CONSTRUCTION PLANS

CHURCH OF GOD IN CHRIST

3500 BALDWIN ROAD

CITY OF AUBURN HILLS, OAKLAND COUNTY, MICHIGAN

PERMIT / APPROVAL SUMMARY		
DATE SUBMITTED	DATE APPROVED	PERMIT / APPROVAL
10/11/2021		CITY OF AUBURN HILLS ENGINEERING PERMIT
10/11/2021		OAKLAND COUNTY SESC PERMIT
10/11/2021		RCOC APPROACH IN PERMIT
2/28/2020		EGLE WETLAND PERMIT
		NPDES

LEGAL DESCRIPTION - PROPOSED PARCEL:
(AS RECORDED IN L.47854, P.344)

Lands in part of the East 1/2 of the Southwest 1/4 of Section 5, Town 3 North, Range 10 East, City of Auburn Hills, Oakland County, Michigan, more particularly described as:
Commencing at the South 1/4 Corner of said Section 5; thence along the South line of said Section 5, N86°55'05"W, 344.18 feet to the POINT OF BEGINNING;
thence continuing along said South line N86°55'05"W, 385.55 feet to the North line of Collier Road (66 feet wide); thence along said North line the following two (2) courses:
(1) 254.91 feet along the arc of a non-tangent curve to the left, having a radius of 988.00 feet, and a chord bearing N79°33'01"W, 254.20 feet and;
(2) N86°56'30"W, 206.86 feet to the East line of Baldwin Road (variable width);
thence along said East line, N07°11'12"W, 372.44 feet;
thence S87°52'58"E, 100.82 feet; thence N89°44'25"E, 20.02 feet; thence S87°52'58"E, 103.31 feet; thence S87°53'08"E, 79.82 feet; thence N90°00'00"E, 169.06 feet; thence S50°48'11"E, 532.79 feet;
thence S86°55'05"E, 8.72 feet; thence S03°36'55"W, 100.00 feet to the aforementioned South line of Section 5 and the POINT OF BEGINNING.

Subject to any and all easements and right of ways of record or otherwise.
Containing 6.340 acres of land, more or less.

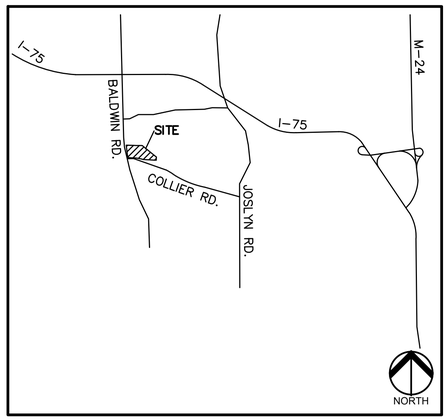
Church of God In Christ (C.O.G.I.C) announce plans to build a new worship center in Auburn Hills, MI. The new edifice will comfortably seat 400-people, and the style of architecture will allow the church to make a very powerful and positive statement of faith on the corner of Baldwin and Collier. The church will continue to fulfill its three-fold purpose: 1) to seek and save the lost,(Matthew 28:19-20); 2) to nurture the believer; 3) to equip the believer in discovering their place in ministry; and to ultimately continue the great commission in the Tri-County area and throughout the world. We will also serve the needs of the surrounding communities while proclaiming the 'Good News' for all.

The Not-for-Profit entity of the church, 'Set The Captured Free', will serve not only our congregants but the communities by offering the following:

- Day Care Program - providing a safe, home-away -from-home environment for ages 2-5, during the week. The children will learn age appropriate basic skills in preparation for grade school.
- Latch Key Program - providing a safe environment designed to support parents and children in a before and after school child care program. This program will provide support with homework and tutoring.
- Kids/Teen College - Week-end program targeting ages 4-17, which will bring FREE academic enrichment, extracurricular and creative arts classes to young people throughout the community.
- Community Resource Center - upcoming collaborative relationships with local schools and colleges offering support services, (i.e., ESL, Tutoring, Computer Skills, Soft Skills, and other resources that promote self-sufficiency).

CITY OF AUBURN HILLS STANDARD NOTES:

1. ALL CONSTRUCTION SHALL CONFORM TO CURRENT CITY OF AUBURN HILLS STANDARDS.
2. NO WORK SHALL BE PERFORMED WITHOUT INSPECTION.
3. A PERMIT FROM THE DPW IS REQUIRED FOR ALL CONSTRUCTION WITHIN CITY R.O.W. NO EQUIPMENT OR MATERIAL STORAGE WILL BE PERMITTED IN THE R.O.W.
4. ALL CITY STREETS MUST BE MAINTAINED DURING CONSTRUCTION. STREETS SHALL BE KEPT FREE OF MUD, DIRT, CONSTRUCTION DEBRIS, DUST AND THE LIKE. IF CLEAN-UP IS NOT PERFORMED WITHIN 24 HOURS OF NOTIFICATION, THE CITY RESERVES THE RIGHT TO PERFORM THE WORK AND CHARGE THE DEVELOPER ACCORDINGLY.
5. WORKING HOURS (INCLUDING RUNNING OF ANY MACHINERY) SHALL BE RESTRICTED TO MONDAY THROUGH SATURDAY, 7:00 AM TO 7:00 PM; SUNUP TO SUNDOWN; WHICHEVER IS LESS. CONSTRUCTION OPERATIONS BEYOND THE PERIODS MENTIONED ABOVE SHALL BE PERMITTED ONLY AFTER WRITTEN APPROVAL OF THE CITY MANAGER OR HIS DESIGNEE.
6. ALL MATERIALS AND MANUFACTURERS SHALL CONFORM TO THE STANDARD DETAILS.
7. UTILITY STRUCTURES SHALL NOT BE LOCATED IN DRIVEWAYS, AND WHERE POSSIBLE, SHALL NOT BE LOCATED IN PAVED AREAS.
8. THE CONTRACTOR SHALL NOTIFY UTILITY COMPANIES IN ACCORDANCE WITH ACT 53 OF P.A. OF 1974 AND ALSO CONTACT OAKLAND COUNTY UTILITY AND PROTECTION SERVICE (MISS DIG 1-800-482-7171) THREE (3) WORKING DAYS BEFORE THE START OF ANY CONSTRUCTION.
9. THE CONTRACTOR SHALL PROVIDE NECESSARY SIGNS, BARRICADES AND LIGHTS TO PROTECT TRAFFIC AND THE WORK AS DIRECTED BY THE ENGINEER, SUCH DEVICES SHALL BE PLACED PRIOR TO STARTING WORK IN AFFECTED AREAS.
10. ALL SOIL EROSION AND SEDIMENTATION CONTROLS SHALL BE IN ACCORDANCE WITH THE OAKLAND COUNTY STANDARDS AND DETAILS. THE CONTRACTOR SHALL FOLLOW LOCAL RULES AND REGULATIONS FOR SOIL EROSION AND SEDIMENTATION CONTROL FOR ALL MATERIALS THAT ARE DISPOSED OF OFF OF THE PROJECT SITE.
11. ALL SOIL EROSION MEASURES MUST BE PROPERLY PLACED PRIOR TO GRADING OR OTHER CONSTRUCTION ACTIVITIES.
12. FIELD CHANGES TO THE APPROVED PLAN SHALL BE BROUGHT TO THE ATTENTION OF THE INSPECTOR ON SITE, WHO WILL DETERMINE WHETHER THE CHANGE IS CONSIDERED "SIGNIFICANT". "SIGNIFICANT" FIELD CHANGES SHALL BE SUBMITTED TO THE CITY BY THE DESIGN ENGINEER. THE CITY SHALL NOT BE HELD RESPONSIBLE FOR DELAYS IN APPROVAL OF CHANGES TO THE APPROVED SITE IMPROVEMENT (ENGINEERING) PLAN.
13. WHERE POSSIBLE, PUBLIC UTILITIES SHALL NOT BE PLACED UNDER PAVEMENT. THE CITY OF AUBURN HILLS SHALL NOT BE RESPONSIBLE FOR PAVEMENT, CURB, OR OTHER RESTORATION OF PERMANENT FACILITIES LOCATED WITHIN THE MUNICIPAL EASEMENT.
14. THREE (3) WORKING DAYS PRIOR TO STARTING CONSTRUCTION, CONTACT THE CONSTRUCTION DEPARTMENT OF ORCHARD, HILTZ, & McCLIMENT AT (734) 466-4539 TO SCHEDULE INSPECTION. OHM SHALL INSPECT ALL SITE IMPROVEMENTS INCLUDING UNDERGROUND UTILITY INSTALLATION, RETAINING WALLS, PAVEMENT IN CITY R.O.W., ALL SIDEWALKS OR SAFETY PATHS IN ANY PUBLIC R.O.W., AND ANY ADDITIONAL ITEMS NOTED DURING REVIEW OR AT THE PRE-CONSTRUCTION MEETING. FINAL OCCUPANCY MAY BE AFFECTED IF PROCEDURES ARE NOT FOLLOWED FOR PROPER INSPECTION.
15. PERMANENT STRUCTURES OF ANY TYPE, INCLUDING BUT NOT LIMITED TO TREES, LIGHT POLES, DRAINAGE STRUCTURES, SANITARY STRUCTURES, BENCHES, TRASH RECEPTACLES, ETC., WILL BE NOT ALLOWED WITHIN THE INFLUENCE OF THE PUBLIC WATER MAIN OR SANITARY SEWER EASEMENTS.



LOCATION MAP
NO SCALE

DESIGN TEAM

OWNER/APPLICANT/DEVELOPER

TRINITY REAL ESTATE INVESTMENTS
26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI 48304
CONTACT: COURTNEY A. DREW
PHONE: 248.358.8354
EMAIL: CDREW53@AOL.COM

CIVIL ENGINEER

PEA GROUP
2430 ROCHESTER COURT, STE. 100
TROY, MI 48083-1872
CONTACT: JOHN B. THOMPSON, PE
PHONE: 844.813.2949
EMAIL: JTHOMPSON@PEAGROUP.COM

ARCHITECT

GAV & ASSOCIATES, INC.
24001 ORCHARD LAKE RD, SUITE 180A
FARMINGTON, MI 48336
CONTACT: GHASSAN ABDELNOUR
PHONE: 248.895.9101 EXT. 1002
EMAIL: GHASSAN@GAVASSOCIATES.COM

LANDSCAPE ARCHITECT

PEA GROUP
45 W. GRAND RIVER AVE., STE. 501
DETROIT, MI 48226
CONTACT: KIMBERLY DIETZEL, RLA
PHONE: 844.813.2949
EMAIL: KDIETZEL@PEAGROUP.COM

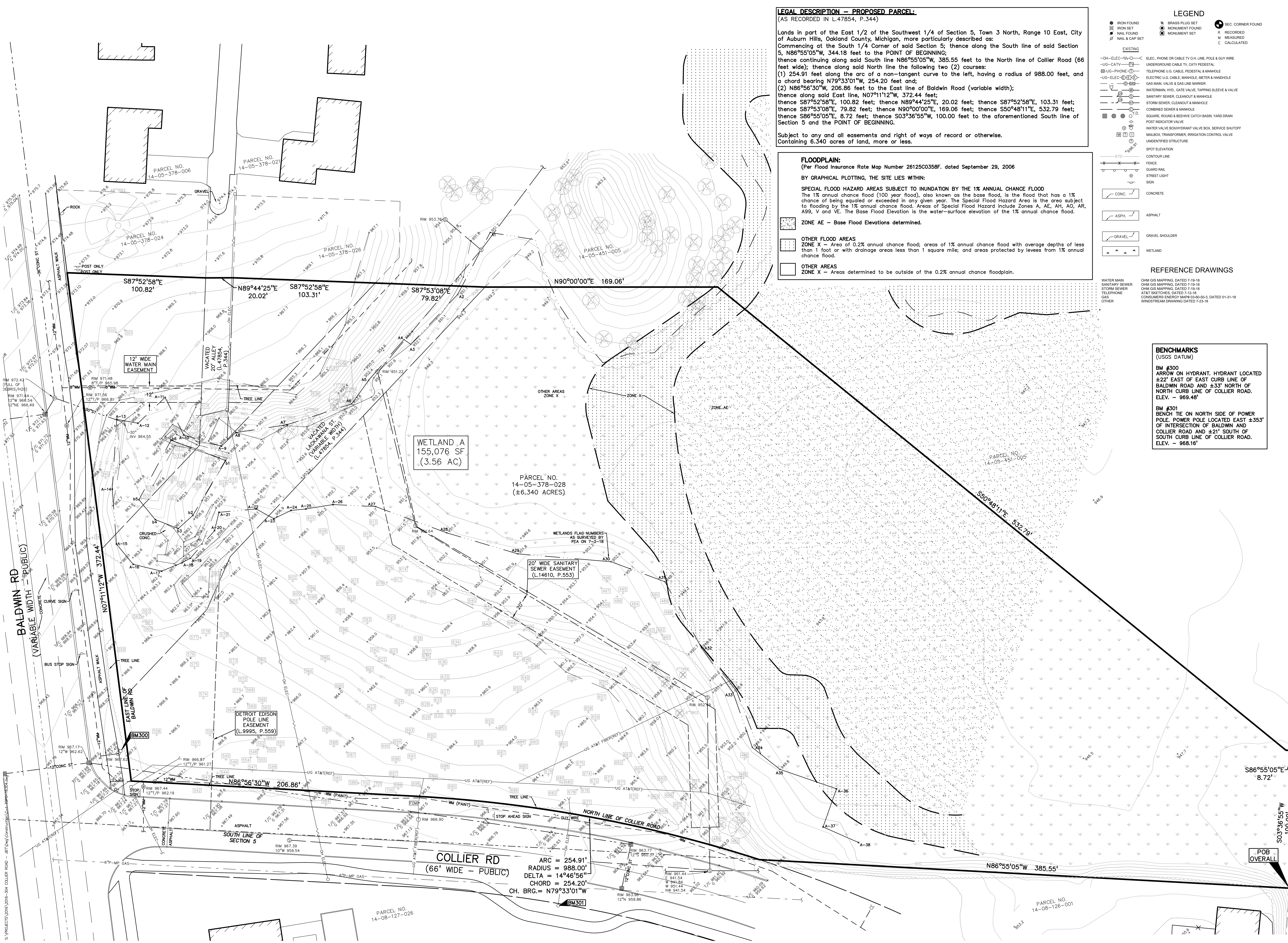
PEA GROUP

INDEX OF DRAWINGS

REVISIONS	
DESCRIPTION	DATE
ORIGINAL ISSUE DATE	8/22/2020
ENGINEERING REVIEW #1 COMMENTS	10/11/2021
ENGINEERING REVIEW #2 COMMENTS	11/1/2021

STATE OF MICHIGAN
JOHN BRUCE THOMPSON
ENGINEER
NO. 43292
PROFESSIONAL ENGINEER

PEA GROUP | CHURCH OF GOD IN CHRIST | PEA JOB NO. 2016-304 | CONSTRUCTION PLANS



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FLOODPLAIN:
(Per Flood Insurance Rate Map Number 26125C0358F. dated September 29, 2006

BY GRAPHICAL PLOTTING, THE SITE LIES WITHIN:

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
The 1% annual chance flood (100 year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE AE – Base Flood Elevations determined.

OTHER FLOOD AREAS
ZONE X – Area of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS
ZONE X – Areas determined to be outside of the 0.2% annual chance floodplain.

LEGEND

- IRON FOUND
- IRON SET
- NAIL FOUND
- NAIL & CAP SET
- BRASS PLUG SET
- MONUMENT FOUND
- MONUMENT SET
- SEC. CORNER FOUND
- R RECORDED
- M MEASURED
- C CALCULATED

EXISTING

- –OH–ELEC– ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
- –UG–CATV– UNDERGROUND CABLE TV, CATV PEDESTAL
- –UG–PHONE– TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
- –UG–ELEC– ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
- GAS MAIN, VALVE & GAS LINE MARKER
- WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
- SANITARY SEWER, CLEANOUT & MANHOLE
- STORM SEWER, CLEANOUT & MANHOLE
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- ×696.91 SPOT ELEVATION
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- FENCE
- GUARD RAIL
- STREET LIGHT
- SIGN
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- ASPH. ASPHALT
- GRAVEL GRAVEL SHOULDER
- WETLAND

REFERENCE DRAWINGS

WATER MAIN	OHM GIS MAPPING, DATED 7-19-18
SANITARY SEWER	OHM GIS MAPPING, DATED 7-19-18
STORM SEWER	OHM GIS MAPPING, DATED 7-19-18
TELEPHONE	AT&T SKETCHES, DATED 7-12-18
GAS	CONSUMERS ENERGY MAP# 03-60-50-3, DATED 01-31-18
OTHER	WINDSTREAM DRAWING DATED 7-23-18

BENCHMARKS
(USGS DATUM)

BM #300
ARROW ON HYDRANT. HYDRANT LOCATED ±22' EAST OF EAST CURB LINE OF BALDWIN ROAD AND ±33' NORTH OF NORTH CURB LINE OF COLLIER ROAD.
ELEV. – 969.48'

BM #301
BENCH TIE ON NORTH SIDE OF POWER POLE. POWER POLE LOCATED EAST ±353' OF INTERSECTION OF BALDWIN AND COLLIER ROAD AND ±21' SOUTH OF SOUTH CURB LINE OF COLLIER ROAD.
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26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE
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3500 BALDWIN ROAD
AUBURN HILLS, MI

REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
TOPOGRAPHIC SURVEY

PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK

DRAWING NUMBER:
C-1.0

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(Per Flood Insurance Rate Map Number 26125C0358F. dated September 29, 2006

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DEMOLITION LEGEND:

- ITEM TO BE PROTECTED
- ITEM TO BE REMOVED
- CURB/FENCE REMOVAL
- CONCRETE PAVEMENT AND SIDEWALK REMOVAL
- UTILITY REMOVAL
- ASPHALT REMOVAL
- SAWCUT LINE

GENERAL DEMOLITION NOTES:

THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT:

1. ALL MATERIAL TO BE REMOVED, WHETHER SPECIFICALLY NOTED IN THE PLANS OR NOT, SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF OFF-SITE IN A LEGAL MANNER. NO ON-SITE BURY OR BURN PITS SHALL BE ALLOWED.
2. ALL DEMOLITION WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES.
3. STAGING/PHASING OF DEMOLITION AND CONSTRUCTION IS TO BE COORDINATED WITH THE OWNER AND THE CONTRACTOR PRIOR TO CONSTRUCTION.
4. SPECIFIC DEMOLITION ITEMS HAVE BEEN INDICATED ON THE PLANS AS A GUIDE TO THE GENERAL SCOPE OF THE WORK. IT IS THE INTENT THAT THESE ITEMS SHALL BE COMPLETELY REMOVED BY THE CONTRACTOR ABOVE AND BELOW GROUND, UNLESS SPECIFICALLY NOTED OTHERWISE. AND THAT DEMOLITION WILL INCLUDE BUT WILL NOT NECESSARILY BE LIMITED TO THESE ITEMS. CONTRACTOR SHALL VISIT SITE TO VERIFY EXISTING CONDITIONS AND EXTENTS OF THE DEMOLITION THAT WILL BE REQUIRED PRIOR TO SUBMITTING A BID.
5. REMOVE ALL STRUCTURES DESIGNATED FOR REMOVAL ACCORDING TO THE DEMOLITION PLAN. THIS INCLUDES FOUNDATIONS, FOOTINGS, FOUNDATION WALLS, FLOOR SLABS, UNDERGROUND UTILITIES, CONCRETE, ASPHALT, TREES, ETC.
6. REFER TO SHEET L-1.1 FOR TREE PROTECTION DETAILS.
7. THE CONTRACTOR SHALL, AS A MINIMUM, PROVIDE TREE PROTECTION FENCING AROUND EXISTING TREES TO BE SAVED THAT ARE WITHIN 15 FEET OF CONSTRUCTION ACTIVITIES AND AS INDICATED IN THE PLANS OR PER LOCAL AGENCY REQUIREMENTS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN UP, NOISE, DUST CONTROL, STREET SWEEPING AND HOURS OF OPERATION IN ACCORDANCE WITH THE LOCAL CODES.
9. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE, MARKINGS, LIGHTS AND OTHER TRAFFIC CONTROL DEVICES TO PROTECT THE WORK ZONE AND SAFELY MAINTAIN TRAFFIC PER AGENCY REQUIREMENTS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
10. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONFIRM THAT UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.
11. ALL BUILDING GAS LEADS, METERS AND ASSOCIATED EQUIPMENT SHALL BE REMOVED AS SHOWN ON THE PLANS. COORDINATE ALL ASSOCIATED WORK WITH THE APPROPRIATE UTILITY COMPANY.
12. REMOVE ALL OVERHEAD AND UNDERGROUND ELECTRICAL LINES WITHIN THE AREA OF CONSTRUCTION AS SHOWN ON THE PLANS. COORDINATE SHUTDOWNS AND REMOVALS WITH ELECTRICAL SERVICE PROVIDER OR THE APPROPRIATE UTILITY COMPANY. (NOTE: PHONE AND CABLE T.V. SERVICES MAY ALSO BE LOCATED ON OVERHEAD LINES.)
13. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REPLACEMENT OF SIGNS AND SUPPORTS WITHIN THE WORK AREA, AS NECESSARY TO FACILITATE CONSTRUCTION. SIGNS SHALL BE PROTECTED OR STOCKPILED FOR REUSE AS SPECIFIED IN THE PLANS OR AS REQUIRED BY THE AGENCY OF JURISDICTION. THE CONTRACTOR SHALL REPLACE ANY DAMAGED SIGNS AND SUPPORTS AT NO ADDITIONAL COST TO THE OWNER.
14. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE 811/ONE CALL UTILITY LOCATING CENTER, THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

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NORTH

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ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
DEMOLITION PLAN

PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK

DRAWING NUMBER:
C-2.0

S:\PROJECTS\2016\2016-304 COLLIER ROAD - JBT\Dwg\Construction\C-2 2016-16304.dwg

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thence S87°52'58"E, 100.82 feet; thence N89°44'25"E, 20.02 feet; thence S87°52'58"E, 103.31 feet; thence S87°53'08"E, 79.82 feet; thence N90°00'00"E, 169.06 feet; thence S50°48'11"E, 532.79 feet;
thence S86°55'05"E, 8.72 feet; thence S03°36'55"W, 100.00 feet to the aforementioned South line of Section 5 and the POINT OF BEGINNING.

Subject to any and all easements and right of ways of record or otherwise. Containing 6.340 acres of land, more or less.

SITE DATA TABLE:

SITE AREA: 6.34 ACRES (276,169 SQ.FT.) NET AND GROSS

ZONING: R–1, ONE FAMILY RESIDENTIAL

PROPOSED USE: CHURCH (17,464 SQ.FT.)

BUILDING INFORMATION:
MAXIMUM ALLOWABLE BUILDING HEIGHT = 25 FEET (2 STORIES)

BUILDING FOOTPRINT AREA = 17,464 SQ.FT.
TOTAL BUILDING FLOOR AREA = 34,928 SQ.FT.

BUILDING LOT COVERAGE = 6.3%

TOTAL IMPERVIOUS AREA = 74,923 SQ.FT.

SETBACK REQUIREMENTS:

R–1 ZONING DISTRICT:

FRONT SETBACK (SOUTH):	25 FEET REQUIRED	57.23' PROVIDED
REAR SETBACK (EAST):	35 FEET REQUIRED	512.35' PROVIDED
FRONT SETBACK (WEST):	25 FEET REQUIRED	86.95' PROVIDED
REAR SETBACK (NORTH):	35 FEET REQUIRED	131.00' PROVIDED
LANDSCAPE BUFFER:	15 FEET REQUIRED	8.00' PROVIDED AT COLLIER 10.00' PROVIDED AT BALDWIN

PARKING CALCULATIONS:
CHURCH = 1 SPACE PER 3 SEATS
TOTAL PARKING REQUIRED = 400/3 = 134 SPACES

TOTAL PROPOSED PARKING SPACES = 134 SPACES

OPEN SPACE:
MINIMUM OPEN SPACE REQUIRED = 15%
PROVIDED OPEN SPACE ≥ 15%

GENERAL NOTES:

1. ALL LIGHTING SHALL BE SHIELDED AND DIRECTED DOWNWARDS AND AWAY FROM ADJACENT PROPERTIES. LIGHTING SHALL MEET THE REQUIREMENTS OF ZONING ORDINANCE NO. 372.
2. SIGNS SHALL MEET THE REQUIREMENTS OF ZONING ORDINANCE NO. 372.
3. NO OUTSIDE STORAGE WILL BE ALLOWED, WHICH INCLUDES PALLET STORAGE, OVERNIGHT VEHICLES, OR TRAILER STORAGE.
4. GROUND MOUNTED TRANSFORMERS AND ROOF MOUNTED MECHANICAL EQUIPMENT SHALL BE SCREENED PER ZONING ORDINANCE NO. 372.
5. PARKING SPACES SHALL BE DOUBLE STRIPPED PER ZONING ORDINANCE NO. 372.
6. AN ENVIRONMENTAL IMPACT STATEMENT IS NOT REQUIRED.
7. A LAND DIVISION OR COMBINATION IS REQUIRED.
8. SPECIAL LAND USE PERMIT IS REQUIRED PER SECTION 401.2, CHURCHES ARE PERMITTED WHEN INGRESS TO AND EGRESS FROM THE SITE IS DIRECTLY ONTO A MAJOR OR SECONDARY THOROUGHFARE WITH AN 86 FOOT R.O.W.
9. THE DEVELOPER HAS AGREED TO PREP THE PARKING LOT WITH THE INSTALLATION OF ELECTRIC STUBS FOR FUTURE ELECTRIC VEHICLE CHARGING STATION LOCATIONS AND RUN CONDUIT FROM THE POWER SOURCE TO THE STUBS TO SUPPORT FUTURE INSTALLATION. THE SPACES ARE DESIGNATED WITH EV ON THE PLAN AND WILL BE POSTED IF AND WHEN CHARGING STATIONS ARE INSTALLED.
10. A VARIANCE FOR A 10' LANDSCAPE BUFFER ALONG BALDWIN ROAD AND AN 8' LANDSCAPE BUFFER ALONG COLLIER ROAD WAS GRANTED AT THE SEPTEMBER 12, 2019 ZBA MEETING.

SIDEWALK RAMP LEGEND:

SIDEWALK RAMP 'TYPE R' Ⓡ

SIDEWALK RAMP 'TYPE P' Ⓟ

REFER TO LATEST M.D.O.T. R–28 STANDARD RAMP AND DETECTABLE WARNING DETAILS

SIGN LEGEND:

'NO PARKING FIRE LANE' SIGN [1]

'STOP' SIGN [2]

'BARRIER FREE PARKING' SIGN [3]

'VAN ACCESSIBLE' SIGN [4]

REFER TO SHEET C–9.1 FOR SIGN DETAILS

FIRE DEPARTMENT NOTES:

1. THE FOUR (4) INCH STEAMER CAPS ON ALL HYDRANTS WILL BE PAINTED ACCORDING TO THE FOLLOWING:

   WHITE ON 4" MAINS
   RED ON 6" MAINS
   ORANGE ON 8" MAINS
   GREEN ON 12" MAINS
   BLUE ON 16" MAINS OR LARGER

2. NO PARKING SHALL BE PERMITTED AND/OR NO OBSTRUCTIONS SHALL BE PLACED OR CONSTRUCTED WITHIN FIFTEEN (15) FEET OF ANY HYDRANT OR FIRE DEPARTMENT CONNECTION, PUBLIC OR PRIVATE.
3. THE FIRE DEPARTMENT CONNECTION MUST BE LOCATED WITHIN ONE HUNDRED (100) FEET OF A FIRE HYDRANT AND WITHIN FIFTY (50) FEET OF A MINIMUM TWENTY (20) FOOT WIDE PAVED DRIVEWAY OR STREET.
4. GAS METERS, PROPANE TANKS, OVERHEAD ELECTRICAL SERVICES, AND TRANSFORMERS MUST NOT BE LOCATED ON THE SAME SIDE OF THE BUILDING OR STRUCTURE AS THE FIRE DEPARTMENT CONNECTION UNLESS A CLEAR DISTANCE OF ONE HUNDRED FIFTY (150) FEET CAN BE MAINTAINED BETWEEN UTILITIES AND THE FIRE DEPARTMENT CONNECTION.
5. ALL DRIVE AREAS MUST BE POSTED AS FIRE LANES WITH UNIFORM SIGNS IN KEEPING WITH THE STANDARD ESTABLISHED IN THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. SIGNS MUST BE ERECTED ON BOTH SIDES OF THE FIRE LANES WITH SPACING BETWEEN SIGNS NOT EXCEEDING ONE HUNDRED (100) FEET.
6. DESIGNATED EXIT DOORS ONTO DRIVES OR PARKING AREAS MUST BE PROTECTED WITH GUARD POSTS OR PARKING BLOCKS.
7. A WHITE HIGH VISIBILITY STRIPE SHALL BE PAINTED ON THE UPPER FLANGE OF ALL FIRE HYDRANTS.

