water system prior to mainline bursting, disinfection, testing and service reconnection operations. Temporary service connections shall be made at the water service stop box by disconnecting the existing water service and connecting the temporary water line to the stop box.



SECTION E-E

ELECTROFUSION BRANCH SADDLE DETAIL

CITY OF NOVI
WATER MAIN
STANDARD DETAILS

SHEET 5 OF 5

CITY OF NOVI | 45175 WEST 10 MILE ROAD | NOVI, MI 48375 | P (248) 347-0456 | WWW.CITYOFNOVI.ORG

SCALE H: N.T.S. V: N.T.S.
DATE
REVISIONS:
COUNTY OAKLAND COUNTY
DATE
RANGE 8E
TOWN 1N
DATE 3/2014
REVISIONS

DRAWING PATH: P:\0126_01650\183110100_Engineering Design Manual\Standard Detail Revisions\Water.dwg May 01, 2014 - 11:12am

Z:\Projects\16121\DWG\16121 NOVI DETAILS.dwg, WM 5, 2/26/2018 7:16:47 AM, MSmiles

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
CITY REVIEW	9/11/17	JJW									
FSP SUBMITTAL	10/25/17	JJW									
FSP SUBMITTAL	12/12/17	JJW									
STAMPING SET	3/2/18	JJW									

ZEIMET WOZNIAK & ASSOCIATES
Civil Engineers & Land Surveyors
55800 GRAND RIVER AVE., SUITE 100
NEW HUDSON, MICHIGAN 48165
P: (248) 437-5099 F: (248) 437-5222 www.zeimetwozniak.com

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CITY OF NOVI WATERMAIN DETAILS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK 374

DATE 2-16-17
DESIGNED BY JJW
DRAWN BY MAS
SCALE HOR: 1" = N/A VER: 1" = N/A
JOB NO. 16121
SHEET CE-22

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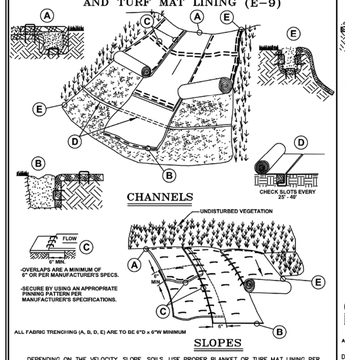
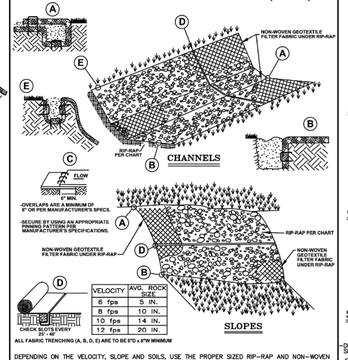
EROSION CONTROL BLANKETS AND TURF MAT LINING (E-9)



DEPENDING ON THE VELOCITY, SLOPE, SOILS, USE PROPER BLANKET OR TURF MAT LINING PER MANUFACTURER'S SPECIFICATIONS TO HANDLE THE SHEER STRESSES OF THE SLOPE/CHANNEL.

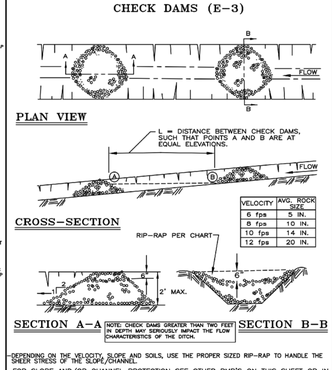
RIP-RAP: CHANNELS AND SLOPES (E-10)



VELOCITY	AVG. ROCK SIZE
6 fps	5 IN.
8 fps	10 IN.
10 fps	14 IN.
12 fps	20 IN.

DEPENDING ON THE VELOCITY, SLOPE AND SOILS, USE THE PROPER SIZED RIP-RAP AND NON-WOVEN GEOTEXTILE FABRIC TO HANDLE THE SHEER STRESS OF THE SLOPE/CHANNEL.

CHECK DAMS (E-3)



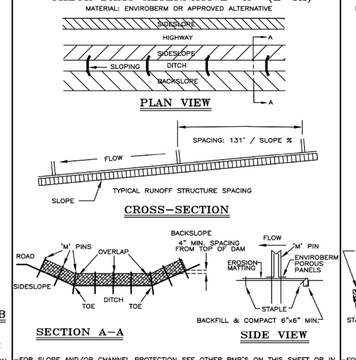
VELOCITY	AVG. ROCK SIZE
6 fps	5 IN.
8 fps	10 IN.
10 fps	14 IN.
12 fps	20 IN.

NOTE: CHECK DAMS GREATER THAN TWO FEET IN DEPTH MAY SERIOUSLY IMPACT THE FLOW CHARACTERISTICS OF THE DITCH.

DEPENDING ON THE VELOCITY, SLOPE AND SOILS, USE THE PROPER SIZED RIP-RAP TO HANDLE THE SHEER STRESS OF THE SLOPE/CHANNEL.
-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

CHECK DAMS ALTERNATIVE "A" (E-3A)

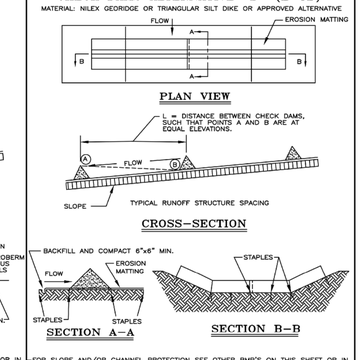
MATERIAL: ENVIROBERM OR APPROVED ALTERNATIVE



-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

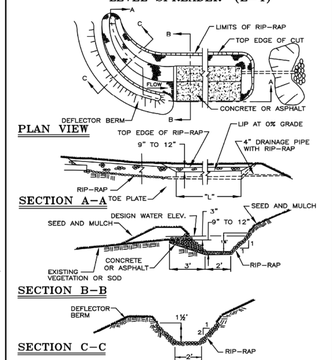
CHECK DAMS ALTERNATIVE "B" (E-3B)

MATERIAL: NILEX GEORIDGE OR TRIANGULAR SILT DIKE OR APPROVED ALTERNATIVE

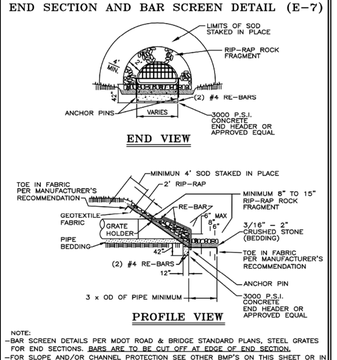


-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

LEVEL SPREADER (E-4)



RIP-RAP, END SECTION AND BAR SCREEN DETAIL (E-7)

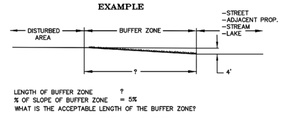


NOTE:
-BAR SCREEN DETAILS PER MDOT ROAD & BRIDGE STANDARD PLANS, STEEL GRATES FOR END SECTIONS. BARS ARE TO BE CUT OFF AT EDGE OF END SECTION.
-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

VEGETATIVE BUFFER ZONE (SP-1)

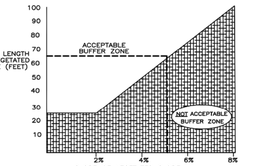
THE GRAPH SHOWN BELOW IS USED TO DETERMINE THE ADEQUACY OF AN EXISTING VEGETATIVE BUFFER ZONE FOR USE AS A SEDIMENT FILTER. THIS GRAPH IS ONLY APPLICABLE IF THE VEGETATION IS 90% DENSE AND AT LEAST 1" IN LENGTH OVER EVERY SQUARE FOOT OF DISTURBED SOIL. AN AREA COVERED WITH WEEDS, OR BUSHES AND TREES WITHOUT A GOOD GROUND COVER IS NOT ACCEPTABLE.

EXAMPLE



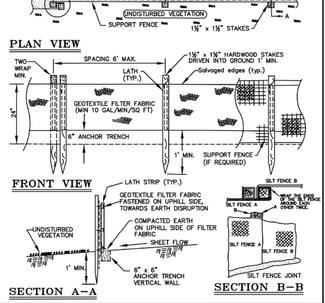
LENGTH OF BUFFER ZONE = ?
% OF SLOPE OF BUFFER ZONE = 5%
WHAT IS THE ACCEPTABLE LENGTH OF THE BUFFER ZONE?

PLOT IN GRAPH BELOW
BUFFER ZONE IS ACCEPTABLE AT 65'



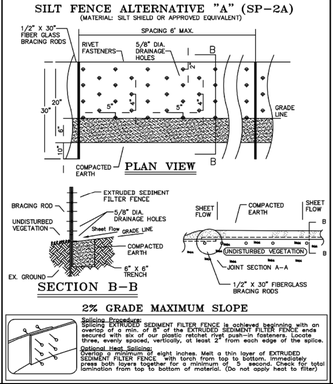
SILT FENCE (SP-2)

(MATERIAL: AMOCO PRO PEX 2130 OR APPROVED EQUIVALENT)



SILT FENCE ALTERNATIVE "A" (SP-2A)

(MATERIAL: SILT SHIELD OR APPROVED EQUIVALENT)



2% GRADE MAXIMUM SLOPE

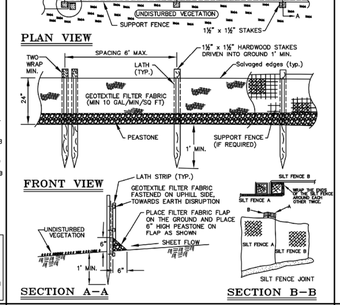
Splicing EXTRUDED SEDIMENT FILTER FENCE is achieved best along with an overlap of a minimum of 6" of the EXTRUDED SEDIMENT FILTER FENCE ends secured with six of our plastic ratchet rivet push-in fasteners. Locate fasteners, evenly spaced, vertically, at least 2" from each edge of the splice.

Optional steel mounting

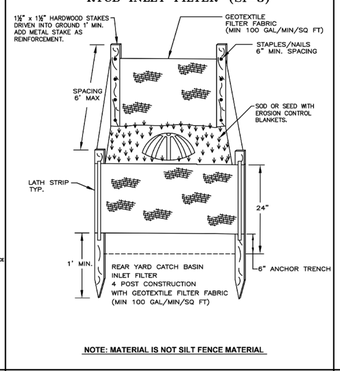
Fold EXTRUDED SEDIMENT FILTER FENCE, eight inches. Melt a thin layer of EXTRUDED SEDIMENT FILTER FENCE with torch from top to bottom, immediately press both layers together for a minimum of 5 second. Check for total lamination from top to bottom of material. (Do not apply heat to filter)

WINTER/FROZEN GROUND SILT FENCE (SP-2W)

(MATERIAL: AMOCO PRO PEX 2130 OR APPROVED EQUIVALENT)

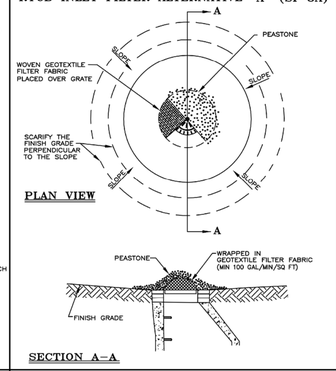


RYCB INLET FILTER (SI-3)



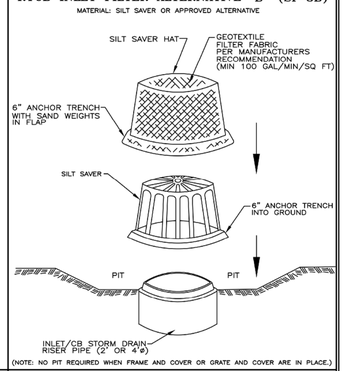
NOTE: MATERIAL IS NOT SILT FENCE MATERIAL

RYCB INLET FILTER ALTERNATIVE "A" (SI-3A)



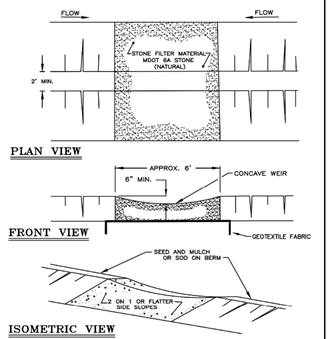
RYCB INLET FILTER ALTERNATIVE "B" (SI-3B)

MATERIAL: SILT SAVER OR APPROVED ALTERNATIVE



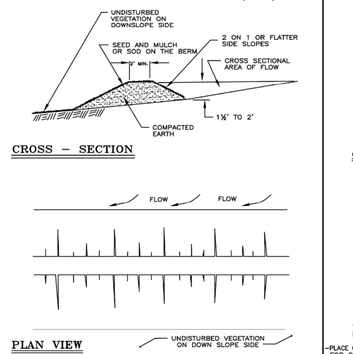
(NOTE: NO PIT REQUIRED WHEN FRAME AND COVER OR GRATE AND COVER ARE IN PLACE.)

EARTH DIVERSION BERM WITH STONE OUTLET FILTER (SP-4)

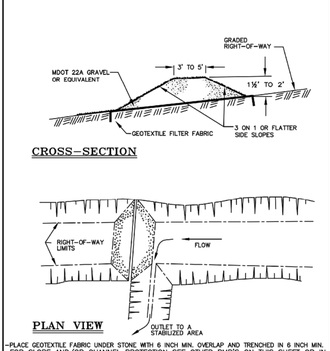


-PLACE GEOTEXTILE FABRIC UNDER STONE WITH 6 INCH MIN. OVERLAP AND TRENCHED IN 6 INCH MIN.

EARTH DIVERSION BERM (E-2)



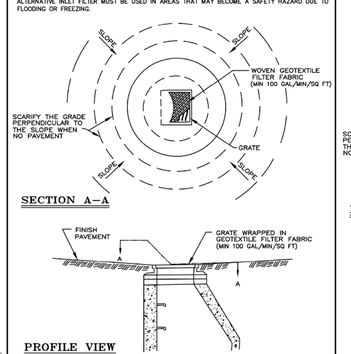
GRAVEL INTERCEPTOR DIKE (SP-6)



-PLACE GEOTEXTILE FABRIC UNDER STONE WITH 6 INCH MIN. OVERLAP AND TRENCHED IN 6 INCH MIN.
-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

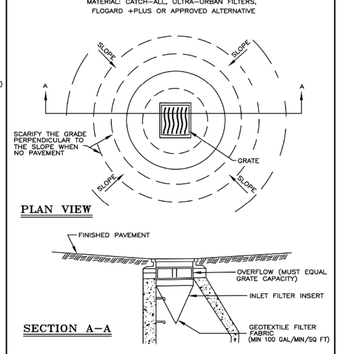
LOW POINT INLET FILTER (SI-2)

ALTERNATIVE INLET FILTER MUST BE USED IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING.

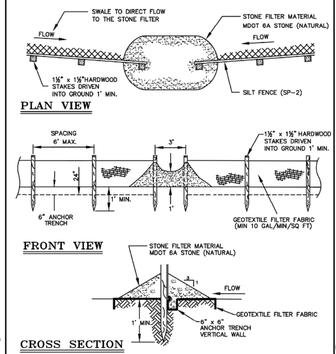


LOW POINT INLET FILTER ALT. "A" (SI-2A)

MATERIAL: CATCH-ALL, ULTRA-URBAN FILTERS, FLOGARD +PLUS OR APPROVED ALTERNATIVE

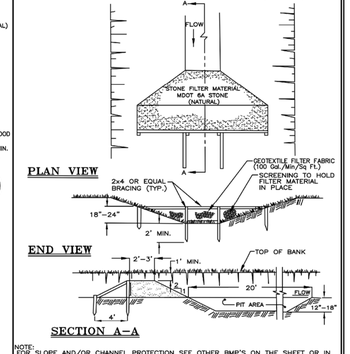


SILT FENCE GRAVEL FILTER (SP-3)



-PLACE GEOTEXTILE FABRIC UNDER STONE WITH 6 INCH MIN. OVERLAP AND TRENCHED IN 6 INCH MIN.

DITCH SEDIMENT TRAP (SO-4)

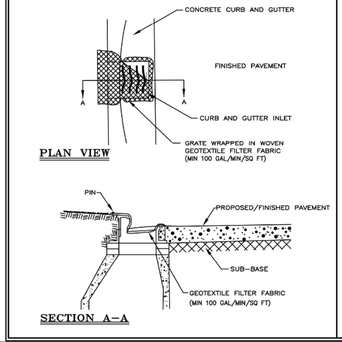


NOTE:
FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THE SHEET OR IN THE WRC SOIL EROSION MANUAL.

CURB AND GUTTER INLET FILTER (SI-4)

(BEFORE AND AFTER PAVING)

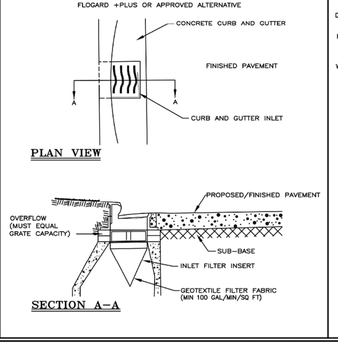
ALTERNATIVE INLET FILTER MUST BE USED IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING.



CURB AND GUTTER INLET FILTER ALTERNATIVE "A" (SI-4A)

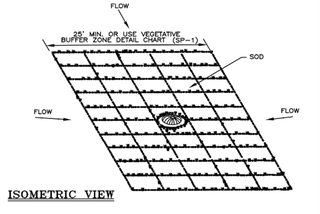
(BEFORE AND AFTER PAVING)

MATERIAL: CATCH-ALL, ULTRA-URBAN FILTERS, FLOGARD +PLUS OR APPROVED ALTERNATIVE

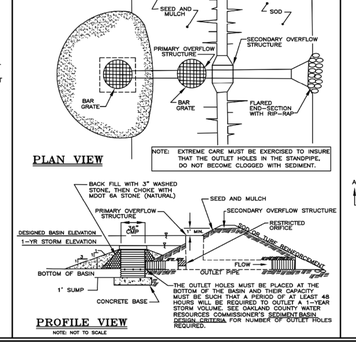


SOD INLET FILTER (SI-1)

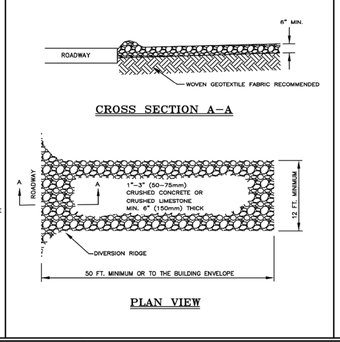
DEFINITION	SOD INLET FILTERS ARE PADS OF SOD PLACED AROUND A STORM DRAIN INLET OR CATCH BASIN.
PURPOSE	SOD INLET FILTERS ARE INSTALLED TO SLOW THE FLOW OF WATER INTO AN INLET OR CATCH BASIN AND TO FILTER OUT SEDIMENT IN THE PROCESS.
WHERE APPLICABLE	SOD INLET FILTERS SHOULD ONLY BE USED TO HANDLE LIGHT CONCENTRATIONS OF SEDIMENT. THEY ARE BEST USED AFTER FINAL GRADING IS COMPLETE AND DURING THE ESTABLISHMENT OF A VEGETATIVE COVER.



TEMPORARY DETENTION BASIN OUTLET STONE FILTER (SO-2)

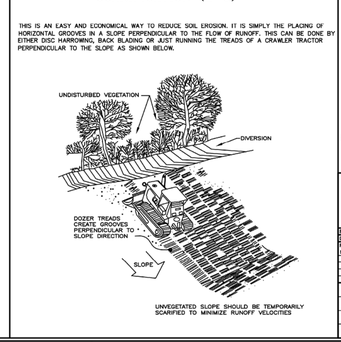


TEMPORARY STONE ACCESS DRIVE (SP-9)



SURFACE ROUGHENING AND SCARIFICATION (E-8)

THIS IS AN EASY AND ECONOMICAL WAY TO REDUCE SOIL EROSION. IT IS SIMPLY THE PLACING OF HORIZONTAL GROOVES IN A SLOPE PERPENDICULAR TO THE FLOW OF RUNOFF. THIS CAN BE DONE BY EITHER DISC HARROWING, BACK BLADING OR JUST RUNNING THE TREADS OF A CRAWLER TRACTOR PERPENDICULAR TO THE SLOPE AS SHOWN BELOW.



NOTE:

WHILE PERFORMING WORK INVOLVING GROUNDS MAINTENANCE AND/OR THE CONSTRUCTION/MAINTENANCE OF ANY INFRASTRUCTURE, INCLUDING ROADS, WATER MAINS, SANITARY SEWERS, STORM DRAINS AND STORM WATER BEST MANAGEMENT PRACTICES (BMPS), CONTRACTORS SHALL MINIMIZE POLLUTION FROM STORM WATER RUNOFF THAT CAN AFFECT WATER QUALITY RELATED TO WORK ACTIVITIES. POLLUTANTS THAT COULD IMPAIR WATER QUALITY MAY INCLUDE FUEL, GREASE AND OIL, NUTRIENTS, BACTERIA AND PATHOGENS, LITTER AND DEBRIS, AND SOIL EROSION AND SEDIMENTATION. APPLICABLE BMPS SHALL BE IMPLEMENTED BY THE CONTRACTOR TO THE MAXIMUM EXTENT PRACTICABLE TO PROTECT WATER QUALITY AND WILDLIFE HABITAT.