SIGN:

BALDWIN ROAD 372'

COLLIER ROAD 461'

TOTAL ROAD FRONTAGE = 833'

(833'/10)x2 = 166.6 SF (USE 164–SF MAX)

NON–DWELLING USES IN RESIDENTIAL DISTRICTS = 164 SF MAX SIGN SIZE (64 SF FREESTANDING SIGN, 100 SF WALL SIGN)

LEGEND

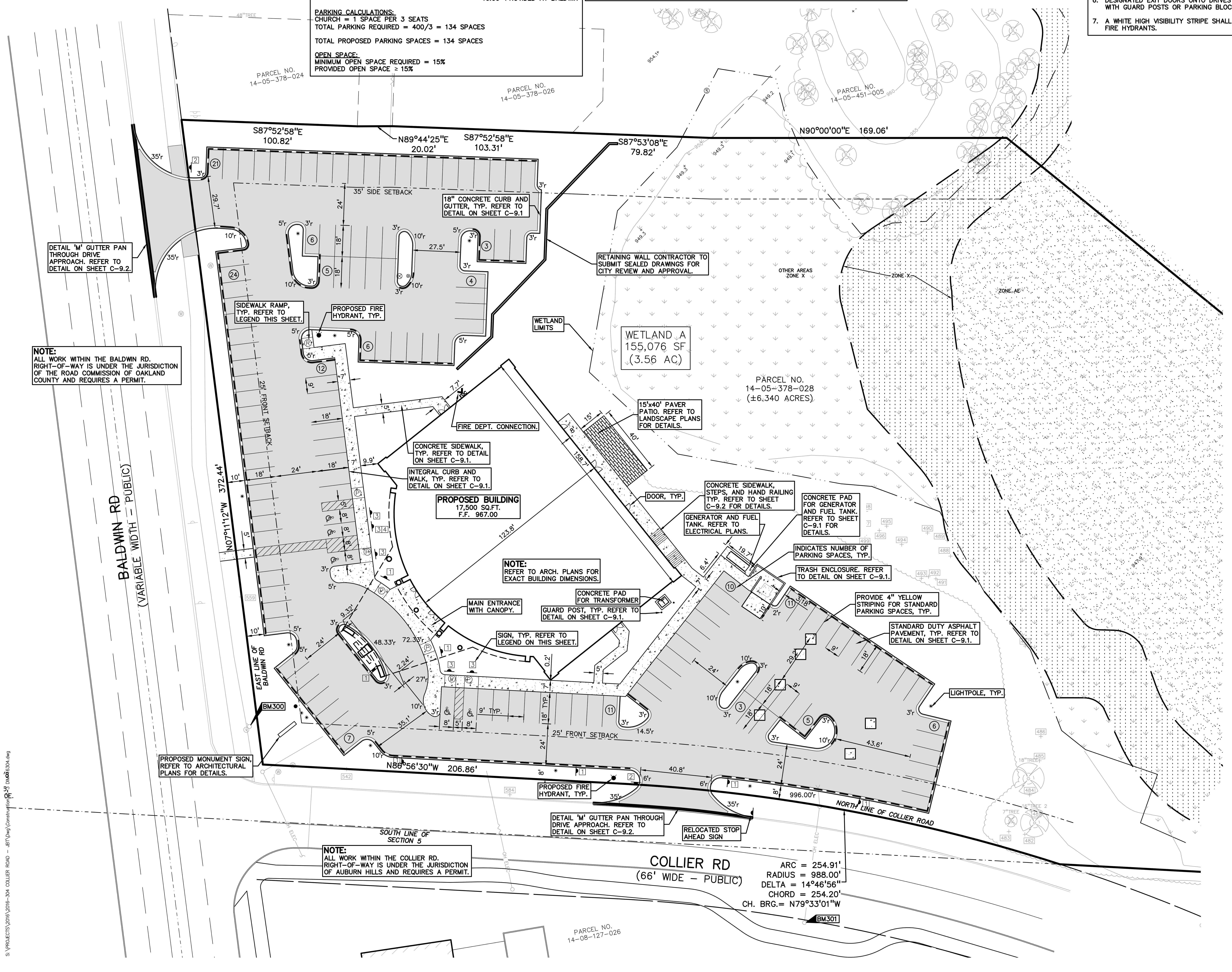
IRON FOUND
IRON SET
NAIL FOUND
NAIL & CAP SET
BRASS PLUG SET
MONUMENT FOUND
MONUMENT SET
SEC. CORNER FOUND
R RECORDED
M MEASURED
C CALCULATED

EXISTING / PROPOSED

ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
UNDERGROUND CABLE TV, CATV PEDESTAL
TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
GAS MAIN, VALVE & GAS LINE MARKER
WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
SANITARY SEWER, CLEANOUT & MANHOLE
STORM SEWER, CLEANOUT & MANHOLE
COMBINED SEWER & MANHOLE
SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
POST INDICATOR VALVE
WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF
MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
UNIDENTIFIED STRUCTURE
SPOT ELEVATION
CONTOUR LINE
FENCE
GUARD RAIL
STREET LIGHT
SIGN
CONCRETE (STD DUTY, HEAVY DUTY, R.O.W. ONLY)
ASPHALT (STD DUTY, HEAVY DUTY, DEEP STRENGTH)
GRAVEL SHOULDER
WETLAND

REFERENCE DRAWINGS

WATER MAIN	OHM GIS MAPPING, DATED 7-19-18
SANITARY SEWER	OHM GIS MAPPING, DATED 7-19-18
STORM SEWER	OHM GIS MAPPING, DATED 7-19-18
TELEPHONE	AT&T SKETCHES, DATED 7-12-18
GAS	CONSUMERS ENERGY MAP# 03-60-50-3, DATED 01-31-18
OTHER	WINDSTREAM DRAWING DATED 7-23-18



CITY OF AUBURN HILLS STANDARD NOTES:

1. ALL CONSTRUCTION SHALL CONFORM TO CURRENT CITY OF AUBURN HILLS STANDARDS.
2. NO WORK SHALL BE PERFORMED WITHOUT INSPECTION.
3. A PERMIT FROM THE DPW IS REQUIRED FOR ALL CONSTRUCTION WITHIN CITY R.O.W. NO EQUIPMENT OR MATERIAL STORAGE WILL BE PERMITTED IN THE R.O.W.
4. ALL CITY STREETS MUST BE MAINTAINED DURING CONSTRUCTION. STREETS SHALL BE KEPT FREE OF MUD, DIRT, CONSTRUCTION DEBRIS, DUST AND THE LIKE. IF CLEAN–UP IS NOT PERFORMED WITHIN 24 HOURS OF NOTIFICATION, THE CITY RESERVES THE RIGHT TO PERFORM THE WORK AND CHARGE THE DEVELOPER ACCORDINGLY.
5. WORKING HOURS (INCLUDING RUNNING OF ANY MACHINERY) SHALL BE RESTRICTED TO MONDAY THROUGH SATURDAY, 7:00 AM TO 7:00 PM; SUNUP TO SUNDOWN; WHICHEVER IS LESS. CONSTRUCTION OPERATIONS BEYOND THE PERIODS MENTIONED ABOVE SHALL BE PERMITTED ONLY AFTER WRITTEN APPROVAL OF THE CITY MANAGER OR HIS DESIGNEE.
6. ALL MATERIALS AND MANUFACTURERS SHALL CONFORM TO THE STANDARD DETAILS.
7. UTILITY STRUCTURES SHALL NOT BE LOCATED IN DRIVEWAYS, AND WHERE POSSIBLE, SHALL NOT BE LOCATED IN PAVED AREAS.
8. THE CONTRACTOR SHALL NOTIFY UTILITY COMPANIES IN ACCORDANCE WITH ACT 53 OF P.A. OF 1974 AND ALSO CONTACT OAKLAND COUNTY UTILITY AND PROTECTION SERVICE (MISS DIG 1–800–482–7171) THREE (3) WORKING DAYS BEFORE THE START OF ANY CONSTRUCTION.
9. THE CONTRACTOR SHALL PROVIDE NECESSARY SIGNS, BARRICADES AND LIGHTS TO PROTECT TRAFFIC AND THE WORK AS DIRECTED BY THE ENGINEER, SUCH DEVICES SHALL BE PLACED PRIOR TO STARTING WORK IN AFFECTED AREAS.
10. ALL SOIL EROSION AND SEDIMENTATION CONTROLS SHALL BE IN ACCORDANCE WITH THE OAKLAND COUNTY STANDARDS AND DETAILS. THE CONTRACTOR SHALL FOLLOW LOCAL RULES AND REGULATIONS FOR SOIL EROSION AND SEDIMENTATION CONTROL FOR ALL MATERIALS THAT ARE DISPOSED OF OFF OF THE PROJECT SITE.
11. ALL SOIL EROSION MEASURES MUST BE PROPERLY PLACED PRIOR TO GRADING OR OTHER CONSTRUCTION ACTIVITIES.
12. FIELD CHANGES TO THE APPROVED PLAN SHALL BE BROUGHT TO THE ATTENTION OF THE INSPECTOR ON SITE, WHO WILL DETERMINE WHETHER THE CHANGE IS CONSIDERED "SIGNIFICANT". "SIGNIFICANT" FIELD CHANGES SHALL BE SUBMITTED TO THE CITY BY THE DESIGN ENGINEER. THE CITY SHALL NOT BE HELD RESPONSIBLE FOR DELAYS IN APPROVAL OF CHANGES TO THE APPROVED SITE IMPROVEMENT (ENGINEERING) PLAN.
13. WHERE POSSIBLE, PUBLIC UTILITIES SHALL NOT BE PLACED UNDER PAVEMENT. THE CITY OF AUBURN HILLS SHALL NOT BE RESPONSIBLE FOR PAVEMENT, CURB, OR OTHER RESTORATION OF PERMANENT FACILITIES LOCATED WITHIN THE MUNICIPAL EASEMENT.
14. THREE (3) WORKING DAYS PRIOR TO STARTING CONSTRUCTION, CONTACT THE CONSTRUCTION DEPARTMENT OF ORCHARD, HILTZ, & McCLIMENT AT (734) 466–4539 TO SCHEDULE INSPECTION. OHM SHALL INSPECT ALL SITE IMPROVEMENTS INCLUDING UNDERGROUND UTILITY INSTALLATION, RETAINING WALLS, PAVEMENT IN CITY R.O.W., ALL SIDEWALKS OR SAFETY PATHS IN ANY PUBLIC R.O.W., AND ANY ADDITIONAL ITEMS NOTED DURING REVIEW OR AT THE PRE–CONSTRUCTION MEETING. FINAL OCCUPANCY MAY BE AFFECTED IF PROCEDURES ARE NOT FOLLOWED FOR PROPER INSPECTION.
15. PERMANENT STRUCTURES OF ANY TYPE, INCLUDING BUT NOT LIMITED TO TREES, LIGHT POLES, DRAINAGE STRUCTURES, SANITARY STRUCTURES, BENCHES, TRASH RECEPTACLES, ETC., WILL BE NOT ALLOWED WITHIN THE INFLUENCE OF THE PUBLIC WATER MAIN OR SANITARY SEWER EASEMENTS.

GENERAL NOTES:

THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT.

1. ALL CONSTRUCTION, WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT OSHA, MDOT AND MUNICIPALITY STANDARDS AND REGULATIONS.
2. THE CONTRACTOR SHALL NOTIFY THE CITY OF AUBURN HILLS ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
3. THE CONTRACTOR MUST CONTACT THE ENGINEER SHOULD THEY ENCOUNTER ANY DESIGN ISSUES DURING CONSTRUCTION. IF THE CONTRACTOR MAKES DESIGN MODIFICATIONS WITHOUT THE WRITTEN DIRECTION OF THE DESIGN ENGINEER, THE CONTRACTOR DOES SO AT HIS OWN RISK.
4. ALL NECESSARY PERMITS, TESTING, BONDS AND INSURANCES ETC., SHALL BE PAID FOR BY THE CONTRACTOR. THE OWNER SHALL PAY FOR ALL CITY INSPECTION FEES.
5. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE 811/ONE CALL UTILITY LOCATING CENTER, THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION. IF NO NOTIFICATION IS GIVEN AND DAMAGE RESULTS, SAID DAMAGE WILL BE REPAIRED AT SOLE EXPENSE OF THE CONTRACTOR. IF EXISTING UTILITY LINES ARE ENCOUNTERED THAT CONFLICT IN LOCATION WITH NEW CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER SO THAT THE CONFLICT MAY BE RESOLVED.
6. CONTRACTOR TO VERIFY THAT THE PLANS AND SPECIFICATIONS ARE THE VERY LATEST PLANS AND SPECIFICATIONS AND FURTHERMORE, VERIFY THAT THESE PLANS AND SPECIFICATIONS HAVE BEEN APPROVED. ALL ITEMS CONSTRUCTED BY THE CONTRACTOR PRIOR TO RECEIVING FINAL APPROVAL, HAVING TO BE ADJUSTED OR RE–DONE, SHALL BE AT THE CONTRACTORS EXPENSE. SHOULD THE CONTRACTOR ENCOUNTER A CONFLICT BETWEEN THESE PLANS AND/OR SPECIFICATIONS, THEY SHALL SEEK CLARIFICATION IN WRITING FROM THE ENGINEER BEFORE COMMENCEMENT OF CONSTRUCTION. FAILURE TO DO SO SHALL BE AT SOLE EXPENSE TO THE CONTRACTOR.
7. ANY WORK WITHIN THE STREET OR HIGHWAY RIGHTS–OF–WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AGENCIES HAVING JURISDICTION AND SHALL NOT BEGIN UNTIL ALL NECESSARY PERMITS HAVE BEEN ISSUED FOR THE WORK.
8. 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.
9. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADING, SIGNAGE, LIGHTS AND TRAFFIC CONTROL DEVICES TO PROTECT THE WORK AND SAFELY MAINTAIN TRAFFIC IN ACCORDANCE WITH LOCAL REQUIREMENTS AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST EDITION). THE DESIGN ENGINEER, OWNER, CITY, COUNTY, AND STATE SHALL NOT BE HELD LIABLE FOR ANY CLAIMS RESULTING FROM ACCIDENTS OR DAMAGES CAUSED BY THE CONTRACTOR'S FAILURE TO COMPLY WITH TRAFFIC AND PUBLIC SAFETY REGULATIONS DURING THE CONSTRUCTION PERIOD.
10. 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 WILL NOT BE PAID FOR SEPARATELY.

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NORTH

SCALE: 1" = 30' (0 15 30 60)

Know what's below. Call before you dig.

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

CLIENT
TRINITY REAL ESTATE INVESTMENTS
26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE
CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

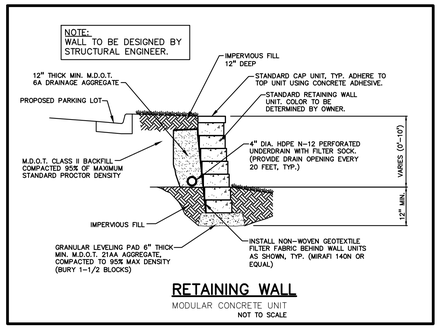
REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
DIMENSION AND PAVING PLAN

PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK

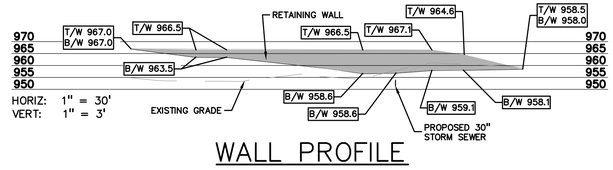
DRAWING NUMBER:
C-3.0



RETAINING WALL

MODULAR CONCRETE UNIT

NOT TO SCALE



WALL PROFILE

LEGEND

- IRON FOUND
- IRON SET
- NAIL FOUND
- NAIL & CAP SET
- BRASS PLUG SET
- MONUMENT FOUND
- MONUMENT SET
- SEC. CORNER FOUND
- R RECORDED
- M MEASURED
- C CALCULATED

EXISTING	PROPOSED
OH-ELEC	ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
UG-CATV	UNDERGROUND CABLE TV, CATV PEDESTAL
UG-PHONE	TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
UG-ELEC	ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
GAS	GAS MAIN, VALVE & GAS LINE MARKER
W	WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
S	SANITARY SEWER, CLEANOUT & MANHOLE
ST	STORM SEWER, CLEANOUT & MANHOLE
	COMBINED SEWER & MANHOLE
C.B.	SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
	POST INDICATOR VALVE
	WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF
M	MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
?	UNIDENTIFIED STRUCTURE
+686.0	SPOT ELEVATION
670	CONTOUR LINE
X X X	FENCE
	GUARD RAIL
	STREET LIGHT
	SIGN
CONC.	CONCRETE
ASPH.	ASPHALT
GRAVEL	GRAVEL SHOULDER
	WETLAND

PROPOSED	
671.21	
671	
	STD DUTY / HEAVY DUTY / R.O.W. ONLY
	STD DUTY / HEAVY DUTY / DEEP STRENGTH

REFERENCE DRAWINGS

WATER MAIN	OHM GIS MAPPING, DATED 7-19-18
SANITARY SEWER	OHM GIS MAPPING, DATED 7-19-18
STORM SEWER	OHM GIS MAPPING, DATED 7-19-18
TELEPHONE	AT&T SKETCHES, DATED 7-12-18
GAS	CONSUMERS ENERGY MAP# 03-60-50-3, DATED 01-31-18
OTHER	WINDSTREAM DRAWING DATED 7-23-18

NOTE:
ALL WORK WITHIN THE BALDWIN RD. RIGHT-OF-WAY IS UNDER THE JURISDICTION OF THE ROAD COMMISSION OF OAKLAND COUNTY AND REQUIRES A PERMIT.

NOTE:
ALL WORK WITHIN THE COLLIER RD. RIGHT-OF-WAY IS UNDER THE JURISDICTION OF AUBURN HILLS AND REQUIRES A PERMIT.

BALDWIN RD
(VARIABLE WIDTH - PUBLIC)

COLLIER RD
(66' WIDE - PUBLIC)

PARCEL NO. 14-05-378-024
PARCEL NO. 14-05-378-026
PARCEL NO. 14-05-451-005
PARCEL NO. 14-05-378-028 (±6,340 ACRES)
PARCEL NO. 14-08-127-026

RETAINING WALL CONTRACTOR TO SUBMIT SEALED DRAWINGS FOR CITY REVIEW AND APPROVAL.

PROPOSED BUILDING
17,500 SQ.FT.
F.F. 967.00

WETLAND A
155,076 SF
(3.56 AC)

EROSION CONTROL BLANKETS, TYP. REQUIRED ON ALL SLOPES 1:4 OR STEEPER. REFER TO SHEET C-5.0 FOR PLACEMENT.

TAPER CURB FROM 6" TO 0" HEIGHT OVER 5'.

OTHER AREAS ZONE X

ZONE X

ZONE AE

BM300

BM301

SYMBOLS: GRADING

PROPOSED SPOT ELEVATION:
TYPICALLY TOP OF PAVEMENT IN PAVED AREAS, GUTTER GRADE IN CURB LINES. — 622.50

PROPOSED CONTOUR LINE — 922 —

ABBREVIATIONS:
T/C = TOP OF CURB
G = GUTTER GRADE
T/P = TOP OF PAVEMENT
T/S = TOP OF SIDEWALK
T/W = TOP OF WALL
B/W = BOTTOM OF WALL
F.G. = FINISH GRADE
RIM = RIM ELEVATION

RETAINING WALL NOTE:
TOP OF WALL (T/W) AND BOTTOM OF WALL (B/W) GRADES ARE THE FINISH GRADE AT THE TOP AND BOTTOM OF THE RETAINING WALL, NOT THE ACTUAL TOP AND BOTTOM OF THE WALL STRUCTURE.

EARTHWORK BALANCING NOTE:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPORTING OR EXPORTING ALL MATERIALS AS REQUIRED TO PROPERLY GRADE THIS PROJECT TO THE FINISHED ELEVATIONS SHOWN ON THE APPROVED PLANS. THE CONTRACTOR SHALL MAKE THEIR OWN DETERMINATION OF CUT AND FILL QUANTITIES AND ALLOW FOR REMOVAL OF EXCESS OR IMPORTATION OF ADDITIONAL MATERIAL AT NO ADDITIONAL COST TO THE OWNER.

GENERAL GRADING AND EARTHWORK NOTES:

THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT

1. CONTRACTOR TO FIELD VERIFY ALL EXISTING TREES AND BRUSH AND REMOVE ALL THAT ARE NECESSARY TO GRADE SITE.
2. ALL GRADES ARE TO TOP OF PAVEMENT UNLESS OTHERWISE NOTED.
3. THE STAGING OF CONSTRUCTION ACTIVITIES SHALL OCCUR ONLY WITHIN THE SITE BOUNDARIES. ANY CONSTRUCTION ACTIVITIES OUTSIDE OF THE SITE BOUNDARIES SHALL BE AT THE SOLE RESPONSIBILITY AND RISK OF THE CONTRACTOR.
4. ALL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL MEET THE REQUIREMENTS OF THE AUTHORIZED PUBLIC AGENCY OF JURISDICTION. AN EROSION CONTROL PERMIT MUST BE SECURED FROM THE OAKLAND COUNTY WATER RESOURCES COMMISSIONER PRIOR TO CONSTRUCTION.
5. ALL EARTHWORK AND GRADING OPERATIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE SOILS INVESTIGATION AND REPORT.
6. REFER TO SOIL EROSION CONTROL PLAN FOR ADDITIONAL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES AND NOTES.
7. ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED OR SODDED IN ACCORDANCE WITH THE LANDSCAPE PLANS. PROVIDE A MINIMUM OF 3" OF TOPSOIL IN THESE AREAS UNLESS OTHERWISE NOTED.
8. THE CONTRACTOR SHALL NOTE EXISTING UNDERGROUND UTILITIES WITHIN AND ADJACENT TO THE SITE. BACKFILL FOR EXISTING UTILITY TRENCHES SHALL BE EXAMINED CRITICALLY. ANY TRENCHES FOUND TO HAVE SOFT, UNSTABLE OR UNSUITABLE BACKFILL MATERIAL, IN THE OPINION OF THE THIRD PARTY TESTING COMPANY, THAT ARE TO BE WITHIN THE ZONE OF INFLUENCE OF PROPOSED BUILDINGS OR PAVEMENT SHALL BE COMPLETELY EXCAVATED AND BACKFILLED WITH SUITABLE MATERIAL.
9. ON-SITE FILL CAN BE USED IF THE SPECIFIED COMPACTION REQUIREMENTS CAN BE ACHIEVED. IF ON-SITE SOIL IS USED, IT SHOULD BE CLEAN AND FREE OF FROZEN SOIL, ORGANICS, OR OTHER DELETERIOUS MATERIALS.
10. THE FINAL SUBGRADE/EXISTING AGGREGATE BASE SHOULD BE THOROUGHLY PROOFROLLED USING A FULLY LOADED TANDEM AXLE TRUCK OR FRONT END LOADER UNDER THE OBSERVATION OF A GEOTECHNICAL/PAVEMENT ENGINEER. LOOSE OR YIELDING AREAS THAT CANNOT BE MECHANICALLY STABILIZED SHOULD BE REINFORCED USING GEOGRIDS OR REMOVED AND REPLACED WITH ENGINEERED FILL OR AS DICTATED BY FIELD CONDITIONS.
11. 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 AREAS OR BELOW SUBGRADE IN CUT AREAS WILL BE CLASSIFIED AS SUBGRADE UNDERCUTTING.
12. SUBGRADE UNDERCUTTING SHALL BE PERFORMED WHERE NECESSARY AND THE EXCAVATED MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ANY SUBGRADE UNDERCUTTING SHALL BE BACKFILLED AS RECOMMENDED IN THE GEOTECHNICAL ENGINEERING REPORT FOR THE PROJECT.
13. ANY SUB-GRADE WATERING REQUIRED TO ACHIEVE REQUIRED DENSITY SHALL BE CONSIDERED INCIDENTAL TO THE JOB.

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NORTH

0 15 30 60

SCALE: 1" = 30'

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

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CLIENT
TRINITY REAL ESTATE INVESTMENTS
26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE
CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
GRADING PLAN

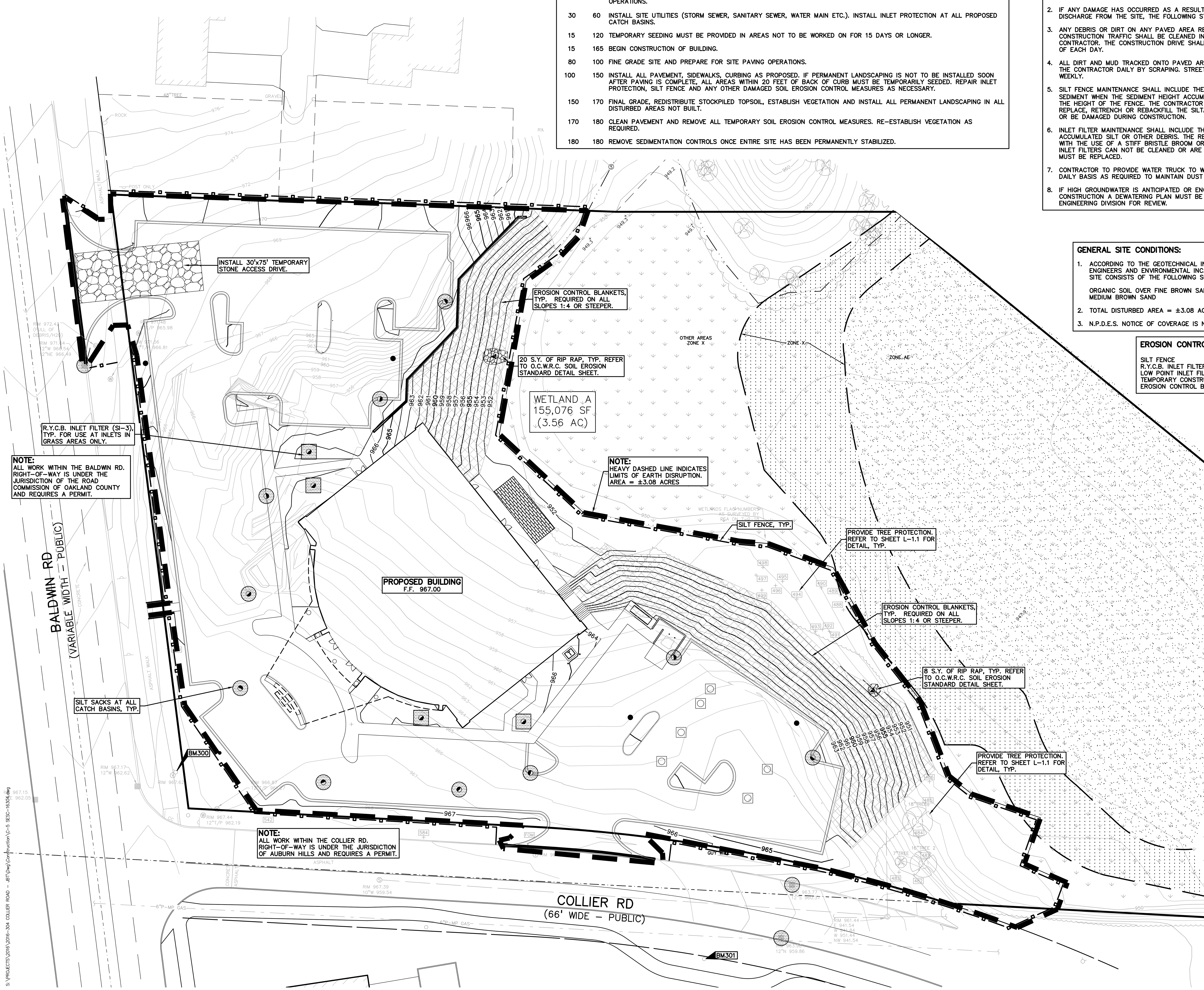
PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK

DRAWING NUMBER:
C-4.0

S:\PROJECTS\2016\2016-304 COLLIER ROAD - AUT\Civil\Construction\C-4 GRADE-16304.dwg

SEQUENCE OF CONSTRUCTION:

START DAY	END DAY	
1	140	INSTALL CRUSHED CONCRETE ACCESS APPROACH AT SITE ROAD APPROACH.
1	180	INSTALL TEMPORARY SOIL EROSION CONTROL MEASURES, SILT FENCES, INLET PROTECTION, ETC. AS NECESSARY.
1	180	MAINTAIN A 25' BUFFER OF VEGETATION AROUND PERIMETER OF SITE WHERE POSSIBLE.
1	15	REMOVE ALL VEGETATION, TREES AND BRUSH FROM THE PROPOSED CONSTRUCTION AREA UNLESS MARKED TO REMAIN. STRIP AND STOCKPILE TOPSOIL AS REQUIRED RESTORATION. ALL STOCKPILES MUST BE GRADED AND SEEDED.
1	15	REMOVE ALL PAVEMENT, CURB, UTILITIES, ETC. AS REQUIRED TO INSTALL THE PROPOSED WORK AS SHOWN ON THE TOPOGRAPHIC SURVEY AND DEMOLITION PLAN.
1	15	DISPOSE OF ALL EXCESS/UNSUITABLE MATERIALS OFF SITE IN A LEGAL MANNER. NO ON-SITE BURN OR BURY PITS ALLOWED.
15	60	ROUGH GRADE SITE. SEED AND MULCH BLANKETS MUST BE INSTALLED AS SHOWN WITHIN 5 DAYS OF FINAL GRADE. REPAIR AND/OR RE-INSTALL ANY TEMPORARY SOIL EROSION CONTROL MEASURES THAT WERE DAMAGED DURING GRADING OPERATIONS.
30	60	INSTALL SITE UTILITIES (STORM SEWER, SANITARY SEWER, WATER MAIN ETC.). INSTALL INLET PROTECTION AT ALL PROPOSED CATCH BASINS.
15	120	TEMPORARY SEEDING MUST BE PROVIDED IN AREAS NOT TO BE WORKED ON FOR 15 DAYS OR LONGER.
15	165	BEGIN CONSTRUCTION OF BUILDING.
80	100	FINE GRADE SITE AND PREPARE FOR SITE PAVING OPERATIONS.
100	150	INSTALL ALL PAVEMENT, SIDEWALKS, CURBING AS PROPOSED. IF PERMANENT LANDSCAPING IS NOT TO BE INSTALLED SOON AFTER PAVING IS COMPLETE, ALL AREAS WITHIN 20 FEET OF BACK OF CURB MUST BE TEMPORARILY SEEDED. REPAIR INLET PROTECTION, SILT FENCE AND ANY OTHER DAMAGED SOIL EROSION CONTROL MEASURES AS NECESSARY.
150	170	FINAL GRADE, REDISTRIBUTE STOCKPILED TOPSOIL, ESTABLISH VEGETATION AND INSTALL ALL PERMANENT LANDSCAPING IN ALL DISTURBED AREAS NOT BUILT.
170	180	CLEAN PAVEMENT AND REMOVE ALL TEMPORARY SOIL EROSION CONTROL MEASURES. RE-ESTABLISH VEGETATION AS REQUIRED.
180	180	REMOVE SEDIMENTATION CONTROLS ONCE ENTIRE SITE HAS BEEN PERMANENTLY STABILIZED.



SOIL EROSION MAINTENANCE SCHEDULE AND NOTES:

1. THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT BY:

   TO BE DETERMINED

2. IF ANY DAMAGE HAS OCCURRED AS A RESULT OF STORM WATER DISCHARGE FROM THE SITE, THE FOLLOWING STEPS SHALL BE IMPLEMENTED.
3. ANY DEBRIS OR DIRT ON ANY PAVED AREA RESULTING FROM CONSTRUCTION TRAFFIC SHALL BE CLEANED IN A PROMPT MANNER BY THE CONTRACTOR. THE CONSTRUCTION DRIVE SHALL BE CLEANED AT THE END OF EACH DAY.
4. ALL DIRT AND MUD TRACKED ONTO PAVED AREAS SHALL BE REMOVED BY THE CONTRACTOR DAILY BY SCRAPING. STREET SWEEPING IS REQUIRED WEEKLY.
5. SILT FENCE MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY BUILT UP SEDIMENT WHEN THE SEDIMENT HEIGHT ACCUMULATES TO 1/3 TO 1/2 OF THE HEIGHT OF THE FENCE. THE CONTRACTOR IS RESPONSIBLE TO REMOVE, REPLACE, RETRENCH OR REBACKFILL THE SILTATION FENCE SHOULD IT FALL OR BE DAMAGED DURING CONSTRUCTION.
6. INLET FILTER MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY ACCUMULATED SILT OR OTHER DEBRIS. THE REMOVAL OF SILT SHOULD BE WITH THE USE OF A STIFF BRISTLE BROOM OR SQUARE POINT SHOVEL. IF INLET FILTERS CAN NOT BE CLEANED OR ARE DAMAGED, THEN THE FABRIC MUST BE REPLACED.
7. CONTRACTOR TO PROVIDE WATER TRUCK TO WATER DOWN THE SITE ON A DAILY BASIS AS REQUIRED TO MAINTAIN DUST CONTROL.
8. IF HIGH GROUNDWATER IS ANTICIPATED OR ENCOUNTERED DURING CONSTRUCTION A DEWATERING PLAN MUST BE SUBMITTED TO THE CITY ENGINEERING DIVISION FOR REVIEW.

GENERAL SITE CONDITIONS:

1. ACCORDING TO THE GEOTECHNICAL INVESTIGATION BY HASTINGS TESTING ENGINEERS AND ENVIRONMENTAL INC. DATED JANUARY 17, 2020, THE SITE CONSISTS OF THE FOLLOWING SOIL TYPES:

   ORGANIC SOIL OVER FINE BROWN SAND WITH TRACE TO SOME SILT AND MEDIUM BROWN SAND

2. TOTAL DISTURBED AREA = ±3.08 ACRES
3. N.P.D.E.S. NOTICE OF COVERAGE IS NOT REQUIRED

EROSION CONTROL QUANTITIES:

SILT FENCE	1710 LF
R.Y.C.B. INLET FILTER	4 EA.
LOW POINT INLET FILTER	12 EA.
TEMPORARY CONSTRUCTION ACCESS DRIVE	1 EA.
EROSION CONTROL BLANKETS	1850 S.Y.

LEGEND

IRON FOUND
IRON SET
NAIL FOUND
NAIL & CAP SET
BRASS PLUG SET
MONUMENT FOUND
MONUMENT SET
SEC. CORNER FOUND
R RECORDED
M MEASURED
C CALCULATED

EXISTING — PROPOSED

- ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
- UNDERGROUND CABLE TV, CATV PEDESTAL
- TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
- ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
- GAS MAIN, VALVE & GAS LINE MARKER
- WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
- SANITARY SEWER, CLEANOUT & MANHOLE
- STORM SEWER, CLEANOUT & MANHOLE
- COMBINED SEWER & MANHOLE
- SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
- POST INDICATOR VALVE
- WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF
- MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
- UNIDENTIFIED STRUCTURE
- SPOT ELEVATION
- CONTOUR LINE
- FENCE
- GUARD RAIL
- STREET LIGHT
- SIGN
- CONCRETE (STD DUTY, HEAVY DUTY, R.O.W. ONLY)
- ASPHALT (STD DUTY, HEAVY DUTY, DEEP STRENGTH)
- GRAVEL SHOULDER
- WETLAND

REFERENCE DRAWINGS

WATER MAIN	OHM GIS MAPPING, DATED 7-19-18
SANITARY SEWER	OHM GIS MAPPING, DATED 7-19-18
STORM SEWER	OHM GIS MAPPING, DATED 7-19-18
TELEPHONE	AT&T SKETCHES, DATED 7-12-18
GAS	CONSUMERS ENERGY MAP# 03-60-50-3, DATED 01-31-18
OTHER	WINDSTREAM DRAWING DATED 7-23-18

SYMBOLS: EROSION CONTROL:

- (SP-2) SILT FENCE
- (SI-2A) LOW POINT INLET FILTER
- (SI-3) RYCB INLET FILTER
- (SP-9) TEMPORARY STONE ACCESS DRIVE
- (E-9) EROSION CONTROL BLANKET

REFER TO O.C.W.R.C. SOIL EROSION AND SEDIMENTATION CONTROL DETAILS SHEET FOR ALL DEVICE DETAILS.

SOIL EROSION AND SEDIMENTATION CONTROL SEQUENCE OF CONSTRUCTION

1. SEE OAKLAND COUNTY W.R.C. SOIL EROSION AND SEDIMENTATION CONTROL DETAILS SHEET FOR ALL SOIL EROSION CONTROL RELATED DETAILS.
2. PLACE SILT FENCE & INSTALL INLET FILTERS ON EXISTING STORM SEWER STRUCTURES, ACCORDING TO PLANS.
3. INSTALL TEMPORARY CRUSHED CONCRETE ACCESS DRIVE AT ALL CONSTRUCTION ENTRANCES. (80'x24'x8" W/MINIMUM OF 1"-3" CRUSHED CONCRETE - NO FINES).
4. REMOVE CURB, PAVEMENT, TREES, ETC. AS DIRECTED ON THE DEMOLITION PLAN.
5. STRIP AND STOCKPILE TOPSOIL FOR RESTORATION REQUIREMENTS.
6. DISPOSE OF ALL EXCESS, UNSUITABLE MATERIALS OFF SITE IN A LEGAL MANNER. NO BURN OR BURY PITS ALLOWED.
7. UNSUITABLE MATERIALS CONSIST OF, BUT ARE NOT NECESSARILY LIMITED TO THE FOLLOWING: CONCRETE, ASPHALT, TREES, BRUSH, STUMPS, ROOTS, OR OTHER MISCELLANEOUS DEBRIS OR TRASH.
8. MASS GRADE THE SITE IN ACCORDANCE WITH THE PLANS.
9. INSTALL SEED, MULCH AND EROSION CONTROL BLANKETS AS SHOWN ON THE PLAN WITHIN 5 DAYS OF COMPLETION OF MASS GRADING OR WHENEVER DISTURBED AREAS WILL REMAIN UNCHANGED FOR 30 DAYS OR GREATER. 3-4" TOPSOIL WILL BE USED WHERE VEGETATION IS REQUIRED.
10. COMPLETE ROUGH GRADING OF SITE AND INSTALL UTILITIES. PLACE INLET FILTERS AT ALL INLETS AND CATCH BASINS, AS SHOWN.
11. FINISH GRADE AND PAVE SITE AS PROPOSED TO DRAIN TO STORM SEWER SYSTEM. REPAIR INLET FILTERS AS REQUIRED.
12. APPLY TOPSOIL, SEED AND MULCH/SOD TO ALL DISTURBED AREAS UPON COMPLETION OF GRADING. THE CONTRACTOR SHALL STAGE CONSTRUCTION ACTIVITIES IN ORDER TO MINIMIZE THE EXPOSURE OF UNSTABILIZED AREAS.
13. CLEAN PAVEMENT AND STORM SEWERS. REMOVE SILT FENCE, AND INLET FILTERS ONCE VEGETATION HAS BEEN ESTABLISHED.
14. ALL DIRT AND MUD TRACKED ONTO PUBLIC ROADS SHALL BE REMOVED DAILY.
15. STREET CATCH BASINS TO BE PERIODICALLY CLEANED AND FILTER CLOTH CHANGED AND MAINTAINED.

PEA GROUP
TROY ■ WASHINGTON TWP
BRIGHTON ■ DETROIT
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www.peagroup.com

NORTH

0 15 30 60
SCALE: 1" = 30'

Know what's below. Call before you dig.

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

CLIENT
TRINITY REAL ESTATE INVESTMENTS
26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE
CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
SOIL EROSION CONTROL PLAN

PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK

DRAWING NUMBER:
C-5.0

STORM STRUCTURES		
OC	2	(4' DIA./0' SUMP) RIM = 962.71 12" SW 951.88 12" NE 951.88
PT	3	(4' DIA./0' SUMP) RIM = 964.27 15" SW 958.32 12" NE 958.42 15" SE 958.22
CB	4	(4' DIA./2' SUMP) RIM = 965.80 15" W 958.91 12" N 960.61 15" NE 958.91
CB	5	(4' DIA./2' SUMP) RIM = 965.70 15" W 959.19 12" NW 960.49 15" E 959.19
CB	6	(4' DIA./2' SUMP) RIM = 965.80 15" NW 959.64 15" E 959.64
CB	7	(4' DIA./2' SUMP) RIM = 966.00 15" N 959.98 15" SE 959.98

STORM STRUCTURES		
CB	8	(4' DIA./2' SUMP) RIM = 967.15 12" E 960.56 15" S 960.36
CB	9	(4' DIA./2' SUMP) RIM = 966.85 12" NE 961.11 12" SW 961.11
CB	10	(4' DIA./2' SUMP) RIM = 966.50 12" SW 961.35
*CB	11	(4' DIA./2' SUMP) RIM = 962.77 12" SW 958.58
CB	12	(4' DIA./2' SUMP) RIM = 962.40 12" NW 957.12
MH	15	(5' DIA./2' SUMP) RIM = 970.33 30" E 958.26

*LOW HEAD STRUCTURE

STORM STRUCTURES		
CB	20	(4' DIA./2' SUMP) RIM = 966.65 6" NW 961.79 12" S 961.39
CB	21	(4' DIA./2' SUMP) RIM = 966.75 12" SE 961.47
CB	22	(4' DIA./2' SUMP) RIM = 966.30 12" NE 960.92 6" SE 961.32 12" S 960.92
MH	24	(5' DIA./2' SUMP) RIM = 967.03 30" W 956.17 30" E 952.37
CB	25	(4' DIA./2' SUMP) RIM = 966.35 12" N 960.82 12" W 960.72
CB	26	(4' DIA./2' SUMP) RIM = 966.30 15" N 960.18 15" S 960.18

HYDRANTS	
a	HYDRANT F.G. = 967.20
b	HYDRANT F.G. = 969.13

WATER MAIN STRUCTURES	
c	GV IN WELL RIM = 968.40
d	GV IN BOX RIM = 968.17

END SECTIONS	
1	END SECTION 12" 951.70
14	END SECTION 30" 952.25

SANITARY SEWER BASIS OF DESIGN:

Storage Facility		
Usuable Building area	17,464 sf	
Unit Factor (church)	0.11 /1000 sf	
REU	1.9	
Population (P) (3.5 PEOPLE/EDU)	6.7 People	
TOTAL		
REU	**1.9**	
	7 People	
Average Flow (100 GPCPD)	**700 G.P.D.**	
	0.001 C.F.S.	
P (1000s)	**0.007**	
Peaking Factor (PF)	**4.43**	
PF = (18+sqrt(P))/(4+sqrt(P))		
Peak Flow (G.D.P.)	**3,100 G.P.D.**	
Peak Flow (C.F.S.)	**0.005 C.F.S.**	
8" Pipe Capacity Provided =	**C.F.S.**	

WATER MAIN BASIS OF DESIGN:

Storage Facility		
Usuable Building area	17,464 sf	
Unit Factor (church)	0.11 /1000 sf	
REU	1.9	
Population (P) (3.5 PEOPLE/EDU)	6.7 People	
TOTAL		
REU	**1.9**	
	7 People	
Average Flow (150 GPCPD)	**1,050 G.P.D.**	
	0.002 C.F.S.	
	0.001 M.G.D.	
Design Max. Flow = (2*avg)	**2100.00 G.P.D.**	
	0.003 C.F.S.	
	0.002 M.G.D.	

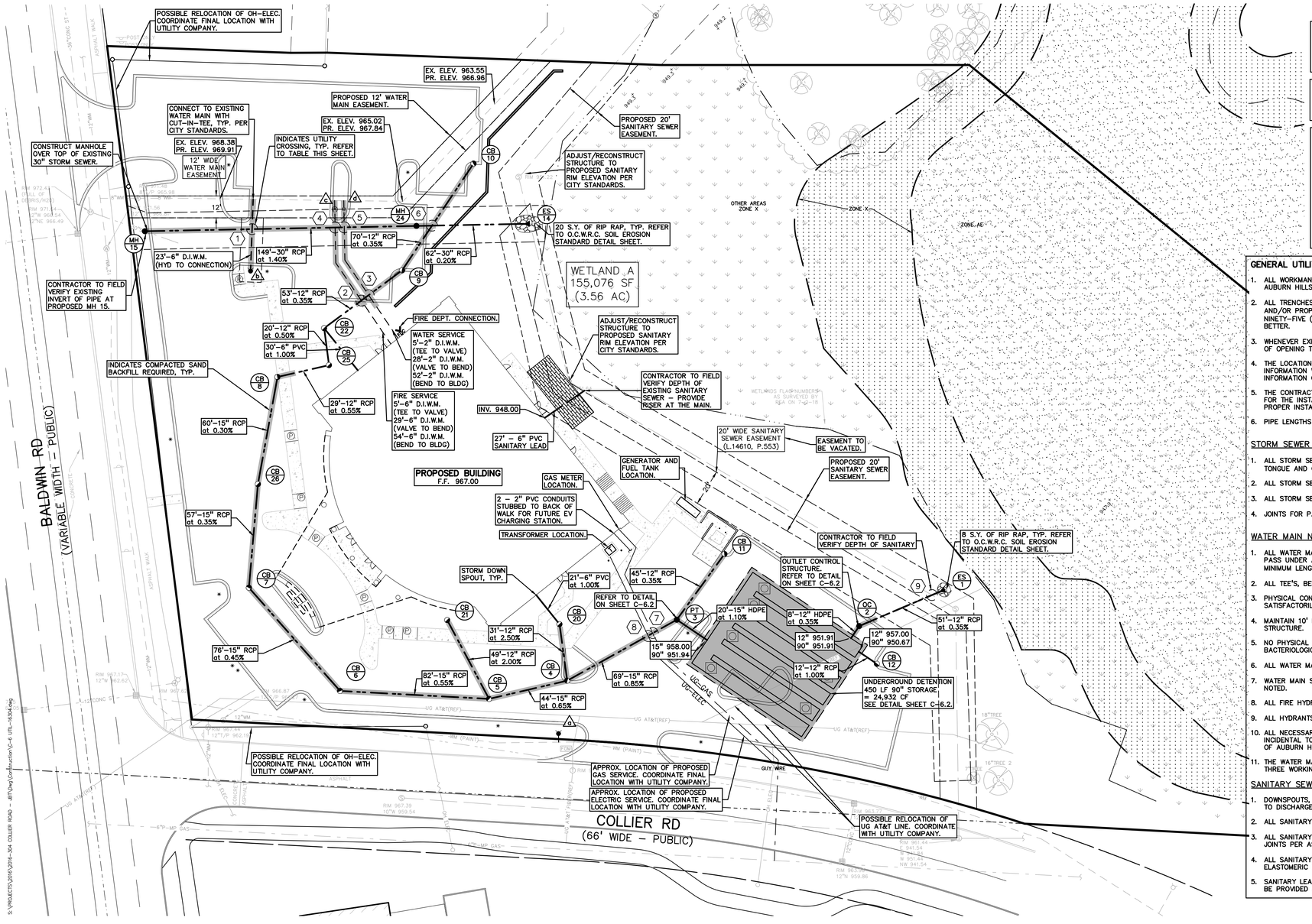
CROSSING	CROSSING PIPE 1				CROSSING PIPE 2				Clearance	NOTES
1	30 "	ST	T/P=	960.23	6 "	WM	B/P=	962.07	1.84	
2	12 "	ST	B/P=	960.84	6 "	WM	T/P=	959.34	1.50	DIP WATER MAIN
3	12 "	ST	B/P=	960.86	2 "	WM	T/P=	959.36	1.50	DIP WATER MAIN
4	30 "	ST	T/P=	959.59	6 "	WM	B/P=	961.19	1.60	
5	30 "	ST	T/P=	959.52	2 "	WM	B/P=	961.33	1.81	
6	30 "	ST	T/P=	955.15	12 "	ST	B/P=	961.04	5.90	
7	15 "	ST	T/P=	959.89	6 "	GAS	B/P=	962.47	2.58	
8	15 "	ST	T/P=	959.91	2 "	ELEC	B/P=	962.70	2.79	
9	12 "	ST	B/P=	951.56	21 "	SAN	T/P=	944.17	7.39	

FIRE DEPARTMENT NOTES:

1. THE FOUR (4) INCH STEAMER CAPS ON ALL HYDRANTS SHALL BE PAINTED ACCORDING TO THE FOLLOWING:

   WHITE ON 4" MAINS
   RED ON 6" MAINS
   ORANGE ON 8" MAINS
   GREEN ON 12" MAINS
   BLUE ON 16" MAINS OR LARGER

2. NO PARKING SHALL BE PERMITTED AND/OR NO OBSTRUCTIONS SHALL BE PLACED OR CONSTRUCTED WITHIN FIFTEEN (15) FEET OF ANY HYDRANT OR FIRE DEPARTMENT CONNECTION PUBLIC OR PRIVATE.
3. THE FIRE DEPARTMENT CONNECTION MUST BE LOCATED WITHIN ONE HUNDRED (100) FEET OF A FIRE HYDRANT AND WITHIN FIFTY (50) FEET OF A MINIMUM TWENTY (20) FOOT WIDE PAVED DRIVEWAY OR STREET.
4. GAS METERS, PROPANE TANKS, OVERHEAD ELECTRICAL SERVICES, AND TRANSFORMERS MUST NOT BE LOCATED ON THE SAME SIDE OF THE BUILDING OR STRUCTURE AS THE FIRE DEPARTMENT CONNECTION UNLESS A CLEAR DISTANCE OF ONE HUNDRED FIFTY (150) FEET CAN BE MAINTAINED BETWEEN UTILITIES AND THE FIRE DEPARTMENT CONNECTION.
5. ALL DRIVE AREAS MUST BE POSTED AS FIRE LANES WITH UNIFORM SIGNS IN KEEPING WITH THE STANDARD ESTABLISHED IN THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. SIGNS MUST BE ERECTED ON BOTH SIDES OF THE FIRE LANES WITH SPACING BETWEEN SIGNS NOT EXCEEDING ONE HUNDRED (100) FEET.
6. DESIGNATED EXIT DOORS ONTO DRIVES OR PARKING AREAS MUST BE PROTECTED WITH GUARD POSTS OR PARKING BLOCKS.
7. A WHITE HIGH VISIBILITY STRIPE SHALL BE PAINTED ON THE UPPER FLANGE OF ALL FIRE HYDRANTS.



PREMIUM TRENCH BACKFILL NOTE:
ALL UTILITIES UNDER PAVEMENT OR WITHIN 3' OF THE EDGE OF PAVEMENT (OR WITHIN THE 45° LINE OF INFLUENCE OF PAVEMENT) SHALL HAVE M.D.O.T. CLASS II GRANULAR BACKFILL COMPACTED TO 95% MAX. DRY DENSITY (ASTM D-1557).

NOTE:
CONTRACTOR TO VERIFY ALL QUANTITIES. ANY DEVIATIONS TO THE PLAN QUANTITIES SHALL BE BROUGHT TO THE ATTENTION OF PEA, INC. FOR VERIFICATION, PRIOR TO BIDDING.

PUBLIC UTILITY EASEMENTS:
ALL SANITARY SEWERS 8" AND LARGER IN DIAMETER ARE TO BE PUBLIC AND SHALL BE LOCATED IN A 20' WIDE EASEMENT. ALL WATER MAIN SHALL BE LOCATED IN A 12' WIDE EASEMENT.

STORM SEWER QUANTITIES:

12" RCP CL-IV PIPE	360 LF
15" RCP CL-IV PIPE	388 LF
30" RCP CL-IV PIPE	211 LF
12" HDPE PIPE	8 LF
15" HDPE PIPE	20 LF
12" CONC. END SECTION	1 EA.
30" CONC. END SECTION	1 EA.
4' DIA. CATCH BASIN	14 EA.
5' DIA. MANHOLE	2 EA.
6' DIA. OUTLET CONTROL STRUCTURE	1 EA.
CONSTRUCT MH OVER EXISTING LINE	1 EA.
90" UNDERGROUND DETENTION	450 LF

SANITARY SEWER QUANTITIES:

6" PVC SDR 23.5 PIPE	27 LF

WATER MAIN QUANTITIES:

2" COPPER 'K' WATER LEAD	85 LF
6" D.I.W.M. CLASS 54	111 LF
2" VALVE AND BOX	1 EA.
6" GATE VALVE AND WELL	1 EA.
HYDRANT ASSEMBLY	2 EA.

GENERAL UTILITY NOTES:

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE CITY OF AUBURN HILLS.
2. 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.
3. 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.
4. THE LOCATIONS AND DIMENSIONS SHOWN ON THE PLANS FOR EXISTING UTILITIES ARE IN ACCORDANCE WITH AVAILABLE INFORMATION WITHOUT UNCOVERING AND MEASURING. THE DESIGN ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION OR THAT ALL EXISTING UNDERGROUND FACILITIES ARE SHOWN. CONTRACTOR TO FIELD VERIFY UTILITIES.
5. THE CONTRACTOR MUST COORDINATE TO ENSURE ALL REQUIRED PIPES, CONDUITS, CABLES AND SLEEVES ARE PROPERLY PLACED FOR THE INSTALLATION OF GAS, ELECTRIC, PHONE, CABLE, IRRIGATION, ETC. IN SUCH A MANNER THAT WILL FACILITATE THEIR PROPER INSTALLATION PRIOR TO THE PLACEMENT OF THE PROPOSED PAVEMENT AND LANDSCAPING.
6. PIPE LENGTHS INDICATED ARE FROM CENTER OF STRUCTURE AND TO END OF FLARED END SECTION UNLESS NOTED OTHERWISE.

STORM SEWER NOTES:

1. ALL STORM SEWER 12" DIAMETER OR LARGER SHALL BE REINFORCED CONCRETE PIPE (RCP C-76) CLASS IV WITH MODIFIED TONGUE AND GROOVE JOINT WITH RUBBER GASKETS UNLESS SPECIFIED OTHERWISE (ASTM C-443).
2. ALL STORM SEWER LEADS SHALL BE CONSTRUCTED AT 1.00% MINIMUM SLOPE.
3. ALL STORM SEWER 10" OR LESS AND/OR LEADS SHALL BE SDR 26.
4. JOINTS FOR P.V.C. PIPE SHALL BE ELASTOMERIC (RUBBER GASKET) AS SPECIFIED IN A.S.T.M. DESIGNATION D-3212.