SOIL EROSION AND SEDIMENTATION CONTROL DETAILS

REVISION BLOCK			
Date Issuing / Source Date: N/A			
Rev. No.:	Rev. By:	Rev. Date:	Description:
1	WJ	3-23-07	BIDDING/SET DETAIL #SYS
2	WJ	4-30-09	SET ISSUED COMMITTEE APPROVAL / NAME CHANGES
3	RS	3-30-11	SET ISSUED ALTERNATIVE "A" DETAIL (SP-2A) ADDED
4	DS	4-15-13	SET ISSUED COMMITTEE APPROVAL / NOTE CHANGES

ORIG. DATE:	01/01/01	WRC WATER RESOURCES COMMISSIONER Jim Nash	ONE PUBLIC WORKS DRIVE, BLDG 95 WEST WATERFORD, MICHIGAN 48328-1907
SCALE:	NONE		SHEET NO.: 1 of 1
DESIGNED BY:	WRC		
DRAWN BY:	Mapping		

REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
CITY REVIEW	9/11/17	JJW									
FSP SUBMITTAL	10/25/17	JJW									
FSP SUBMITTAL	12/12/17	JJW									
STAMPING SET	3/2/18	JJW									

ZEIMET WOZNIAK & ASSOCIATES
Civil Engineers & Land Surveyors
55800 GRAND RIVER AVE., SUITE 100
NEW HUDSON, MICHIGAN 48165
P: (248) 437-5099 F: (248) 437-5222 www.zeimetwozniak.com

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OCWRC SOIL EROSION DETAILS
GRIFFIN FUNERAL HOME
SECTION 20, NOVI, MICHIGAN

FIELD BOOK

DATE	2-16-17	SCALE	HOR: 1" = N/A VER: 1" = N/A
DESIGNED BY	JJW	JOB NO.	16121
DRAWN BY	MAS	SHEET	CE-23

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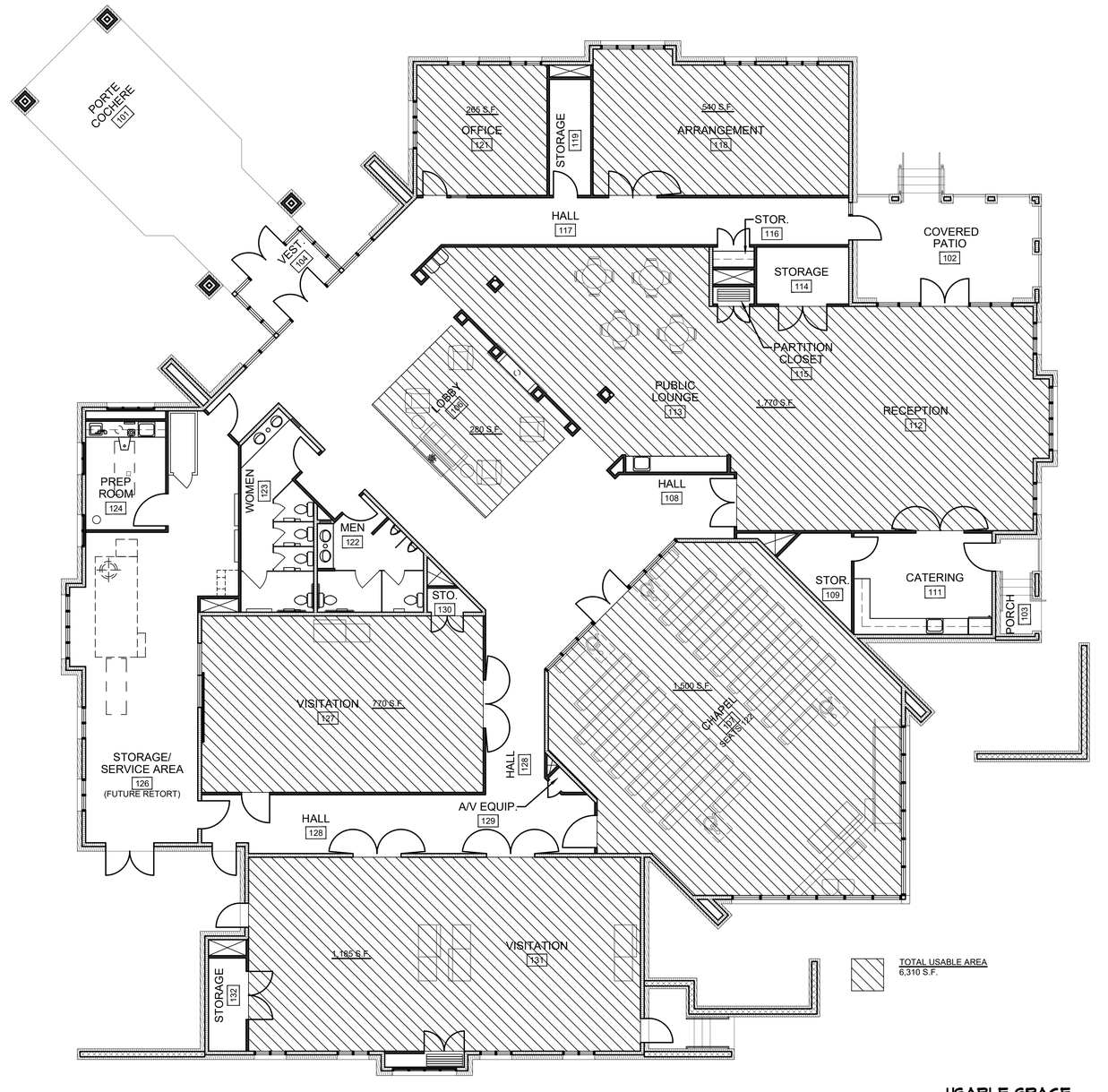
Z:\Projects\16121\DWG\16121 NOVI DETAILS.dwg, OCWRC, 2/26/2018 7:17:31 AM, MSmiles



01 USABLE SPACE FLOOR PLAN
SCALE: 1/8" = 1'-0"

NORTH

ISSUE DATE:
MARCH 10, 2017
OCTOBER 25, 2017
FSP Submittal
MARCH 2, 2018
STAMPING SET

REVISION:

ROBERT C. WEINGARTEN ARCHITECT No. 40171

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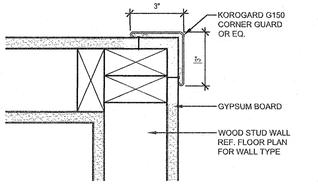
SCHEMATIC DESIGN
NOVI, MI

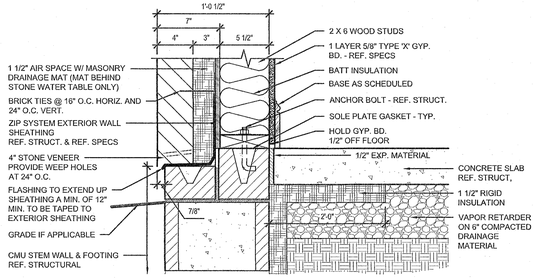
SHEET NO.

A0.1

JOB NUMBER: 16238

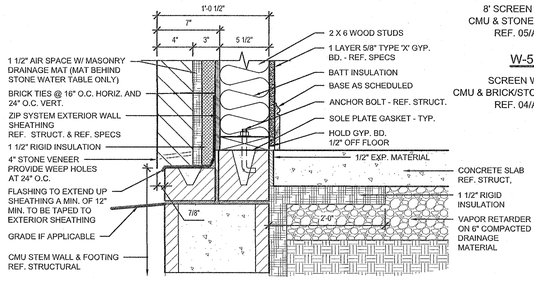


04 CORNER GUARD DETAIL
SCALE: 3"=1'-0"



W-4

2x6 WOOD STUD WALL W/ STONE VENEER / WATERTABLE - ABOVE GRADE



W-3

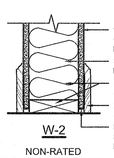
2x6 WOOD STUD WALL W/ RIGID INSULATION & STONE VENEER / WATERTABLE - ABOVE GRADE

W-6

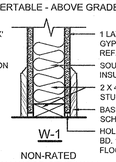
8' SCREEN WALL
CMU & STONE VENEER
REF. 05/A5.1

W-5

SCREEN WALL
CMU & BRICK/STONE VENEER
REF. 04/A5.1



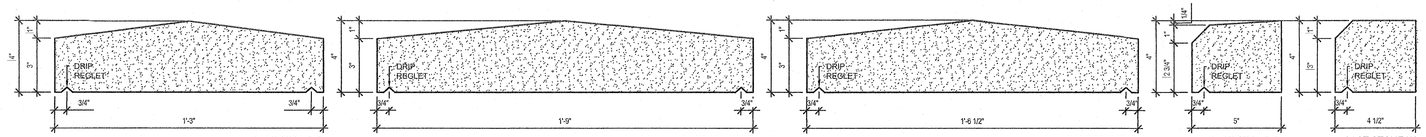
W-2
NON-RATED
2X6 WOOD STUD WALL



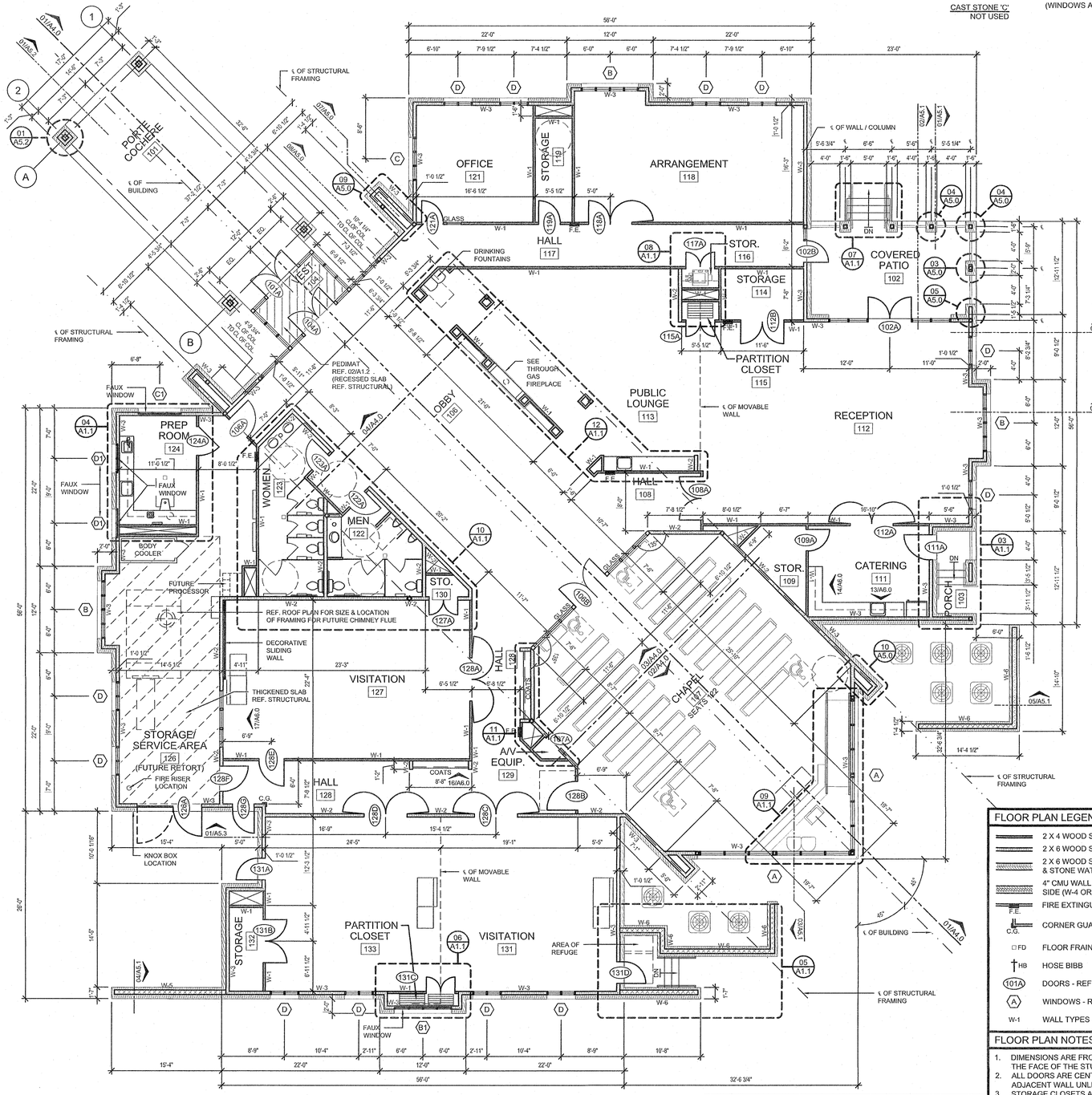
W-1
NON-RATED
2X4 WOOD STUD WALL

ZIP SYSTEM NOTES:
1/8" JTS AT ALL EDGES, ALL JOINTS & PENETRATIONS TAPED WITH 'ZIP SYSTEM' TAPE OR LIQUID FLASHING.
FIRE RATING NOTE:
REF. REFLECTED CEILING PLANS (A1.1) FOR FIRE RATED WALL (FRW) LOCATIONS & DETAILS
STRUCTRUAL NOTE:
• REFER TO STRUCTURAL SHEETS FOR WALLS DESIGNED TO BE LOAD BEARING AND SHEERWALL CONSTRUCTION.
• REFER TO STRUCTURAL SHEETS FOR ALL REINFORCING NOTES.

03 WALL TYPES
SCALE: 1 1/2" = 1'-0"



02 CAST STONE PROFILES
SCALE: 3" = 1'-0"



01 FLOOR PLAN
SCALE: 1/8" = 1'-0"

FLOOR PLAN LEGEND

- 2 X 4 WOOD STUD WALL (W-1)
- 2 X 6 WOOD STUD WALL (W-2)
- 2 X 6 WOOD STUD WALL W/ 4" BRICK VENEER & STONE WATERTABLE (W-3)
- 4" CMU WALL W/ 4" BRICK STONE VENEER EA. SIDE (W-4 OR W-5) - REF. 02/A0.1
- F.E. FIRE EXTINGUISHER AND CABINET
- C.G. CORNER GUARDS - REF. 04/A1.0
- FD FLOOR FRAIN
- HB HOSE BIBB
- 101A DOORS - REF. A2.1 FOR ELEVS.
- A WINDOWS - REF. A2.2 FOR ELEVS.
- W-1 WALL TYPES - REF. 1.0

FLOOR PLAN NOTES

1. DIMENSIONS ARE FROM THE FACE OF BRICK/STONE TO THE FACE OF THE STUD.
2. ALL DOORS ARE CENTERED IN WALL OR 6 1/2" OFF ADJACENT WALL UNLESS DIMENSIONED OTHERWISE
3. STORAGE CLOSETS ARE TO HAVE 5 ADJUSTABLE SHELVING - REF. PLAN FOR DEPTH

AREA CALCULATIONS:

CONDITIONED AREA	10,356 SQ. FT.
COVERED PATIO, GARAGE, & PORTE COCHERE	1,820 SQ. FT.
TOTAL	12,176 SQ. FT.

ISSUE DATE:
OCTOBER 6, 2017
PERMIT REVIEW
OCTOBER 25, 2017
FSP Submittal
MARCH 2, 2018
STAMPING SET

REVISION:

JST ARCHITECTS
ARCHITECTURE | PLANNING | MAUSOLEUM | CEMETERY | INTERIORS
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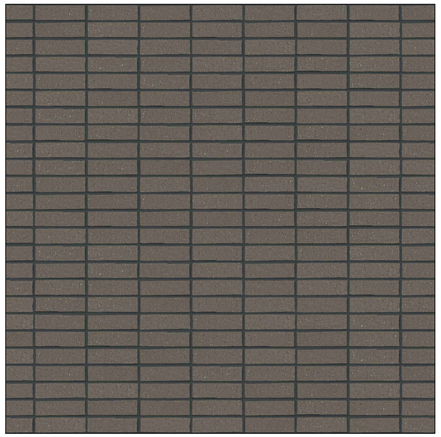
CONSTRUCTION DOCUMENTS
NOVI, MI

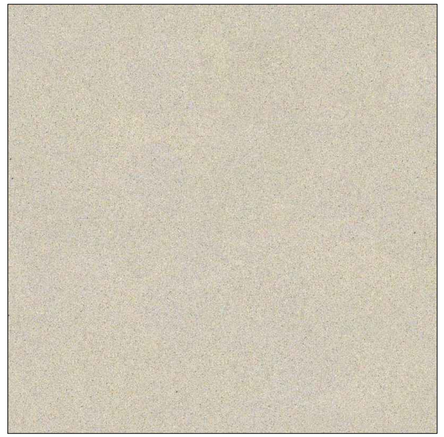
SHEET NO.
A1.0

JOB NUMBER: 16238

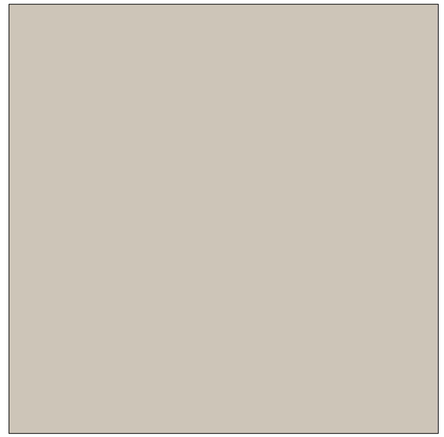


L
MATERIAL: BRICK (ACME - MODULAR)
COLOR: CHARCOAL GREY W/BLACK GROUT
USE: MASONRY WALL
MATERIAL %: 45

K
MATERIAL: STONE (COUNTRY RUBBLE)
COLOR: MADISON COUNTY
USE: MASONRY WALL
MATERIAL %: 55

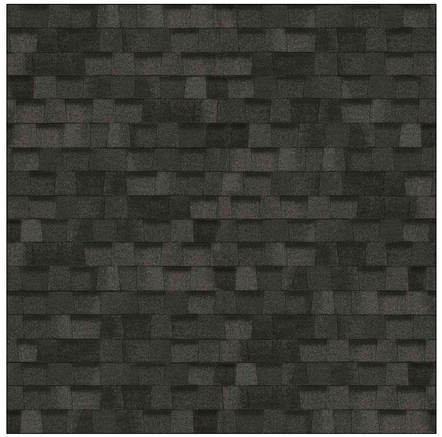


J
MATERIAL:CAST STONE
COLOR: COFFEE
USE:WATER TABLE CAP
MATERIAL %: NA



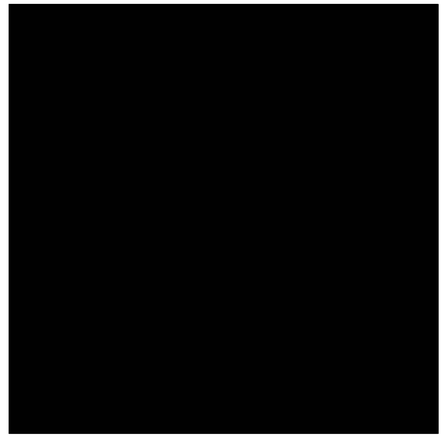
I
MATERIAL:PRE-FIN. CONCRETE BD.
COLOR: CHINA WHITE
USE:SOFFITS
MATERIAL %:NA

H
MATERIAL: METAL ROOFING
COLOR: MUSKET GREY
USE:ACCENT ROOFING
MATERIAL %: 10



G
MATERIAL: ASPHALT SHINGLE
COLOR: ONYX BLACK
USE:MAIN ROOFING
MATERIAL %:90

F
MATERIAL: PRE-FIN. CONCRETE BD.
COLOR: CHARCOAL GREY
USE:FASCIA & FREIZE BOARDS
MATERIAL %:NA



E
MATERIAL: ALUMINUM STOREFRONT
COLOR: BLACK ANODIZED #29
USE:WINDOWS
MATERIAL %:NA

D
MATERIAL: INSULATED WOOD-ALUM PANELS
COLOR: CHERRY
USE:WINDOW HEADER ACCENT
MATERIAL %:NA

C
MATERIAL: WOOD DOORS
COLOR: CHERRY
USE:DECORATIVE EXT. DOORS
MATERIAL %:NA

B
MATERIAL: PRE-FINISHED/ PAINTED METAL
COLOR: CHARCOAL GREY
USE: EXT. METALS DOORS/FRAMES, GUTTERS & DOWNSPOUTS
MATERIAL %:NA

A
MATERIAL: ANODIZED/PAINTED METAL RAILING
COLOR: BLACK
USE:STAIR & HAND RAILING
MATERIAL %:NA

ISSUE DATE:
MARCH 10, 2017
OCTOBER 25, 2017
FSP Submittal
MARCH 2, 2018
STAMPING SET

REVISION:

STATE OF MICHIGAN
ROBERT C. KILLINGSWORTH
ARCHITECT
No. 40171
LICENSED ARCHITECT

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L.J. GRIFFIN FUNERAL HOME
SCHEMATIC DESIGN
NOVI, MI

SHEET NO.
A2.0

JOB NUMBER: 16238

VIEW UNDER CARPORT LOOKING NORTHEAST

VIEW LOOKING NORTH/NORTHEAST

VIEW LOOKING EAST/NORTHEAST

VIEW LOOKING EAST

VIEW LOOKING SOUTH/SOUTHEAST

VIEW LOOKING SOUTH/SOUTHWEST

VIEW LOOKING NORTH/NORTHEAST

VIEW LOOKING WEST/SOUTHWEST

VIEW LOOKING NORTH/NORTHWEST

VIEW LOOKING NORTH

ISSUE DATE:

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	OCTOBER 25, 2017
	FSP Submittal
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STATE OF MICHIGAN
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ARCHITECTURE | PLANNING | MAUSOLEUM | CEMETERY | INTERIORS
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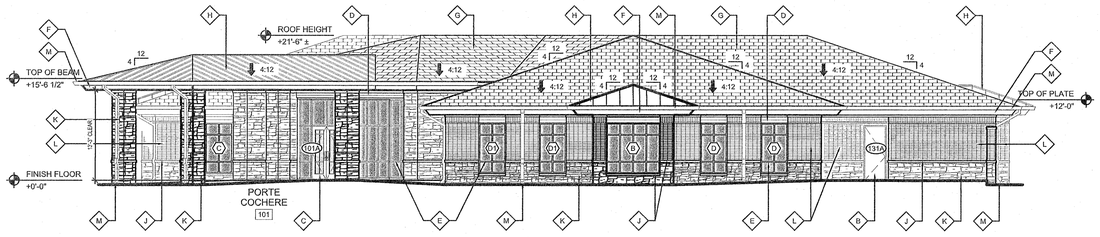
L.J. GRIFFIN FUNERAL HOME
SCHEMATIC DESIGN

NOVI, MI

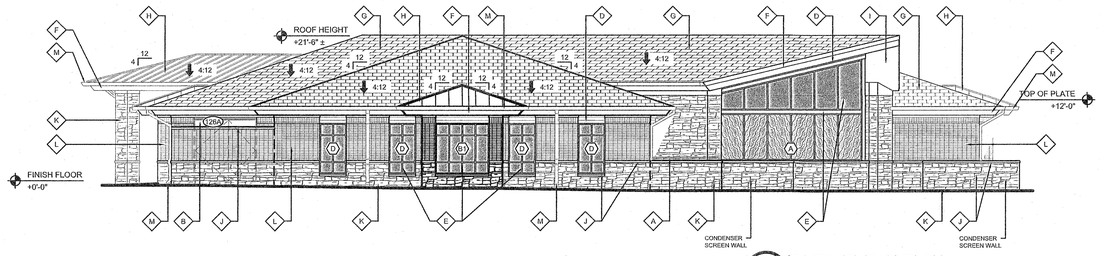
SHEET NO.