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 TEE'S, BENDS, CONNECTIONS, ETC. ARE CONSIDERED INCIDENTAL TO THE JOB.
3. PHYSICAL CONNECTIONS SHALL NOT BE MADE BETWEEN EXISTING AND NEW WATER MAINS UNTIL REQUIRED TESTING IS SATISFACTORILY COMPLETED.
4. MAINTAIN 10' HORIZONTAL CLEARANCE BETWEEN OUTER EDGE OF WATER MAIN AND ANY SANITARY/STORM SEWER OR STRUCTURE.
5. NO PHYSICAL CONNECTION TO THE EXISTING WATER MAIN CAN BE MADE UNTIL ALL NEW WATER MAIN PASSES PRESSURE AND BACTERIOLOGICAL TESTS TO THE SATISFACTION OF THE CITY OF AUBURN HILLS.
6. ALL WATER MAIN AND FITTINGS (3" DIAMETER AND LARGER) SHALL BE DUCTILE IRON, CLASS 54.
7. WATER MAIN SERVICE LEADS SHALL BE TYPE 'K' ANNEALED SEAMLESS COPPER WITH FLARED FITTINGS, UNLESS OTHERWISE NOTED.
8. ALL FIRE HYDRANTS SHALL BE EJIW #5BR MODEL #250 PER CITY OF AUBURN HILLS STANDARDS.
9. ALL HYDRANTS TO BE A MINIMUM OF 3' FROM BACK OF CURB, TYP.
10. ALL NECESSARY FITTINGS, THRUST BLOCKS, RESTRAINING GLANDS, BLOW OFFS, ETC. FOR WATER MAIN ARE CONSIDERED INCIDENTAL TO THIS PROJECT. THE CONTRACTOR SHALL INSTALL THESE ITEMS AS NECESSARY AND AS REQUIRED BY THE CITY OF AUBURN HILLS.
11. THE WATER MAIN CONTRACTOR SHALL NOTIFY THE CITY ENGINEER AT THE CITY OF AUBURN HILLS AT 248-370-9400 AT LEAST THREE WORKING DAYS IN ADVANCE OF STARTING CONSTRUCTION.

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 AT 1.00% MINIMUM SLOPE.
3. ALL SANITARY SEWER 8" OR LARGER SHALL BE P.V.C. TRUSS PIPE (ASTM D2680) AND FITTINGS, WITH ELASTOMERIC GASKET JOINTS PER ASTM D3212 UNLESS OTHERWISE NOTED.
4. ALL SANITARY SEWER LEADS SHALL BE POLYVINYL CHLORIDE (PVC) SDR 23.5 PIPE AND FITTINGS. ALL JOINTS TO BE ELASTOMERIC GASKET JOINTS PER ASTM D3212 UNLESS OTHERWISE NOTED.
5. SANITARY LEADS SHALL BE PROVIDED WITH CLEANOUTS EVERY 100 FEET AND AT EVERY BEND AS SHOWN. ALL CLEANOUTS TO BE PROVIDED WITH E.J.I.W. #1565 BOX OR EQUAL.

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NORTH

0 15 30 60
SCALE: 1" = 30'

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

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CLIENT
TRINITY REAL ESTATE INVESTMENTS
26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE
CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

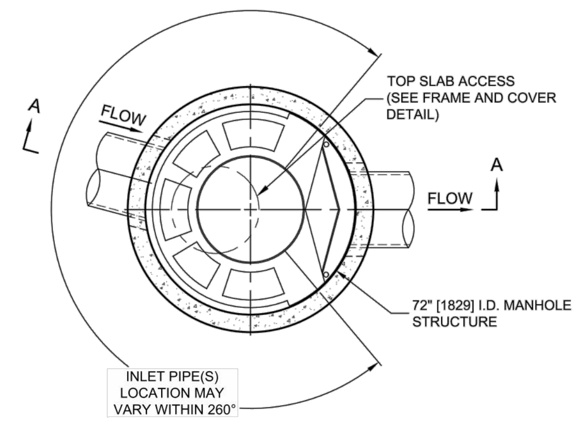
ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
UTILITY PLAN

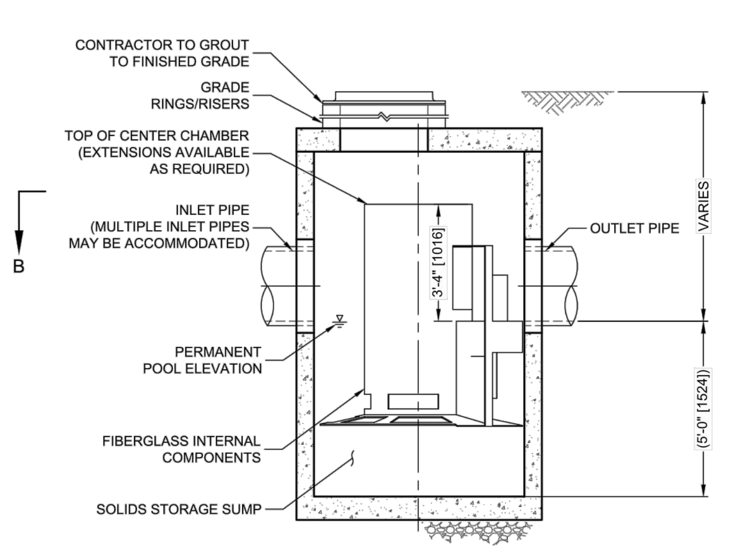
PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK

DRAWING NUMBER:
C-6.1

S:\PROJECTS\2016\2016-304 COLLIER ROAD - AUT\Dwg\Construction\C-6 UTIL-16304.dwg



PLAN VIEW B-B
NOT TO SCALE



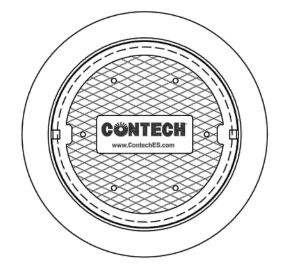
ELEVATION A-A
NOT TO SCALE

CASCADE separator™

CASCADE SEPARATOR DESIGN NOTES

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

CONFIGURATION DESCRIPTION
- GRATED INLET ONLY (NO INLET PIPE)
- GRATED INLET WITH INLET PIPE OR PIPES
- CURB INLET ONLY (NO INLET PIPE)
- CURB INLET WITH INLET PIPE OR PIPES



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			PT3
WATER QUALITY FLOW RATE (cfs [L/s])			4.05
PEAK FLOW RATE (cfs [L/s])			3.94
RETURN PERIOD OF PEAK FLOW (yrs)			
RIM ELEVATION			964.27
PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1	958.32	RCP	15"
INLET PIPE 2	958.42	RCP	12"
OUTLET PIPE	958.22	RCP	15"
NOTES / SPECIAL REQUIREMENTS:			

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. CASCADE SEPARATOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

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

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CS-6
CASCADE SEPARATOR
STANDARD DETAIL

CONTECH ENGINEERED SOLUTIONS

Oakland County 1-Year

Project: **Church of God in Christ**
Location: **Auburn Hills, MI**

Area (acres):	2.75
C Factor:	0.78
Tc (min):	23

1 year I = 97/(Tc+30) = 1.84 in/hr
1 year Flow = CIA = **3.94 cfs**

Recommended CS Model: **CS-6**

CASCADE SEPARATOR™ MODEL SPECIFICATIONS PER NJDEP CERTIFICATION LETTER

Model	Manhole Diameter (ft)	MTFR (cfs)	50% Maximum Sediment Storage Area Volume (ft^3)
CS-4	4	1.80	9.4
CS-5	5	2.81	14.7
CS-6	6	4.05	21.2
CS-8	8	7.20	37.7
CS-10	10	11.3	58.9
CS-12	12	16.2	84.8

The NJDEP certifies the use of the Cascade Separator™ Stormwater Treatment Device by Contech Engineered Solutions, LLC at a TSS removal rate of 50% when designed, operated, and maintained in accordance with the information provided in the certification report dated October 1, 2019.

PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20 & HS25
- APPROX. LINEAR FOOTAGE = 450 lf.

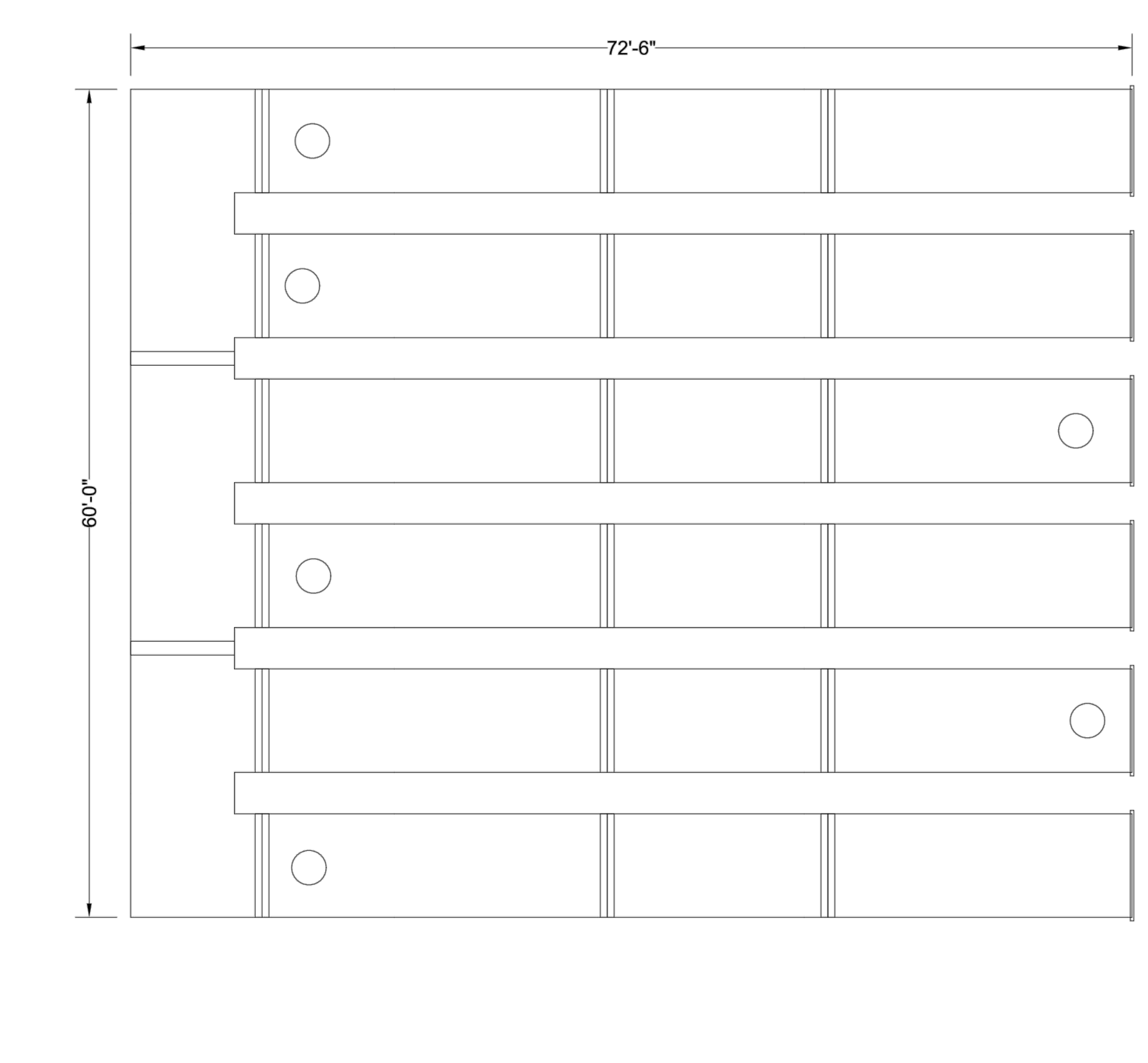
STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = N/A
- PIPE STORAGE VOLUME = 19,880 cf.
- BACKFILL STORAGE VOLUME = 5,052 cf.
- TOTAL STORAGE PROVIDED = 24,932 cf.

PIPE DETAILS
- DIAMETER = 90 IN.
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = Perforated
- BARRELL SPACING = 36 IN.

BACKFILL DETAILS
- WIDTH AT ENDS = 24 IN.
- ABOVE PIPE = 0 IN.
- WIDTH AT SIDES = 24 IN.
- BELOW PIPE = 0 IN.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

NOTES
- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE 2⅔" x ½" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.



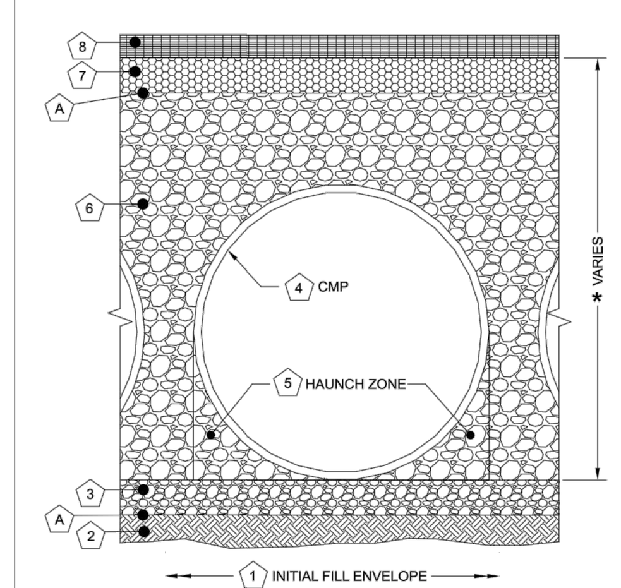
ASSEMBLY
SCALE: 1" = 10'

MARK	DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC, www.ContechES.com, 9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069, 800-338-1122 513-645-7000 513-645-7993 FAX — CONTECH CMP DETENTION SYSTEMS, CONTECH DYODS DRAWING

DYO1253 Collier
90" CMP Detention - 21471 cf.
Auburn Hills, MI
DETENTION SYSTEM

PROJECT No.: 980 SEQ. No.: 1253 DATE: 8/18/2020 DESIGNED: DYO DRAWN: DYO CHECKED: DYO APPROVED: DYO SHEET NO.: D1



Material Location	Description	Material Designation	Designation
(8) Rigid or Flexible Pavement (if applicable)			
(7) Road Base (if applicable			
(A) Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types. Wrap the trench only.
(6) Backfill	Infiltration pipe systems have a pipe perforation sized of 3/8" diameter. An open graded, free draining stone, with a particle size of ½" – 2 ½" diameter is recommended.	AASHTO M 145-A-1 or AASHTO M 43 - 3, 4	Material shall be worked into the pipe haunches by means of shovel-slicing, rodding, air-tamper, vibratory rod, or other effective methods. Compaction of all placed fill material is necessary and shall be considered adequate when no further yielding of the material is observed under the compactor, or under foot, and the Project Engineer or his representative is satisfied with the level of compaction*
(3) Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	For soil aggregates larger than 3/8" a dedicated bedding layer is not required for CMP. Pipe may be placed on the trench bottom comprised of native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Soil aggregates less than 3/8" and unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation.
(A) Geotextile Layer	None	None	Contech does not recommend geotextiles be placed under the invert of Infiltration systems due to the propensity for geotextiles to clog over time.

Infiltration Systems - CMP Infiltration & CMP Perforated Drainage Pipe

* Note: The listed AASHTO designations are for gradation only. The stone must also be angular and clean.

(1) MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

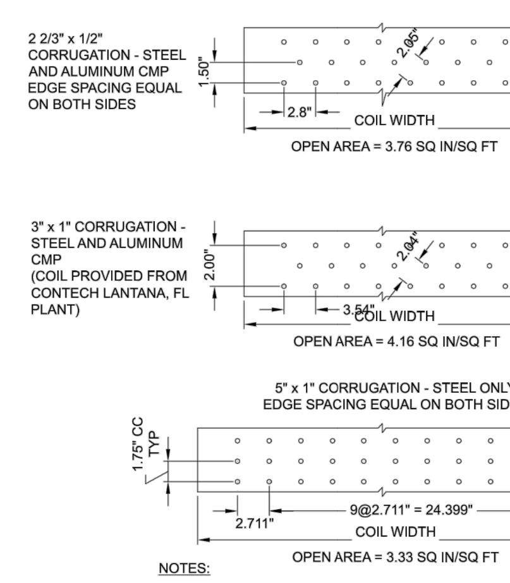
(2) PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

(5) HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL
MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

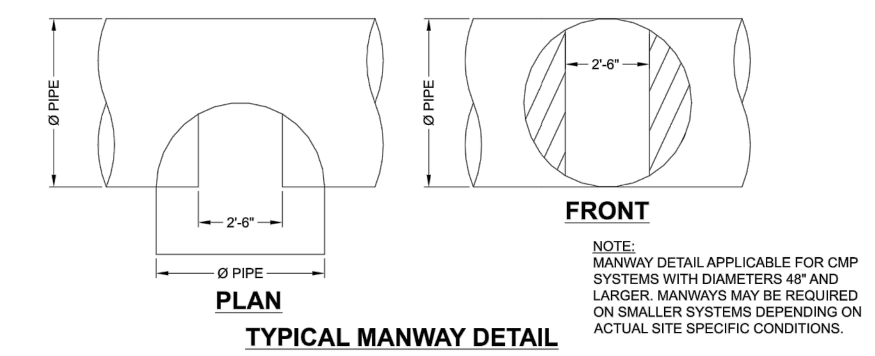
EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE PIPE. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT. MAINTAIN BALANCED LOADING ON ALL PIPES IN THE SYSTEM DURING ALL SUCH OPERATIONS.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.



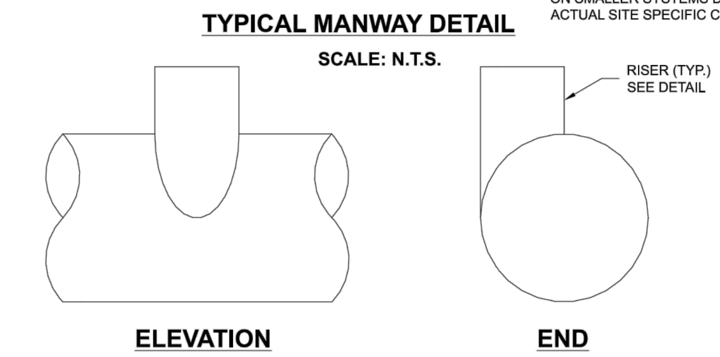
NOTES:
1. PERFORATIONS MEET AASHTO AND ASTM SPECIFICATIONS.
2. PERFORATION OPEN AREA PER SQUARE FOOT OF PIPE IS BASED ON THE NOMINAL DIAMETER AND LENGTH OF PIPE.
3. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
4. ALL HOLES Ø3/8".

TYPICAL PERFORATION DETAIL
SCALE: N.T.S.



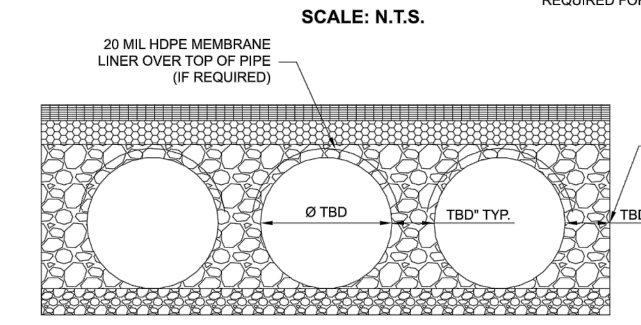
NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

TYPICAL MANWAY DETAIL
SCALE: N.T.S.



NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

TYPICAL RISER DETAIL
SCALE: N.T.S.

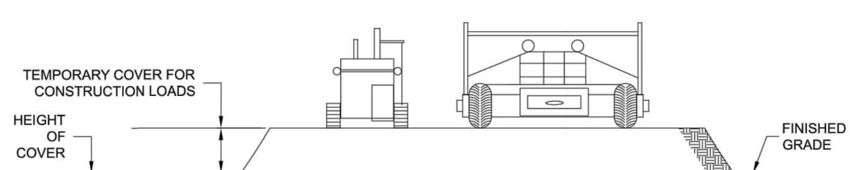


TYPICAL SECTION VIEW
LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

DYO1253 Collier
90" CMP Detention - 21471 cf.
Auburn Hills, MI
DETENTION SYSTEM

PROJECT No.: 980 SEQ. No.: 1253 DATE: 8/18/2020 DESIGNED: DYO DRAWN: DYO CHECKED: DYO APPROVED: DYO SHEET NO.: D2



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips) 18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM
SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745
APPLICABLE

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL APPLICABLE PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
REQUIREMENTS

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
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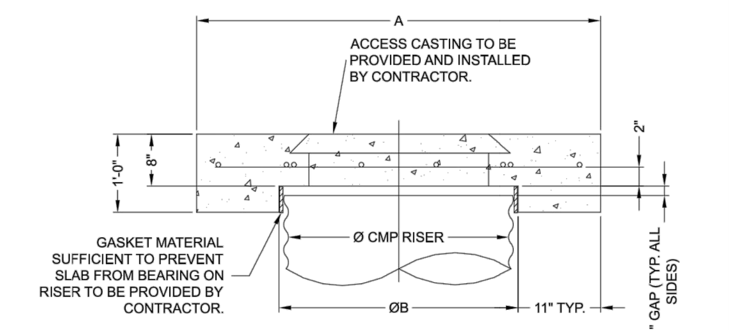
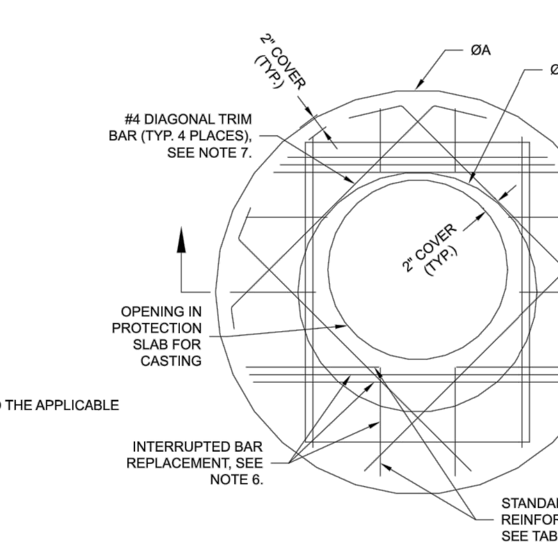


SECTION VIEW

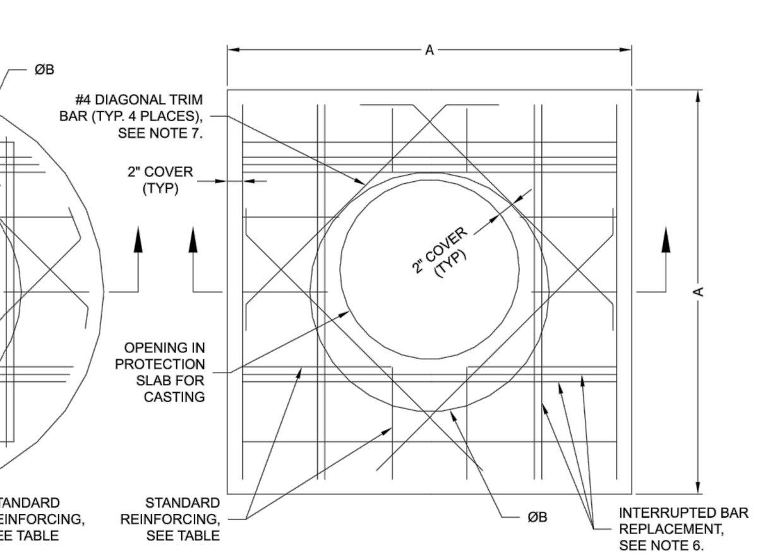
REINFORCING TABLE

Ø CMP RISER	A	Ø B	REINFORCING	**BEARING PRESSURE (PSF)
24"	Ø 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	Ø 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	Ø 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	Ø 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	Ø 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:
1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL
SCALE: N.T.S.

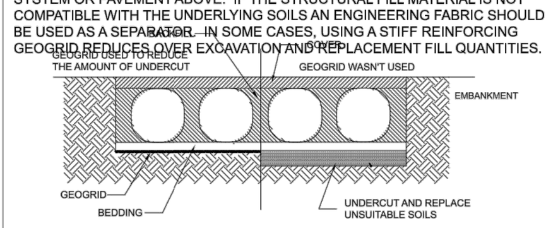
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

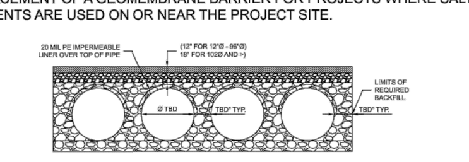
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER
A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

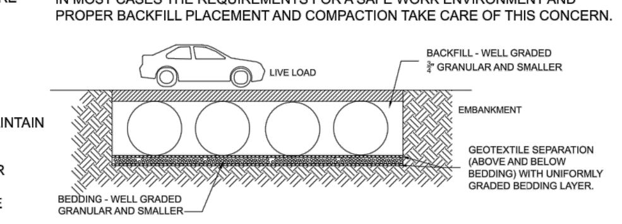
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

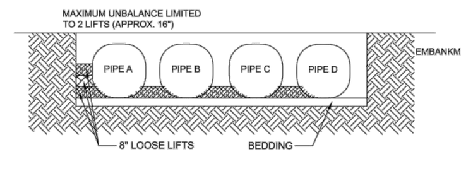
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



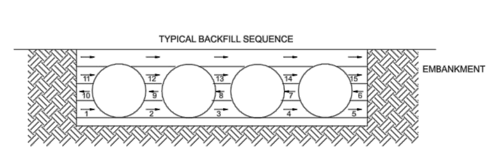
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

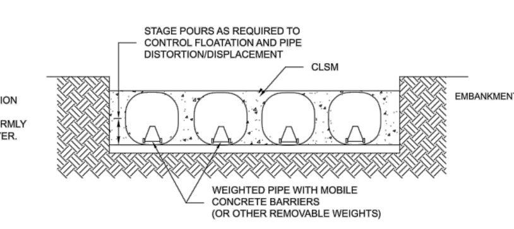


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

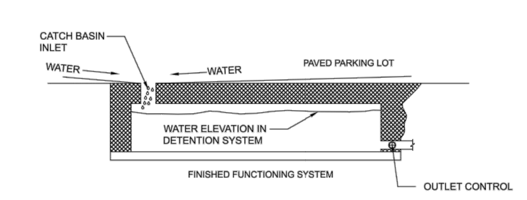


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, QUARTERLY INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

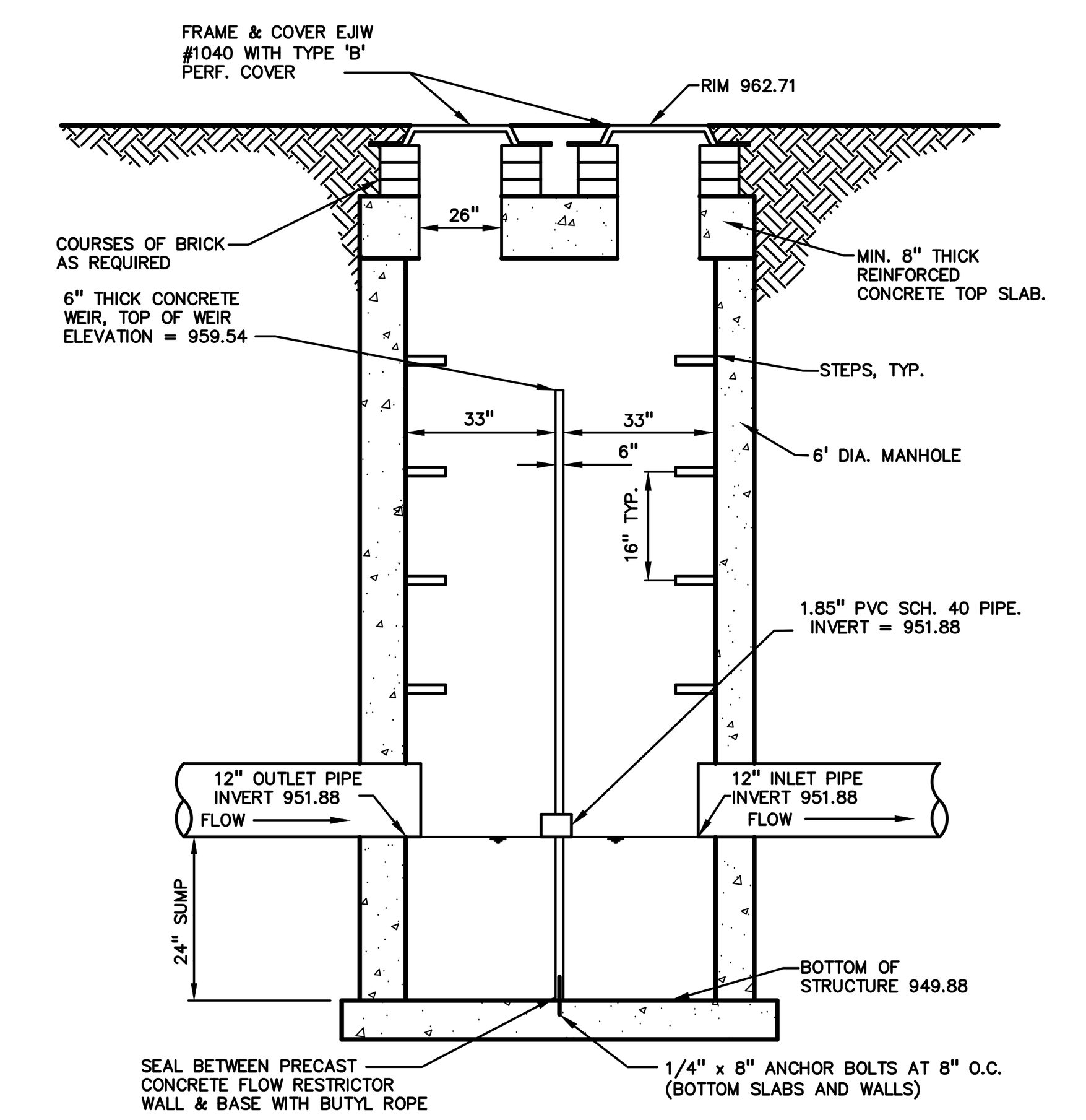
ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

DYO1253 Collier
90" CMP Detention - 21471 cf.
Auburn Hills, MI
DETENTION SYSTEM

PROJECT No.: 980 SEQ. No.: 1253 DATE: 8/18/2020 DESIGNED: DYO DRAWN: DYO CHECKED: DYO APPROVED: DYO SHEET NO.: D3 / D4



6' DIA. OUTLET CONTROL STRUCTURE (OC#2)
NOT TO SCALE

100 YEAR STORM DETENTION DESIGN (OAKLAND COUNTY DESIGN METHOD)

Site Drainage Data		
Contributing Area (A):	2.34	acre
Allowable Discharge (Qa)	0.18	cfs (0.776*area)
Part of John E. Olson Drainage District (Sinking Bridge Drain)		
Coefficient of Runoff (Cr):	0.76	
(Represents Future Developed Conditions)		
100-yr Design Storm Calculations		
Qo = ((Qa)/(A)(Cr):	0.10	cfs/acre impervious
T = -25 + ((10312.5/Qo))^0.5:	296.13	minutes
Vs = (16500(T)/(T+25)) - 40Qo(T):	14,031	cf/acre impervious
Vt = (Vs)(A)(Cr):	24,953	cft
Underground Detention Storage		
Perf. Pipe Diameter:	90	in
Perf. Pipe Volume per Linear Foot:	44.179	cft
Total Pipe Length:	450.5	ft
Total Pipe Volume:	19,902	cft
Length of Detention Field:	77.5	ft
Width of Detention Field:	65	ft
Area of Detention Field:	5,038	sft
Height of Detention Field:	7.5	ft
Volume of Detention Field	37,781	cft
Volume of Aggregate	17,879	cft
Volume of Detention Field - Total Pipe Volume		
Percent Voids of Aggregate:	30	%
Void Volume:	5,364	cft
Total Detention Volume:	25,266	cft
Total Pipe Volume + Void Volume		
Outlet Control Restriction Calculations		
Depth of Water in Pipe:	7.5	ft
Detention Pipe Maximum Invert:	951.94	ft
Maximum Storage Elevation:	959.44	ft
Restriction Hole Invert:	951.88	ft
Average Height (H):	3.81	ft
Restriction Hole Dia.:	1.85	in
Restriction Hole Area:	0.01867	sft
Average Flow thru Restriction Hole:	0.18	cfs
Time for Release of Bankfull Volume:	38.99	hrs
Use the Standpipe Outlet Detail from the City of Auburn Hills Standard Storm Sewer Details Sheet 2		
Rim:	962.71	ft
Top of Standpipe:	959.44	ft
Orifice Diameter:	1.85	in
Orifice Invert:	951.88	ft

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NORTH

SCALE: 1" = 30'

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

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26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE
CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
UNDERGROUND DETENTION CALCULATIONS

PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK

DRAWING NUMBER:
C-6.2

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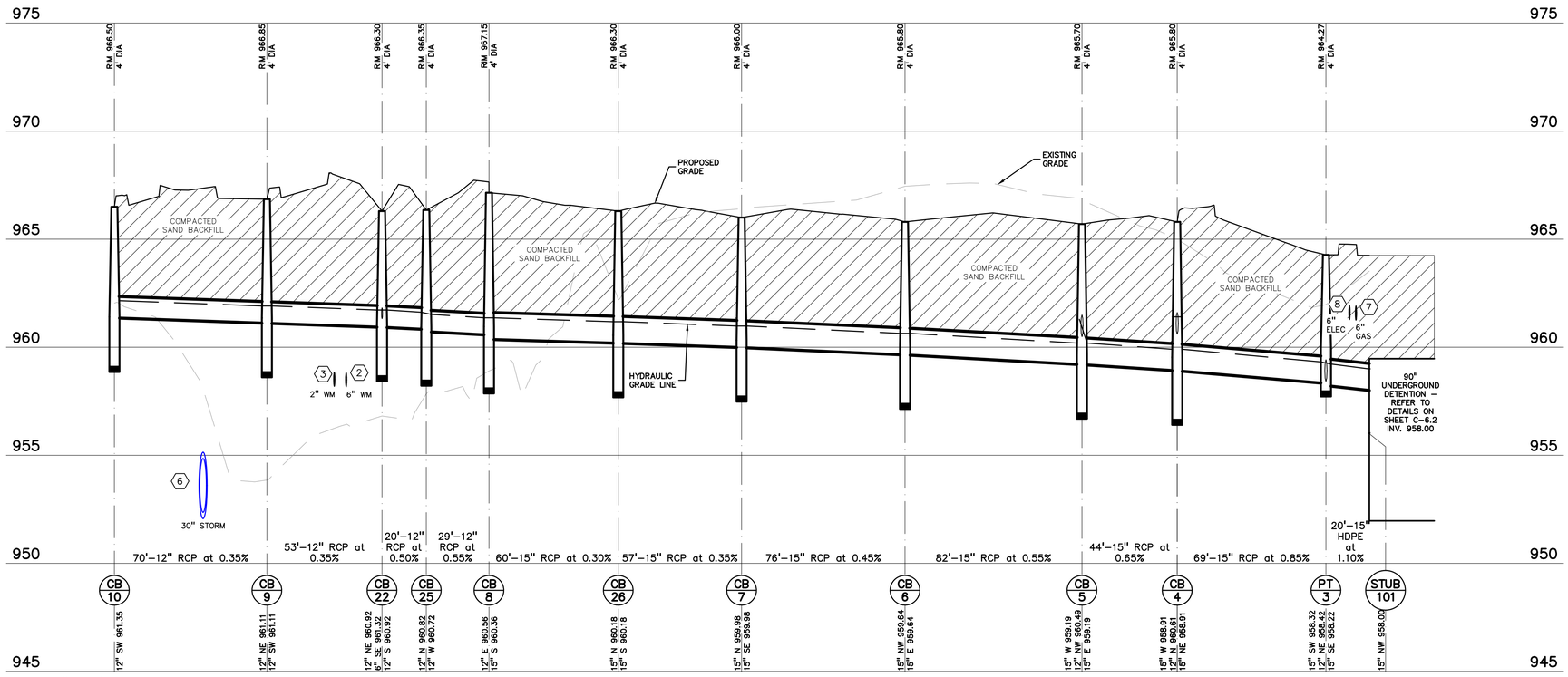

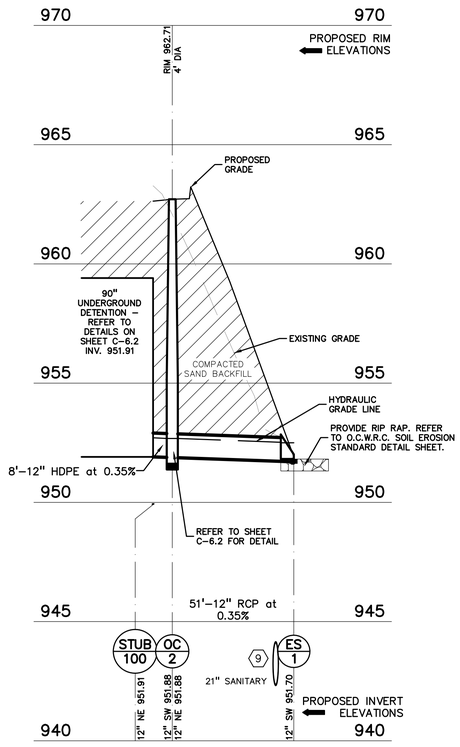

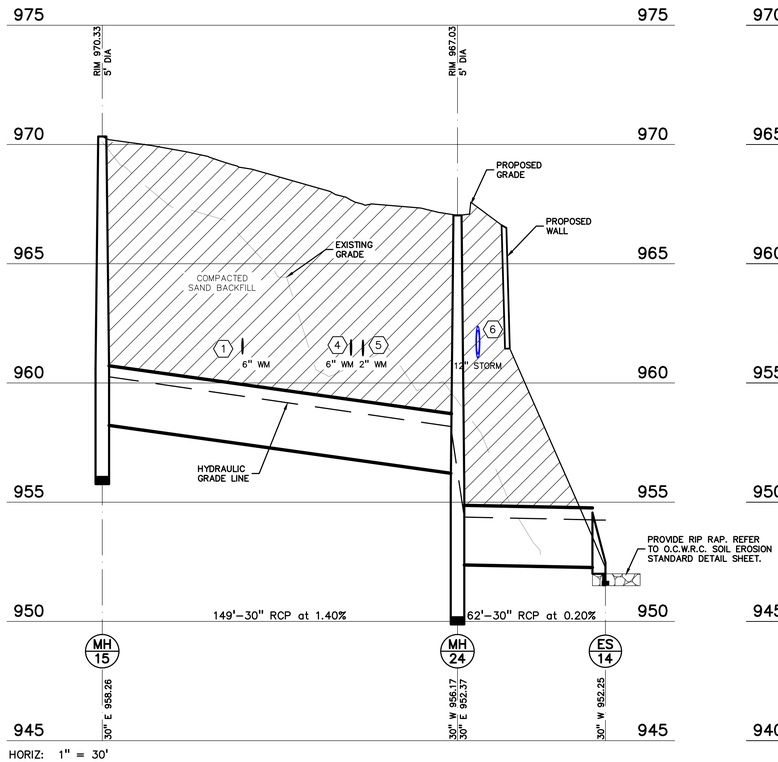

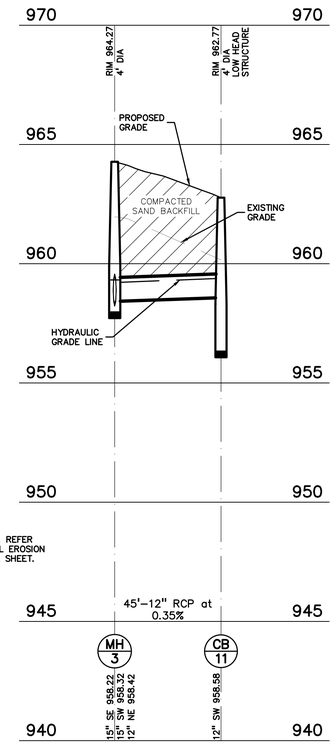

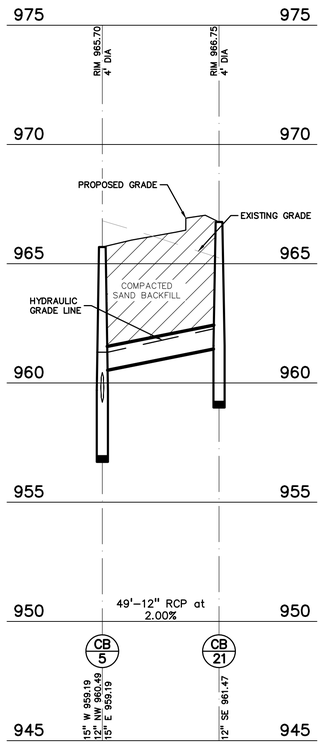

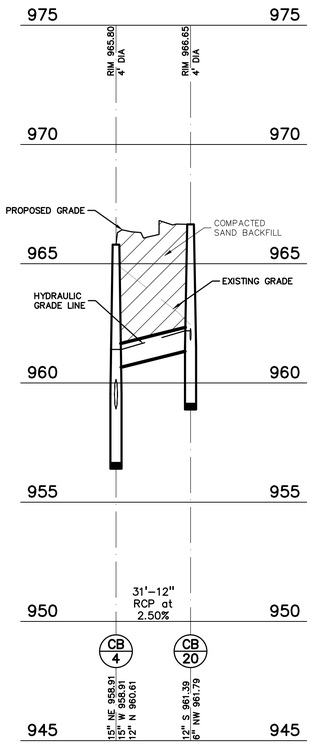

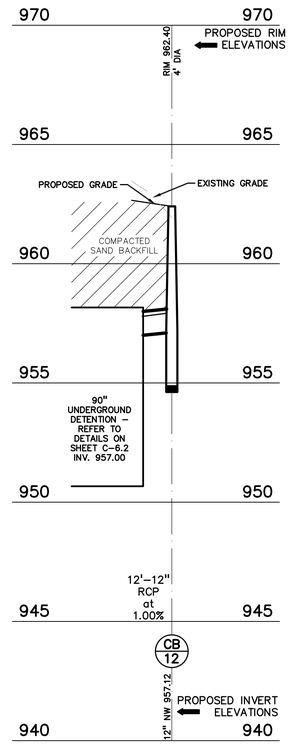

HORIZ: 1" = 30'
VERT: 1" = 3'

HORIZ: 1" = 30'
VERT: 1" = 3'

S:\PROJECTS\2016\2016-304 COLLIER ROAD - #1\Dwg\Construction\C-7 PROF-16304.dwg

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PROJECT TITLE
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AUBURN HILLS, MI

REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
UTILITY PROFILES

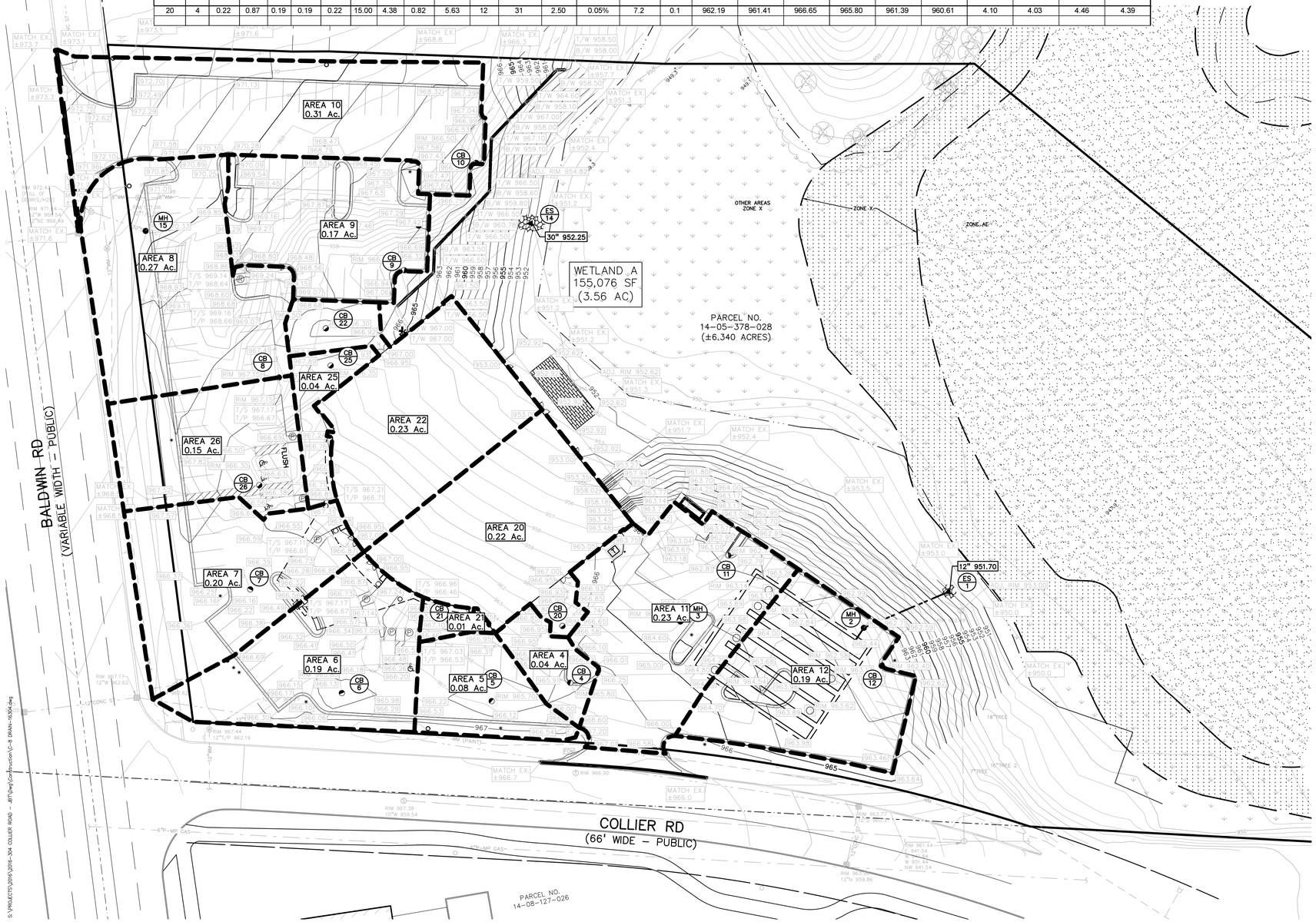
PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK

DRAWING NUMBER:
C-7.0

STORM SEWER SYSTEM DESIGN

I = B/(T+D) ^ E B = 175.0 D = 25.0 E = 1
C = varies
T = 15 (min.) Pipe "n" Value = 0.013

FROM STR	TO STR	AREA (A) (Acres)	COEF. C	A x C	TOTAL AREA (AxC)	TOTAL AREA (Acres)	TIME t (min.)	INT. I (in/hr)	FLOW Q (cfs)	PIPE CAP. (cfs)	PIPE DIA. (in.)	PIPE LENGTH (ft.)	PIPE SLOPE (%)	MIN HG PER "Q"	VEL. FULL (ft./sec)	TIME FLOW (min.)	H.G.L. ELEV. UP STREAM	H.G.L. ELEV. DOWN STREAM	RIM ELEV. UP STREAM	RIM ELEV. DOWN STREAM	INVERT ELEV. UP STREAM	INVERT ELEV. DOWN STREAM	PIPE COVER UP STREAM	PIPE COVER DOWN STREAM	HGL COVER UP STREAM	HGL COVER DOWN STREAM
10	9	0.31	0.76	0.23	0.23	0.31	15.00	4.38	1.01	2.11	12	70	0.35	0.08%	2.7	0.4	962.15	961.91	966.50	966.85	961.35	961.11	3.98	4.58	4.35	4.94
9	22	0.17	0.83	0.14	0.37	0.48	15.40	4.33	1.62	2.11	12	53	0.35	0.21%	2.7	0.3	961.91	961.72	966.85	966.30	961.11	960.92	4.58	4.21	4.94	4.58
22	25	0.23	0.82	0.19	0.57	0.71	15.70	4.30	2.44	2.52	12	20	0.50	0.47%	3.2	0.1	961.72	961.62	966.30	966.35	960.92	960.82	4.21	4.36	4.58	4.73
25	8	0.04	0.25	0.01	0.58	0.75	15.80	4.29	2.47	2.64	12	29	0.55	0.48%	3.4	0.1	961.52	961.36	966.35	967.15	960.72	960.56	4.46	5.42	4.83	5.79
8	26	0.27	0.65	0.17	0.75	1.02	15.90	4.28	3.21	3.54	15	60	0.30	0.25%	2.9	0.3	961.36	961.18	967.15	966.30	960.36	960.18	5.35	4.68	5.79	5.12
26	7	0.15	0.75	0.11	0.86	1.17	16.20	4.25	3.66	3.82	15	57	0.35	0.32%	3.1	0.3	961.18	960.98	966.30	966.00	960.18	959.98	4.68	4.58	5.12	5.02
7	6	0.20	0.71	0.14	1.00	1.36	16.50	4.22	4.22	4.33	15	76	0.45	0.43%	3.5	0.4	960.98	960.64	966.00	965.80	959.98	959.64	4.58	4.72	5.02	5.16
6	5	0.19	0.70	0.13	1.13	1.55	16.90	4.18	4.73	4.79	15	82	0.55	0.54%	3.9	0.3	960.64	960.19	965.80	965.70	959.64	959.19	4.72	5.07	5.16	5.51
5	4	0.08	0.77	0.06	1.20	1.65	17.20	4.15	4.98	5.21	15	44	0.65	0.60%	4.2	0.2	960.19	959.91	965.70	965.80	959.19	958.91	5.07	5.46	5.51	5.89
4	3	0.04	0.72	0.03	1.42	1.90	17.40	4.13	5.85	5.96	15	69	0.85	0.82%	4.9	0.2	959.91	959.32	965.80	964.27	958.91	958.32	5.46	4.52	5.89	4.95
3	101	0.00	0.00	0.00	1.61	2.14	17.60	4.11	6.62	6.77	15	20	1.10	1.05%	5.5	0.1	959.22	959.00	964.27	964.25	958.22	958.00	4.62	4.81	5.05	5.25
100	2	0.00	0.00	0.00	0.00	0.00	15.00	4.38	0.00	2.11	12	8	0.35	0.00%	2.7	0.1	952.71	952.68	962.63	962.71	951.91	951.88	9.56	9.67	9.92	10.03
2	1	0.00	0.00	0.00	0.00	0.00	15.10	4.36	0.00	2.11	12	51	0.35	0.00%	2.7	0.3	952.68	952.50	962.71	953.07	951.88	951.70	9.67	0.20	10.03	0.57
15	24	0.00	0.00	0.00	0.00	0.00	15.00	4.38	0.00	48.53	30	149	1.40	0.00%	9.9	0.3	960.26	958.17	970.30	967.03	958.26	956.17	9.25	8.06	10.05	8.85
24	14	0.00	0.00	0.00	0.00	0.00	15.30	4.34	0.00	18.34	30	62	0.20	0.00%	3.7	0.3	954.37	954.25	967.03	955.13	952.37	952.25	11.86	0.08	12.65	0.88
21	5	0.01	0.41	0.01	0.01	0.01	15.00	4.38	0.02	5.04	12	49	2.00	0.00%	6.4	0.1	962.27	961.29	966.75	965.70	961.47	960.49	4.11	4.04	4.48	4.41
20	4	0.22	0.87	0.19	0.19	0.22	15.00	4.38	0.82	5.63	12	31	2.50	0.05%	7.2	0.1	962.19	961.41	966.65	965.80	961.39	960.61	4.10	4.03	4.46	4.39



LEGEND

- IRON FOUND
- IRON SET
- NAIL FOUND
- NAIL & CAP SET
- BRASS PLUG SET
- MONUMENT FOUND
- MONUMENT SET
- SEC. CORNER FOUND
- R RECORDED
- M MEASURED
- C CALCULATED

EXISTING / PROPOSED

- ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
- UNDERGROUND CABLE TV, CATV PEDESTAL
- TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
- ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
- GAS MAIN, VALVE & GAS LINE MARKER
- WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
- SANITARY SEWER, CLEANOUT & MANHOLE
- STORM SEWER, CLEANOUT & MANHOLE
- COMBINED SEWER & MANHOLE
- SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
- POST INDICATOR VALVE
- WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF
- MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
- UNIDENTIFIED STRUCTURE
- SPOT ELEVATION
- CONTOUR LINE
- FENCE
- GUARD RAIL
- STREET LIGHT
- SIGN
- CONCRETE
- ASPHALT
- GRAVEL SHOULDER
- WETLAND

STD DUTY | HEAVY DUTY | R.O.W. ONLY
STD DUTY | HEAVY DUTY | DEEP STRENGTH

REFERENCE DRAWINGS

WATER MAIN	OHM GIS MAPPING, DATED 7-19-18
SANITARY SEWER	OHM GIS MAPPING, DATED 7-19-18
STORM SEWER	OHM GIS MAPPING, DATED 7-19-18
TELEPHONE	AT&T SKETCHES, DATED 7-12-18
GAS	CONSUMERS ENERGY MAP# 03-60-50-3, DATED 01-31-18
OTHER	WINDSTREAM DRAWING DATED 7-23-18

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NORTH

0 15 30 60
SCALE: 1" = 30'

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PROJECT TITLE
CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
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REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
DRAINAGE MAP

PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK

DRAWING NUMBER:
C-8.0

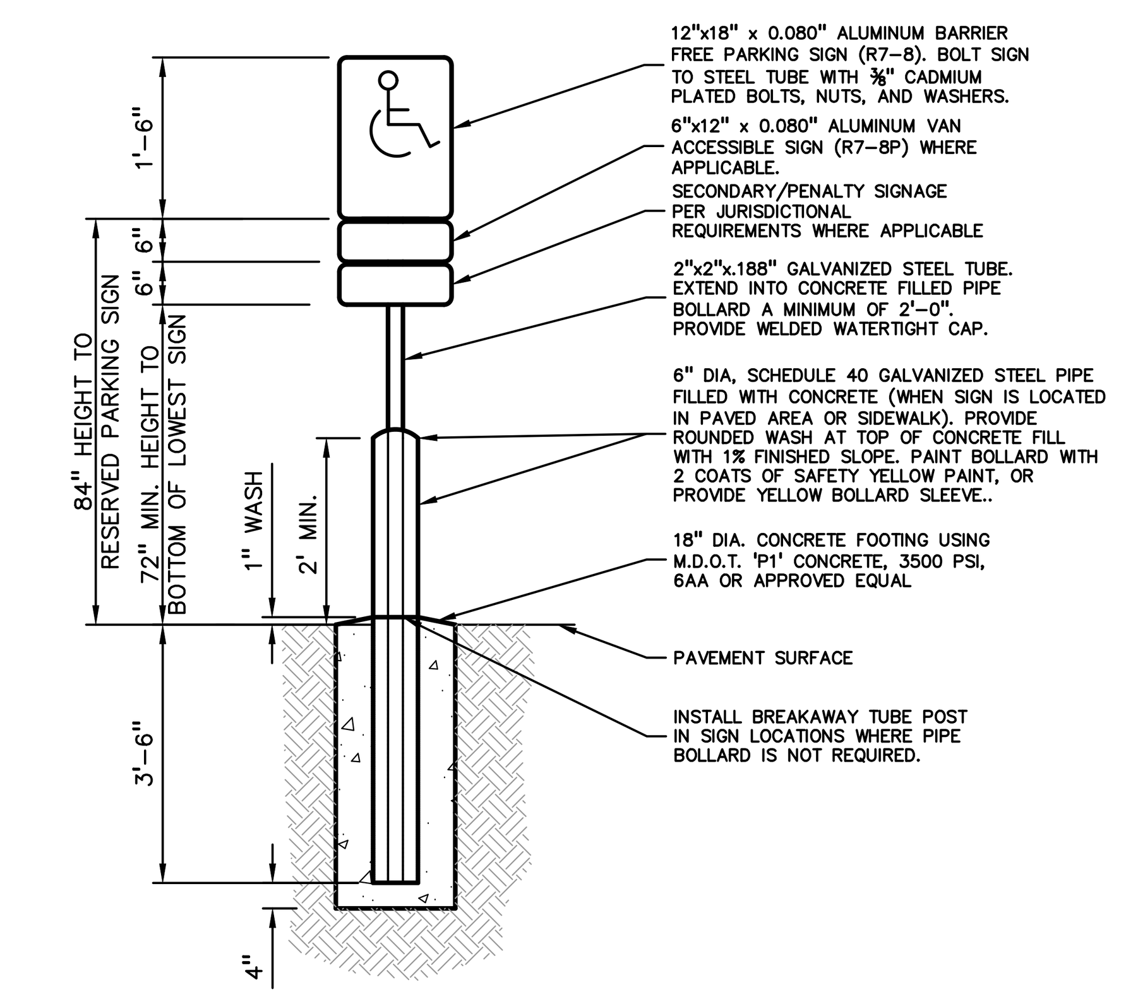
S:\PROJECTS\2016\2016-304 COLLIER ROAD - AUT\Dwg\Construction\C-8 DRAIN-16-304.dwg