A3.0

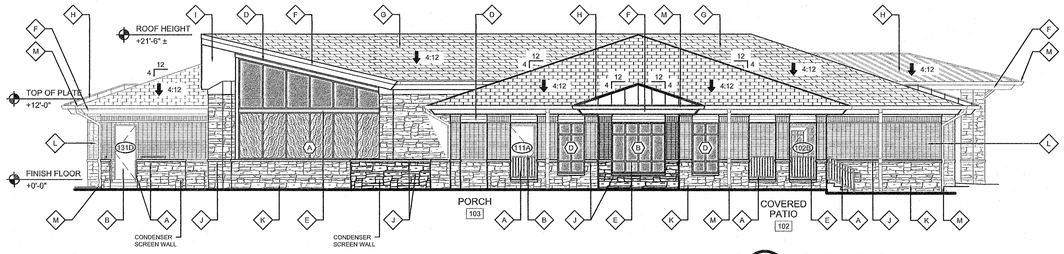
JOB NUMBER: 16238



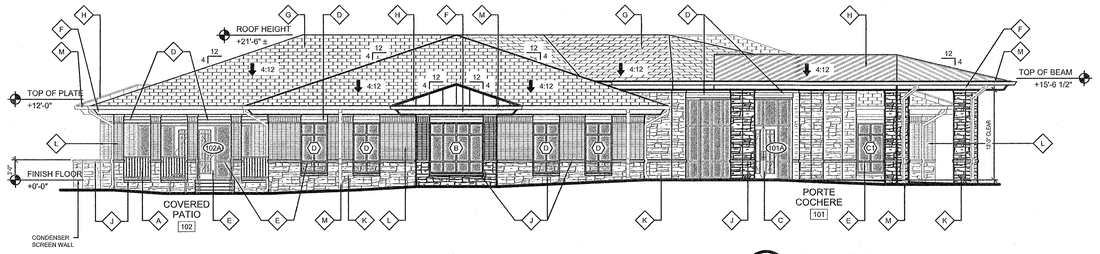
06 SOUTH ELEVATION
SCALE: 3/32 = 1'-0"



05 EAST ELEVATION
SCALE: 3/32 = 1'-0"



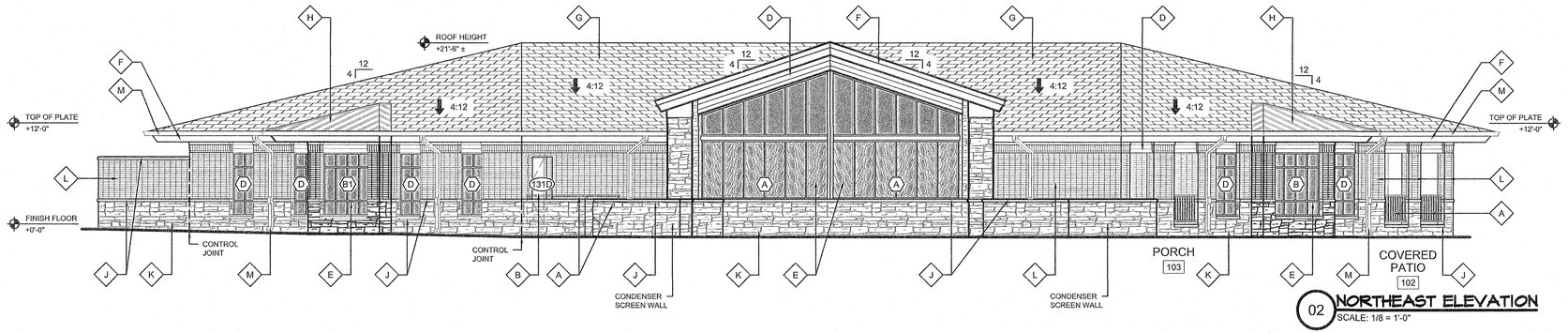
04 NORTH ELEVATION
SCALE: 3/32 = 1'-0"



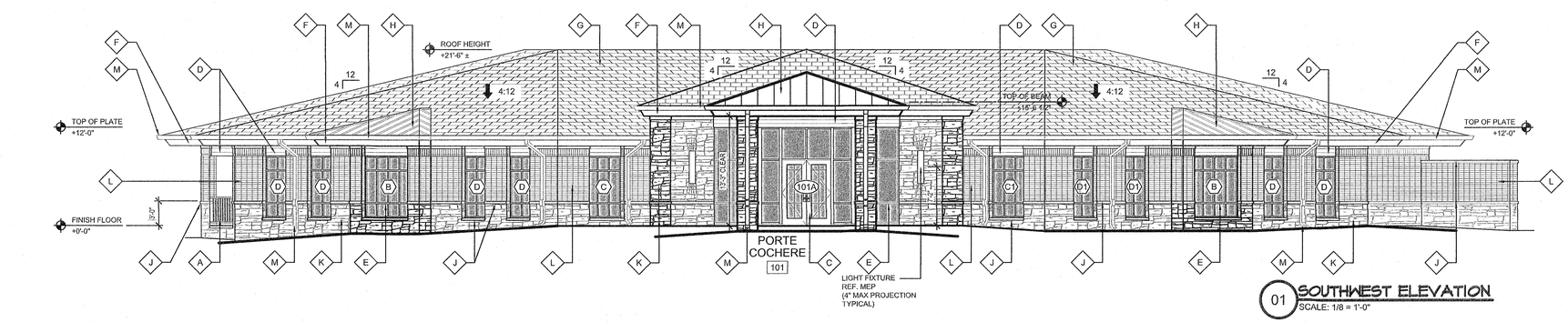
03 WEST ELEVATION
SCALE: 3/32 = 1'-0"

MATERIAL KEY

GLASS	PRE-FINISHED SEAMLESS METAL GUTTERS COLOR '01'
BRICK W/ ROWLOCK /SOLDIER COURSE	STONE
CAST STONE REF. 02/A1.0	PRIMED & PAINTED VENTED CONCRETE BOARD SOFFIT COLOR '03'
METAL ROOFING REF. A1.4	ASPHALT SHINGLE REF. A1.4
PRIMED & PAINTED CONCRETE BOARD FRIEZE & FASCIA BOARDS COLOR '01'	METAL CLAD WINDOWS REF. A2.1
PRIMED & PAINTED CONCRETE BOARD WINDOW HEADER COLOR '02'	FIBERGLAS DOORS REF. A2.1
METAL DOOR/FRAMES REF. A2.1	ANODIZED/PAINTED METAL RAILING REF. A5.2



02 NORTHEAST ELEVATION
SCALE: 1/8 = 1'-0"



01 SOUTHWEST ELEVATION
SCALE: 1/8 = 1'-0"

ISSUE DATE:
OCTOBER 6, 2017
PERMIT REVIEW
OCTOBER 25, 2017
FSP Submittal
MARCH 2, 2018
STAMPING SET

REVISION:

JST ARCHITECTS
ARCHITECTURE | PLANNING | MAUSOLEUM | CEMETERY | INTERIORS
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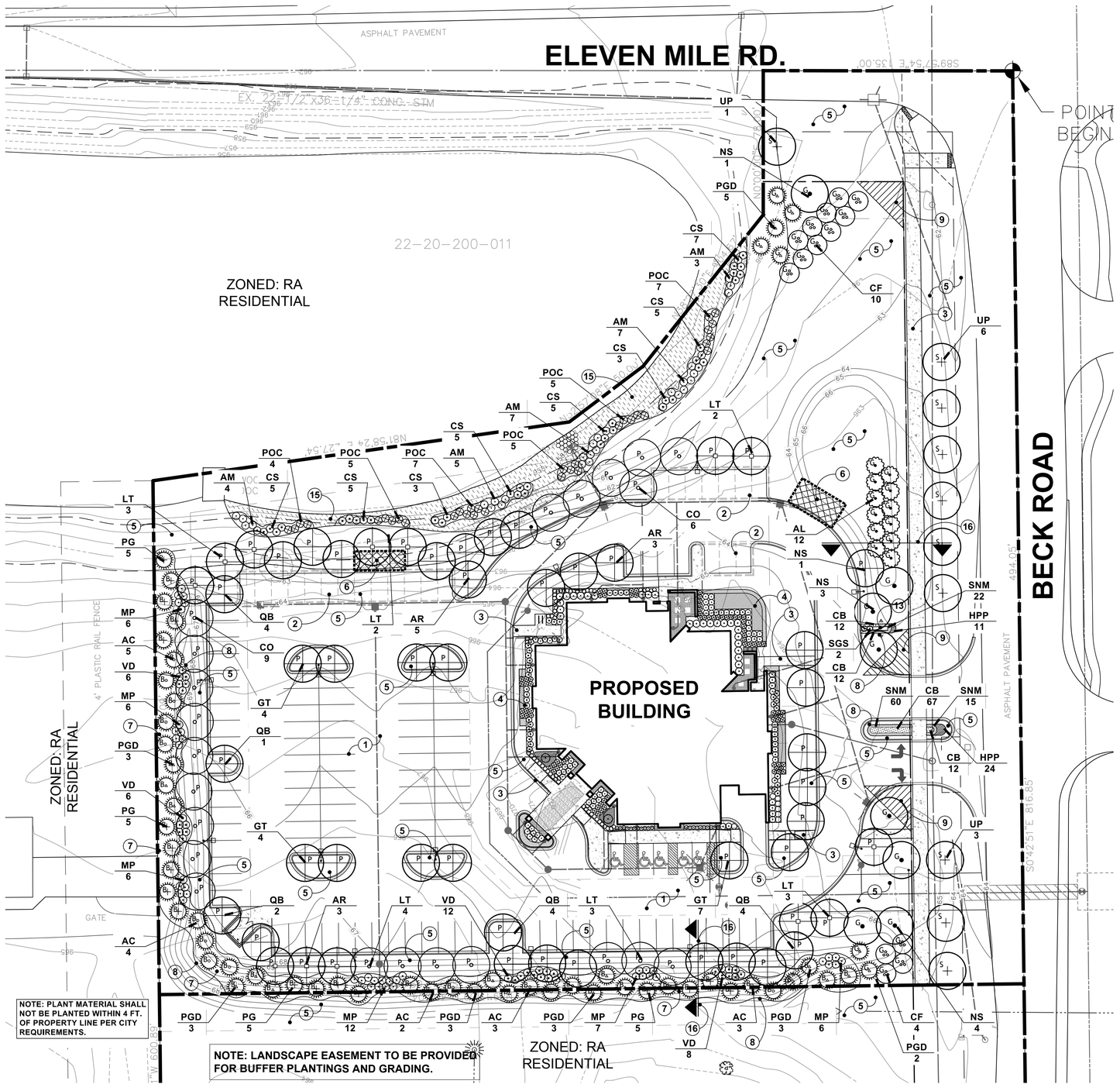
NOVI FUNERAL HOME
CONSTRUCTION DOCUMENTS
NOVI, MI

SHEET NO.
A3.0

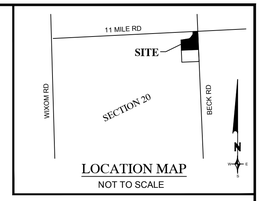
JOB NUMBER: 16238



SITE PLANTING PLAN

SCALE 1" = 30'

NOT TO BE USED AS CONSTRUCTION DRAWING



LOCATION MAP
NOT TO SCALE

NOTE KEY: (1)

1. ASPHALT PARKING LOT
2. LAND BANKED PARKING, SEE CIVIL ENGINEERING DRAWINGS
3. CONCRETE SIDEWALK - SEE CIVIL DWGS.
4. PROPOSED FOUNDATION PLANTINGS, SEE SHEET LP-2
5. SEEDED LAWN OVER MINIMUM 4" DEPTH TOPSOIL. SEE TOPSOIL NOTE BELOW, ALL DISTURBED AREAS
6. SNOW DEPOSIT AREA
7. CONTINUOUS MULCH BED
8. SHOVEL CUT BED EDGE, TYPICAL
9. 25' CLEAR VISION TRIANGLE
10. 2" DIA. EGGSTONE OVER FILTER MAT
11. 4" RYERSON STEEL EDGING, ¼" THICK
12. 2 FT. X 2 FT. CONC. PATIO STEPPING STONE
13. PROJECT SIGN - SEE ARCH. DRAWINGS.
14. PROPOSED BIKE RACKS
15. NATIVE SEEDING, SEED TO EDGE OF WATER, SEE MIX SHEET LP-3
16. CROSS SECTION - SEE SHEET LP-3

LANDSCAPE DATA

R.O.W. Frontage

Eleven Mile Road Frontage:	76 ln. ft.
Beck Road Frontage:	434 ln. ft.
Total Frontage:	**510 ln. ft.**
Canopy/Evergreen Trees Req.:	15 Trees
(1 Tree/ 35 ln. ft.)	
Canopy/ Evergreen Trees Prov.:	**15 Trees**
Sub-Canopy Trees Req.:	26 Trees
(1 Tree/ 20 ln. ft.)	
Sub-Canopy Trees Prov.:	**26 Trees**

Street Trees

Eleven Mile Road Frontage:	51 ln. ft.
(Measured From Sight Dist. Triangles)	
(1 Tree/ 35 ln. ft.)	
Trees Required:	*1 Trees*
Beck Road Frontage:	385 ln. ft.
(Measured From Sight Dist. Triangles)	
(1 Tree/ 35 ln. ft.)	
Trees Required:	*11 Trees*
Total Trees Provided: (*Per Waiver)	**10 Trees***

PARKING LOT

INTERIOR PARKING LOT LANDSCAPING

Square Footage of Parking Spaces:	15,409 s.f.
Sq. Footage of Land Bank Spaces:	3,579 s.f.
Required Landscape Area:	1,899 s.f.
(Parking space s.f. x 0.10 s.f.)	
Additional Paved Vehicular Use Area:	34,817 s.f.
Required Landscape Area:	1,741 s.f.
(V.U.A. x 0.05 s.f.)	
Total s.f. of Landscape Area Req.:	3,640 s.f.
Total s.f. of Landscape Area Prov.:	**3,641 s.f.**
Parking Lot Tree Requirement:	
Total Trees Required (1 per 75 s.f.):	49 Trees
Total Trees Provided:	**49 Trees**

PARKING PERIMETER LANDSCAPING

Parking Lot Perimeter:	866 l.f.
Canopy/Evergreen Trees Req.:	25 Trees
(1 Tree/ 35 ln. ft.)	
Total Trees Provided:	**25 Trees**

BUILDING

FOUNDATION PERIMETER LANDSCAPING

Building Perimeter:	477 l.f.
Landscape Area Req.:	3,816 s.f.
(Building Perimeter x 8.0')	
Landscape Area Prov.:	**3,870 s.f.**

PLANTING KEY

- **GREENBELT TREES**
- **STREET TREES**
- **BUFFER TREES**
- **PARKING LOT TREES**

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O. SOD/ SEED LAWN AREAS - ALL LAWN AREAS BETWEEN CURBS AND BUILDINGS OR BETWEEN BUILDINGS, DISK SOIL TO 4" DEEP BEFORE TOPSOIL PLACEMENT

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PLANT MIX

ALL PLANTING/ PERENNIAL BEDS TO RECEIVE:

1 - 6 CU FT. COMPOST

1 - 40 LB BAG DRIMANURE

1 - 1 LB BAG SHEMINS 13-13-13 MULTI PURPOSE FERTILIZER

PER 100 SQ FT BED AREA.

HAND TILL INTO SOIL TO A DEPTH OF 12" MINIMUM

MULCH

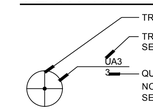
MULCH TO BE DOUBLE SHREDDED HARDWOOD BARK MULCH

NO GROUND WOOD PALETTE MULCH PERMITTED

TOPSOIL

CONTRACTOR TO TILL OR DISK SUBGRADE TO 4" DEPTH AND INSTALL 4" COMPACTED DEPTH TOPSOIL IN ALL LAWN AREAS - TOPSOIL SHALL BE PROVIDED BY CONTRACTOR

PLANT KEY



IRRIGATION

ALL LANDSCAPE AREAS WILL BE IRRIGATED WITH A FULLY AUTOMATIC IRRIGATION SYSTEM.

STATE OF MICHIGAN — STEPHEN L. DEAK — LANDSCAPE ARCHITECT — No. 1245 — REGISTERED LANDSCAPE ARCHITECT

deak
PLANNING + DESIGN
143 cadycentre #79
northville, mi 48167
[T] 866 355-4204
deakplanningdesign.com

REVISIONS	DATE	BY
RVSD. PER OWNER	9/27/17	SD
FINAL SITE PLAN	12/12/17	SD
STAMPING SET	3/2/18	SD

ZEIMET WOZNIAK & ASSOCIATES
Civil Engineers & Land Surveyors
55800 Grand River Avenue, Suite 100
New Hudson, Michigan 48165-9318
248.437.5099 - 248.437.5222 fax www.zeimetwozniak.com

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CLIENT:
NOVI GRIFFIN FUNERAL HOME, LLC
7707 MIDDLEBELT RD.
WESTLAND, MI 48185

LANDSCAPE PLAN
GRIFFIN FUNERAL HOME
NOVI, MICHIGAN, SEC 20

DATE	03/10/17
SCALE	HOR: 1" = 30' VER: 1" =
DESIGNED BY	SD
JOB NO.	DPD-121702
DRAWN BY	SD
SHEET	LP-1

FIELD BOOK

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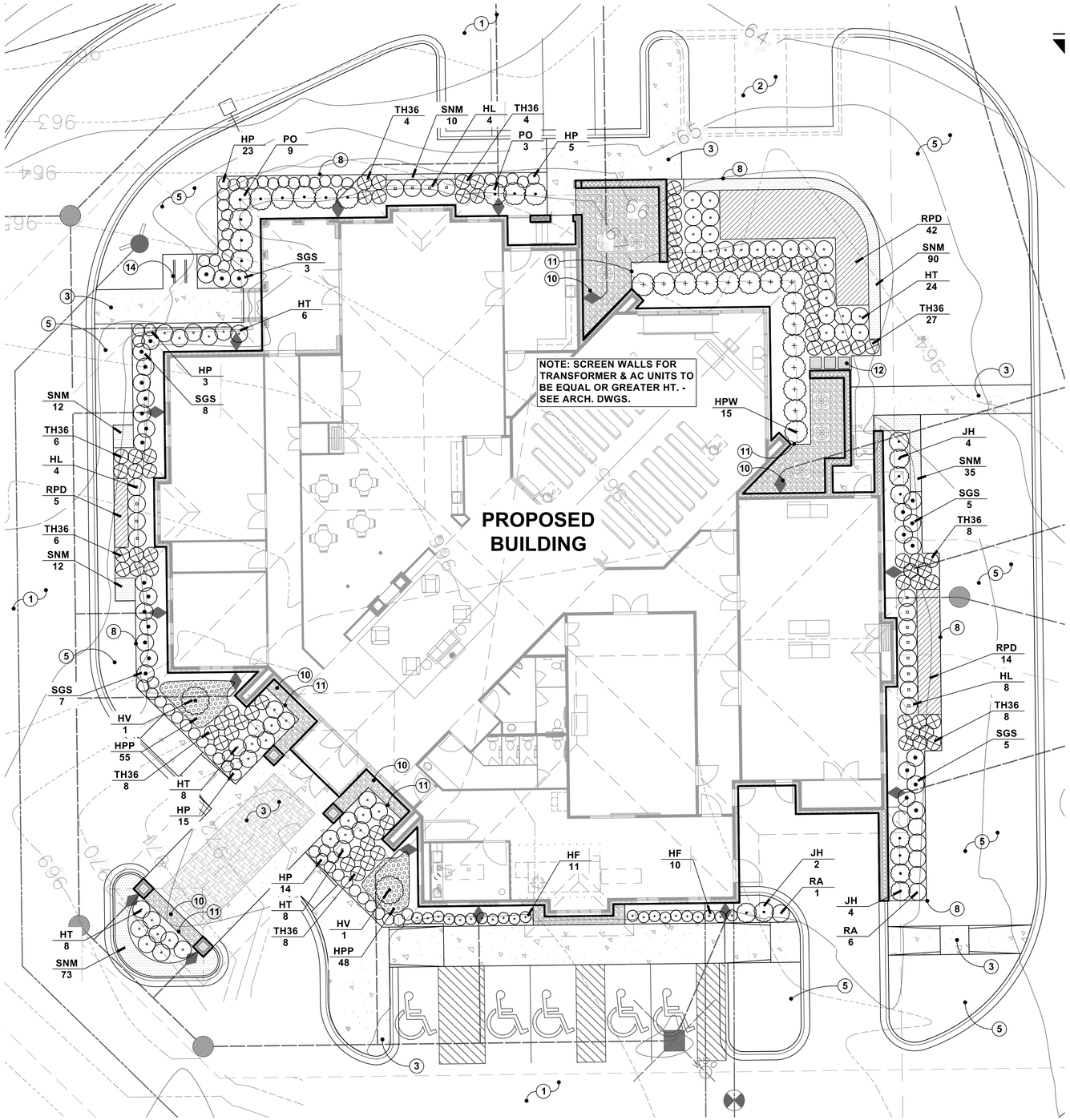


FOUNDATION PLANTING DETAIL

SCALE 1" = 10'

1 inch = 10 feet

NORTH

NOT TO BE USED AS CONSTRUCTION DRAWING

PLANT LIST

GREENBELT PLANTINGS

QUAN.	KEY	COMMON/ BOTANICAL NAME	SIZE	SPEC.	UNIT	TOTAL
8	NS	Sour Gum *Nyssa sylvatica*	3" Cal.	B&B	$ 400.00	$ 3,200.00
7	PGD	Black Hills Spruce *Picea g. 'Densata'*	7' ht.	B&B	$ 325.00	$ 2,275.00
12	AL	Downy Serviceberry - single stem *Amalanchier laevis*	2" Cal.	B&B	$ 250.00	$ 3,000.00
14	CF	Flowering Dogwood *Cornus florida*	7' ht. 4 stem min.	B&B	$ 250.00	$ 3,500.00

STREET TREES

10	UP	Pioneer Elm *Ulmus 'Pioneer'*	3" Cal.	B&B	$ 325.00	$ 3,250.00

BUFFER PLANTINGS

17	AC	Concolor Fir *Abies concolor*	7' ht.	B&B	$ 325.00	$ 5,525.00
20	PG	White Spruce *Picea glauca*	7' ht.	B&B	$ 325.00	$ 6,500.00
16	PGD	Black Hills Spruce *Picea g. 'Densata'*	7' ht.	B&B	$ 325.00	$ 5,200.00
43	MP	Bayberry *Myrica pensylvanica*	30" Ht.	B&B	$ 50.00	$ 2,150.00
32	VD	Arrowood Viburnum *Viburnum dentatum*	30" Ht.	B&B	$ 50.00	$ 1,600.00

PARKING LOT TREES

17	LT	Tulip Tree *Liriodendron tulipfera*	3" Cal.	B&B	$ 400.00	$ 6,800.00
15	CO	Hackberry *Celtis occidentalis*	3" Cal.	B&B	$ 400.00	$ 6,000.00
15	GT	Skyline Honeylocust *Gleditsia t. 'Skyline'*	3" Cal.	B&B	$ 400.00	$ 6,000.00
15	QB	Swamp White Oak *Quercus bicolor*	3" Cal.	B&B	$ 400.00	$ 6,000.00
11	AR	Red Pointe Red Maple *Acer r. 'Red Pointe'*	3" Cal.	B&B	$ 400.00	$ 4,400.00
1	NS	Sour Gum *Nyssa sylvatica*	3" Cal.	B&B	$ 400.00	$ 400.00

DETENTION BASIN PLANTINGS

38	CS	Redtwig Dogwood *Cornus sericea*	30" Ht.	Cont.	$ 50.00	$ 1,900.00
26	AM	Iriquois Beauty Chokeberry *Aronia m. 'Iriquois Beauty'*	30" Ht.	Cont.	$ 50.00	$ 1,300.00
33	POC	Coppertina Ninebark *Physocarpus o. 'Coppertina'*	30" Ht.	Cont.	$ 50.00	$ 1,650.00
3	BSM	Basin Slope Seed Mix	34 lbs/ac.	LBS.	$ 300.00	$ 900.00

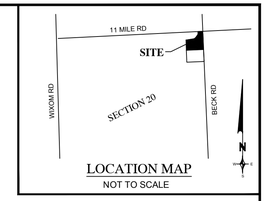
FOUNDATION PLANTINGS

2	HV	Vernal Witchhazel *Hamamalis vernalis*	48" ht.	B&B	$ 50.00	$ 100.00
54	HT	Tuff Stuff Hydrangea *Hydrangea serrata'Tuff Stuff'*	3 gal.	Cont.	$ 50.00	$ 2,700.00
79	TH36	Hicks Yew *Taxus x m. 'Hicksii'*	36" Ht.	Cont.	$ 50.00	$ 3,950.00
30	SGS	Golden Sunrise Spirea *Spirea j. 'Golden Sunrise*	24" Ht.	Cont.	$ 50.00	$ 1,500.00
10	JH	Hetz Columnar Juniper *Juniperus c. 'Hetz Columnaris'*	5' ht.	B&B	$ 50.00	$ 500.00
7	RA	Gro-Low Sumac *Rhus a. 'Gro-Low'*	18" Ht.	Cont.	$ 50.00	$ 350.00
16	HL	Little Lime Hydrangea *Hydrangea p. 'Little Lime'*	30" Ht.	Cont.	$ 50.00	$ 800.00
15	HPW	Pinky Winky Hydrangea *Hydrangea p. 'Pinky Winky'*	30" Ht.	Cont.	$ 50.00	$ 750.00
61	RPD	Peach Drift Rose *Rosa 'Peach Drift'*	24" Ht.	Cont.	$ 50.00	$ 3,050.00
12	PO	Summer Wine Ninebark *Physocarpus o. 'Summer Wine'*	30" Ht.	Cont.	$ 50.00	$ 600.00
329	SNM	Marcus Sage *Salvia nemorosa 'Marcus'*	1 gal.	Cont.	$ 15.00	$ 4,935.00
138	HPP	Palace Purple Coralbells *Heuchera 'Palace Purple'*	1 gal.	Cont.	$ 15.00	$ 2,070.00
60	HP	Patriot Hosta *Hosta 'Patriot'*	1 gal.	Cont.	$ 15.00	$ 900.00
21	HF	Francee Hosta *Hosta 'Francee'*	1 gal.	Cont.	$ 15.00	$ 315.00
103	CB	Carex Buchananii *Leatherleaf Sedge Red Rooster*	1 gal.	Cont.	$ 15.00	$ 1,545.00
148		SHREDDED HARD BARK MULCH (C.Y.)			$ 40.00	$ 5,920.00
6984		SEEDED LAWN (S.Y.)			$ 2.50	$ 17,460.00
					TOTAL:	$ 95,615.00

NOTE:
1. CONTRACTOR TO VERIFY ALL PLANT QUANTITIES.
2. PLANT SPECIES SELECTIONS PROVIDED TO MEET CITY REQUIREMENTS.
3. DO NOT USE DWARF SPECIES OF CORNUS SERICEA.