PAVING NOTES:

1. IN AREAS WHERE NEW PAVEMENTS ARE BEING CONSTRUCTED, THE TOPSOIL AND SOIL CONTAINING ORGANIC MATTER SHALL BE REMOVED PRIOR TO PAVEMENT CONSTRUCTION.
2. PROVIDE EXPANSION JOINTS AND JOINT SEALANT AT TWO "END-OF-RADIUS" LOCATIONS (OPPOSITE SIDES AT EACH LONG END) OF CONCRETE CURB ISLANDS.
3. REFER TO ARCHITECTURAL PLANS FOR DETAILS OF FROST SLAB AT EXTERIOR BUILDING DOORS.
4. CONSTRUCTION TRAFFIC SHOULD BE MINIMIZED ON THE NEW PAVEMENT. IF CONSTRUCTION TRAFFIC IS ANTICIPATED ON THE PAVEMENT STRUCTURE, THE INITIAL LIFT THICKNESS COULD BE INCREASED AND PLACEMENT OF THE FINAL LIFT COULD BE DELAYED UNTIL THE MAJORITY OF THE CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED. THIS ACTION WILL ALLOW REPAIR OF LOCALIZED FAILURE, IF ANY DOES OCCUR, AS WELL AS REDUCE LOAD DAMAGE ON THE PAVEMENT SYSTEM.
5. PAVEMENT MIX DESIGNS SUBMITTED FOR REVIEW BY THE ENGINEER MUST FOLLOW THE CURRENT MDOT REVIEW CHECKLISTS AS SUMMARIZED BELOW:
   - 5.1. CONCRETE MIX DESIGN REVIEW CHECKLIST (FORM 2000)
   - 5.2. SUPERPAVE MIX DESIGN CHECKLIST (FORM 1862)
   - 5.3. MARSHALL MIX DESIGN CHECKLIST (FORM 1849)
6. CONCRETE PAVEMENT JOINTING – UNLESS SHOWN OTHERWISE IN THE PLANS OR REQUIRED BY THE AUTHORITY HAVING JURISDICTION;
   - 6.1. WHERE PROPOSED CONCRETE ABUTS A STRUCTURE PROVIDE A MINIMUM ½" EXPANSION JOINT WITH SEALANT, THE JOINT FILLER BOARD MUST BE AT LEAST THE FULL DEPTH OF THE CONCRETE AND HELD DOWN A ½INCH TO ALLOW FOR SEALING
   - 6.2. WHERE PROPOSED CONCRETE ABUTS EXISTING CONCRETE OR IN BETWEEN POURS OF PROPOSED CONCRETE (CONSTRUCTION JOINT) PROVIDE 5/8" DOWELS EVERY 30" CENTER TO CENTER HALF WAY ALONG THE THICKNESS OF THE PROPOSED PAVEMENT. ALTERNATE DOWELS SIZES AND SPACING MUST BE APPROVED THE ENGINEER PRIOR TO COMMENCING WORK AND VIA THE SUBMITTAL PROCESS.
   - 6.3. WHERE PROPOSED CONCRETE ABUTS EXISTING OR PROPOSED SIDEWALK PROVIDE A MINIMUM ½" EXPANSION JOINT WITH SEALANT
   - 6.4. WHERE PROPOSED CONCRETE ABUTS EXISTING OR PROPOSED CURBING PROVIDE A MINIMUM ½" EXPANSION JOINT WITH SEALANT
   - 6.5. CONTROL, LONGITUDINAL AND/OR TRANSVERSE JOINTS SHALL BE PLACED TO PROVIDE PANELS WITHIN THE PAVEMENT AS SQUARE AS POSSIBLE WITH THE FOLLOWING MAXIMUM SPACING PARAMETERS;
     - 6.5.1. 6-INCH THICK CONCRETE PAVEMENT: 12' X 12'
     - 6.5.2. 8-INCH THICK CONCRETE PAVEMENT: 15' X 15'
   - 6.6. IRREGULAR-SHAPED PANELS MAY REQUIRE THE USE OF REINFORCING MESH OR FIBER MESH AS DETERMINED BY THE ENGINEER. THE USE OF MESH MUST BE APPROVED THE ENGINEER PRIOR TO COMMENCING WORK AND VIA THE SUBMITTAL PROCESS.
   - 6.7. IF A JOINT PLAN IS NOT PROVIDED IN THE PLANS, THE CONTRACTOR SHALL SUBMIT ONE TO THE ENGINEER FOR REVIEW PRIOR TO COMMENCING WORK AND VIA THE SUBMITTAL PROCESS.
7. CONCRETE CURBING JOINTING – UNLESS SHOWN OTHERWISE IN THE PLANS OR REQUIRED BY THE AUTHORITY HAVING JURISDICTION;
   - 7.1. WHERE PROPOSED CONCRETE CURBING ABUTS A STRUCTURE PROVIDE A MINIMUM ½" EXPANSION JOINT WITH SEALANT
   - 7.2. WHERE PROPOSED CONCRETE ABUTS EXISTING OR PROPOSED SIDEWALK PROVIDE A MINIMUM ½" EXPANSION JOINT WITH SEALANT
   - 7.3. WHERE PROPOSED CONCRETE ABUTS EXISTING CURBING PROVIDE A MINIMUM ½" EXPANSION JOINT WITH SEALANT
   - 7.4. IN BETWEEN POURS OF PROPOSED CONCRETE CURBING (CONSTRUCTION JOINT)
     - 7.4.1. CARRY THE REBAR CONTINUOUSLY BETWEEN POURS
     - 7.4.2. IF THE REBAR IS NOT LONG ENOUGH TO CARRY CONTINUOUSLY THEN TIE TWO PIECES OF REBAR PER THE LATEST MDOT SPECIFICATIONS
   - 7.5. CONTROL JOINTS SHALL BE PLACED A MAXIMUM 10' CENTER TO CENTER AND AT ALL RADIUS RETURNS

BARRIER FREE SIGN NOTES:

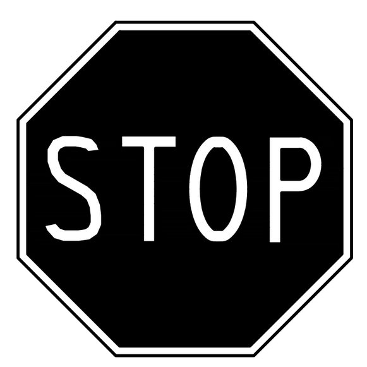
1. ONE SIGN IS REQUIRED AT EACH BARRIER FREE PARKING SPACE.
2. ALL SIGNS SHALL COMPLY WITH THE LATEST STANDARDS OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD).
3. WHEN TWO BARRIER FREE PARKING SPACES ARE ADJACENT AND FACING EACH OTHER, TWO SIGNS ARE REQUIRED, BUT CAN BE MOUNTED ON THE SAME POST.
4. SIGN POSTS SHALL BE 2" NOM. SQUARE 14-GAUGE GALVANIZED STEEL TUBE WITH 7/16" HOLES AT 1" CENTERS. POSTS SHALL TELESCOPE INSIDE ANCHOR POSTS A MINIMUM OF 12".
5. ANCHOR POSTS SHALL BE 2.25" NOM. SQUARE 12-GAUGE GALVANIZED STEEL POST, A MINIMUM OF 3 FEET LONG.
6. IF THESE NOTES AND DETAILS CONFLICT WITH LOCAL CODES AND ORDINANCES, THE STRICTER REQUIREMENT SHOULD BE USED.
7. ALTERNATE MATERIALS MAY BE USED IF IN COMPLIANCE WITH A.D.A. GUIDELINES AND LOCAL REQUIREMENTS.



DET 1 BARRIER FREE SIGN AND POST DETAIL
NOT TO SCALE

12" x 18"
RED ON WHITE REFLECTORIZED
7'-0" MOUNTING HEIGHT
(LR7-22)

NO PARKING SIGN DETAIL
NOT TO SCALE



30" x 30"
WHITE ON RED REFLECTORIZED
7'-0" MOUNTING HEIGHT
(R1-1)

STOP SIGN DETAIL
NOT TO SCALE

12" x 18" (R7-8)
GREEN BORDER AND LEGEND
WHITE SYMBOL, BLUE BACKGROUND.
REFLECTORIZED

DET 2 BARRIER FREE PARKING SIGN DETAIL
NOT TO SCALE

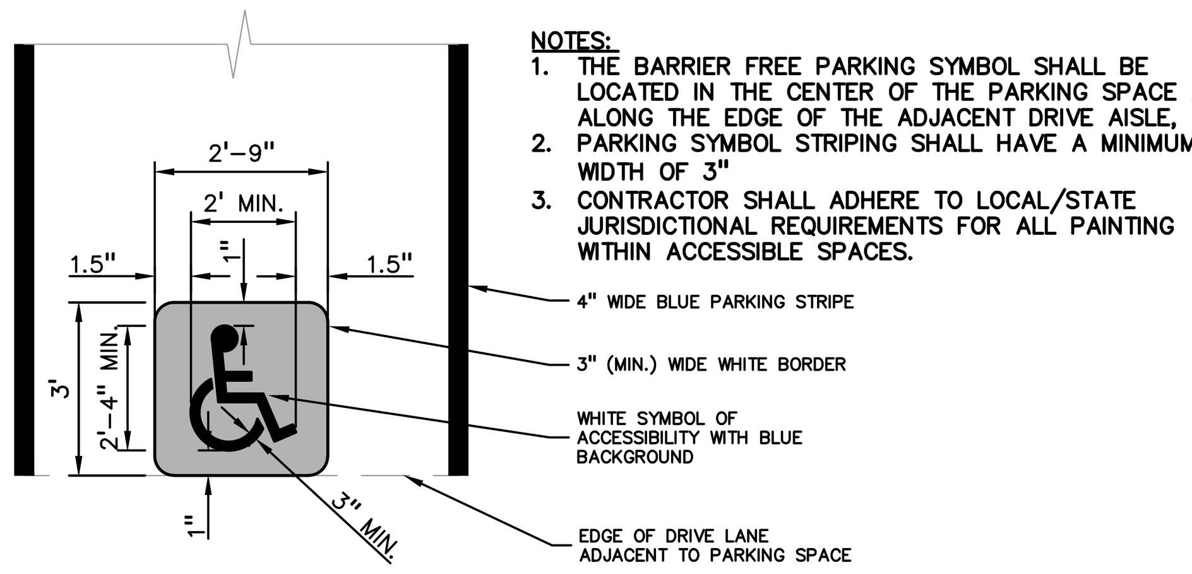
12" x 18" (R7-8)
GREEN BORDER AND LEGEND
WHITE SYMBOL, BLUE BACKGROUND.
REFLECTORIZED

NOTE:
MAY ONLY BE USED AT 11' WIDE SPACES LOCATED ON THE LEFT SIDE OF A 5' WIDE AISLE, OR 8' WIDE SPACES LOCATED TO THE LEFT OF 8' WIDE AISLES

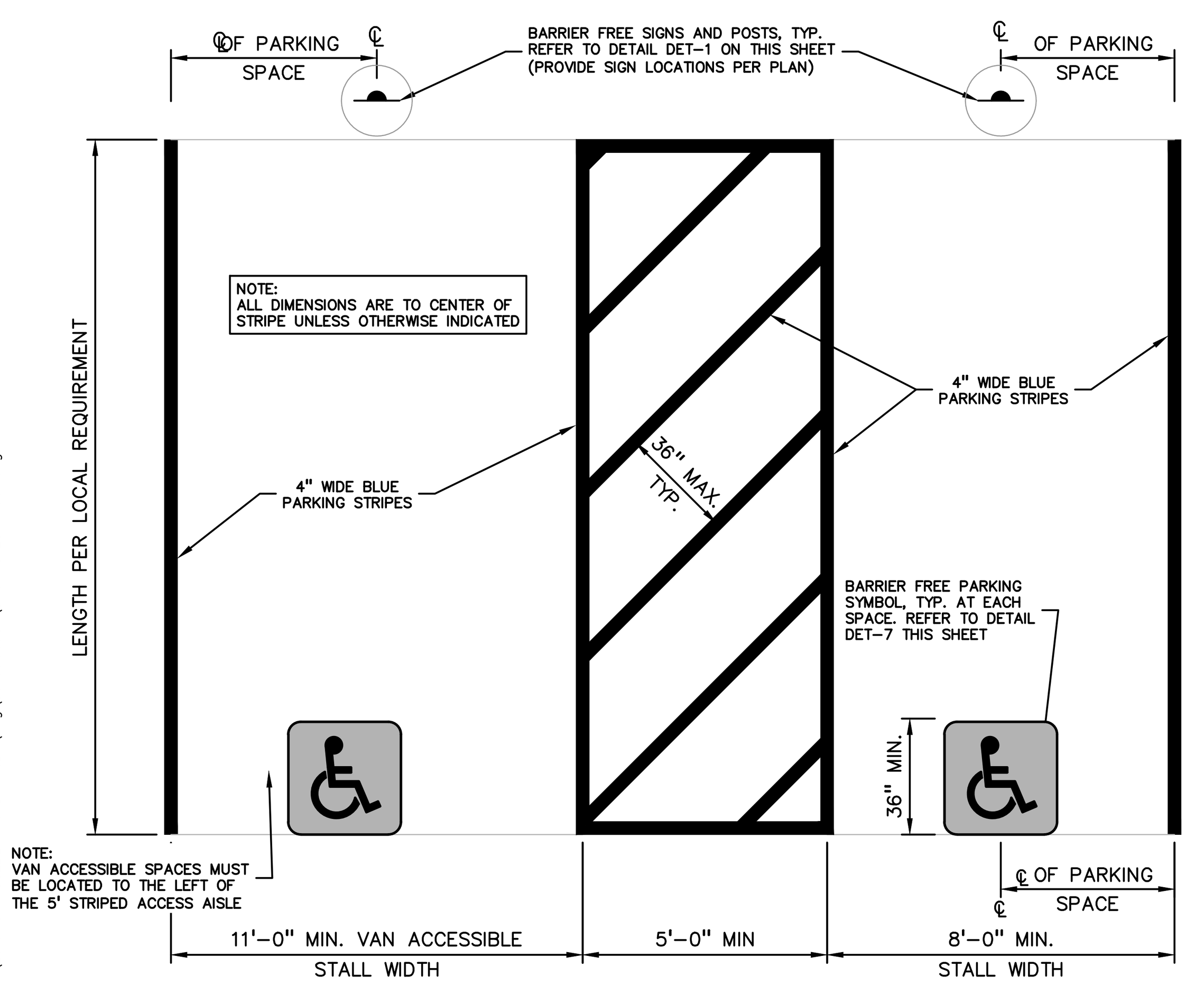
6" x 12" (R7-8P)
GREEN BORDER AND LEGEND
REFLECTORIZED

DET 3 VAN ACCESSIBLE PARKING SIGN DETAIL
NOT TO SCALE

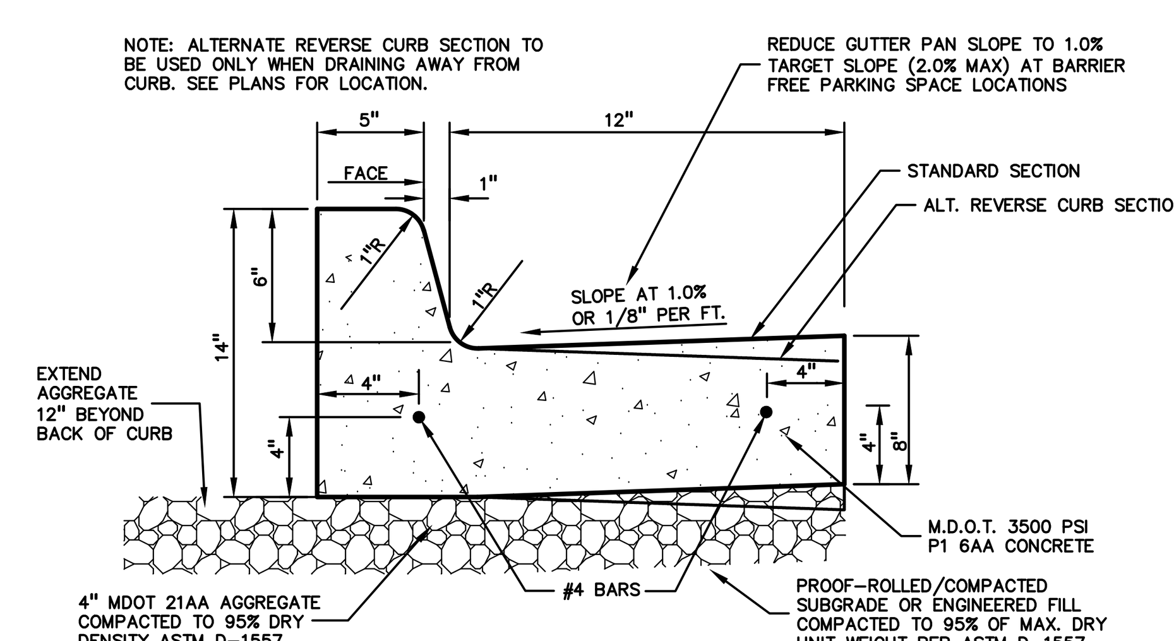
NOTES:
1. THE BARRIER FREE PARKING SYMBOL SHALL BE LOCATED IN THE CENTER OF THE PARKING SPACE AND ALONG THE EDGE OF THE ADJACENT DRIVE AISLE, TYP.
2. PARKING SYMBOL STRIPING SHALL HAVE A MINIMUM WIDTH OF 3"
3. CONTRACTOR SHALL ADHERE TO LOCAL/STATE JURISDICTIONAL REQUIREMENTS FOR ALL PAINTING WITHIN ACCESSIBLE SPACES.



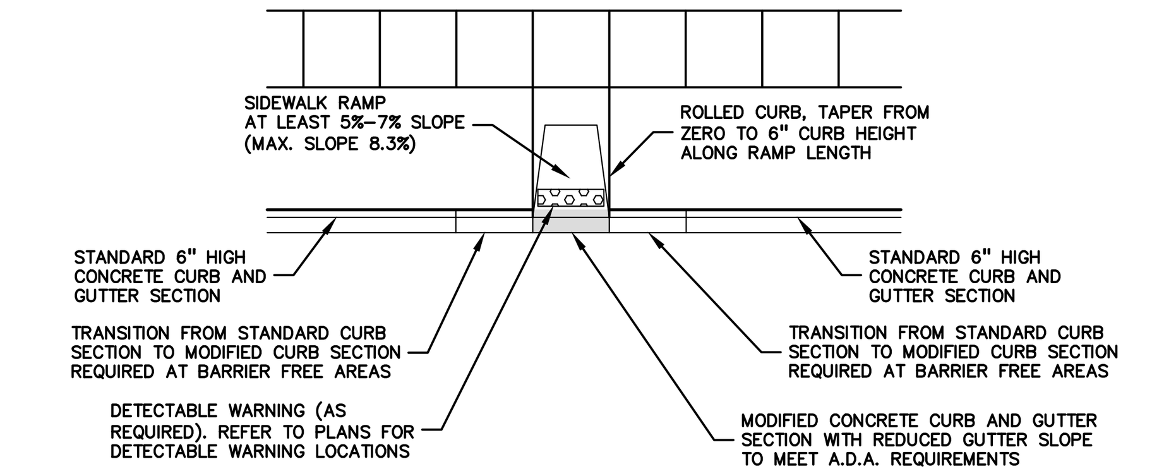
DET 7 BARRIER FREE PARKING SYMBOL DETAIL (INTERNATIONAL SYMBOL OF ACCESSIBILITY)
NOT TO SCALE



DET 5 UNIVERSAL BARRIER FREE PARKING STALL DETAIL
NOT TO SCALE



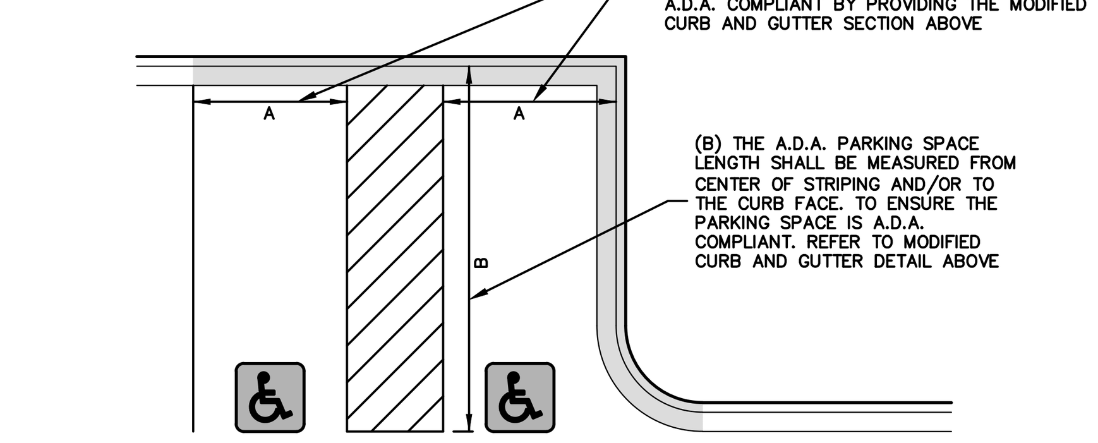
MODIFIED CURB AND GUTTER SECTION FOR BARRIER FREE PARKING AREAS



TYPICAL SIDEWALK RAMP PLAN VIEW

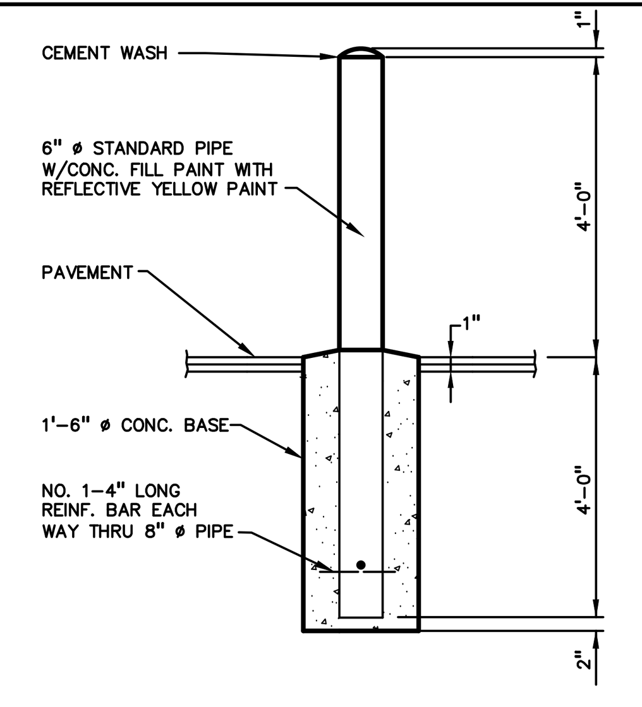
(A) THE STANDARD A.D.A. PARKING SPACE WIDTH OF 8.0' SHALL BE MEASURED FROM CENTER OF STRIPING AND/OR TO THE CURB FACE (WHERE SPACES ARE DIMENSIONED TO THE CURB FACE). ENSURE THE PARKING SURFACE IS A.D.A. COMPLIANT BY PROVIDING THE MODIFIED CURB AND GUTTER SECTION ABOVE

(B) THE A.D.A. PARKING SPACE LENGTH SHALL BE MEASURED FROM CENTER OF STRIPING AND/OR TO THE CURB FACE. TO ENSURE THE PARKING SPACE IS A.D.A. COMPLIANT. REFER TO MODIFIED CURB AND GUTTER DETAIL ABOVE

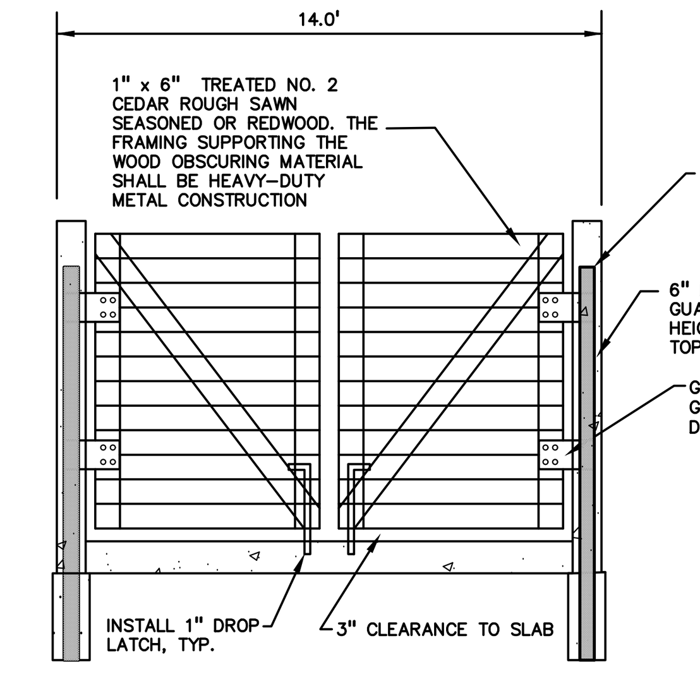


TYPICAL BARRIER FREE PARKING SPACES

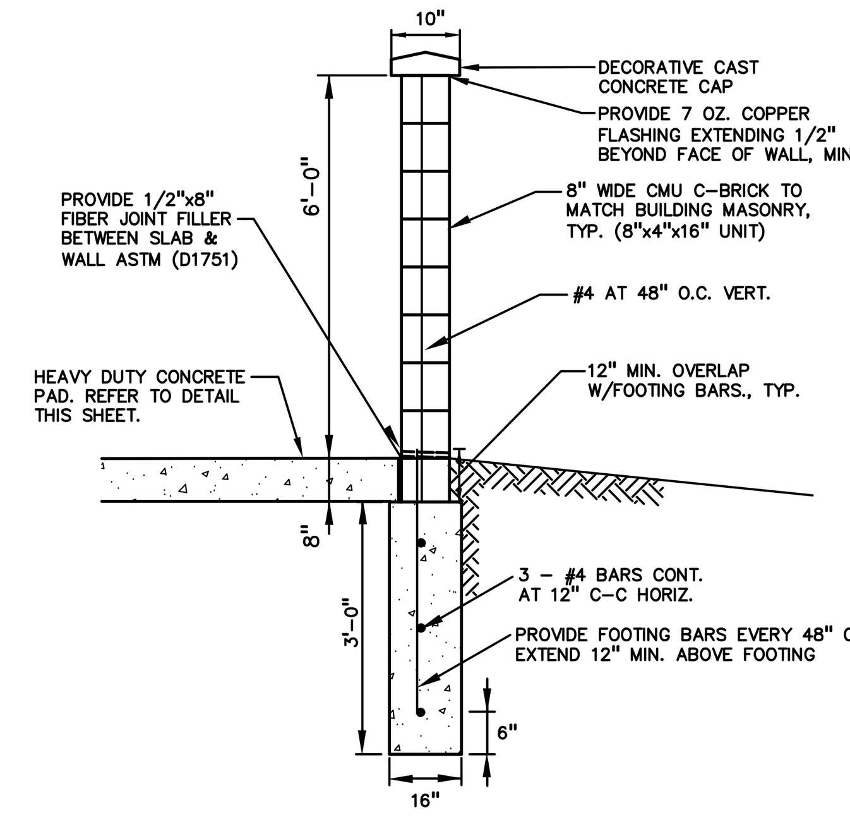
DET 4 MODIFIED 18"x6" CONCRETE CURB AND GUTTER DETAIL TO BE USED IN BARRIER FREE AREAS