NOTE KEY:

1. ASPHALT PARKING LOT
2. LAND BANKED PARKING, SEE CIVIL ENGINEERING DRAWINGS
3. CONCRETE SIDEWALK - SEE CIVIL DWGS.
4. PROPOSED FOUNDATION PLANTINGS, SEE SHEET LP-2
5. SEEDED LAWN OVER MINIMUM 4" DEPTH TOPSOIL. SEE TOPSOIL NOTE BELOW, ALL DISTURBED AREAS
6. SNOW DEPOSIT AREA
7. CONTINUOUS MULCH BED
8. SHOVEL CUT BED EDGE, TYPICAL
9. 25' CLEAR VISION TRIANGLE
10. 2" DIA. EGGSTONE OVER FILTER MAT
11. 4" RYERSON STEEL EDGING, ¼" THICK
12. 2 FT. X 2 FT. CONC. PATIO STEPPING STONE
13. PROJECT SIGN - SEE ARCH. DRAWINGS.
14. PROPOSED BIKE RACKS
15. NATIVE SEEDING, SEED TO EDGE OF WATER, SEE MIX SHEET LP-3



LOCATION MAP
NOT TO SCALE

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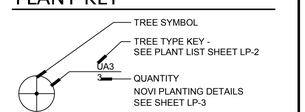

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WESTLAND, MI 48185

FOUNDATION PLANTING PLAN
GRIFFIN FUNERAL HOME
NOVI, MICHIGAN, SEC 20

FIELD BOOK

DATE 03/10/17	SCALE	HOR: 1" = 10' VER: 1" =	
DESIGNED BY SD	JOB NO.	DPD-121702	
DRAWN BY SD	SHEET	LP-2	

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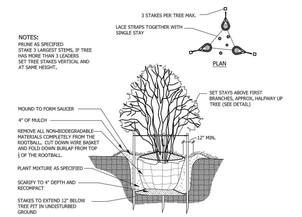
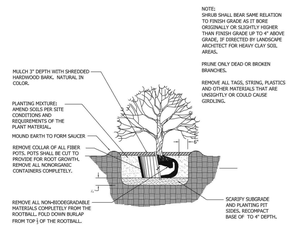
NOVI PLANTING DETAILS



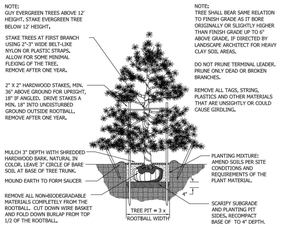
MULTI-STEM TREE PLANTING DETAIL

Not to scale



SHRUB PLANTING DETAIL

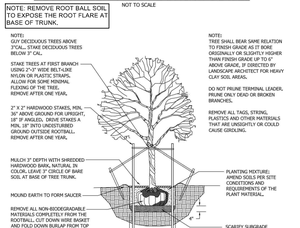
NOT TO SCALE



EVERGREEN TREE PLANTING DETAIL

NOT TO SCALE

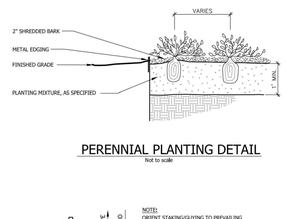
NOTE: REMOVE ROOT BALL SOIL TO EXPOSE THE ROOT FLARE AT BASE OF TRUNK.



DECIDUOUS TREE PLANTING DETAIL

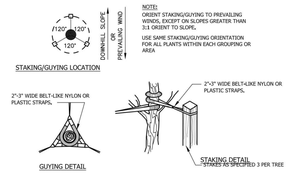
NOT TO SCALE

NOTE: REMOVE ROOT BALL SOIL TO EXPOSE THE ROOT FLARE AT BASE OF TRUNK.



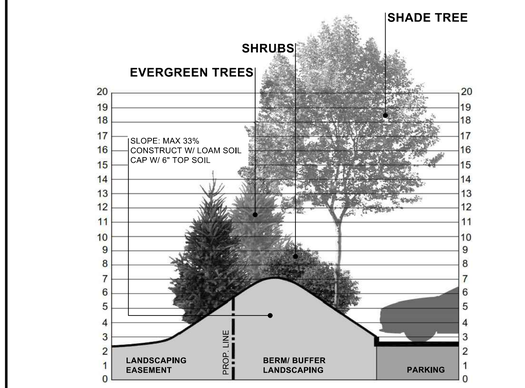
PERENNIAL PLANTING DETAIL

Not to scale



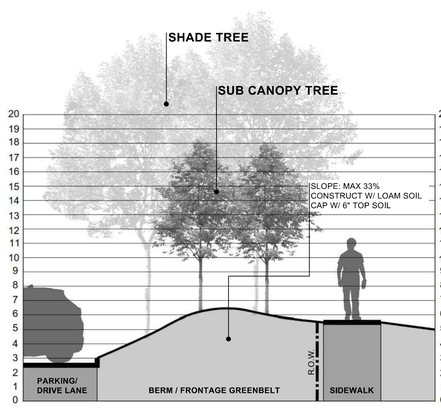
TREE STAKING DETAIL

Not to scale



SECTION B-B'

SCALE: HORZ. 1" = 10' VERT. 1" = 5'



SECTION A-A'

SCALE: HORZ. 1" = 10' VERT. 1" = 5'

EROSION CONTROL BLANKET

North American Green
14649 Highway 41 North
Evansville, IN 47725
800-772-2040
FAX: 812-867-0247
www.nagreen.com

Material and Performance Specification Sheet

S150 Erosion Control Blanket

The short-term double net erosion control blanket shall be a machine-produced mat of 100% agricultural straw with a functional longevity of up to 12 months. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top and bottom sides with a lightweight photodegradable polypropylene netting having an approximate 0.50 x 0.50 (1.27 x 1.27 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread.

The S150 shall meet requirements established by the Erosion Control Technology Council (ECTC) Specification and the US Department of Transportation, Federal Highway Administration's (FHWA) *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-03 Section 713.17 as a type 2.D Short-term Double Net Erosion Control Blanket.*

The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

Material Content		
Matrix	100% Straw Fiber	0.5 lbs/yd² (0.27 kg/m²)
Nettings	Top and Bottom nets, lightweight photodegradable	1.5 lbs/1000 ft² (.073 kg/100 m²) approx. weight
Thread	Degradable	

S150 is available in the following standard roll sizes:

Width	4.0 ft (1.2 m)	6.67 ft (2.03 m)	16 ft (4.87 m)
Length	135 ft (41.14 m)	108 ft (32.92 m)	108 ft (32.92 m)
Weight ± 10%	30 lbs (13.6 kg)	40 lbs (18.14 kg)	86 lbs (40.54 kg)
Area	60 yd² (50.16 m²)	80.0 yd² (66.9 m²)	192 yd² (160.5 m²)

Index Value Properties:

Property	Test Method	Typical
Thickness	ASTM D6525	0.36 in (9.14 mm)
Resiliency	ECTC Guidelines	80.5%
Water Absorbency	ASTM D1117	514%
Mass/Unit Area	ASTM 6475	10.52 oz/yd² (357.7 g/m²)
Swell	ECTC Guidelines	15%
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	6.06 oz-in
Light Penetration	ECTC Guidelines	9.8%
Tensile Strength - MD	ASTM D6818	160.3 lbs/ft (2.51 kN/m)
Elongation – MD	ASTM D6818	17.2%
Tensile Strength – TD	ASTM D6818	164.4 lbs/ft (2.44 kN/m)
Elongation – TD	ASTM D6818	33.1%

Bench Scale Testing* (NTPEP):

Test Method	Parameters	Results
ECTC Method 2 Rainfall	50 mm (2 in)/hr for 30 min	Si/M** = 8.04
	100mm (4 in)/hr for 30 min	Si/M** = 10.46
	150 mm (6 in)/hr for 30 min	Si/M** = 13.67
ECTC Method 3 Shear Resistance	**Shear at 0.50 inch soil loss**	**2.1 lbs/ft²**
ECTC Method 4 Germination	Top Soil, Fescue, 21 day incubation	484% improvement of bareroots

* Bench Scale data should not be used for design purposes.
** Soil Loss Ratio - S150 tests with Rain Cell/Soil Loss with TECP (soil loss is based on regression analysis)

Updated 3/09

Performance Design Values:

Maximum Permissible Shear Stress	
Unvegetated Shear Stress	1.75 lbs/ft² (84 Pa)
Unvegetated Velocity	6.00 ft/s (1.83 m/s)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2:1	≥ 2:1
< 10 ft (6 m)	0.004	0.109	NA
20-50 ft	0.063	0.118	NA
≥ 50 ft (15.2 m)	0.12	0.180	NA

Roughness Coefficients- Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.060
0.50 – 2.0 ft	0.050 – 0.021
≥ 2.0 ft (0.60 m)	0.021

Product Participant of: QDOT Recycling

BASIN SLOPE MIX- INCLUDE S150 BLANKET ENTIRE AREA

Stormwater Seed Mix			
Botanical Name	**Common Name**		**PLS Ounces/Acre**
Permanent Grasses/Sedges/Rushes:			
Carex cristatella	Crested Oval Sedge		1.00
Carex frankii	Bristly Cattail Sedge		1.00
Carex lurida	Bottlebrush Sedge		2.00
Carex sparganioides v. cephaloidea	Rough-Clustered Sedge		2.00
Carex vulpinoidea	Brown Fox Sedge		6.00
Eleocharis ovata	Blunt Spike Rush		0.50
Elymus virginicus	Virginia Wild Rye		12.00
Glyceria striata	Fowl Manna Grass		1.25
Juncus effusus	Common Rush		1.00
Juncus torreyi	Torrey's Rush		0.25
Leersia oryzoides	Rice Cut Grass		1.00
Panicum virgatum	Switch Grass		2.00
Scirpus atrovirens	Dark Green Rush		1.00
Scirpus cyperinus	Wool Grass		0.50
Scirpus fluviatilis	River Bulrush		0.25
Scirpus validus	Great Bulrush		6.00
		Total	**45.75**
Temporary Cover:			
Avena sativa	Common Oat		360.00
Lolium multiflorum	Annual Rye		116.00
		Total	476.00
Forbs:			
Alisma spp.	Water Plantain (Various Mix)		4.25
Asclepias incarnata	Swamp Milkweed		1.50
Bidens spp.	Bidens (Various Mix)		2.00
Helenium autumnale	Sneezeweed		3.00
Mimulus ringens	Monkey Flower		1.00
Penthorum sedoides	Ditch Stonecrop		0.50
Polygonum pensylvanicum	Smartweed		4.00
Rudbeckia subtomentosa	Sweet Black-Eyed Susan		1.00
Sagittaria latifolia	Broad-Leaf Arrowhead		1.00
Senna hebecarpa	Wild Senna		1.00
Thalictrum dasycarpum	Purple Meadow Rue		2.00
		Total	21.25

NATIVE SEEDING MAINTENANCE

During the first growing season, native areas should be mowed a minimum of four times to height of about 4"-6" when the growth reaches 10"-12". Selective herbicide applications or hand pulling may be needed to control unwanted weed populations. If a mower cannot be set high enough, a string trimmer may be used.

During the second growing season, native areas should be mowed a minimum of two times to height of about 8" when the growth reaches 10"-18". Selective herbicide applications or hand pulling may be needed to control unwanted weed populations.

By the second growing season it should be apparent if some areas need reseeding. Reseed or overseed as needed to provide for full coverage.

Long term management my include prescribed burning, mowing, hand pulling, and selective herbicide applications. If burning is not allowed or feasible, the planting may be mowed to a short height and the clippings removed in the early spring before ground nesting birds begin nesting.

SEED MIX NOTES

1. The seed mixes shall be applied at the specified rate of for each mix.
2. Must be installed to manufacturer specification and requirements.
3. The planting mix for the rain garden shall be 70% sharp sand and 30% compost.

Manufacturer: JFNew, Inc.
128 Sunset Drive
Walkerton, IN 46574
574-586-2412

CITY OF NOVI LANDSCAPE NOTES:

1. ALL PLANT MATERIALS ARE TO BE INSTALLED IN A SOUND, WORKMAN-LIKE MANNER AND IN ACCORDANCE WITH THE CURRENT CITY OF NOVI PLANTING REQUIREMENTS

2. ALL PLANT MATERIALS SHALL BE INSTALLED BETWEEN MARCH 15th AND NOVEMBER 15th.

3. ALL PLANT MATERIALS ARE TO BE NORTHERN NURSERY GROWN NO.1 GRADE AND INSTALLED ACCORDING TO ACCEPTED PLANTING PROCEDURES. ALL PLANT MATERIALS SHALL CONFORM TO THE CURRENT AAN STANDARDS FOR NURSERY STOCK. THEY SHALL BE PLANTED ACCORDING TO THE CITY OF NOVI PLANTING DETAILS AND SPECIFICATIONS. THE CITY SHALL HAVE THE RIGHT TO INSPECT THE PLANT MATERIALS PRIOR TO PLANTING AND TO REJECT ANY PLANT MATERIALS DEEMED TO NOT MEET THE STANDARDS OF THE ZONING ORDINANCE.

4. ALL TREES SHALL HAVE A CENTRAL LEADER AND A RADIAL BRANCHING STRUCTURE. PARK GRADE TREES ARE NOT ACCEPTABLE. ALL TREES SHALL BE BALLED AND BURLAPPED (B&B).

5. ANY DECIDUOUS CANOPY TREES WITH BRANCHES THAT MIGHT TEND TO DEVELOP INTO "V" CROTCHES SHALL BE SUBORDINATED SO AS NOT TO BECOME DOMINANT BRANCHES.

6. MULCH SHALL BE NATURAL COLOR, FINELY SHREDDED HARDWOOD BARK FOR ALL PLANTINGS. 3" THICK FOR TREES IN 4-FOOT DIAMETER CIRCLE WITH 3" PULLED AWAY FROM TRUNK. 2-3" THICK FOR SHRUBS AND SHRUB BEDS AND 2" THICK BARK FOR PERENNIALS.

7. ALL PLANT MATERIAL SHALL BE WARRANTIED FOR TWO (2) FULL YEARS AFTER DATE OF ACCEPTANCE BY THE CITY OF NOVI. ALL UNHEALTHY AND DEAD MATERIAL SHALL BE REPLACED WITHIN ONE (1) YEAR OR THE NEXT APPROPRIATE PLANTING PERIOD WHICHEVER COMES FIRST.

8. ALL PLANT MATERIAL SHALL BE MAINTAINED IN A HEALTHY GROWING CONDITION, INCLUDING WATERING, CULTIVATION, WEED CONTROL AND SOIL ENRICHMENTS AS MAY BE NECESSARY.

9. ANY SUBSTITUTIONS OR DEVIATIONS FROM THE LANDSCAPE PLAN MUST BE APPROVED IN WRITING BY THE CITY OF NOVI PRIOR TO INSTALLATION.

10. ALL TREE WRAP, STAKES, AND GUYS MUST BE REMOVED BY JULY 1ST FOLLOWING THE FIRST WINTER SEASON AFTER INSTALLATION.

11. ALL LANDSCAPE AREAS ARE TO BE MAINTAINED IN HEALTHY GROWING CONDITION FREE OF DEBRIS AND REFUSE AND IN CONFORMANCE WITH THE APPROVED LANDSCAPE PLAN.

12. CONTRACTOR TO REMOVE All CONSTRUCTION DEBRIS AND EXCESS MATERIALS FROM THE SITE PRIOR TO FINAL ACCEPTANCE.

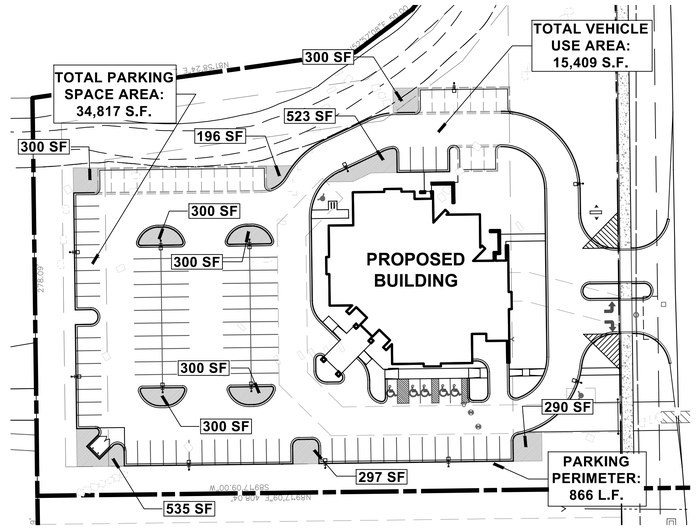
13. PLANT MATERIALS, EXCEPT SOD, GROUND COVERS, AND CREEPING VINE TYPE PLANTINGS, SHALL NOT BE LOCATED WITHIN FOUR (4) FEET OF THE PROPERTY LINE.

14. ALL TRANSFORMERS ARE TO BE SCREENED IN ACCORDANCE WITH THE CITY OF NOVI ORDINANCE AND SO AS TO NOT CONFLICT WITH DTE RESTRICTIONS. (SEE DETAIL THIS SHEET).

15. THE OWNER IS RESPONSIBLE FOR REQUEST OF FINAL INSPECTION AND ACCEPTANCE OF THE LANDSCAPE AT THE END OF THE 2-YEAR GUARANTEE PERIOD.

16. THE PROVIDER OF THE FINANCIAL GUARANTEE FOR THE LANDSCAPE INSTALLATION SHALL BE FULLY RESPONSIBLE FOR COMPLETION OF THE LANDSCAPE INSTALLATION AND MAINTENANCE PER THE APPROVED LANDSCAPE PLAN AND APPLICABLE CITY ORDINANCES.

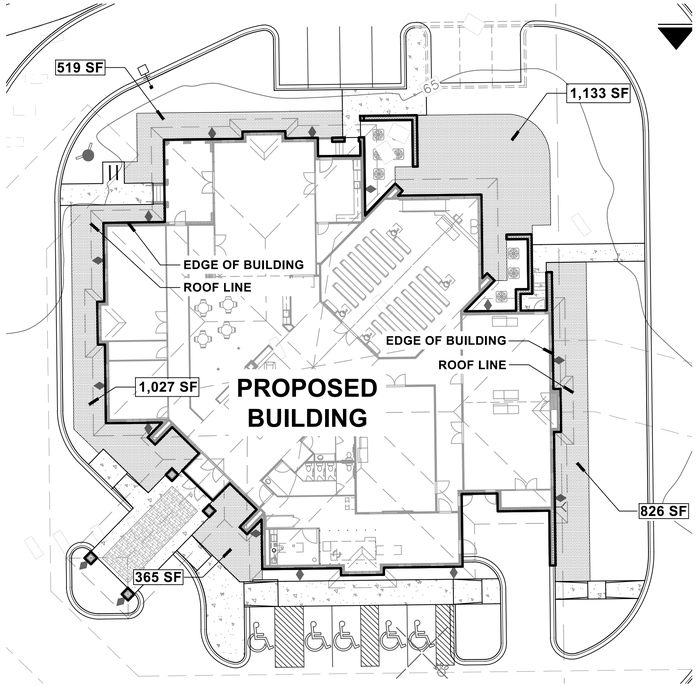
THE DETAILS AND NOTES SHOWN ON THIS PAGE ARE STANDARDS. THESE DETAILS ARE NOT ALL INCLUSIVE AND ARE NOT MEANT TO SUBSTITUTE FOR ANY ORDINANCE OR CODE REQUIREMENT. FOR COMPLETE LANDSCAPE REQUIREMENTS, SEE THE ZONING ORDINANCE LANDSCAPE SECTION 5.5, THE LANDSCAPE DESIGN MANUAL AND THE APPROPRIATE REFERENCES WITHIN THE APPLICABLE ZONING CLASSIFICATION AND ANY OTHER APPLICABLE CODE REQUIREMENTS.



PARKING LANDSCAPE AREAS

SCALE 1" = 50'

NORTH

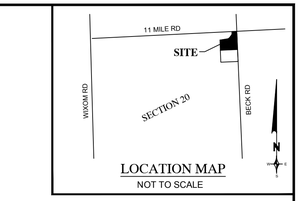


FOUNDATION LANDSCAPE AREAS

SCALE 1" = 20'

NORTH

NOT TO BE USED AS CONSTRUCTION DRAWING



LOCATION MAP

NOT TO SCALE

GENERAL PLANTING REQ.:

A. THE WORK SHALL CONSIST OF PROVIDING ALL NECESSARY MATERIAL, LABOR, EQUIPMENT, TOOLS, AND SUPERVISION REQUIRED FOR THE COMPLETION AS SHOWN ON THE DRAWING.

B. ALL PLANT MATERIALS SHALL CONFORM TO THE TYPE STATED ON THE PLANT LIST. SIZES SHALL BE THE MINIMUM STATED ON THE PLANT LIST OR LARGER. ALL MEASUREMENTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE "A.A.N. STANDARDS FOR NURSERY STOCK".

C. ALL TREE LOCATIONS SHALL BE STAKED BY LANDSCAPE CONTRACTOR AND ARE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION OF THE PLANT MATERIAL.

D. ALL SINGLE TRUNK SHADE TREES TO HAVE A CENTRAL LEADER, TREES WITH FORKED OR IRREGULAR TRUNKS WILL NOT BE ACCEPTED. ALL SINGLE STEM SHADE TREES TO HAVE STRAIGHT TRUNKS AND SYMMETRICAL CROWNS.

E. ALL MULTI-STEM TREES SHALL BE HEAVILY BRANCHED AND HAVE SYMMETRICAL CROWNS. ONE SIDED TREES OR THOSE WITH THIN OPEN CROWNS SHALL NOT BE ACCEPTED.

F. ALL EVERGREEN TREES SHALL BE HEAVILY BRANCHED AND FULL TO THE GROUND, SYMMETRICAL IN SHAPE AND NOT SHEARED FOR THE LAST FIVE GROWING SEASONS.

G. THE CONTRACTOR IS RESPONSIBLE FOR PLANTING THE MATERIALS AT THE CORRECT GRADES AND SPACING. THE PLANTS SHALL BE ORIENTED AS TO GIVE THE BEST APPEARANCE.

H. WHEN THE PLANT HAS BEEN PROPERLY SET, THE PIT SHALL BE BACKFILLED WITH A TOPSOIL AND NATIVE SOIL MIXTURE, GRADUALLY FILLING, PATTING AND SETTLING WITH WATER.

I. ALL PLANT MATERIALS SHALL BE PRUNED AND INJURIES REPAIRED. THE AMOUNT OF PRUNING SHALL BE LIMITED TO THE REMOVAL OF DEAD OR INJURED TWIGS AND TO COMPENSATE FOR THE LOSS OF ROOTS FROM TRANSPLANTING. CUTS SHOULD BE FLUSH, LEAVING NO STUBS.

J. THE CONTRACTOR AGREES TO GUARANTEE ALL PLANT MATERIALS FOR THE PERIOD OF TWO YEARS. AT THAT TIME THE OWNER'S REPRESENTATIVE RESERVES THE RIGHT FOR A FINAL INSPECTION. PLANT MATERIAL WITH 25% DIE BACK, AS DETERMINED BY THE OWNER'S REPRESENTATIVE SHALL BE REPLACED. THIS GUARANTEE INCLUDES THE FURNISHING OF NEW PLANTS, LABOR AND MATERIALS. THESE NEW PLANTS SHALL ALSO BE GUARANTEED FOR THE PERIOD OF TWO YEARS.

K. TOPSOIL SHALL BE FRIABLE, FERTILE TOPSOIL OF CLAY LOAM CHARACTER CONTAINING AT LEAST 5% BUT NOT MORE THAN 20% BY WEIGHT OF ORGANIC MATTER WITH A PH RANGE FROM 6.0 TO 7.0. SOIL SHALL BE FREE FROM CLAY LUMPS, COARSE SAND, PLANT ROOTS, STICKS AND OTHER FOREIGN MATERIALS.

L. NO MACHINERY IS TO BE USED WITHIN THE DRIP LINE OF EXISTING TREES. HAND GRADE ALL LAWN AREAS WITHIN DRIP LINE OF EXISTING TREES.