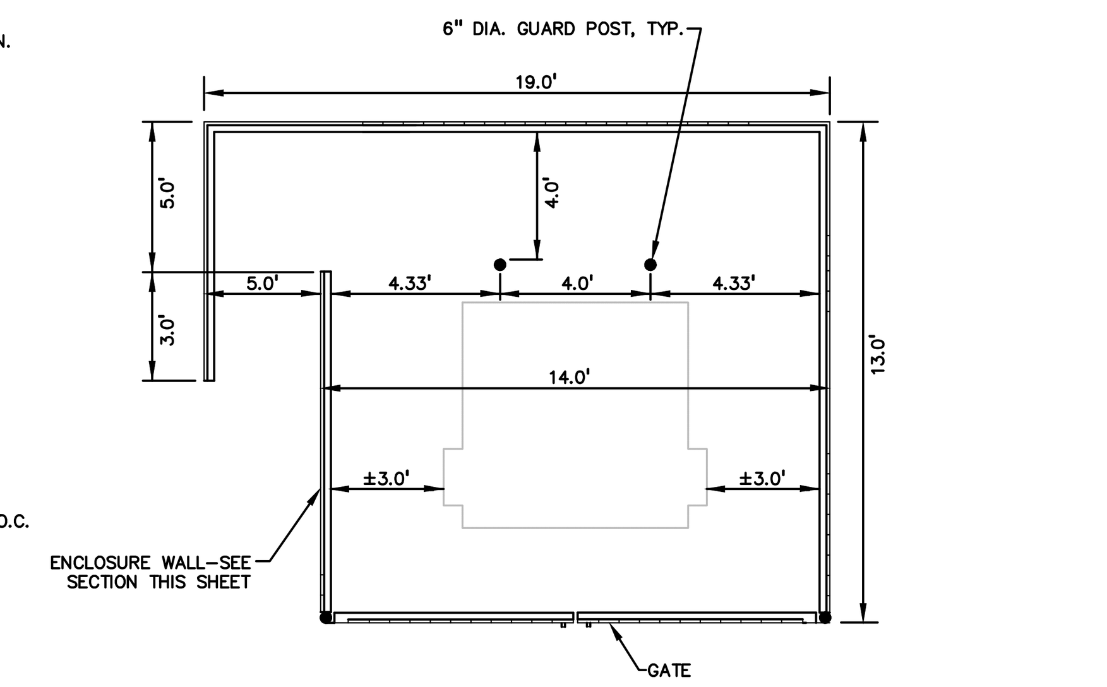
6" DIA. GUARD POST DETAIL
NOT TO SCALE



TRASH ENCLOSURE GATE DETAIL
NOT TO SCALE

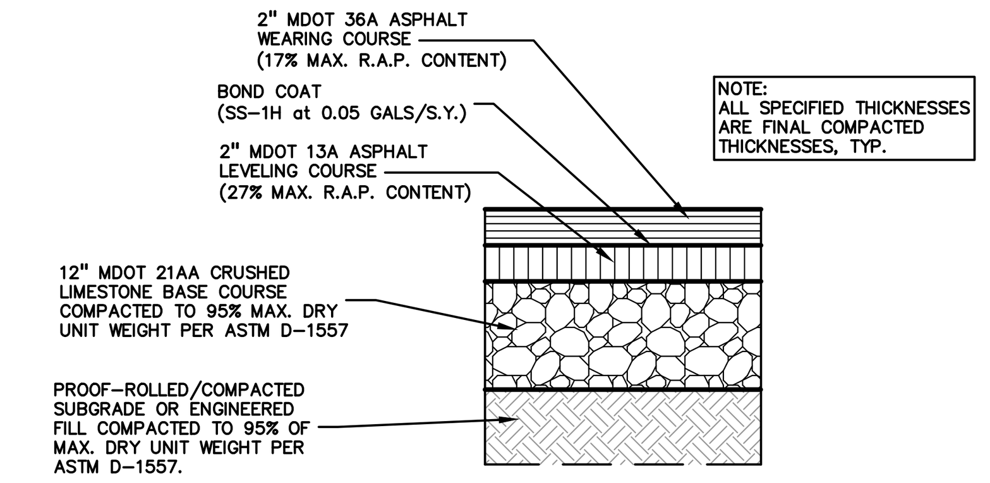


DUMPSTER ENCLOSURE WALL CROSS SECTION
NOT TO SCALE



PLAN VIEW
NOT TO SCALE

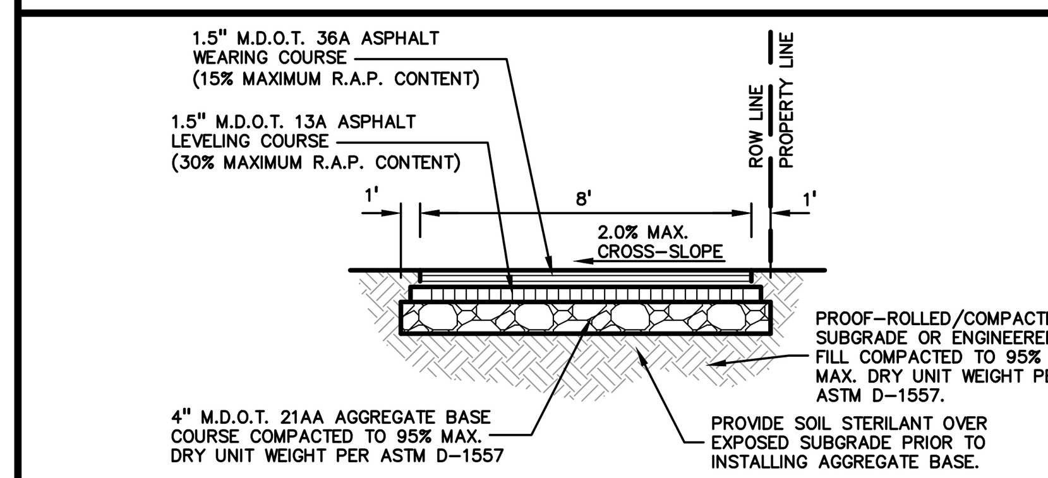
TRASH ENCLOSURE DETAILS



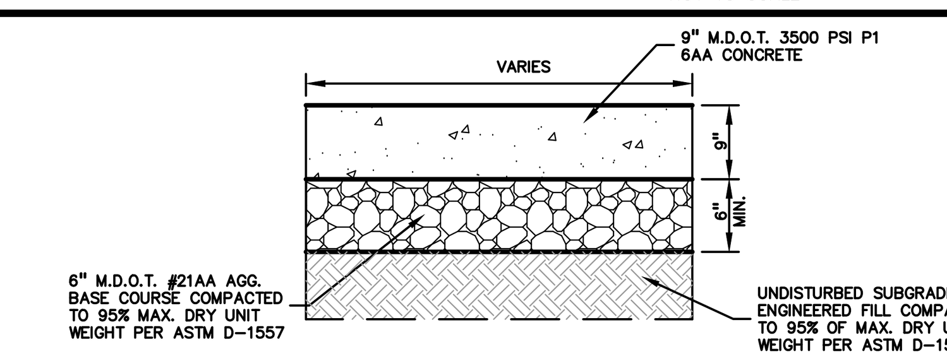
STANDARD DUTY ASPHALT DETAIL
(NOT FOR USE IN THE RIGHT-OF-WAY)
NOT TO SCALE

AGGREGATE BASE NOTE:
THIS PAVEMENT SECTION DESIGN ASSUMES THE USE OF MDOT 21AA CRUSHED LIMESTONE BASE MATERIAL THAT MEETS THE REQUIREMENTS OF MDOT STANDARD SPECIFICATION SECTION 902 FOR AGGREGATES. IF CRUSHED CONCRETE AGGREGATE BASE IS PROPOSED IN LIEU OF THE SPECIFIED CRUSHED LIMESTONE MATERIAL, PEA GROUP WILL REQUIRE A MINIMUM 25% INCREASE IN BASE THICKNESS. HOWEVER, IF TESTING DOCUMENTATION IS PROVIDED TO PEA GROUP THAT SHOWS THAT THE CRUSHED CONCRETE MATERIAL MEETS ALL REQUIREMENTS OF MDOT SPECIFICATION SECTION 902, THEN THE 25% INCREASE IN THICKNESS MAY BE REEVALUATED.

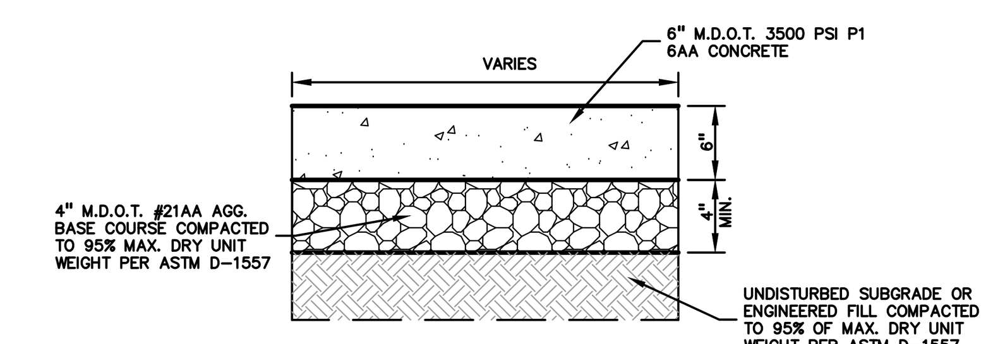
ASPHALT MATERIAL NOTES:
HOT-MIX ASPHALT MIXTURES UTILIZING RECYCLED ASPHALT PAVEMENT (RAP) MUST MEET MDOT SPECIAL PROVISION 12SP501(E). THE BINDER GRADE FOR THIS WORK IS PG58-22. IF ASPHALT MIXES CONTAINING RAP ARE TO BE SUPPLIED FOR THIS PROJECT, THE ASPHALT BINDER MUST BE REVISED PER MDOT 'TIER 1' OR 'TIER 2' REQUIREMENTS (RAP CONTENT UP TO 27% MAXIMUM). TIER 3 MIXES ARE NOT ACCEPTABLE ON THIS PROJECT. AN ASPHALT MIX DESIGN FOR ALL SPECIFIED MIXES SHOULD BE FORWARDED TO PEA GROUP FOR REVIEW PRIOR TO CONSTRUCTION



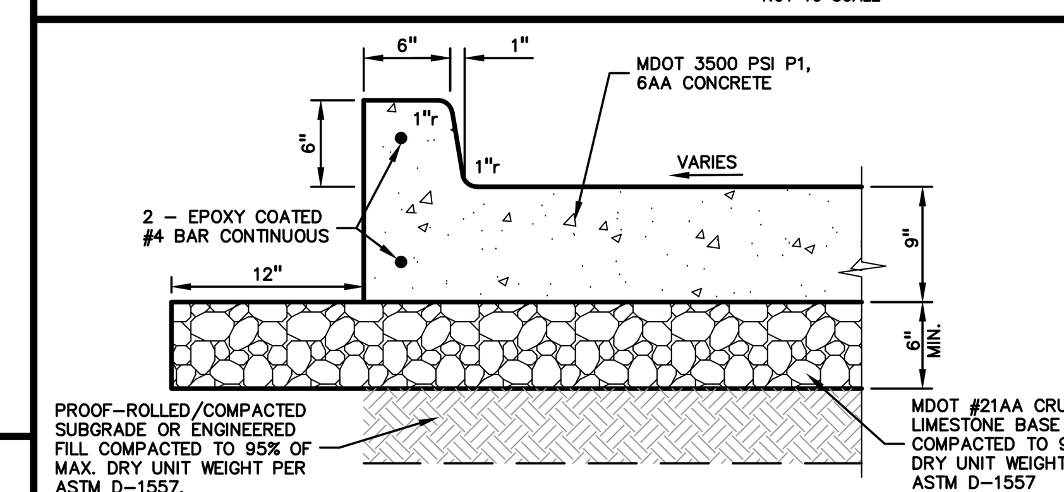
ASPHALT BIKE PATH DETAIL
NOT TO SCALE



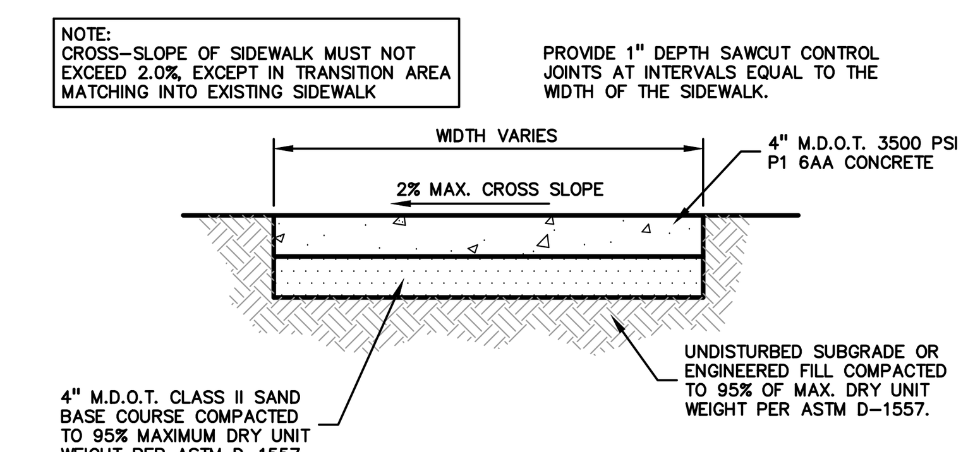
HEAVY DUTY CONCRETE DETAIL
NOT TO SCALE



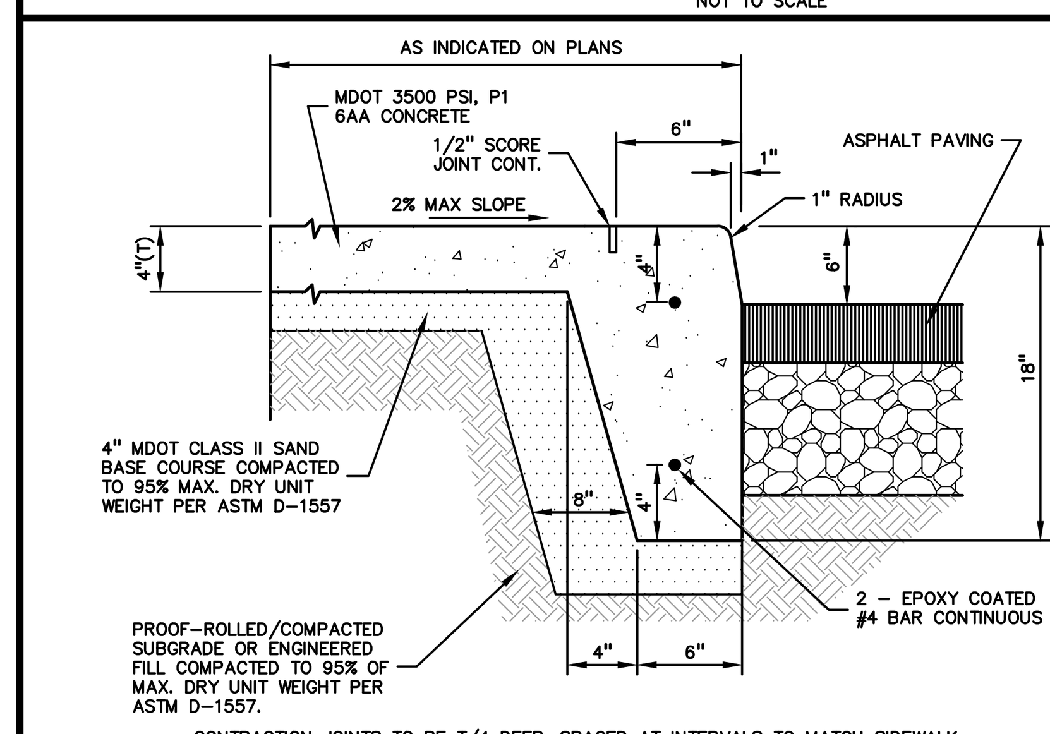
UTILITY PAD CONCRETE DETAIL
NOT TO SCALE



CONCRETE PAVEMENT WITH INTEGRAL CURB
NOT TO SCALE

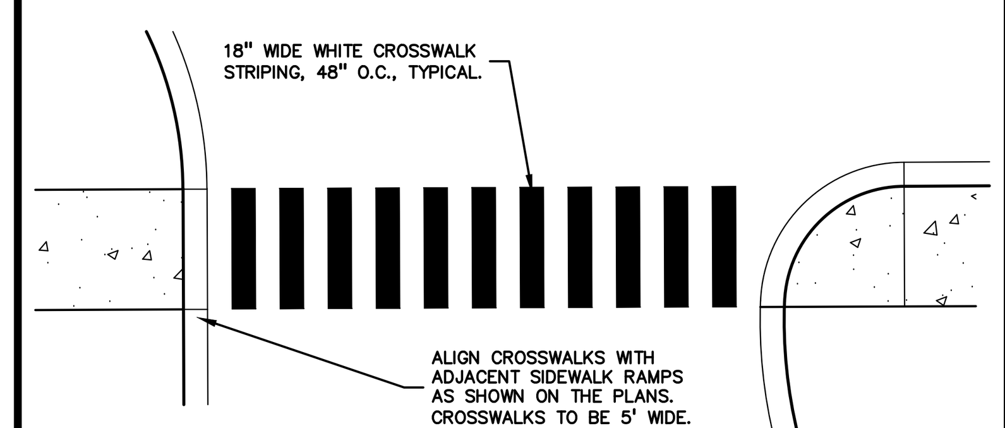


CONCRETE SIDEWALK
NOT TO SCALE

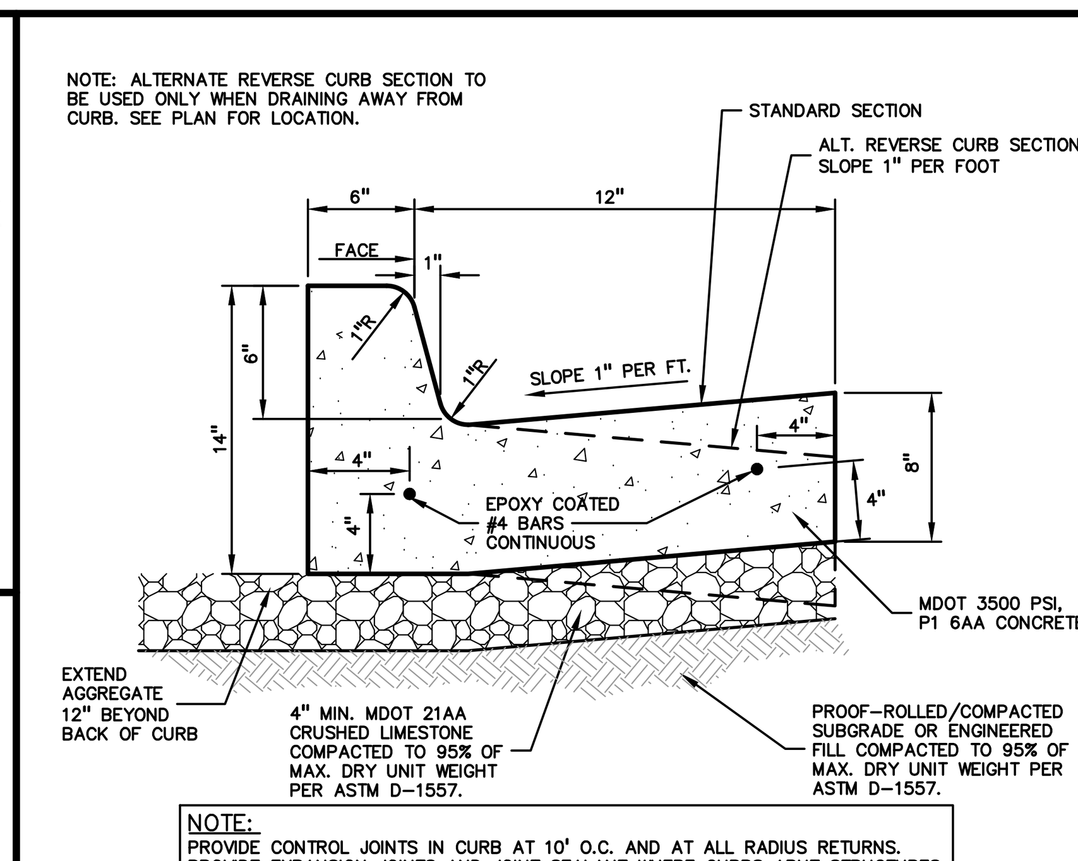


CONTRACTION JOINTS TO BE T/4 DEEP, SPACED AT INTERVALS TO MATCH SIDEWALK WIDTH (SAWCUT). 1/2-INCH PRE-MOLDED FILLER EXPANSION JOINTS WITH JOINT SEALANT SHALL BE PLACED ONLY WHERE SIDEWALK ABUTS A STRUCTURE.

INTEGRAL CURB AND SIDEWALK
NOT TO SCALE

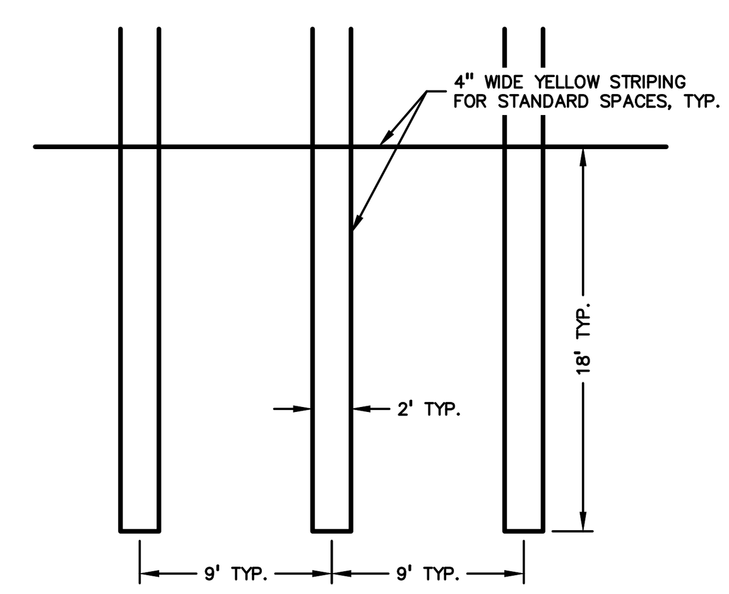


STRIPED CROSSWALK DETAIL
NOT TO SCALE

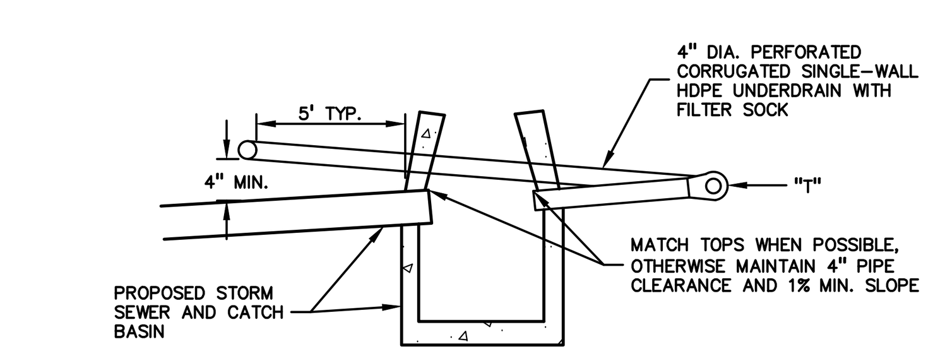


NOTE:
PROVIDE CONTROL JOINTS IN CURB AT 10' O.C. AND AT ALL RADIUS RETURNS.
PROVIDE EXPANSION JOINTS AND JOINT SEALANT WHERE CURBS ABUT STRUCTURES.

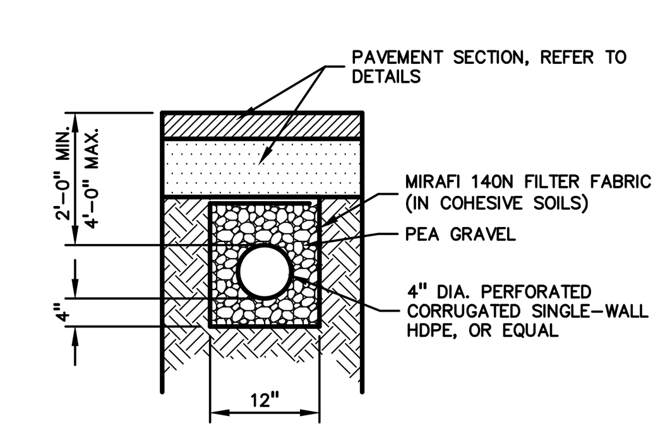
18"x6" STANDARD CONCRETE CURB AND GUTTER
NOT TO SCALE



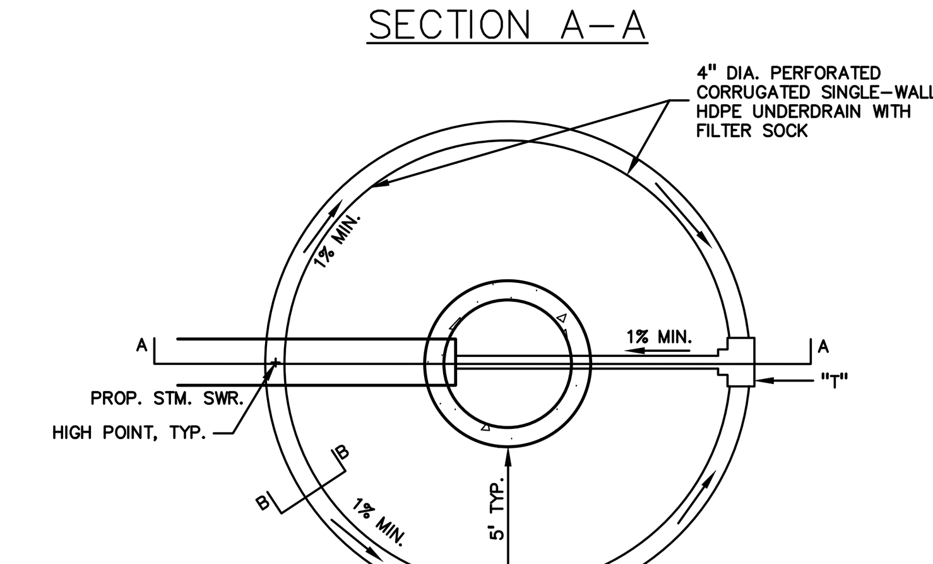
DOUBLE STRIPING DETAIL
NOT TO SCALE



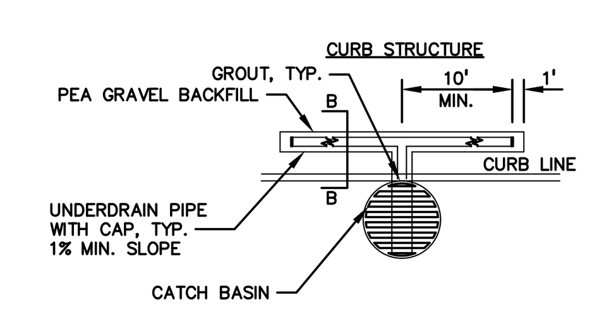
SECTION A-A



SECTION B-B



PLAN VIEW – PAVEMENT STRUCTURE



PLAN VIEW – CURB STRUCTURE

PAVEMENT INLET/CATCH BASIN UNDERDRAIN DETAIL
NOT TO SCALE

PEA GROUP
TROY ■ WASHINGTON TWP
BRIGHTON ■ DETROIT
t: 844.813.2949

www.peagroup.com

CAUTION!!
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CLIENT
TRINITY REAL ESTATE INVESTMENTS
26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE
CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

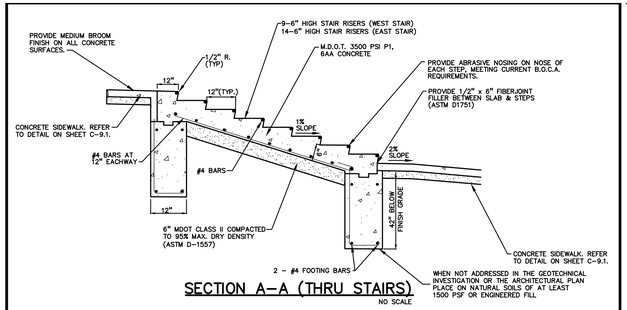
REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

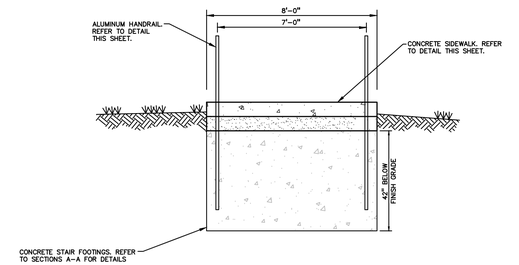
DRAWING TITLE
NOTES & DETIALS

PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK

DRAWING NUMBER:
C-9.1



SECTION A–A (THRU STAIRS)
NO SCALE



SECTION B–B (THRU STAIRS)
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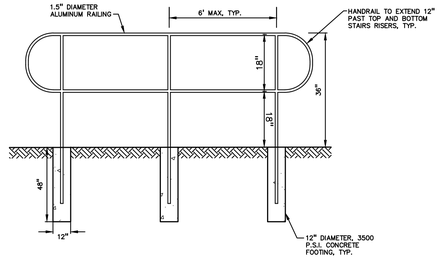
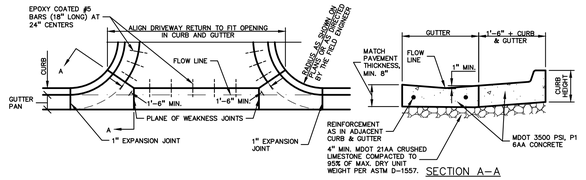


NOTE:
1. HANDRAIL TO CONFORM TO LATEST ADA STANDARDS AND GUIDELINES.
2. CONTRACTOR TO SUBMIT SHOP DRAWING PRIOR TO CONSTRUCTION.