M. IT IS MANDATORY THAT POSITIVE DRAINAGE IS PROVIDED AWAY FROM ALL BUILDINGS, WALKS AND PAVED AREAS.

N. ALL PLANTING BEDS SHALL RECEIVE 4" SHREDDED BARK MULCH. SEE SPECIFICATIONS.

O. SOD/ SEED LAWN AREAS - ALL LAWN AREAS BETWEEN CURBS AND BUILDINGS OR BETWEEN BUILDINGS, DISK SOIL TO 4" DEEP BEFORE TOPSOIL PLACEMENT

P. SOD SHALL BE TWO YEAR OLD "BARON/CHERIADELPHI" KENTUCKY BLUE GRASS GROWN IN A SOD NURSERY ON LOAM SOIL.

PLANT MIX

ALL PLANTING/ PERENNIAL BEDS TO RECEIVE:

1 - 6 CU FT. COMPOST

1 - 40 LB BAG DRIMANURE

1 - 1 LB BAG SHEMINS 13-13-13 MULTI PURPOSE FERTILIZER

PER 100 SQ FT BED AREA.

HAND TILL INTO SOIL TO A DEPTH OF 12" MINIMUM

MULCH

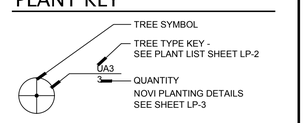
MULCH TO BE DOUBLE SHREDDED HARDWOOD BARK MULCH

NO GROUND WOOD PALETTE MULCH PERMITTED

TOPSOIL

CONTRACTOR TO TILL OR DISK SUBGRADE TO 4" DEPTH AND INSTALL 4" COMPACTED DEPTH TOPSOIL IN ALL LAWN AREAS - TOPSOIL SHALL BE PROVIDED BY CONTRACTOR

PLANT KEY



IRRIGATION

ALL LANDSCAPE AREAS WILL BE IRRIGATED WITH A FULLY AUTOMATIC IRRIGATION SYSTEM.

deak
PLANNING + DESIGN
143 cadycentre #79
northville, mi 48167
[T] 866 355-4204
deakplanningdesign.com

REVISIONS	DATE	BY
RVSD. PER OWNER	9/27/17	SD
FINAL SITE PLAN	12/12/17	SD
STAMPING SET	3/2/18	SD

ZEIMET WOZNIAK & ASSOCIATES
Civil Engineers & Land Surveyors
53800 Grand River Avenue, Suite 100
New Hudson, Michigan 48165-9318
248.437.5099 - 248.437.5222 fax www.zeimetwozniak.com

MISS DIG SYSTEM, INC. 1-800-482-7171
THREE FULL WORKING DAYS BEFORE YOU DIG, CALL THE MISS DIG SYSTEM

CLIENT:
NOVI GRIFFIN FUNERAL HOME, LLC
7707 MIDDLEBELT RD.
WESTLAND, MI 48185

LANDSCAPE DETAILS
GRIFFIN FUNERAL HOME
NOVI, MICHIGAN, SEC 20

FIELD BOOK

DATE 03/10/17	SCALE HOR: 1" = 20' VER: 1" =
DESIGNED BY SD	JOB NO. DPD-121702
DRAWN BY SD	SHEET LP-3

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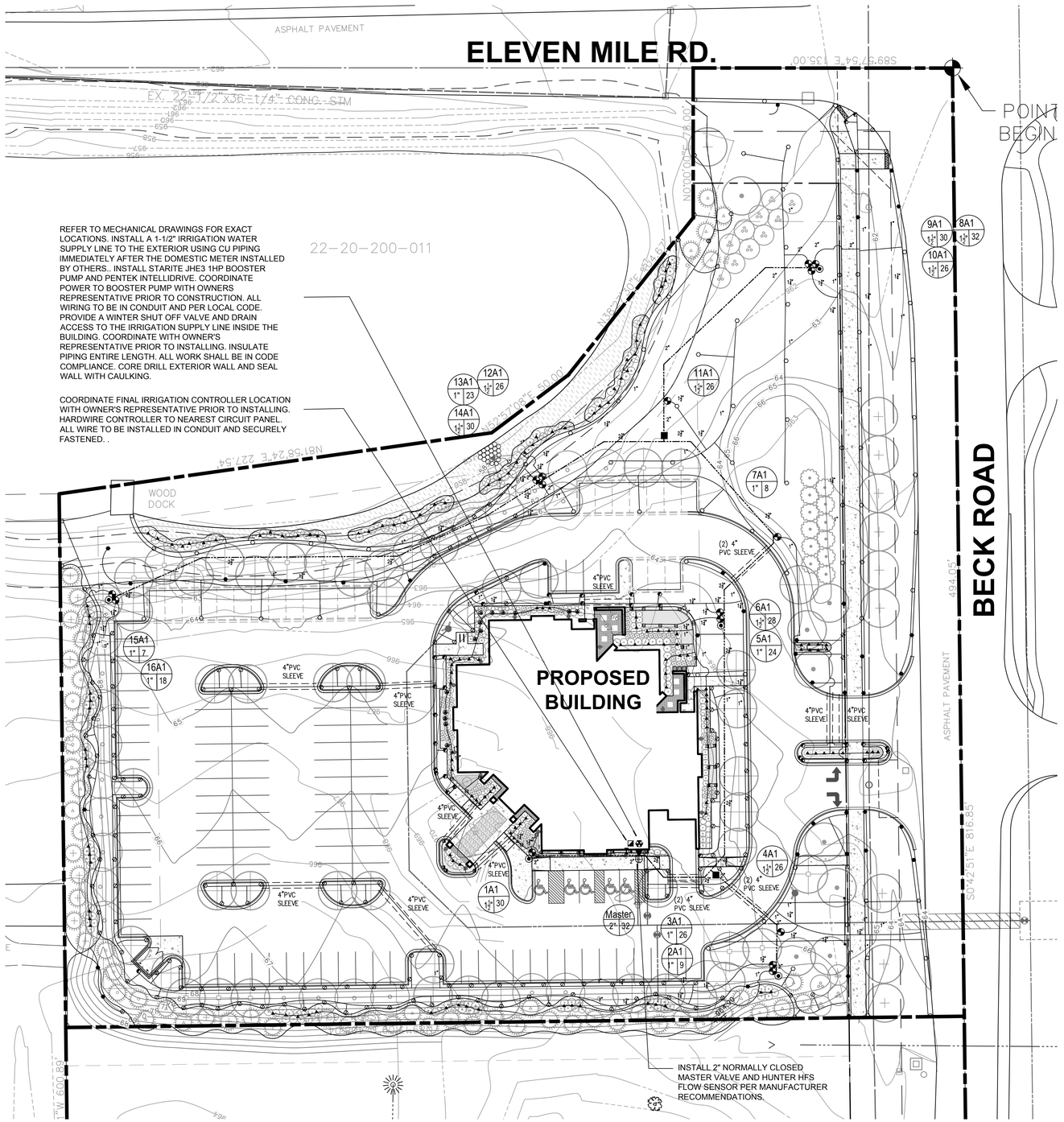
ELEVEN MILE RD.



REFER TO MECHANICAL DRAWINGS FOR EXACT LOCATIONS. INSTALL A 1-1/2" IRRIGATION WATER SUPPLY LINE TO THE EXTERIOR USING CU PIPING IMMEDIATELY AFTER THE DOMESTIC METER INSTALLED BY OTHERS. . INSTALL STARITE JHE3 1HP BOOSTER PUMP AND PENTEK INTELLIDRIVE. COORDINATE POWER TO BOOSTER PUMP WITH OWNERS REPRESENTATIVE PRIOR TO CONSTRUCTION. ALL WIRING TO BE IN CONDUIT AND PER LOCAL CODE. PROVIDE A WINTER SHUT OFF VALVE AND DRAIN ACCESS TO THE IRRIGATION SUPPLY LINE INSIDE THE BUILDING. COORDINATE WITH OWNER'S REPRESENTATIVE PRIOR TO INSTALLING. INSULATE PIPING ENTIRE LENGTH. ALL WORK SHALL BE IN CODE COMPLIANCE. CORE DRILL EXTERIOR WALL AND SEAL WALL WITH CAULKING.

COORDINATE FINAL IRRIGATION CONTROLLER LOCATION WITH OWNER'S REPRESENTATIVE PRIOR TO INSTALLING. HARDWIRE CONTROLLER TO NEAREST CIRCUIT PANEL. ALL WIRE TO BE INSTALLED IN CONDUIT AND SECURELY FASTENED. .

INSTALL 2" NORMALLY CLOSED MASTER VALVE AND HUNTER HFS FLOW SENSOR PER MANUFACTURER RECOMMENDATIONS.

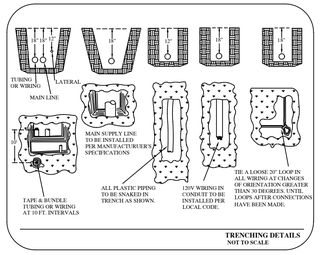
SITE IRRIGATION PLAN

SCALE 1" = 30'

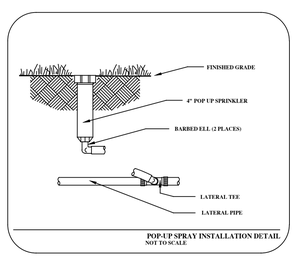
0 15 30 60

1 inch = 30 feet

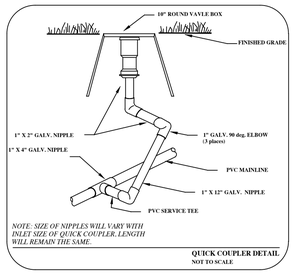
NORTH



TRENCHING DETAILS
NOT TO SCALE

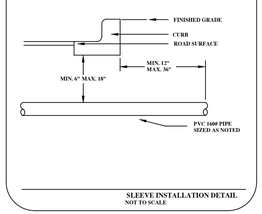


POP-UP SPRAY INSTALLATION DETAIL
NOT TO SCALE

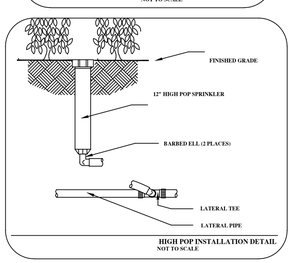


NOTE: SIZE OF NIPPLES WILL VARY WITH INLET SIZE OF QUICK COUPLER. LENGTH WILL REMAIN THE SAME.

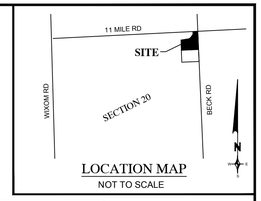
QUICK COUPLER DETAIL
NOT TO SCALE



SLEEVE INSTALLATION DETAIL
NOT TO SCALE



HIGH POP INSTALLATION DETAIL
NOT TO SCALE



LOCATION MAP
NOT TO SCALE

PIPE SIZE CHART
0–12 GPM = 1" DIAMETER POLYETHYLENE PIPE
12–24 GPM = 1 ¼" DIAMETER POLYETHYLENE PIPE
24–30 GPM = 1 1/2" DIAMETER POLYETHYLENE PIPE
30–60 GPM = 2" DIAMETER POLYETHYLENE PIPE

IRRIGATION LEGEND:

Hunter

FIXED SPRAY POP-UP (12") ⊟10 Series ■ 12 Series ◻ 15 Series ◨ Strip Series	PROS-12 -CV
FIXED SPRAY POP-UP (12") ▲ w/ 2' radius nozzle ● w/ 4' radius nozzle	PROS-12 -CV
FIXED SPRAY POP-UP (4") w/ MPR nozzle MPR1000 MP8000 MP3000 MP8530/MPLC(RC)B	PROS-04 PRS40-CV
ELECTRIC MASTER VALVE – 2" w/ decoder	ICV–Series
ELECTRIC VALVE w/ decoder	ICV–Series
QUICK COUPLER VALVE	HQ 44RC
ELECTRIC CONTROLLER	ICORE–m–DUAL
REDUCED PRESSURE ASSEMBLY	FEBCO 825Y150
ISOLATION GATE VALVE (LINE SIZE)	
RAIN SENSOR DEVICE (Install at all controller locations)	SOLAR SYNC (wireless)
POINT OF CONNECTION TO WATER SOURCE	See note this sheet
PVC MAINLINE, SDR 26, BE, Size as shown	
POLYETHYLENE PIPE, 100#, NSF APPROVED, Size as shown	
PVC SLEEVES – SDR 26 – Size as shown	

WATER REQUIREMENTS: 32 GPM @ 60 PSI
AFTER BOOSTER PUMP INSTALLATION
(CONTRACTOR TO VERIFY PSI AVAILABLE ON SITE PRIOR TO SYSTEM INSTALLATION)

VALVE DESIGNATION:
Controller and Station Number
Gallons Per Minute
Valve Size

NOTES:
1. Refer to the specifications for installation details and descriptions, as well as, construction methods which will be accepted.
2. All work shall be in compliance with all local, state, and federal codes and ordinances.
3. All electrical connections shall be made using 3m DBY–6 splice kits.
4. All control wiring downstream of the controller shall be HUNTER ID WIRE Communication cable UL approved for direct bury.
5. All polyethylene lateral pipe clamps shall be stainless steel worm gear type clamps. Lateral pipes 1–1/2" or larger shall be double clamped.
6. Pipe routing is schematic. All heads are to be field adjusted to within 2' to take into consideration any obstruction. Final head placements are subject to the landscape architects approval.
7. All sprinkler heads shall be mounted on 2 elbow poly swing joints as specified.
8. Contractor to verify final controller location with owner's authorized representative prior to installation.
9. All pipe not sized downstream of control valve is 1".
10. Irrigation contractor's point of connection to water source shall be as noted on this sheet.
11. Locate and connect to indicated water source. All pipe installed above grade shall be copper type "M".
12. 120v power (by electrician) to the controller locations should be provided others. Coordinate with owner's representative. Hardwire controller directly to nearest circuit panel. Place all wires in conduit per code.
13. Design pressure does not take into account seasonal supply fluctuations. Periods of drought may cause temporary pressure losses to the city water supply resulting in inadequate irrigation system performance. Irrigation design is based on normal weather conditions and typical municipal water supply abilities.
14. Irrigation contractor shall be responsible for determining and maintaining the irrigation schedule during the project construction and throughout the length of the warranty period.
15. The irrigation schedule shall deliver 1" of precipitation per week +/– natural rainfall quantities for turf grass.
16. Landscape material shall receive adjusted amounts of precipitation to maintain proper plant health.
17. Landscape and turf grass shall be irrigated separately.
18. Rotors and spray zones may not be combined to operate at the same time.
19. When specified, follow manufacturer's product recommendations concerning proper installation of water flow sensors. Allow proper straight pipe distances before and after flow sensors.

LIQUID ASSETS LLC
IRRIGATION DESIGN & WATER MANAGEMENT
4843 Kittery NW
Comstock Park, Michigan 49321
Tel. (248) 789–0330
email: abarnes@lqdassets.org
www.lqdassets.org

NOT TO BE USED AS CONSTRUCTION DRAWING

REVISIONS	DATE	BY
FINAL SITE PLAN	12/12/17	SD
STAMPING SET	3/2/18	SD

ZEIMET WOZNIAK & ASSOCIATES
Civil Engineers & Land Surveyors
55800 Grand River Avenue, Suite 100
New Hudson, Michigan 48165-9318
248.437.5099 - 248.437.5222 fax www.zeimetwozniak.com

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CLIENT:
NOVI GRIFFIN FUNERAL HOME, LLC
7707 MIDDLEBELT RD.
WESTLAND, MI 48185

IRRIGATION PLAN
GRIFFIN FUNERAL HOME
NOVI, MICHIGAN, SEC 20

FIELD BOOK

DATE 12/04/17	SCALE	HOR: 1" = 30' VER: 1" =	
DESIGNED BY AJB	JOB NO.	DPD-121702	
DRAWN BY AJB	SHEET	IR-1	

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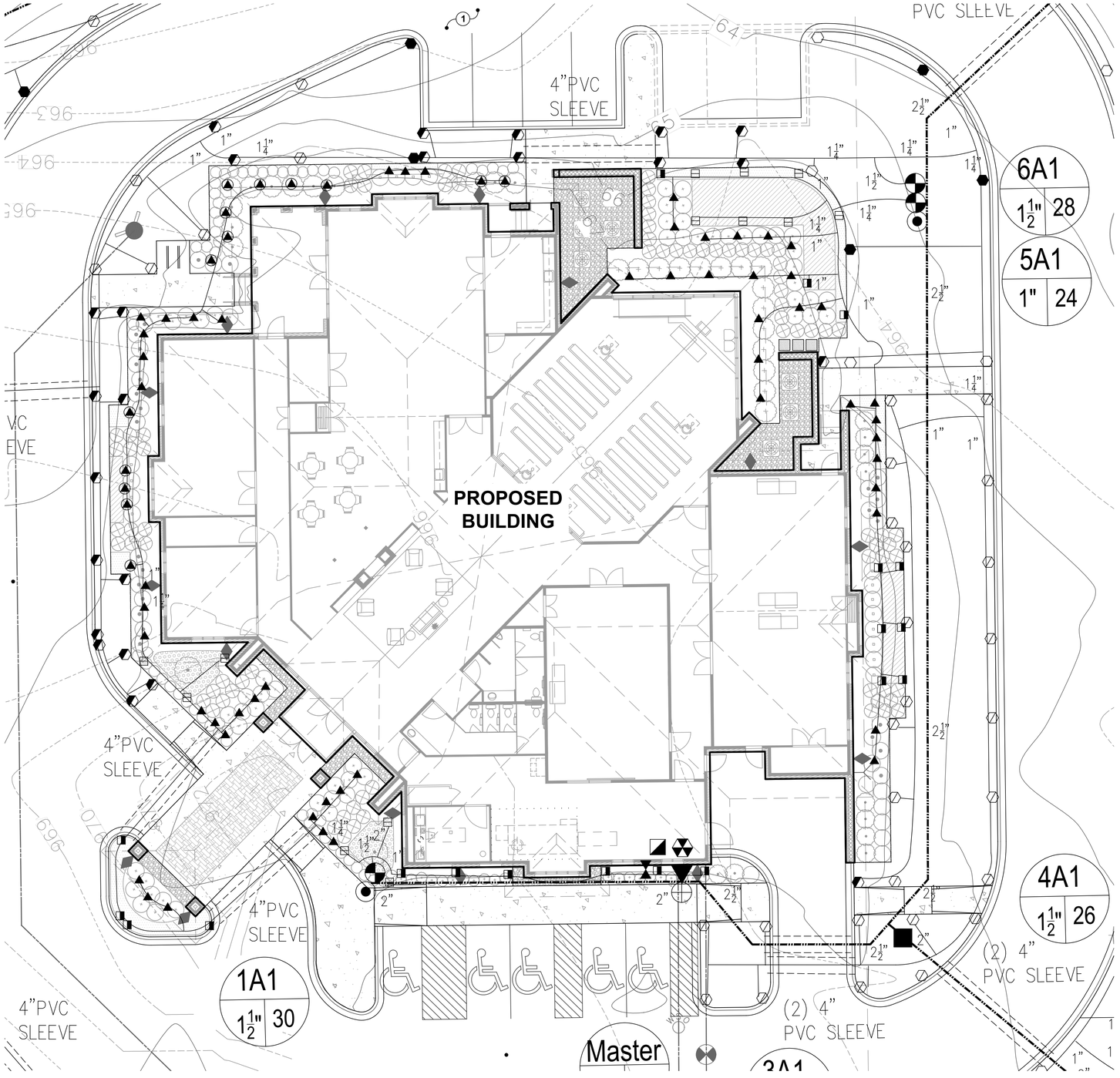


FOUNDATION IRRIGATION DETAIL

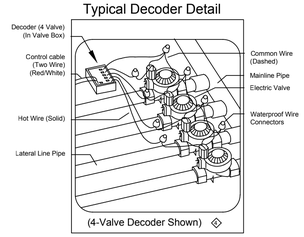
SCALE 1" = 10'

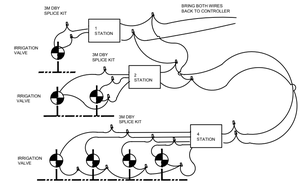
0 5 10 20
1 inch = 10 feet

NORTH

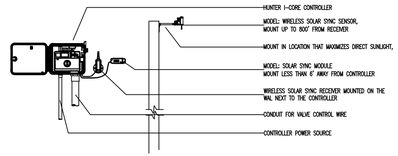
NOT TO BE USED AS CONSTRUCTION DRAWING

Typical Decoder Detail

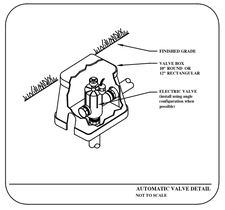




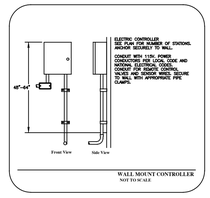
SAMPLE DECODER WIRING DIAGRAM



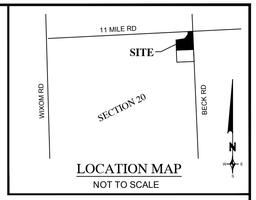
WIRELESS SOLAR SYNC SYSTEM
* IRRIGATION DETAIL



AUTOMATIC VALVE DETAIL
NOT TO SCALE



WALL MOUNT CONTROLLER
NOT TO SCALE



LOCATION MAP
NOT TO SCALE

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REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY	REVISIONS	DATE	BY
FINAL SITE PLAN	12/12/17	SD									
STAMPING SET	3/2/18	SD									

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FOUNDATION IRRIGATION PLAN
GRIFFIN FUNERAL HOME
NOVI, MICHIGAN, SEC 20

FIELD BOOK

DATE	12/04/17	SCALE	HOR: 1" = 10' VER: 1" =
DESIGNED BY	AJB	JOB NO.	DPD-121702
DRAWN BY	AJB	SHEET	IR-2

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GENERAL NOTES:

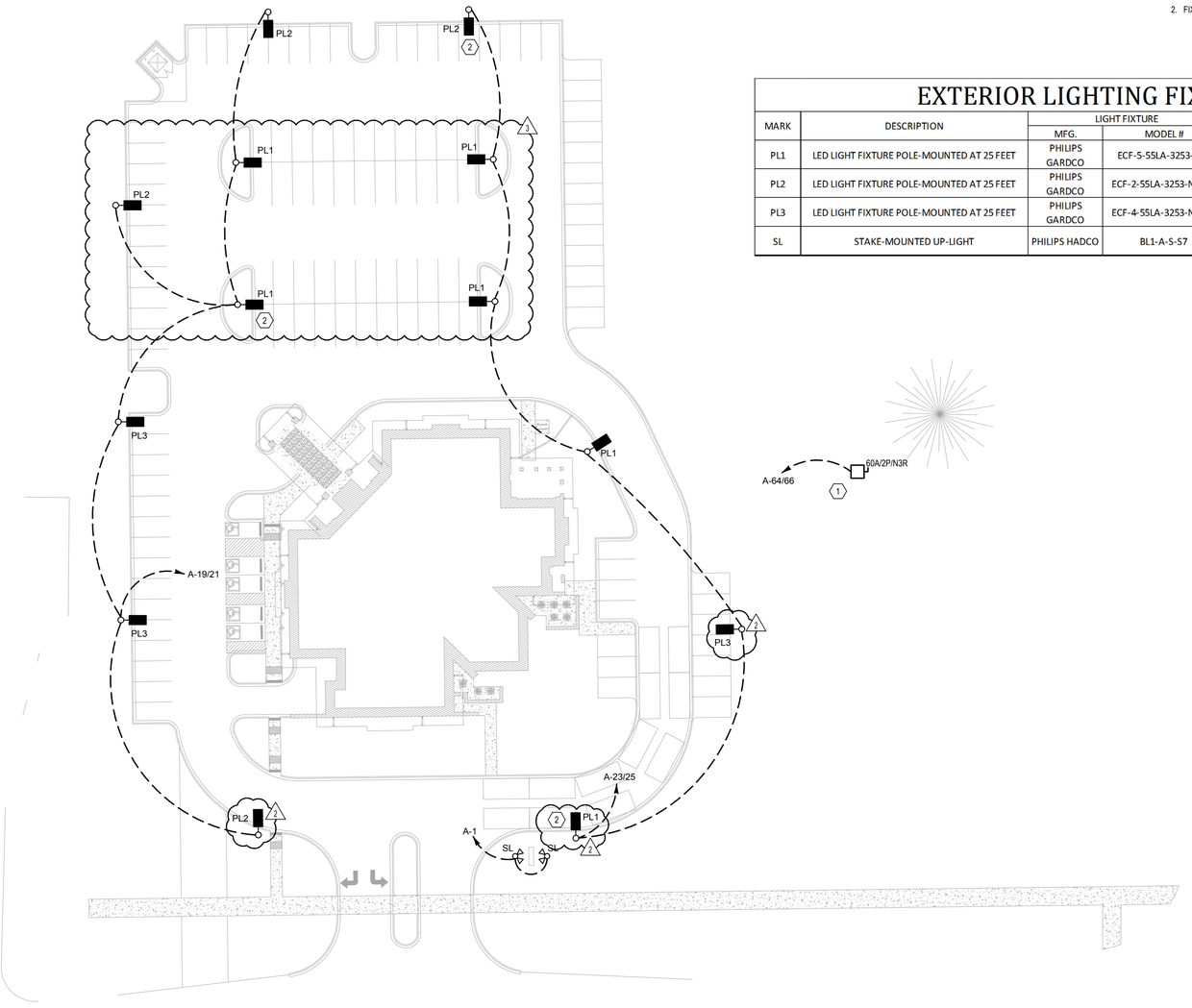
1. CONDUCTOR SIZE FOR ALL SITE LIGHTING CIRCUITS SHALL BE #8 AWG TO MINIMIZE VOLTAGE DROP.
2. ALL POLE-MOUNTED FIXTURES TO BE ROUTED THROUGH ASTRONOMICAL TIMECLOCK AND AUTOMATICALLY SHUT OFF AFTER NORMAL OPERATING HOURS.
3. UNLESS OTHERWISE INDICATED, SITE LIGHTING FIXTURES SHALL BE EXTINGUISHED AFTER BUSINESS HOURS (8AM TO 10PM).

KEY NOTES: (DESIGNATED BY "⟨#⟩")

1. PROVIDE NEMA 3R DISCONNECTING MEANS FOR FLOATING FOUNTAIN. VERIFY ELECTRICAL REQUIREMENTS WITH OWNER AND VENDOR DRAWINGS PRIOR TO INSTALLATION.
2. FIXTURE SHALL BE EXEMPT FROM NIGHTTIME SHUTOFF.

EXTERIOR LIGHTING FIXTURE SCHEDULE

MARK	DESCRIPTION	LIGHT FIXTURE		MOUNTING	LAMPS	VOLTS	WATTS	NOTES
		MFG.	MODEL #					
PL1	LED LIGHT FIXTURE POLE-MOUNTED AT 25 FEET	PHILIPS GARDCO	ECF-5-55LA-3253-NW	POLE	LED	UNV	52	CONTROL VIA TIMECLOCK
PL2	LED LIGHT FIXTURE POLE-MOUNTED AT 25 FEET	PHILIPS GARDCO	ECF-2-55LA-3253-NW-IS	POLE	LED	UNV	52	CONTROL VIA TIMECLOCK
PL3	LED LIGHT FIXTURE POLE-MOUNTED AT 25 FEET	PHILIPS GARDCO	ECF-4-55LA-3253-NW-IS	POLE	LED	UNV	52	CONTROL VIA TIMECLOCK
SL	STAKE-MOUNTED UP-LIGHT	PHILIPS HADCO	BL1-A-S-S7	STAKE	MR 16	120	75	CONTROL VIA TIMECLOCK



1 SITE PLAN - ELECTRICAL
SCALE: 1" = 30'-0"

NORTH

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Dallas, TX. 75287
p. 469.385.1616 ♦ f. 469.385.1615
Texas Registered Engineering Firm F-4990

Project Number: 1730254
Drawn By:EMR Checked By:SHD

ISSUE DATE:

	OCTOBER 6, 2017
	PERMIT REVIEW

REVISION:

1	JANUARY 17, 2018
	CITY COMMENTS
2	FEBRUARY 2, 2018
	CITY COMMENTS
3	MARCH 2, 2018
	STAMPING SET

STATE OF MICHIGAN
MARK N. BIGBIE
ENGINEER
No. 6201054622
LICENSED PROFESSIONAL ENGINEER
3/8/18

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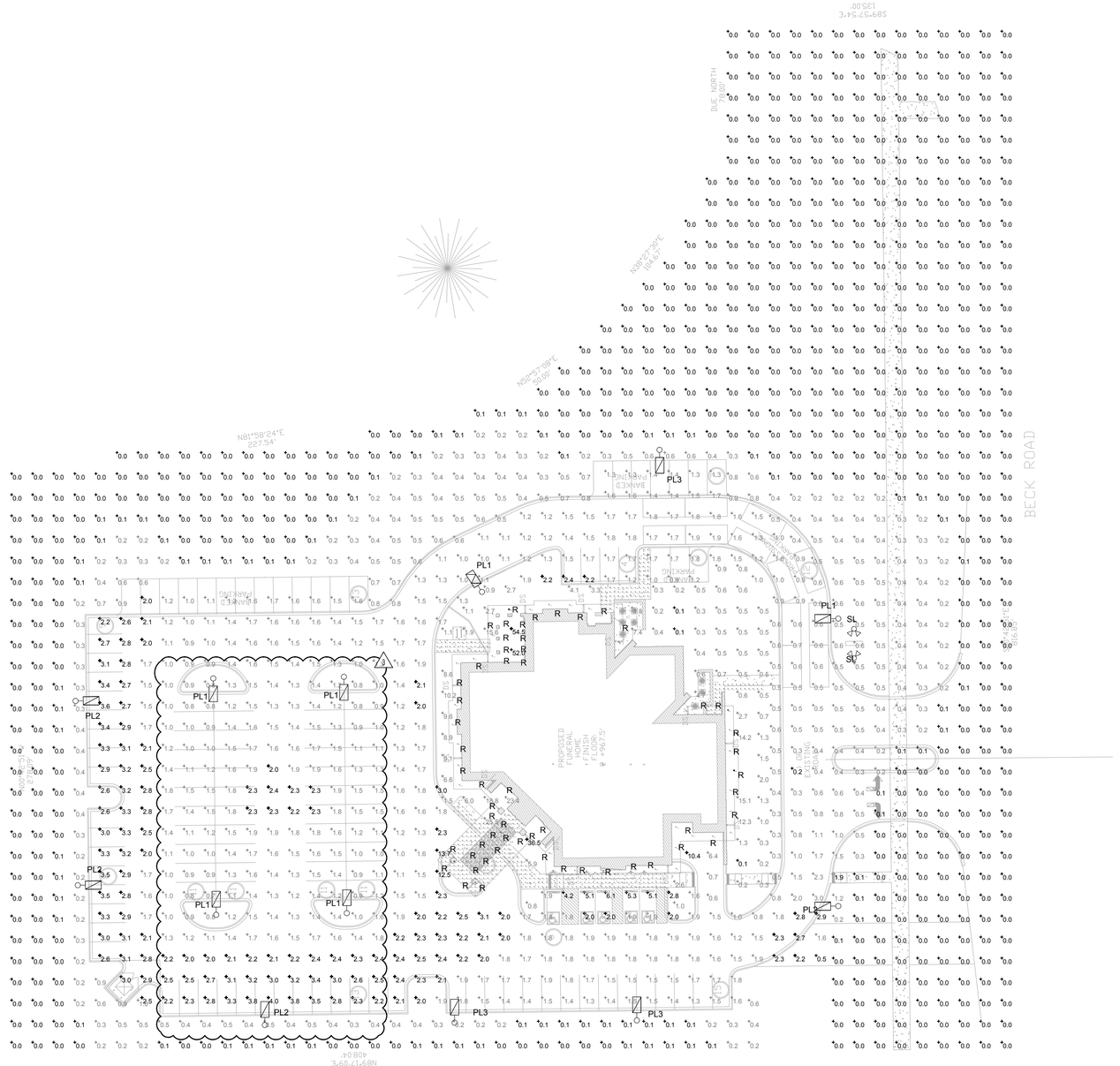
CONSTRUCTION DOCUMENTS
NOVI, MI

SHEET NO.
E1.0

JOB NUMBER: 16238



1 PHOTOMETRIC PLAN

SCALE: 1" = 30'-0"

NORTH

GENERAL NOTES:

1. ELECTRICAL SERVICE TO LIGHT FIXTURES SHALL BE PLACED UNDERGROUND.
2. FLASHING LIGHT SHALL NOT BE PERMITTED.
3. ONLY NECESSARY LIGHTING FOR SECURITY PURPOSES AND LIMITED OPERATIONS SHALL BE PERMITTED AFTER NORMAL HOURS OF OPERATION.

Statistics

Description	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
Canopy	4.0 fc	36.5 fc	0.1 fc	365.0:1	40.0:1	0.1:1
Parking	1.8 fc	13.7 fc	0.5 fc	27.4:1	3.6:1	0.1:1
Pond	53.1 fc	54.2 fc	52.0 fc	1.0:1	1.0:1	1.0:1
Property	0.1 fc	1.9 fc	0.0 fc	N/A	N/A	0.1:1
Sidewalks	15.1 fc	47.2 fc	0.0 fc	N/A	N/A	0.3:1
Soffit N W	16.9 fc	30.4 fc	6.9 fc	4.4:1	2.4:1	0.6:1
Soffit S E	15.6 fc	21.4 fc	2.2 fc	9.7:1	7.1:1	0.7:1
Unlit Driveway	1.1 fc	10.4 fc	0.2 fc	52.0:1	5.5:1	0.1:1

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Project Number: 1730254
Drawn By:EMR Checked By:SHD

ISSUE DATE:

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STATE OF MICHIGAN
MARK N. BIGBIE
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No. 6201054622
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3/5/18

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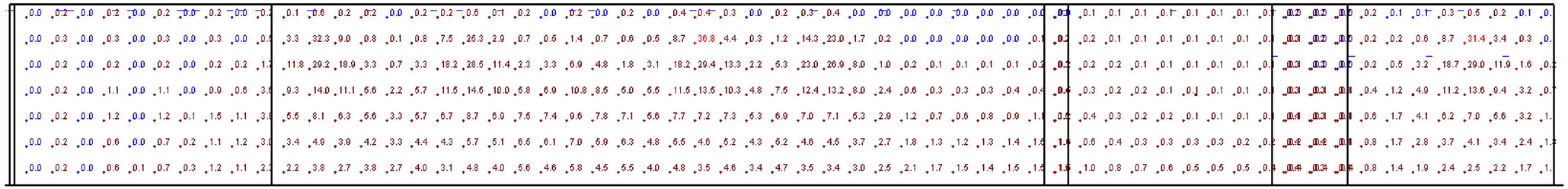
NOVI, MI

SHEET NO.

E1.1

JOB NUMBER: 16238

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
East Facade		3.0 fc	36.8 fc	0.0 fc	N/A	N/A	0.1:1

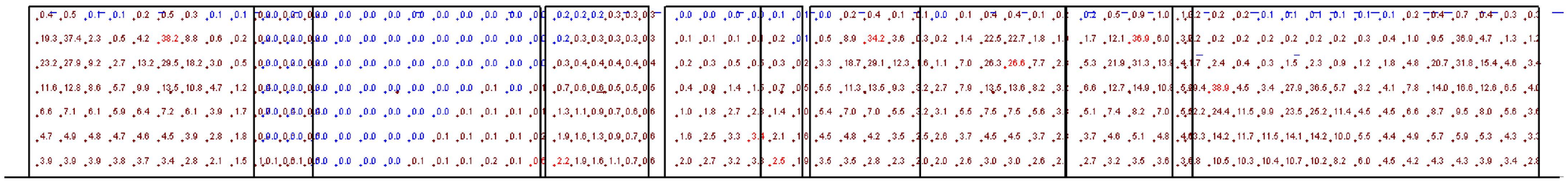


1 EAST FACADE PHOTOMETRICS

SCALE: NTS

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
North Facade		4.3 fc	38.9 fc	0.0 fc	N/A	N/A	0.1:1



1 NORTH FACADE PHOTOMETRICS

SCALE: NTS

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STATE OF MICHIGAN
MARK N. BIGBIE
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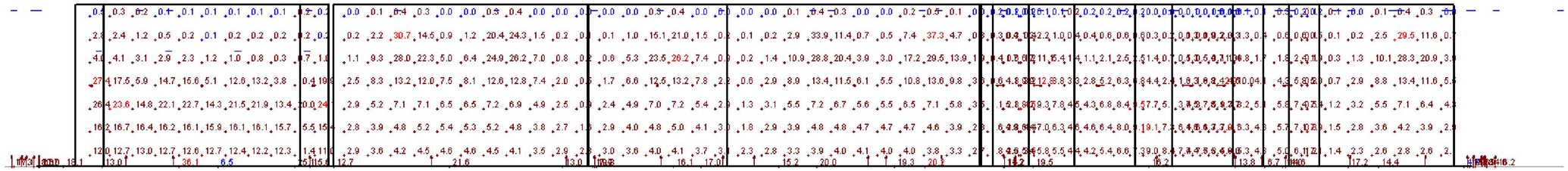
SHEET NO.

E1.2

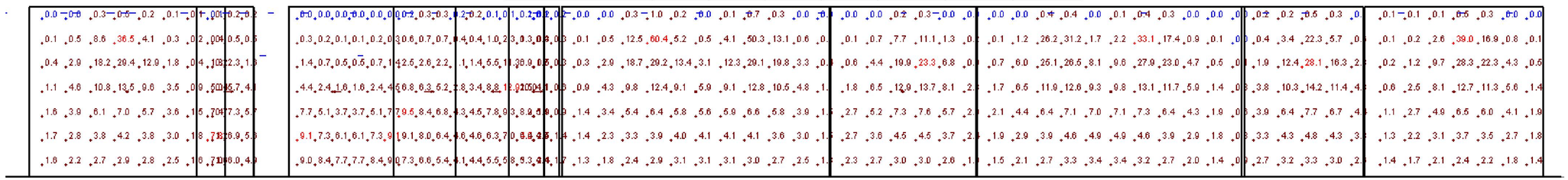
JOB NUMBER: 16238

Statistics							
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
West Facade		5.5 fc	37.3 fc	0.0 fc	N/A	N/A	0.1:1



1 WEST FACADE PHOTOMETRICS
SCALE: NTS

Statistics							
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
South Facade		4.8 fc	60.4 fc	0.0 fc	N/A	N/A	0.1:1



1 SOUTH FACADE PHOTOMETRICS
SCALE: NTS

ISSUE DATE:
OCTOBER 6, 2017
PERMIT REVIEW

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2 FEBRUARY 2, 2018 CITY COMMENTS
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ENGINEER
No. 6201054622
LICENSED PROFESSIONAL ENGINEER
3/5/18

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Texas Registered Engineering Firm F-4990

Project Number: 1730254
Drawn By:EMR Checked By:SHD

SHEET NO.
E1.3

JOB NUMBER: 16238

PHILIPS
GARDCO

Site & Area
EcoForm

Project:
Location:
Cat.No:
Type:
Qty:
Notes:

Philips Gardco EcoForm LED luminaire combines economy with performance. Capable of delivering up to 20,000 lumens or more in a compact, low profile housing, EcoForm offers a new level of customer value. EcoForm features an innovative retrofit arm kit, simplifying site conversions to LED by eliminating the need to drill additional holes in most existing poles. Integral control systems, including motion response and wireless controls are available for further energy savings during off peak hours.

Ordering guide

example: ECF–APD–MRO–1–4–75LA–NW–120–NP–LF

Prefix	Controls	Mounting	Optical System	Wattage	Color Temp	Voltage	Finish	Options
ECF –	–	–	–	–	–	–	–	–

ECF EcoForm

Controls
- **—** Standard luminaire (leave blank)
- **DIM** 0-10V Dimming
- **APD**[1] Auto Profile Dimming
- **APD–MRO**[1] Auto Profile Dimming and Motion Response Override pole-mounted motion sensor
- **APD–MRI**[1,2] APD with Motion Response Override luminaire sensor
- **MRI**[1,2] Motion Response at 50% low luminaire sensor
- **MR50**[1] Motion Response at 50% low, pole mounted sensor
- **Wireless Controls** (Remote wireless controller available. See p.2 for details)
- **LLC2**[1,4] #2 lens for 8' mounting heights
- **LLC3**[1,4] #3 lens for 9-20' mounting heights
- **LLC4**[1,4] #4 lens for 21-40' mounting heights

Mounting
- **1** Standard
- **2** @180
- **2@90** 2@90
- **3** 3@90
- **3@120** 3@120
- **4** 4@90
- **WS** Wall mount including surface conduit rear entry permitted
- **MA** Mast Arm Fitter (requires 2-3/8" O.D. Mast Arm)

Optical System
- **2** Type 2
- **3** Type 3
- **4** Type 4
- **5** Type 5

Wattage
- **530 mA**
- **55LA–3253**[1] **75LA–4853** **100LA–6453**
- **700mA**
- **70LA–3270** **105LA–4870** **135LA–6470**
- **1050mA**
- **105LA–321A** **160LA–481A** **215LA–641A**

Color Temp
- **CW** Cool White 5,700K 70CRI (nominal)
- **NW** Neutral White 4,000K 70CRI (nominal)
- **WW**[1] Warm White 3,000K 70CRI (nominal)

Voltage
- **120** 120V
- **208** 208V
- **240** 240V
- **277** 277V
- **347** 347V
- **480** 480V
- **UNV** 120–277V 50hz/60hz
- **HVU** 347–480V 50hz/60hz

Finish
- **BRP** Bronze Paint
- **BLP** Black Paint
- **WP** White Paint
- **NP** Natural Paint
- **OC** Optional Color Specify optional color or RAL (ex: OC-LGP or OC-RAL7024)
- **SC** Special color Specify, must supply color chip Requires factory quote.
- **RAM** Retrofit Arm Mount kit
- **PTF2**[3] Pole Top Fitter for 2-⅛" 3" Tenon
- **PTF3**[3] Pole Top Fitter for 3"–3½" Tenon
- **PTF4**[3] Pole Top Fitter for 3½"–4" Tenon
- **RPA**[3] Round Pole Adapter for 3"–3.9" O.D.
- **BD** Blird Deterrent (field installed only)

Options
- **TL** Tool-Less entry and driver removal hardware
- **TB**[1] Terminal Block
- **IS**[1] Internal Shield
- **LF**[1] Line Fusing
- **LFC**[1] Line Fusing for Canada
- **PC**[1,5] Receptacle with Photocell (includes PCR5)
- **PCB**[1,5] Photocell Button
- **PCR5**[1,6,12] Photocell Receptacle only with 2 dimming connections
- **PCR7**[1,6,7] Photocell Receptacle only with 2 dimming and 2 auxiliary connections
- **RAM** Retrofit Arm Mount kit
- **PTF2**[3] Pole Top Fitter for 2-⅛" 3" Tenon
- **PTF3**[3] Pole Top Fitter for 3"–3½" Tenon
- **PTF4**[3] Pole Top Fitter for 3½"–4" Tenon
- **RPA**[3] Round Pole Adapter for 3"–3.9" O.D.
- **BD** Blird Deterrent (field installed only)

1. Available in 120V–277V Voltages only (UNV, 120, 208, 240 & 277).
2. MRSO and APO–MRO luminaires require one motion sensor per pole, ordered separately. See page 2 for Accessories. Available in 120V or 277V only.
3. ECF–MRI requires outboarded sensor when used with Terminal Block (TB) Option.
4. LLC2/LLC3/LLC4 Wireless Controls are not configurable with PC/PCB/PCR5/PCR7 Options. See page 6-7 for more info.
5. Contact factory for lead times on warm white.
6. Not configurable with Type 5 (5) Optics.
7. Not configurable with 120–277V (UNV) Voltage. Voltage must be specified.
8. Not configurable with 480V (480) Voltage.
9. Works with 3-pin or 5-pin NEMA photocell/dimming device.
10. If ordered with DIM, APD, MRI, MRSO, APO–MRI, APO–MRO, dimming will not be connected to NEMA receptacle.
11. Works with 3-pin or 5-pin NEMA photocell/dimming device and auxiliary connections are not connected (for future use only).
12. Not configurable with 3@120 (3@120) Mounting.
13. No adaptor required for 4" round poles. RPAs provided with Black Paint standard.

ECF EcoForm LED luminaire

EcoForm Accessories (order separately)

FS1R-100

MR hand held programmer

For use with 'MRI' motion response when field programming is required. If desired, only one is needed per job.

MS-A-120V

120V Input Area Motion Sensor

For MRSO (Motion Response) or APO–MRO (Automatic Profile Dimming with Motion Response Override)

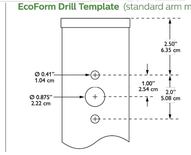
MS-A-277V

277V Input Area Motion Sensor

For MRSO (Motion Response) or APO–MRO (Automatic Profile Dimming with Motion Response Override)

Note: Motion Sensors are ordered separately, with one (1) motion sensor required per pole location for MRSO or APO–MRO luminaires. See Luminaire Configuration Information on page 5 for more details. Area motion sensor color is Arctic White. MRI and APO–MRI luminaires include an integral motion sensor.

EcoForm Drill Template (standard arm mount)



EcoForm Wireless Controls Accessories (for wall or pole mount)[1,2,3,4]

LLCR2-(F)

Standalone wall or pole wireless controller with #2 Lens.

LLCR3-(F)

Standalone wall or pole wireless controller with #3 Lens.

LLCR4-(F)

Standalone wall or pole wireless controller with #4 Lens.

1. When using the wireless remote accessory option (LLCR-F) in a pole mount application, specify pole option (CL=Coupling Internal Thread, 3/4" size)
2. 120–277V only
3. Must specify finish (F=Specify matching finish)
4. Luminaire configuration must include 0–10V Dimming 'ECF–DIM' option when Wireless Controls Accessories are specified

LED Wattage and Lumen Values (standard EcoForm luminaire)

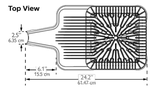
Ordering Code	No. of LED Modules (16 LEDs per Module)	Total LEDs	LED Current (mA)	Average System Watts[5]	Color Temp.	Type 2 Delivered Lumens[6]	Type 2 Efficacy (LPW)	Type 2 BUG Rating	Type 3 Delivered Lumens[6]	Type 3 Efficacy (LPW)	Type 3 BUG Rating	Type 4 Delivered Lumens[6]	Type 4 Efficacy (LPW)	Type 4 BUG Rating	Type 5 Delivered Lumens[6]	Type 5 Efficacy (LPW)	Type 5 BUG Rating
55LA-3253	2	32	530	52	4000K	6,294	122	B1-U0-G1	6,190	120	B2-U0-G2	6,106	118	B1-U0-G2	5,867	114	B3-U0-G2
70LA-3270	2	32	700	69	4000K	7,754	112	B2-U0-G2	7,955	115	B2-U0-G2	7,659	111	B2-U0-G2	7,421	107	B3-U0-G2
75LA-4853	3	48	530	77	4000K	9,344	121	B2-U0-G2	9,191	119	B2-U0-G2	9,086	117	B2-U0-G2	8,712	113	B3-U0-G2
105LA-321A	2	32	1050	107	4000K	10,709	100	B2-U0-G2	10,981	103	B3-U0-G2	10,576	99	B2-U0-G2	10,255	96	B4-U0-G2
105LA-4870	3	48	700	104	4000K	11,513	111	B2-U0-G2	11,812	114	B3-U0-G2	11,373	110	B2-U0-G2	11,019	106	B4-U0-G2
100LA-6453	4	64	530	103	4000K	12,491	121	B2-U0-G2	12,285	119	B3-U0-G2	12,129	118	B2-U0-G2	11,645	113	B4-U0-G2
135LA-6470	4	64	700	139	4000K	15,390	111	B3-U0-G2	15,789	114	B3-U0-G2	15,192	110	B3-U0-G3	14,729	106	B4-U0-G2
160LA-481A	3	48	1050	158	4000K	15,901	101	B3-U0-G3	16,343	103	B3-U0-G2	15,696	99	B3-U0-G3	15,188	96	B4-U0-G2
215LA-641A	4	64	1050	211	4000K	21,255	101	B3-U0-G3	21,265	100	B4-U0-G3	20,984	99	B3-U0-G3	20,874	99	B5-U0-G3

5. System input wattage may vary based on input voltage, by up to +/- 10% , and based on manufacturer forward voltage, by up to +/- 8%.
6. Lumen values based on photometric tests performed in compliance with IESNA LM-79.

Note: Some data may be scaled based on tests of similar, but not identical, luminaires.

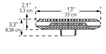
Dimensions – Standard EcoForm luminaire

Top View



Side View

End View



EPA (ft²/m²)

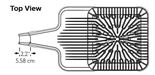
Single	Twin (2@180)	3/4@90
0.2 / 0.019	0.5 / 0.046	0.5 / 0.046

Approximate Luminaire Weight: 20 Lbs (9.07 Kg)

ECF EcoForm LED luminaire

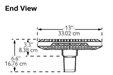
Dimensions – EcoForm with Retrofit Arm Mount (RAM)

Top View



Side View

End View



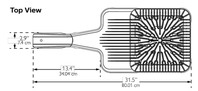
EPA (ft²/m²)

Single	Twin (2@180)	3/4@90
0.3 / 0.028	0.6 / 0.056	0.7 / 0.065

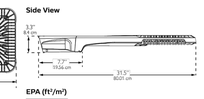
Approximate Luminaire Weight: 21 Lbs (9.53 Kg)

Dimensions – EcoForm with Mast Arm Fitter (MA)

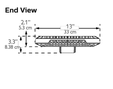
Top View



Side View



End View



EPA (ft²/m²)

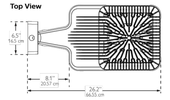
Single

0.51 / 0.047

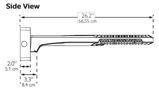
Approximate Luminaire Weight: 21.5 Lbs (9.77 Kg)

Dimensions – EcoForm with Wall Mount (WS)

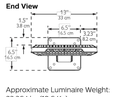
Top View



Side View



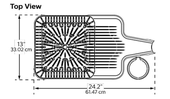
End View



Approximate Luminaire Weight: 23.36 Lbs (10.6 Kg)

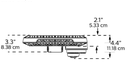
Dimensions – EcoForm with wireless controls (luminaire mounted controller)

Top View



Side View

End View



ECF EcoForm LED luminaire

Luminaire Configuration Information

ECF

Philips Gardco EcoForm LED standard luminaire providing constant wattage and constant light output when power to the luminaire is energized.

ECF–DIM

Philips Gardco EcoForm LED luminaire provided with 0–10V dimming for connection to a control system provided by others.

ECF–APD

Philips Gardco EcoForm LED luminaire with Automatic Profile Dimming. Luminaire is provided with a Philips DynaDimmer module, programmed to go to 50% power, 50% light output two (2) hours prior to night time mid-point and remain at 50% for six (6) hours after night time mid-point. Mid-point is continuously recalculated by the Philips DynaDimmer module based on the average mid-point of the last two full night cycles. Short duration cycles, and power interruptions are ignored and do not affect the determination of mid-point.

ECF–APD is available in 120V–277V input only.

ECF–APD Dimming Profile:

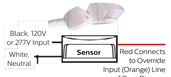
100%	2 hours	6 hours	100%
	50%	50%	
Power On	Mid Point		Power Off

ECF–MR50

Philips Gardco EcoForm LED luminaire with motion response, providing a 50% power reduction on low and a commensurate reduction in light output. The power and light output reduction is accomplished utilizing the Philips DynaDimmer takes, programmed for a constant 50% power. Power supplied by the motion sensor connected to the override line on the DynaDimmer takes the luminaire to high setting, 100% power and light output, when motion is detected. The luminaire remains on high until no motion is detected for the motion sensor duration period, after which the luminaire returns to low. Duration period is factory set at 15 minutes, and is field adjustable from 5 minutes up to 15 minutes.

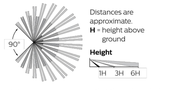
ECF–MR50 is available in 120V–277V input only to the luminaire. Motion sensors require single voltage 120V or 277V input.

The Area PIR motion sensor is the WattStopper EW-200–120–W (120V Input - MSA–120V) or the WattStopper EW-200–277–W (277V Input - MSA–277V.) One motion sensor per pole is required and is ordered separately. Area sensors require single voltage 120V or 277V input.



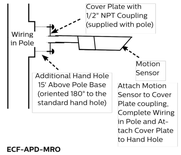
The area motion detector provides coverage equal to up to 6 times the sensor height above ground, 270° from the front-center of the sensor.

Area PIR Motion Sensor Coverage Pattern:



Motion response requires that the pole include an additional hand hole 15 feet above the pole base, normally oriented 180° to the standard hand hole. For Philips Gardco poles, order the pole with the Motion Sensor Mounting (MSM) option which includes the hand hole and a special hand hole cover plate for the sensor with a 1/2" NPT receptacle centered on the hand hole cover plate into which the motion sensor mounts. Once the motion sensor is connected to the hand hole cover plate, then wiring connections are completed in the pole. The plate (complete with motion sensor attached and wired) is then mounted to the hand hole. If poles are supplied by others, the customer is responsible for providing suitable mounting accommodations for the motion sensor in the pole.

Mounting to a Philips Gardco Pole:



ECF–APD–MRO

Philips Gardco EcoForm LED luminaire with Automatic Profile Dimming, with Motion Response Override. The ECF–APD–MRO combines the benefits of both automatic profile dimming and motion response, using the Philips DynaDimmer module. The luminaire will dim to 50% power, 50% light output, per the dimming profile shown for the ECF–APD. If motion is detected during the time that the luminaire is operating at 50%, the luminaire returns to 100% power and light output. The luminaire remains on high until no motion is detected for the duration period, after which the luminaire returns to low. Duration period is factory set at 15 minutes, and is field adjustable from 5 minutes up to 15 minutes.

Notes:

ECF–APD–MRO is available in 120V through 277V input only to luminaire. The motion sensor requires either 120V or 277V input to the motion sensor.

The ECF–APD–MRO has the same pole requirements and utilizes the same motion sensors as the ECF–MR50. The motion sensor mounts and wires identically as well. The ECF–APD–MRO utilizes the identical dimming profile as shown for the ECF–APD.

By combining the benefits of automatic profile dimming and motion response, the ECF–APD–MRO assures maximum energy savings, and insures that adequate light is present if motion is detected.

All motion sensors utilized consume 0.0 watts in the off state.

ECF EcoForm LED luminaire

Luminaire Configuration Information (Continued)

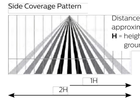
ECF–MRI

Luminaires with Motion Response include a LED driver and an integral programmable motion sensor. The motion sensor is set to a constant 50%. When motion is detected, the luminaire goes to 100%. The luminaire remains on high until no motion is detected for the motion sensor duration period, after which the luminaire returns to low. Duration period is factory set at 5 minutes. Available with 120V or 277V only.

Luminaires include a passive infrared (PIR) motion sensor, WattStopper® FSP–211 equipped with an FSP–L3 lens, capable of detecting motion within 20 feet of the sensor, 180° around the luminaire, when placed at a 20 foot mounting height, or mounted on a wall. Available in 120V or 277V input only. Motion sensor off state power is 0.0 watts.

The approximate motion sensor coverage pattern is as shown below.

Side Coverage Pattern



Top Coverage Pattern

ECF–APD–MRI

Luminaires with Automatic Profile Dimming and Motion Response Override combine the benefits of both automatic profile dimming and motion response. APD–MRI luminaires utilize Philips DynaDimmer. The luminaire will dim to 50% power, 50% light output, per the dimming profile shown for APD luminaires (see page 4). If motion is detected during the time that the luminaire is operating at 50%, the luminaire goes to 100% power and light output. The luminaire remains on high until no motion is detected for the duration period, after which the luminaire returns to low. Duration period is factory set at 5 minutes.

APD–MRI luminaires are available with 120V or 277V input voltages only.

APD–MRI luminaires use the identical motion sensor as MRI luminaires. See motion sensor details for ECF–MRI.

FS1R-100 Wireless Remote Programming Tool

The FS1R-100 Remote Programming Tool accessory permits adjustment of ECF–MRI and ECF–APD–MRI sensor settings, including duration and dimming level on low, without the need to connect any wires to the luminaire.

The FS1R-100 Wireless IR Programming Tool is a handheld tool for setup and testing of WattStopper FSP–211. It provides wireless access to the FSP–211 sensors for setup and parameter changes.

The FS1R-100 display shows menus and prompts to lead you through each process. The navigation pad provides a familiar way to navigate through the customization fields.

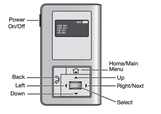
Within a certain mounting height of the sensor, the FS1R-100 allows modification of the system without requiring ladders or tools simply with a touch of a few buttons.

The FS1R-100 IR transceiver allows bi-directional communication between the FSP–211 and the FS1R-100 programming tool . Simple menu screens let you see the current status of the system and make changes. It can change FSP–211 sensor parameters such as high/low mode, sensitivity, time delay, cut off and more. With the FS1R-100 you can also establish and store FSP–211 parameter profiles.

The FS1R-100 operates on three standard 1.5V AAA Alkaline batteries or three rechargeable AAA NiMH batteries. The battery status displays in the upper right corner of the display. Three bars next to BAT= indicates a full battery charge. A warning appears on the display when the battery level falls below a minimum acceptable level. To conserve battery power, the FS1R-100 automatically shuts off 10 minutes after the last key press.

You navigate from one field to another using (up) or (down) arrow keys. The active field is indicated by flashing (alternates between yellow text on black background and black text on yellow background.)

Once active, use the Select button to move to a menu or function within the active field. Value fields are used to adjust parameter settings. They are shown in "less–than/greater–than" symbols <value>. Once active, change them using (left) and (right) arrow keys. In general the up key increments and the down key decrements a value. Selections wrap–around if you continue to press the key beyond maximum or minimum values. Moving away from the value field overwrites the original value. The Home button takes you to the main menu. The Back button can be thought of as an undo function. It takes you back one screen. Changes that were in process prior to pressing the key are lost.More information on the FSIR-100 Remote Programming Tool is available at wattstopper.com.

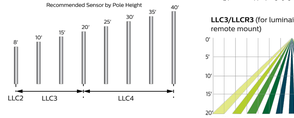


ECF EcoForm LED luminaire

Luminaire Configuration Information – EcoForm with wireless controls

ECF–LLC2/3/4 Luminaire Mounted Controller

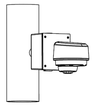
Wireless controller attached to luminaire and Includes radio, photocell and motion sensor with #2, 3, or 4 lens for 8–40' mounting heights.



LLCR2/3/4 Pole Mounted Controller

In this configuration, the wireless controller will be mounted to the pole at a fifteen foot mounting height. The number of luminaires on each pole, as well as the specific wattage chosen, will determine how many controllers will be required.

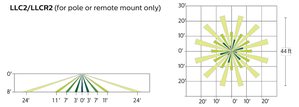
When using the wireless remote accessory option (LLCR–F) in a pole mount application, specify pole option (CL=Coupling Internal Thread, 3/4" size). Confirm required orientation of luminaire and wireless controller. Indicate height above pole base and orientation to handhold. Recommended min pole height is 18ft, with option (CL) 15ft above pole base. Other heights are possible when choosing the appropriate sensor lens type. See pole specification sheets for more information.



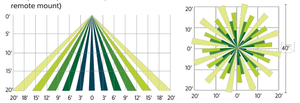
Remote Mount Wireless Controller

Used to extend the communication on site, to extend motion response and add other luminaires that are not pole mounted. Consult factory for more information.

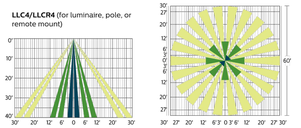
LLC2 (for pole or remote mount only)



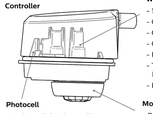
LLC3/LLCR3 (for luminaire, pole, or remote mount)



LLC4/LLCR4 (for luminaire, pole, or remote mount)



Controller



Photocell
- Ambient light photocell on every wireless radio that averages the light levels of up to 5 controllers for an accurate reading and optimal light harvesting activity.
- Reports ambient light readings to 1500 Fc.

Wireless Radio
- 1.8 Watts max (no load draw)
- Operating voltage 120–277 VAC RMS
- Communicates using the ZigBee protocol
- Carries out dimming commands from Gateway
- Reports ambient light readings to 1500 Ft-Cd
- Transmission Systems Operating within the band 2400–2483.5Mhz
- ROHS Compliant

Motion Response
- Detects motion through passive infrared sensing technology with three different lens configurations
- Motion sensor coverage can be adjusted from a narrow to a wide detection range, which helps reduce false triggers to further increase energy savings.
- Sensing profiles can be updated to adapt to activity levels in the environment, such as occupancy level, wind, and mounting height

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Texas Registered Engineering Firm F-4990

Project Number: 1730254
Drawn By:EMR Checked By:SHD

ISSUE DATE:
OCTOBER 6, 2017
PERMIT REVIEW

REVISION:
1 JANUARY 17, 2018 CITY COMMENTS
2 FEBRUARY 2, 2018 CITY COMMENTS
3 MARCH 2, 2018 STAMPING SET

STATE OF MICHIGAN
MARK N. BIGBIE
ENGINEER
No. 6201054622
LICENSED PROFESSIONAL ENGINEER
3/7/18

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NOVI FUNERAL HOME
CONSTRUCTION DOCUMENTS
NOVI, MI

SHEET NO.
E1.4

JOB NUMBER: 16238

ECF EcoForm LED luminaire

Luminaire Configuration Information (EcoForm with wireless controls)

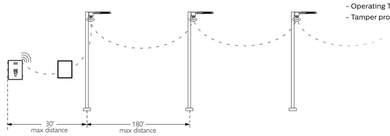
Gateway

Overview: One gateway is included with the wireless controls system. The gateway opens up communication with the wireless radios installed with the EcoForm luminaires (or pole), allowing you to control your fixtures straight from the web. One gateway can communicate with up to 800 fixtures. Typically one unit is required per parking lot.

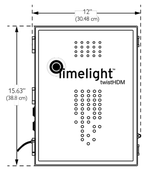
Installation: Gateway has 4 blind threaded holes on the back side that accept 10-32 screws. Mount spacing is 10.41" across and 14.19" vertical.

Requirements: The gateway must be mounted in a secure on-site location. The gateway requires 120V. Distance of gateway to the first radio varies upon application, contact factory. Strong internet connection required.

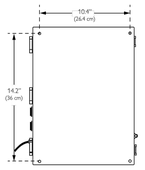
Specifications:
- High density RF Mesh coordinator
- Ethernet or wireless internet connection to server
- Proprietor of software "rules of operation"
- Watertight Ethernet connections
- Highly protected, long life ac/dc power supply
- Single board, ARM compliant 520Mhz Intel computer.
- Operating Temperature -20°C to 55°C
- Tamper proof housing



Front View



Back View



Side View

ECF EcoForm LED luminaire

Specifications

Housing
One piece die cast aluminum housing with integral arm and separate,self retained hinged, one piece die cast door frame.

IP Rating
LED light engine rated IP66.

Vibration Resistance
EcoForm with Standard Arm carries a 3G vibration rating that conforms to standards set forth by ANSI C136.31. Testing includes vibration to 3G acceleration in three axes, all performed on the same luminaire.

Electrical
Driver efficiency (>90% standard). 120–480V available (restrictions apply). Open/short circuit protection. Optional 0–10V dimming to 10% power. RoHS compliant. Surge protector standard. 10KA per ANSI/IEEE C62.41.2.

LED Board and Array
32, 48, or 64 LEDs. Color temperatures: 3000K, 4000K, 5700K +/- 250K. Minimum CRI of 70. Aluminum metal clad board. RoHS compliant.

LED Thermal Management
The housing design allows the one piece housing to provide excellent thermal management critical to long LED system life.

Energy Saving Benefits
System efficacy up to 95 lms/W with significant energy savings over Pulse Start Metal Halide luminaires. Optional control options provide added energy savings during unoccupied periods.

LED Performance

Predicted Lumen Depreciation Data[1]

Ambient Temperature °C	Driver (mA)	Calculated L_{70} Hours[1,3]	L_{70} Per TM-21[2,3]	Lumen Maintenance % @ 60,000 hours
Up to 40 °C	Up to 1050 mA	> 350,000 hours	> 60,000 hours	97%

1. Predicted performance derived from LED manufacturer's data and engineering design estimates, based on IESNA LM-80 methodology. Actual experience may vary due to field application conditions.
2. L70 is the predicted time when LED performance depreciates to 70% of initial lumen output.
3. Calculated per IESNA TM21-11. Published L70 hours limited to 6 times actual LED test hours.

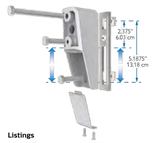
Wireless Controls
The wireless controls system includes: gateway, controller (with wireless radio, motion response, and photocell), and commissioning/ training. This intelligent web-based system operates through a high density mesh (HDM) wireless technology. Wireless radios with motion response and photocell sensors are integrated with PureForm luminaires, and enable the fixtures to communicate via the ZigBee protocol. The gateway is a mini computer that connects to the Internet, and is located in a secure location. The central database channels communication to and from the gateway, allowing data to be viewed or managed through the web-based graphical user interface (GUI). See wireless controls pages 6–7 for details and technical information.

Motion Sensors
ECF–MPSO, ECF–APD–MRO, ECF–MRI, ECF–APD–MRI luminaires may be specified for additional energy savings during unoccupied periods. See pages 4–6 for complete details.

Optical Systems
Type 2, 3, 4, and 5 distributions available. Internal Shield option mounts to LED optics and is available with Type 2, 3, and 4 distributions to control backlight.

Mounting
Standard luminaire arm mounts to 4" round poles. Square pole adapter included with every luminaire. Round Pole Adapter (RPA) required for 3-3.9" poles.

Retrofit Arm Mount
EcoForm features an innovative retrofit arm kit. When specified with the retrofit arm (RAM) option, EcoForm seamlessly simplifies site conversions to LED by eliminating the need for additional pole drilling on most existing poles. RAM will be boxed separately.



Listings
ETL/cETL listed to the UL 1598 standard, suitable for Wet Locations. Suitable for use in ambients from –40° to 40°C (–40° to 104°F). The quality systems of this facility have been registered by UL to the ISO 9001 series standards. All EcoForm luminaires equipped with NW and CW are DesignLights Consortium® qualified.

Finish
Each standard color luminaire receives a fade and abrasion resistant, electrostatically applied, thermally cured, triglycidal isocyanurate (TGIC) textured polyester powdercoat finish. Standard colors include bronze (BRP), black (BLP), white (WP), and natural aluminum (NP). Consult factory for specs on optional or custom colors.

Warranty
EcoForm luminaires feature a 5 year limited warranty. Philips Gardco LED Luminaires with LED arrays feature a 5 year limited warranty covering the LED arrays. LED Drivers also carry a 5 year limited warranty. Motion sensors are covered by warranty for 5 years by the motion sensor manufacturer.

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philips.com/luminaires

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281 Hillmount Rd, Markham, ON, Canada L6C 2S3
Tel. 800-668-9008

Halo Commercial

R / RX

PD610/PD615/PD620/PD630
PDM6A
61V

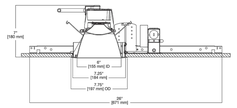
ORDERING INFORMATION

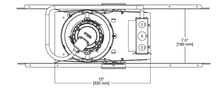
SAMPLE NUMBER: PD610ED010REM-PDM6A827-61VC
A complete luminaire consists of a housing, LED module and reflector, order separately.

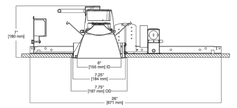
Housing	Lumens	Driver	Options	LED Module	CRI/CCT
PD6 = 6" aperture LED downlight **PD6CP** = 6" aperture LED downlight, CCEA listed for City of Chicago plenum requirements	**10** = 1,000 lumens (nominal) **15** = 1,500 lumens (nominal) **20** = 2,000 lumens (nominal) **30** = 3,000 lumens (nominal)	**ED010** = 120-277V 50/60Hz, 0-10V and LE/TE phase cut dimming **D010** = 120-277V 50/60Hz, 0-10V dimming (3,000 lumen only)	**REM** = Emergency operation with remote indicator and test switch **IEM** = Emergency operation with integral indicator and test switch, 60 Hz only (REM and IEM options not available with PD6CP housing)	**PDM6A** = Downlight LED module for PD6 housing, provides 1,000, 1,500, 2,000, or 3,000 lumens (nominal) depending on connected housing type	**827** = 80 CRI, 2700K CCT **927** = 90 CRI, 2700K CCT **830** = 80 CRI, 3000K CCT **930** = 90 CRI, 3000K CCT **835** = 80 CRI, 3500K CCT **935** = 90 CRI, 3500K CCT **840** = 80 CRI, 4000K CCT **940** = 90 CRI, 4000K CCT

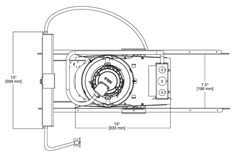
Reflector	Finish Option	Flange Option	Accessories
61V = 6" vertical parabolic reflector **61VEM** = 6" vertical parabolic reflector for IEM	**C** = Specular clear **G** = Specular gold **H** = Semi-specular clear **W** = White (white flange) **BB** = Black baffle (white flange) **WB** = White baffle (white flange)	**Blank** = Polished flange standard with C, G & H reflector finishes **Blank** = White flange standard with W, BB, & WB **WF** = White flange option available with C, G, & H reflector finishes	**HB128APK** = L channel hanger bar, 26", "No-Fuss", pair (replacement) **RMB22** = 22" long wood joist mounting bars, pair **H347** = Step down transformer for 347V input **H347** = Step down transformer for 347V input, 75VA max **H347200** = Step down transformer for 347V input, 200VA max **PORLWTPD1** = LumeWatt Pro Wireless Sensor Kit (0-10V only)

DIMENSIONS









R / RX

Halo Commercial

PD610/PD615/PD620/PD630
PDM6A
61V

COMPLIANCE TABLE

1000 LUMEN

	80 CRI															
Catalog #	PD610ED010- PDM6A827				PD610ED010- PDM6A830				PD610ED010- PDM6A835				PD610ED010- PDM6A840			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1032	77			1109	83			1177	88			1187	89		
61VCWF	1005	75			1080	81			1146	86			1156	86		
61VG	1003	75			1078	80			1144	85			1154	86		
61VGWF	966	72			1039	78			1102	82			1111	83		
61VH	924	69			993	74			1053	79			1062	79		
61VHWF	921	69			990	74			1051	78			1060	79		
61VW	960	72			1032	77			1095	82			1104	82		
61VBB	897	67			964	72			1023	76			1031	77		
61VWB	980	73			1053	79			1118	83			1127	84		

	90 CRI															
Catalog #	PD610ED010- PDM6A927				PD610ED010- PDM6A930				PD610ED010- PDM6A935				PD610ED010- PDM6A940			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	795	59			853	64			917	68			1017	76		
61VCWF	775	58			831	62			894	67			990	74		
61VG	773	58			829	62			892	67			988	74		
61VGWF	745	56			799	60			859	64			952	71		
61VH	712	53			763	57			821	61			910	68		
61VHWF	710	53			761	57			819	61			908	68		
61VW	740	55			794	59			854	64			946	71		
61VBB	691	52			741	55			797	59			884	66		
61VWB	755	56			810	60			871	65			966	72		

1500 LUMEN

	80 CRI															
Catalog #	PD615ED010- PDM6A827				PD615ED010- PDM6A830				PD615ED010- PDM6A835				PD615ED010- PDM6A840			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1417	77			1523	82			1616	87			1630	88		
61VCWF	1380	75			1483	80			1574	85			1587	86		
61VG	1377	74			1480	80			1570	85			1584	86		
61VGWF	1327	72			1426	77			1513	82			1526	82		
61VH	1268	69			1363	74			1446	78			1458	79		
61VHWF	1265	68			1359	73			1442	78			1455	79		
61VW	1318	71			1417	77			1503	81			1516	82		
61VBB	1231	67			1323	72			1404	76			1416	77		
61VWB	1346	73			1446	78			1534	83			1548	84		

	90 CRI															
Catalog #	PD615ED010- PDM6A927				PD615ED010- PDM6A930				PD615ED010- PDM6A935				PD615ED010- PDM6A940			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1092	59			1171	63			1260	68			1396	75		
61VCWF	1064	57			1141	62			1227	66			1360	74		
61VG	1061	57			1138	62			1224	66			1357	73		
61VGWF	1022	55			1096	59			1179	64			1307	71		
61VH	977	53			1048	57			1127	61			1249	68		
61VHWF	975	53			1045	57			1124	61			1246	67		
61VW	1016	55			1090	59			1172	63			1299	70		
61VBB	949	51			1018	55			1095	59			1213	66		
61VWB	1037	56			1112	60			1196	65			1326	72		

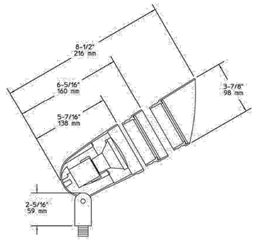
ES = ENERGY STAR® Compliant

T24 = Can be used to comply with California Title 24 Non-Residential

SL

Aluminum Bullyte (BL1) Specification Sheet

Project Name:	Location:	MFG: Philips Hadco
Fixture Type:	Catalog No.:	Qty:



Ordering Guide

Example: BL1 A S S7

Product Code	BL1	Aluminum Bullyte
Finish	A H	Black Bronze
Shroud	S L	Short Shroud Long Shroud
Mounting	S7	Mounting Stake

Specifications

HOUSING:
Die-cast aluminum. Fully rotatable shroud, gasketed, cast aluminum. Fasteners are 300 series stainless steel. Fully-adjustable swivel arm with vibration-proof locking teeth. ⅛" NPS male threads to screw onto accessory mounting stake or junction box, sold separately.

FINISH:
Thermoset polyester powdercoat is electrostatically applied after a five-stage conversion cleaning process and bonded by heat fusion thermosetting.

OPTICAL ASSEMBLY:
Clear tempered glass lens.

LAMPING:
75W maximum MR16 bi-pin lamp. Covered MR16 are recommended to protect lamps inner capsule. Lower wattage lamps are acceptable. Lamp is not included.

ELECTRICAL ASSEMBLY:
Bi-pin socket type (GU5.3) with 250° C high temperature teflon coated wire leads. 12 Volt fixture is pre-wired with 3-ft pigtail of 18-2 AWG, 105° C, SPT-1W wire. Low voltage quick connector, catalog #LVC3 included for easy hook-up to the low voltage supply cable, not included. 12 Volt system requires remote transformer, not included.

WARRANTY:
Three-year limited warranty.

CERTIFICATIONS:
ETL listed to U.S. safety standards for wet locations. cETL listed to Canadian safety standards for wet locations. Manufactured to ISO 9001:2008 Standards.

Width:
3 7/8" (98mm)

Length:
8 1/2" (216mm)

Max. Weight:
1.4 lb

PHILIPS HADCO

Note: Philips reserves the right to modify the above details to reflect changes in the cost of materials and/or production and/or design without prior notice.
100 Craftway Drive, Littlestown, PA 17340 | P: +1-717-359-7131 F: +1-717-359-9289 | http://www.hadco.com/ | Copyright 2013 Philips
HW1

R / RX

Halo Commercial

DESCRIPTION

Recessed 6-inch LED lens downlight is available in various distributions, lumen and CRI/CCT options. Suitable for commercial construction and can be used for both new or renovation work. Insulation must be kept 3" from top and sides of housing. Use for general area lighting where high efficiency and visual comfort are required.

Catalog #		Type	
Project			
Comments		Date	
Prepared by			

SPECIFICATION FEATURES

MECHANICAL
Frame
Boat shaped galvanized steel frame with adjustable plaster lip accommodates ceilings up to ½ – 2" thick. May be used for new construction or remodeling installations. Provided with (2) remodel clips to secure frame when installed from below the ceiling.

Mounting Brackets
Bar hanger receivers adjusts 2" vertically from above the ceiling or thru the aperture. Use with No Fuss™ bar hangers or with ½" EMT. Removable to facilitate installation from below the ceiling.

No Fuss™ Bar Hangers
Captive preinstalled bar hanger locks to tee grid with a screwdriver or pliers. Centering mechanism allows consistent positioning of fixtures.

OPTICAL
LED Module
Proximity phosphors over chip on board LEDs provide a uniform source with high efficiency and no pixilation. Available in 80 or 90 CRI minimum, accuracy within 3 SDCM provides color uniformity. See ordering information for available CRI / CCT options. Passive thermal management achieves L70 at 50,000 hours in non IC applications. Integral diffuse lens provides visual shielding. Integral connector allows quick connection to housing flex.

Reflector
One piece parabolic aluminum reflector provides cutoff for a visually comfortable optic. Attaches to LED module with (3) speed clamps minimizing light leaks to lens. Self-flanged standard with an optional white painted flange.

Trim Retention
Reflectors are retained with two torsion springs holding the flange tightly to the finished ceiling surface.

ELECTRICAL
Junction Box
(6) ½" and (2) ¾" trade size pry outs positioned to allow straight conduit runs. Listed for (12) #12 AWG (six in, six out) 90°C conductors and feed thru branch wiring.

Driver
Integral UNV 120 - 277V 50/60 Hz constant current driver provides noise free operation. For 347V input use Halo transformer H347 or H347200. Continuous, flicker-free dimming from 100% to 10% with leading or trailing edge phase cut at 120V or 0 -10V analog control.

Emergency Option
Provides 90 minutes of standby lighting meeting most life safety codes for egress lighting. Available with both integral or remote charge indicator and test switch.

Compliance
- cULus listed for wet location
- IP66 Ingress Protection Rated
- Insulation must be kept 3" from top and sides.
- Airtight per ASTM-E283.
- Optional City of Chicago environmental air (CCEA) marking for plenum applications.
- EMI/RFI emissions per FCC 47CFR Part 18 non-consumer limits.
- Contains no mercury or lead and RoHS compliant.
- Photometric testing in accordance with IES LM-79-08.
- Lumen maintenance projections in accordance with IES LM-80-08 andTM-21-11.
- Can be used to comply with CaliforniaTitle 24 Non-Residential Lighting Controls requirements as a LED Luminaire.
- ENERGY STAR® listed for commercial applications, reference database for current listings.

PD610
PD615
PD620
PD630

PDM6A

61V

1000, 1500, 2000 & 3000 Lumen Series

LED 6-Inch Aperture Lens Downlight

THD: ≤ 20%
PF: ≥ 0.90
T Ambient -30 - +40°C
Sound Rating ≤ 22dba

Lumens	1000 Series	
Input Voltage	120V	277V
Input Current	.103 A	.058 A
Input Power	12.1 W	13.2 W
Efficiency	88 LPW	88 LPW
Inrush Current	0.37 A	0.77 A

Lumens	1500 Series	
Input Voltage	120V	277V
Input Current	.146 A	0.072 A
Input Power	17.1 W	17.9 W
Efficiency	87 LPW	87 LPW
Inrush Current	0.47 A	1.04 A

Lumens	2000 Series	
Input Voltage	120V	277V
Input Current	.175 A	0.086 A
Input Power	20.78 W	21.06 W
Efficiency	89 LPW	89 LPW
Inrush Current	0.54 A	1.21 A

Lumens	3000 Series	
Input Voltage	120V	277V
Input Current	.299 A	.145 A
Input Power	35.72 W	36.4 W
Efficiency	82 LPW	82 LPW
Inrush Current	0.85 A	2.0 A

TD517003EN
11/03/2016

ISSUE DATE:
OCTOBER 6, 2017
PERMIT REVIEW

REVISION:
1 JANUARY 17, 2018 CITY COMMENTS
2 FEBRUARY 2, 2018 CITY COMMENTS
3 MARCH 2, 2018 STAMPING SET

STATE OF MICHIGAN
MARK N. BIGBIE
ENGINEER
No. 6201054622
LICENSED PROFESSIONAL ENGINEER
3/9/18

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NOVI FUNERAL HOME
CONSTRUCTION DOCUMENTS
NOVI, MI

SHEET NO.
E1.5

JSE
Jordan & Skala Engineers
17855 North Dallas Parkway • Suite 320
Dallas, TX. 75287
p. 469.385.1616 • f. 469.385.1615
Texas Registered Engineering Firm F-4990
Project Number: 1730254
Drawn By:EMR Checked By:SHD

JOB NUMBER: 16238

R / RX

Halo Commercial

PD610/PD615/PD620/PD630
PDM6A
61V

COMPLIANCE TABLE continued

2000 LUMEN

80 CRI

Catalog #	PD620ED010- PDM6A827				PD620ED010- PDM6A830				PD620ED010- PDM6A835				PD620ED010- PDM6A840			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1724	78			1853	84			1966	89			1983	90		
61VCWF	1679	76			1805	82			1915	87			1931	88		
61VG	1675	76			1801	82			1910	87			1927	88		
61VGWF	1614	73			1735	79			1841	84			1856	84		
61VH	1543	70			1658	75			1759	80			1774	81		
61VHWF	1539	70			1654	75			1755	80			1770	80		
61VW	1604	73			1724	78			1829	83			1845	84		
61VBB	1498	68			1610	73			1708	78			1723	78		
61VWB	1637	74			1759	80			1867	85			1883	86		

90 CRI

Catalog #	PD620ED010- PDM6A927				PD620ED010- PDM6A930				PD620ED010- PDM6A935				PD620ED010- PDM6A940			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1328	60			1425	65			1532	70			1698	77		
61VCWF	1294	59			1388	63			1493	68			1654	75		
61VG	1291	59			1385	63			1489	68			1651	75		
61VGWF	1244	57			1334	61			1435	65			1590	72		
61VH	1189	54			1275	58			1371	62			1520	69		
61VHWF	1186	54			1272	58			1368	62			1516	69		
61VW	1236	56			1325	60			1426	65			1580	72		
61VBB	1154	52			1238	56			1332	61			1476	67		
61VWB	1262	57			1353	61			1455	66			1613	73		

3000 LUMEN

80 CRI

Catalog #	PD630D010- PDM6A827				PD630D010- PDM6A830				PD630D010- PDM6A835				PD630D010- PDM6A840			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	2576	72			2768	78			2937	82			2963	83		
61VCWF	2509	70			2697	76			2861	80			2886	81		
61VG	2503	70			2691	75			2855	80			2879	81		
61VGWF	2412	68			2592	73			2750	77			2774	78		
61VH	2305	65			2477	69			2629	74			2651	74		
61VHWF	2299	64			2471	69			2622	73			2645	74		
61VW	2397	67			2576	72			2733	77			2757	77		
61VBB	2238	63			2406	67			2553	72			2575	72		
61VWB	2446	69			2629	74			2790	78			2814	79		

90 CRI

Catalog #	PD630D010- PDM6A927				PD630D010- PDM6A930				PD630D010- PDM6A935				PD630D010- PDM6A940			
	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24	Lumens	LPW	ES	T24
61VC	1985	56			2129	60			2290	64			2538	71		
61VCWF	1934	54			2074	58			2231	62			2472	69		
61VG	1929	54			2069	58			2226	62			2466	69		
61VGWF	1859	52			1993	56			2144	60			2376	67		
61VH	1776	50			1905	53			2049	57			2271	64		
61VHWF	1772	50			1900	53			2044	57			2265	63		
61VW	1847	52			1981	55			2131	60			2361	66		
61VBB	1725	48			1850	52			1990	56			2205	62		
61VWB	1885	53			2022	57			2175	61			2410	68		

ES = ENERGY STAR® Compliant

T24 = Can be used to comply with California Title 24 Non-Residential

EATON
Powering Business Worldwide

R / RX

Halo Commercial

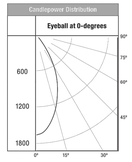
PD610/PD615/PD620/PD630
PDM6A
61V

PHOTOMETRY - 1000 lumen / 80 CRI

PD610ED010- PDM6A835-61VC

Spacing Criteria = 0.76
Lumens per Watt = 97.3 Lm/W
Test No. P137037
Test Model: PD610ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution	
Degrees Vertical	Candela
0°	1665
5	1614
10	1469
20	1057
30	609
40	166
50	18
60	3
70	1
80	0
90	0

*CBCP

Luminance (Average Candela/M²)	
Degree	Avg. 0° Luminance
45	4791
55	497
65	221
75	191
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	55.1	4	4
7	34	5.2	5.2
8	26	6	6
9	20.6	6.8	6.8
10	16.7	7.6	7.6
12	11.6	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

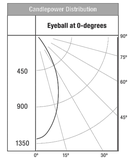
Zone	Lumens	% Fixture
0-30	886	75.3
0-40	1113	94.6
0-60	1175	99.8
0-90	1177	100

PHOTOMETRY - 1000 lumen / 90 CRI

PD610ED010- PDM6A935-61VC

Spacing Criteria = 0.76
Lumens per Watt = 75.8 Lm/W
Test No. P137041
Test Model: PD610ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution	
Degrees Vertical	Candela
0°	1298
5	1258
10	1146
20	824
30	475
40	130
50	14
60	2
70	1
80	0
90	0

*CBCP

Luminance (Average Candela/M²)	
Degree	Avg. 0° Luminance
45	3737
55	392
65	182
75	148
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5'	52	4.4	4.4
7'	32.1	5.8	5.8
8'	24.6	6.6	6.6
9'	19.4	7.4	7.4
10'	15.7	8.2	8.2
12'	10.9	10	10

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	691	75.3
0-40	868	94.6
0-60	916	99.8
0-90	917	100

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Halo Commercial

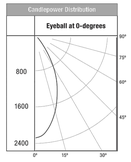
PD610/PD615/PD620/PD630
PDM6A
61V

PHOTOMETRY - 1500 lumen / 80 CRI

PD615ED010- PDM6A835-61VC

Spacing Criteria = 0.76
Lumens per Watt = 87.3 Lm/W
Test No. P160038
Test Model: PD615ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution	
Degrees Vertical	Candela
0°	2287
5	2216
10	2018
20	1452
30	836
40	228
50	25
60	4
70	1
80	0
90	0

*CBCP

Luminance (Average Candela/M²)	
Degree	Avg. 0° Luminance
45	6582
55	688
65	311
75	254
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	75.6	4	4
7	46.7	5.2	5.2
8	35.7	6	6
9	28.2	6.8	6.8
10	22.9	7.6	7.6
12	15.9	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

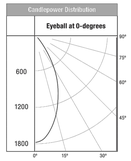
Zone	Lumens	% Fixture
0-30	1217	75.3
0-40	1529	94.6
0-60	1613	99.8
0-90	1616	100

PHOTOMETRY - 1500 lumen / 90 CRI

PD615ED010- PDM6A935-61VC

Spacing Criteria = 0.76
Lumens per Watt = 68.1 Lm/W
Test No. P160042
Test Model: PD615ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution	
Degrees Vertical	Candela
0°	1783
5	1728
10	1573
20	1132
30	652
40	178
50	20
60	3
70	1
80	0
90	0

*CBCP

Luminance (Average Candela/M²)	
Degree	Avg. 0° Luminance
45	5132
55	535
65	246
75	191
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	58.9	4	4
7	36.4	5.2	5.2
8	27.9	6	6
9	22	6.8	6.8
10	17.8	7.6	7.6
12	12.4	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	948	75.3
0-40	1192	94.6
0-60	1257	99.8
0-90	1260	100

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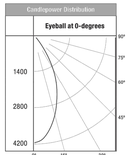
PD610/PD615/PD620/PD630
PDM6A
61V

PHOTOMETRY - 3000 lumen / 80 CRI

PD630ED010- PDM6A835-61VC

Spacing Criteria = 0.76
Lumens per Watt = 82.3 Lm/W
Test No. P137063
Test Model: PD630ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution	
Degrees Vertical	Candela
0°	4157
5	4028
10	3668
20	2639
30	1520
40	415
50	46
60	6
70	2
80	0
90	0

*CBCP

Luminance (Average Candela/M²)	
Degree	Avg. 0° Luminance
45	11970
55	1242
65	558
75	466
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	137.4	4	4
7	84.8	5.2	5.2
8	65	6	6
9	51.3	6.8	6.8
10	41.6	7.6	7.6
12	28.9	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

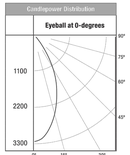
Zone	Lumens	% Fixture
0-30	2212	75.3
0-40	2779	94.6
0-60	2932	99.8
0-90	2937	100

PHOTOMETRY - 3000 lumen / 90 CRI

PD630ED010- PDM6A935-61VC

Spacing Criteria = 0.76
Lumens per Watt = 64.1 Lm/W
Test No. P137057
Test Model: PD630ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution	
Degrees Vertical	Candela
0°	3240
5	3140
10	2859
20	2058
30	1185
40	324
50	36
60	5
70	2
80	0
90	0

*CBCP

Luminance (Average Candela/M²)	
Degree	Avg. 0° Luminance
45	9327
55	975
65	441
75	360
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	107.1	4	4
7	66.1	5.2	5.2
8	50.6	6	6
9	40	6.8	6.8
10	32.4	7.6	7.6
12	22.5	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	1724	75.3
0-40	2166	94.6
0-60	2286	99.8
0-90	2290	100

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www.eaton.com/lighting

Specifications and dimensions subject to change without notice.

R / RX

Halo Commercial

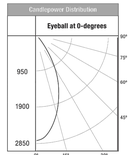
PD610/PD615/PD620/PD630
PDM6A
61V

PHOTOMETRY - 2000 lumen / 80 CRI

PD620ED010- PDM6A835-61VC

Spacing Criteria = 0.76
Lumens per Watt = 89.4 Lm/W
Test No. P137021
Test Model: PD620ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution	
Degrees Vertical	Candela
0°	2782
5	2696
10	2454
20	1766
30	1017
40	278
50	31
60	4
70	2
80	0
90	0

*CBCP

Luminance (Average Candela/M²)	
Degree	Avg. 0° Luminance
45	8009
55	832
65	376
75	318
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	92	4	4
7	56.8	5.2	5.2
8	43.5	6	6
9	34.3	6.8	6.8
10	27.8	7.6	7.6
12	19.3	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

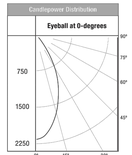
Zone	Lumens	% Fixture
0-30	1480	75.3
0-40	1860	94.6
0-60	1962	99.8
0-90	1966	100

PHOTOMETRY - 2000 lumen / 90 CRI

PD620ED010- PDM6A935-61VC

Spacing Criteria = 0.76
Lumens per Watt = 69.7 Lm/W
Test No. P137025
Test Model: PD620ED010- PDM6A835-61VC

Candlepower Distribution



Scaling factor for the Battery back up:
- 1000 Lumen = 0.55
- 1500 Lumen = 0.40
- 2000 Lumen = 0.33
- 3000 Lumen = 0.22

Candela Distribution	
Degrees Vertical	Candela
0°	2168
5	2102
10	1913
20	1377
30	793
40	217
50	24
60	3
70	1
80	0
90	0

*CBCP

Luminance (Average Candela/M²)	
Degree	Avg. 0° Luminance
45	6241
55	650
65	298
75	233
85	0

Cone of Light Footcandles

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam (ft.) L Length	Beam (ft.) W Width
5.5	71.7	4	4
7	44.3	5.2	5.2
8	33.9	6	6
9	26.8	6.8	6.8
10	21.7	7.6	7.6
12	15.1	9	9

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot. Footcandle values are initial, apply appropriate light loss factors where necessary.

Zonal Lumen Summary

Zone	Lumens	% Fixture
0-30	1154	75.3
0-40	1450	94.6
0-60	1530	99.8
0-90	1532	100

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ISSUE DATE:

	OCTOBER 6, 2017
	PERMIT REVIEW

REVISION:

1	JANUARY 17, 2018 CITY COMMENTS
2	FEBRUARY 2, 2018 CITY COMMENTS
3	MARCH 2, 2018 STAMPING SET

STATE OF MICHIGAN
MARK N. BIGBIE
ENGINEER
No. 6201054622
LICENSED PROFESSIONAL ENGINEER
3/9/18

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JOB NUMBER: 16238

JSE
Jordan & Skala Engineers
17855 North Dallas Parkway • Suite 320
Dallas, TX. 75287
p. 469.385.1616 • f. 469.385.1615
Texas Registered Engineering Firm F-4990

Project Number: 1730254
Drawn By:EMR Checked By:SHD

OCCUPANCY SENSOR SCHEDULE

DESCRIPTION	SYMBOL	WATTSTOPPER MODEL NUMBER	UNOBSTRUCTED RATED COVERAGE	MOUNTING	WATTAGE/ VOLTAGE	TIME DELAY	NOTES
PASSIVE INFRARED SWITCH	$IR	PW-100	300 SF	WALL	800W/120V 1200W/277V	30 MIN.	
PASSIVE INFRARED AREA SENSOR	IR300	WPIR	300 SF	CORNER OF CEILING	24VDC	30 MIN.	1
	IR1000	CX-100	1000 SF	CORNER OF WALL/CEILING	24VDC	30 MIN.	1,2
	IR1200	CI-200	1200 SF	CEILING	24VDC	30 MIN.	1
ULTRASONIC AREA SENSOR	U500 U1000 U2000	UT-305-1 UT-305-2 UT-305-3	500 SF 1000 SF 2000 SF	CEILING	24VDC	30 MIN.	1
	U500L U1000L U2000L	UT-355-1 UT-355-2 UT-355-3	500 SF 1000 SF 2000 SF	CEILING	800W/120V 1200W/277V	30 MIN.	
DUAL TECHNOLOGY AREA SENSOR	DT2000	DT-200	2000 SF	CORNER OF WALL/CEILING	24VDC	30 MIN.	1,2
	DT1000	DT-305	1000 SF	CEILING	24VDC	30 MIN.	1
	DT1000L	DT-355	1000 SF	CEILING	800W/120V 1200W/277V	30 MIN.	

NOTES:
1. SENSOR REQUIRES POWER PACK (INSTALL IN ACCESSIBLE LOCATION)
2. SWIVEL MOUNTING BRACKET INCLUDED.

APPROVED ALTERNATES*: COOPER CONTROLS, PASS & SEYMOUR, LEVITON
* ALTERNATE MANUFACTURER SHALL SUBMIT SHOP DRAWINGS INCLUDING SCALED FLOOR PLANS OF DEVICE LOCATIONS AND CUT SHEETS OF DEVICES.

GENERAL NOTES:

1. ALL EMERGENCY LIGHTS AND EXIT SIGNS SHALL BE CONNECTED TO THE UNSWITCHED PHASE CONDUCTOR OF THE CIRCUIT SERVING THE RESPECTIVE AREA.
2. "RX" FIXTURES MAY REMAIN ILLUMINATED AFTER BUSINESS HOURS (8AM TO 10PM). ALL OTHER EXTERIOR BUILDING-MOUNTED LIGHTS TO BE EXTINGUISHED AFTER BUSINESS HOURS.

KEY NOTES: (DESIGNATED BY "#")

1. ROUTE CIRCUIT THROUGH TIMECLOCK.
2. FIXTURES IN THE DAYLIGHT ZONE SHALL BE CONTROLLED BY DAYLIGHT SENSOR PER 2015 IECC, SECTION C405.2.3.
3. SEE ARCHITECTURAL SHEET A1.3, DETAIL 02 FOR DIMMER STATION INFORMATION.

1 LIGHTING PLAN - ELEC
SCALE: 1/8" = 1'-0"

NORTH

Jordan & Skala Engineers
17855 North Dallas Parkway • Suite 320
Dallas, TX. 75287
p. 469.385.1616 • f. 469.385.1615
Texas Registered Engineering Firm F-4990

Project Number: 1730254
Drawn By:EMR Checked By:SHD

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