ALUMINUM HANDRAIL DETAIL
NOT TO SCALE

CONCRETE STAIRS AND WALK WITH HANDRAIL DETAIL



MDOT DRIVEWAY OPENING–DETAIL 'M'
NOT TO SCALE

PEA GROUP
TROY ■ WASHINGTON TWP
BRIGHTON ■ DETROIT
t: 844.813.2949
www.peagroup.com

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

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SEPTEMBER 22, 2020

DRAWING TITLE
NOTES AND DETAIL SHEET

PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK

DRAWING NUMBER:
C-9.2

S:\PROJECTS\2016\2016-304 COLLIER ROAD - JBT\Dwg\Construction\C-9 NOTES-16304.dwg

LANDSCAPE CALCULATIONS PER CITY OF AUBURN HILLS: ZONED MULTI-FAMILY LOW RISE (RM.2)

TOTAL SITE AREA: 6.34 ACRES (276,170.4 SQ.FT.) NET & GROSS

REQUIREMENT		PROVIDED
NET LANDSCAPE AREA	119,285.4 SQ.FT. X 0.20 = 23,857 SQ FT. REQ.	23,857 SQ FT. PROVIDED (20%)
SITE AREA LANDSCAPE	23,857 SQ FT. / 1,000 = 23 TREES REQ.	23 PROPOSED TREES
FRONTAGE LANDSCAPE	BALDWIN RD: 372 LF – 28 = 344/30 = 11 TREES COLLIER RD: 459 LF – 39 = 420/30 = 14 TREES	25 TREES PROVIDED.
PARKING INTERIOR LANDSCAPE	1 TREE PER ISLAND (4 REQUIRED)	4 PROVIDED
BUFFER AREA SCREENING	1 TREE PER 20LF ABUTTING RESIDENTIAL (288/ 20= 15 TREES REQUIRED)	15 PROVIDED
TOTAL LANDSCAPE TREES	67 TREES REQUIRED	67 NEW TREES PROVIDED
TOTAL REPLACEMENT TREES	1:1 REPLACEMENT FOR ALL REGULATED TREES AND 25% OF LANDMARK DBH: 26" LANDMARK REMOVED x25% = 6.5/ 2.5" CAL. REPLACEMENT TREE = 3 LANDMARK REPLACEMENT + 164 REGULATED REPLACEMENT = 167 REPLACEMENT TREES REQUIRED. SEE SHEET T-1.0 FOR REPLACEMENT CALCS. (REPLACEMENT TREES REQUIRED MAY BE USED AS LANDSCAPE TREES).	67 REPLACEMENT TREES AND 67 LANDSCAPE TREES = 134 PROVIDED. DUE TO LACK OF SPACE ON SITE 33 REMAINING TREES x $380 = $12,540 TO BE PAID INTO THE TREE FUND.
		134 TOTAL NEW TREES PROVIDED

SEED LAWN NOTE:
LAWN SEED SHOULD BE A VARIETY NORMALLY FOUND GROWING IN OAKLAND COUNTY

KEY:

- = SITE AREA LANDSCAPE TREES (23)
- = FRONTAGE TREES (25)
- = PARKING LOT TREES (4)
- = BUFFER TREES (15)
- = REPLACEMENT TREES (67)
- = SHRUBS
- = IRRIGATED SEED LAWN
- = EXISTING TREE / TAG TO REMAIN WITH TREE PROTECTION FENCING (#782)

SEE SHT. T-1.0 FOR EXISTING TREE LIST / REMOVALS

DESCRIPTION	SURVEYED TREES	REPLACEMENT TREES
Non-regulated trees	47	0
Removed - Landmark Trees (26")	1	3
Removed - Regulated Trees	164	164
Previous Mass - Grading	-	0
Saved Trees	23	0
Totals	227	

LANDSCAPE/TREE REPLACEMENT NOTES

- All installed trees are to have a straight trunk.
- All installed trees are to be northern grown.
- All installed trees are to be State Department of Agriculture Nursery Grade No. 1 or better.
- All replacement trees are considered protected regardless of size.
- All trees shall be guaranteed for a minimum of two years.
- All landscaped areas shall be irrigated with an underground sprinkler system.

GENERAL PLANTING NOTES:

1. LANDSCAPE CONTRACTOR SHALL VISIT SITE, INSPECT EXISTING SITE CONDITIONS AND REVIEW PROPOSED PLANTING AND RELATED WORK. IN CASE OF DISCREPANCY BETWEEN PLAN AND PLANT LIST, PLAN SHALL GOVERN QUANTITIES. CONTACT LANDSCAPE ARCHITECT WITH ANY CONCERNS.
2. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL ON SITE UTILITIES PRIOR TO BEGINNING CONSTRUCTION ON HIS/HER PHASE OF WORK. ELECTRIC, GAS, TELEPHONE, CABLE TELEVISION MAY BE LOCATED BY CALLING MISS DIG 1-800-482-7171. ANY DAMAGE OR INTERRUPTION OF SERVICES SHALL BE THE RESPONSIBILITY OF CONTRACTOR. CONTRACTOR SHALL COORDINATE ALL RELATED ACTIVITIES WITH OTHER TRADES ON THE JOB AND SHALL REPORT ANY UNACCEPTABLE JOB CONDITIONS TO OWNER'S REPRESENTATIVE PRIOR TO COMMENCING.
3. ALL PLANT MATERIAL TO BE PREMIUM GRADE NURSERY STOCK AND SHALL SATISFY AMERICAN ASSOCIATION OF NURSERYMEN STANDARD FOR NURSERY STOCK. ALL LANDSCAPE MATERIAL SHALL BE NORTHERN GROWN, NO. 1. GRADE.
4. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL QUANTITIES SHOWN ON LANDSCAPE PLAN PRIOR TO PRICING THE WORK.
5. THE OWNER'S REPRESENTATIVE RESERVES THE RIGHT TO REJECT ANY PLANT MATERIAL NOT MEETING SPECIFICATIONS.
6. ALL SINGLE STEM SHADE TREES TO HAVE STRAIGHT TRUNKS AND SYMMETRICAL CROWNS.
7. ALL SINGLE TRUNK SHADE TREES TO HAVE A CENTRAL LEADER; TREES WITH FORKED OR IRREGULAR TRUNKS WILL NOT BE ACCEPTED.
8. ALL MULTI STEM TREES SHALL BE HEAVILY BRANCHED AND HAVE SYMMETRICAL CROWNS. ONE SIDED TREES OR THOSE WITH THIN OR OPEN CROWNS SHALL NOT BE ACCEPTED.
9. ALL EVERGREEN TREES SHALL BE HEAVILY BRANCHED AND FULL TO THE GROUND, SYMMETRICAL IN SHAPE AND NOT SHEARED FOR THE LAST FIVE GROWING SEASONS.
10. ALL TREES TO HAVE CLAY OR CLAY LOAM BALLS, TREES WITH SAND BALLS WILL BE REJECTED.
11. NO MACHINERY IS TO BE USED WITHIN THE DRIP LINE OF EXISTING TREES; HAND GRADE ALL LAWN AREAS WITHIN THE DRIP LINE OF EXISTING TREES.
12. 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.
13. IT IS MANDATORY THAT POSITIVE DRAINAGE IS PROVIDED AWAY FROM ALL BUILDINGS.
14. ALL PLANTING BEDS SHALL RECEIVE 3" SHREDDED HARDWOOD BARK MULCH WITH PRE EMERGENT, SEE SPECIFICATIONS. SHREDDED PALETTE AND DYED MULCH WILL NOT BE ACCEPTED.
15. ALL LANDSCAPED AREAS SHALL RECEIVE 3" COMPACTED TOPSOIL.
16. SEE SPECIFICATIONS FOR ADDITIONAL COMMENTS, REQUIREMENTS, PLANTING PROCEDURES AND WARRANTY STANDARDS.
17. FOR NON-LAWN SEED MIX AREAS, AS NOTED ON PLAN, BRUSH MOW ONCE SEASONALLY FOR INVASIVE SPECIES CONTROL.

PLANT MATERIAL LIST:

One species to contribute no more than 10% of the Trees for 100+ proposed trees (126 Trees x 0.10 = 12 Trees)

One genus to contribute no more than 20% of the Trees for 100+ proposed trees (126 Trees x 0.20 = 25 Trees)

QTY	KEY	BOTANICAL NAME / COMMON NAME	SIZE / ROOT (MINIMUM)	PERCENTAGE SPECIES	PERCENTAGE GENUS
8	AL2.5	*Amelanchier laevis (SERVICEBERRY - single stem)*	2.5" cal. B&B	5.97%	5.97%
6	AR2.5	*Acer rubrum 'Bowhall' (BOWHALL RED MAPLE)*	2.5" cal. B&B	4.48%	4.48%
10	BN2.5	*Betula nigra (RIVER BIRCH)*	2.5" cal. B&B	7.46%	7.46%
8	CO2.5	*Celtis occidentalis (COMMON HACKBERRY)*	2.5" cal. B&B	5.97%	5.97%
6	GB2.5	*Ginko biloba 'fastigiata' (COLUMNAR GINKO - males only)*	2.5" cal. B&B	4.48%	4.48%
8	GT2.5	*Gleditsia triacanthos inermis 'Skyline' (THORNLESS SKYLINE HONEYLOCUST)*	2.5" cal. B&B	5.97%	5.97%
6	LD2.5	*Larix decidua (LARCH)*	2.5" cal. B&B	4.48%	4.48%
7	MS2.5	*Malus 'Sparking Sprite' (SPARKLING SPRITE CRAB)*	2.5" cal. B&B	5.22%	5.22%
8	NS2.5	*Nyssa sylvatica (SOUR GUM)*	2.5" cal. B&B	5.97%	5.97%
9	PA2.5	*Sassafras albidum (SASSAFRAS)*	2.5" cal. B&B	6.72%	6.72%
10	QB2.5	*Quercus bicolor (SWAMP WHITE OAK)*	2.5" cal. B&B	7.46%	11.19%
5	QR2.5	*Quercus rubra (RED OAK)*	2.5" cal. B&B	3.73%	
5	SA2.5	*Sassafras albidum (SASSAFRAS)*	2.5" cal. B&B	3.73%	3.73%
6	TC2.5	*Tilia cordata (LITTLE LEAF LINDEN)*	2.5" cal. B&B	4.48%	4.48%
4	AC8	*Abies concolor (CONCOLOR FIR)*	8' Ht.	2.99%	2.99%
6	PA8	*Picea abies 'Cupressina' (CUPRESSINA NORWAY SPRUCE)*	8' Ht.	4.48%	11.19%
9	PG8	*Picea glauca 'Montrose Spire' (MONTROSE SPIRE WHITE SPRUCE)*	8' Ht.	6.72%	
7	PN8	*Pinus nigra (AUSTRIAN PINE)*	8' Ht.	5.22%	9.70%
6	PS8	*Pinus strobus (EASTERN WHITE PINE)*	8' Ht.	4.48%	
134	TOTAL			100.00%	100.00%

SHRUB PLANT LIST:

QTY	KEY	COMMON NAME	SCIENTIFIC NAME	SIZE	SPEC
21	HA36	Annabelle Hydrangea	*Hydrangea arborescens 'Annabelle'*	36" Ht.	B&B
15	JC30	Gold Cone Juniper	*Juniperus communis 'Gold Cone'*	30" Ht.	B&B
36	TOTAL				

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NORTH

0 15 30 60

SCALE: 1" = 30'

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

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

CLIENT

TRINITY REAL ESTATE INVESTMENTS
26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE

CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE

LANDSCAPE PLAN

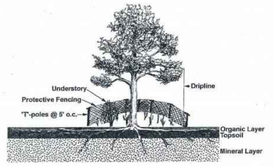
PEA JOB NO.	2016-304
P.M.	JBT
DN.	KD
DES.	KD

DRAWING NUMBER:

L-1.0

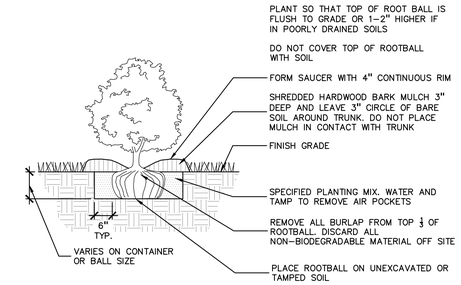
S:\PROJECTS\2016\2016-304 COLLIER ROAD – AUBURN\Landscape\CONSTRUCTION\L1-1.0_LANDSCAPE-11X34.dwg

TREE PROTECTION DETAIL



TREE PROTECTION NOTES

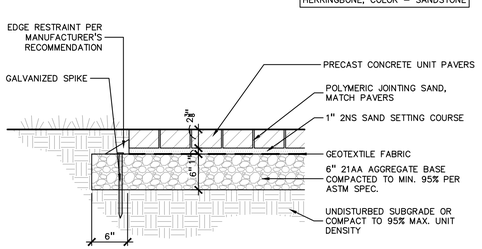
- Identify on site all trees or areas of trees which are being proposed to be preserved with fluorescent orange spray paint (chalk base) or by red flagging tape.
- Erect barriers of four (4) foot high fencing staked with metal "T-posts" five (5) feet on center or all such trees or groups of trees proposed to remain
- Protective barriers are to be erected prior to any clearing or grubbing on the site, and barriers are to remain in tact until approved by the City to be removed, or when a Certificate of Occupancy is issued.
- Keep clear all debris or fill, equipment, and material from within the required protective barrier.
- During construction, the owner, developer, or agent shall not cause or permit any activity within the fence line of any protected tree or group of trees including, but not limited to, the storage of equipment, dumpsters, boulders, dirt, and excavated material, building or waste material, or any other material harmful to the life of a tree.
- No damaging attachment, wires (other than cable wires for trees), signs, or permits may be fastened to any tree protected by this Ordinance.



3 SHRUB PLANTING DETAIL

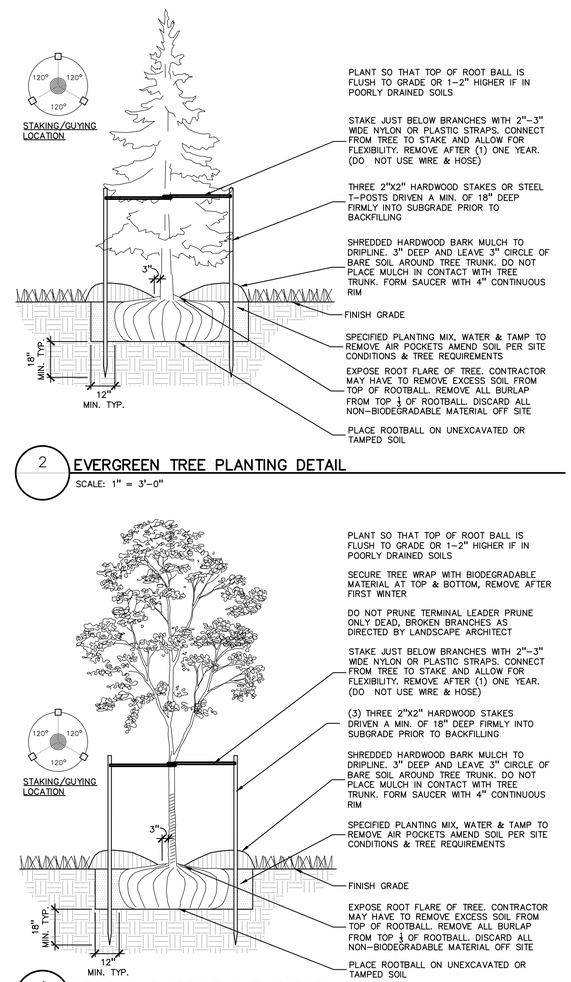
SCALE: 1" = 2'–0"

NOTE:
ALL CONCRETE PAVERS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDED SPECIFICATIONS
MANUFACTURER: UNILOCK
PHONE: 1.800.864.5625
TYPE : HOLLANDSTONE, PATTERN HERRINGBONE, COLOR – SANDSTONE



5 CONCRETE UNIT PAVER DETAIL

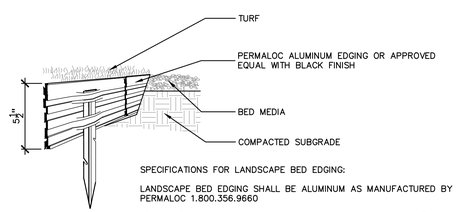
SCALE: 1" = 1'–0"



2 EVERGREEN TREE PLANTING DETAIL

SCALE: 1" = 3'–0"

Wetland Edge Seed Mix		
Botanical Name	**Common Name**	**PLS Ounces/Acre**
Permanent Grasses/Sedges:		
Bolboschoenus fluviatilis	River Bulrush	0.50
Carex comosa	Bristly Sedge	1.00
Carex cristatella	Crested Oval Sedge	2.00
Carex frankii	Bristly Cattail Sedge	6.00
Carex vulpinoidea	Brown Fox Sedge	3.00
Eleocharis palustris	Great Spike Rush	0.50
Elymus virginicus	Virginia Wild Rye	12.00
Glyceria striata	Fowl Manna Grass	1.00
Juncus effusus	Common Rush	1.00
Leersia oryzoides	Rice Cut Grass	0.50
Schoenoplectus americanus	Chairmaker's Bulrush	1.00
Schoenoplectus tabernaemon	Softstem Bulrush	2.50
Scirpus atrovirens	Dark Green Rush	1.00
Scirpus cyperinus	Wool Grass	0.75
	Total	**32.75**
Temporary Cover:		
Avena sativa	Common Oat	360.00
Lolium multiflorum	Annual Rye	100.00
	Total	**460.00**
Forbs:		
Acorus americanus	Sweet Flag	0.50
Alisma spp.	Water Plantain (Various	2.00
Asclepias incarnata	Swamp Milkweed	2.00
Bidens spp.	Bidens (Various Mix)	2.00
Doellingeria umbellata	Flat-Topped Aster	0.25
Eupatorium perfoliatum	Common Boneset	1.00
Helenium autumnale	Sneezeweed	2.00
Iris virginica	Blue Flag	4.00
Lobelia cardinalis	Cardinal Flower	0.10
Lobelia siphilitica	Great Blue Lobelia	0.25
Lycopus americanus	Common Water Horeho	0.25
Mimulus ringens	Monkey Flower	1.50
Penthorum sedoides	Ditch Stonecrop	0.50
Polygonum spp.	Pinkweed (Various Mix)	0.50
Rudbeckia laciniata	Wild Golden Glow	0.75
Sagittaria latifolia	Common Arrowhead	2.00
Senna hebecarpa	Wild Senna	2.00
Sparganium eurycarpum	Common Bur Reed	4.00
Symphyotrichum puniceum	Swamp Aster	1.00
Thalictrum dasycarpum	Purple Meadow Rue	0.50
Verbena hastata	Blue Vervain	1.50
Verbesina alternifolia	Wingstem	2.00
Vernonia spp.	Ironweed (Various Mix)	2.00
	Total	**32.60**



SPECIFICATIONS FOR LANDSCAPE BED EDGING:

LANDSCAPE BED EDGING SHALL BE ALUMINUM AS MANUFACTURED BY PERMALOC 1.800.356.9660

8' OR 16' SECTIONS SHALL BE USED WITH ONE STAKE PER 38" OF EDGING

EDGING SHALL BE 3/16" THICK X 4" DEPTH WHEN ADJ. TO MULCH AND 3/16" THICK X 5 1/2" DEPTH WHEN ADJ. TO ROCK, FINISH: BLACK DURAFLEX MEETING AAMA 2603

STAKE SHALL SECURELY ENGAGE EDGING AND SHALL BE ENTIRELY BELOW TOP SURFACE OF EDGING

EDGING SHALL HAVE A MINIMUM OF 2" OF INTERLOCKING OVERLAP BETWEEN SECTIONS

INSTALL AS PER MANUFACTURER'S SPECIFICATIONS WITH TOP OF EDGING 1/4"–1/2" ABOVE COMPACTED FINISH GRADE. FINISH GRADE TO BE COMPACTED ON BOTH SIDES OF EDGING TO MAINTAIN STABILITY

4 ALUMINUM EDGE DETAIL

SCALE: 1/2" = 1'–0"

1 DECIDUOUS TREE PLANTING DETAIL

SCALE: 1" = 3'–0"

NOT FOR CONSTRUCTION

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REVISIONS	
ENG. REVIEW #1	10-11-21
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ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
LANDSCAPE DETAILS

PEA JOB NO.	2016-304
P.M.	JBT
DN.	KD
DES.	KD

DRAWING NUMBER:
L-1.1

S:\PROJECTS\2016\2016-304 COLLIER ROAD - JBT\Dwg\Landscape\CONSTRUCTION\[L-1.1] LANDSCAPE DETAILS-16-304.dwg

GENERAL LANDSCAPING REQUIREMENTS

1.0 GENERAL

1.1 SUMMARY

1.1.1 Includes But Not Limited To

1. General procedures and requirements for Site Work.

2.0 PRODUCTS – Not Used

3.0 EXECUTION

3.1 PREPARATION

3.1.1 Protection

1. Spillage:
   - A. Avoid spillage by covering and securing loads when hauling on or adjacent to public streets or highways.
   - B. Remove spillage and sweep, wash, or otherwise clean project, streets, and highways.
2. Erosion Control:
   - A. Take precautions necessary to prevent erosion and transportation of soil downstream, to adjacent properties, and into on-site or off-site drainage systems.
   - B. Develop, install, and maintain an erosion control plan if required by law.
   - C. Repair and correct damage caused by erosion.
3. Existing Plants And Features:
   - A. Do not damage tops, trunks, and roots of existing trees and shrubs on site which are intended to remain.
   - B. Do not use heavy equipment within branch spread. Interfering branches may be removed only with permission of Landscape Architect.
   - C. Do not damage other plants and features which are to remain.

3.1.2 If specified precautions are not taken or corrections and repairs made promptly, Owner may take such steps as may be deemed necessary and deduct costs of such from monies due to Contractor. Such action or lack of action on Owner's part does not relieve Contractor from responsibility for proper protection of the Work.

END OF SECTION

LANDSCAPING PREPARATION

1.0 GENERAL

1.1 SUMMARY

1.1.1 Includes But Not Limited To

1. General landscape work requirements.

1.2 QUALITY ASSURANCE

1.2.1 Comply with all applicable local, state and federal requirements, regarding materials, methods of work, and disposal of excess and waste materials.

1.2.2 Obtain and pay for all required inspections, permits, and fees.

1.2.3 Provide notices required by governmental authorities.

1.3 PROJECT CONDITIONS

1.3.1 Locate and identify existing underground and overhead services and utilities within contract limit work areas. (Call Miss Dig: 1-800-482-7171 in Michigan).

1.3.2 Provide adequate means to protect utilities and services designated to remain.

1.3.3 Repair utilities damaged during site work operations at Subcontractor's expense.

1.3.4 When uncharted or incorrectly charted underground piping or other utilities and services are encountered during site work operations, notify the applicable utility company immediately to obtain procedure directions. Cooperate with the applicable utility company in maintaining active services in operation.

1.3.5 Locate, protect, and maintain benchmarks, monuments, control points and project engineering reference points. Re-establish disturbed or destroyed items at Subcontractor's expense.

1.3.6 Perform landscape work operations and the removal of debris and materials to assure minimum interference with streets, walks, and other adjacent facilities.

1.3.7 Obtain governing authorities' written permission when required to close or obstruct streets, walks and adjacent facilities. Provide alternate routes around closed or obstructed traffic ways when required by governing authorities.

1.3.8 Protect and maintain street lights, utility poles and services, traffic signal control boxes, curb boxes, valves and other services, except items designated for removal.

1.3.9 The General Contractor will occupy the premises and adjacent facilities during the entire period of construction. Perform landscape work operations to minimize conflicts and to facilitate General Contractor's use of the premises and conduct of his normal operations.

1.3.10 Perform landscape preparation work before commencing landscape construction.

1.3.11 Provide necessary barricades, coverings and protection to prevent damage to existing improvements indicated to remain.

1.3.12 Protect existing trees scheduled to remain against injury or damage including cutting, breaking or skinning of roots, trunks or branches, smothering by stockpiled construction materials, excavated materials or vehicular traffic within branch spread.

2.0 PRODUCTS

2.1 MATERIALS/EQUIPMENT

2.1.1 As selected by the General Contractor, except as indicated.

1. Tree protection:
   - A. Wood fencing – Snow fencing 4' height.
   - B. Posts – Steel fence post.
   - C. Herbicide for lawn restoration – "Round-up" by Monsanto.

3.0 EXECUTION

3.1 EXISTING UTILITIES

3.1.1 Call "MISS DIG" 811 before construction begins. Information on the drawings related to existing utility lines and services is from the best sources presently available. All such information is furnished only for information and is not guaranteed. Excavate test pits as required to determine exact locations of existing utilities.

3.2 CLEARING

3.2.1 Locate and suitably identify trees and improvements indicated to remain.

3.2.2 Fencing/soil erosion fence is to be installed.

3.2.3 Any equipment that compacts the soil in the areas of existing trees is not allowed.

3.2.4 Protect trees scheduled to remain with 4' high snow fence per plans.

3.2.5 No vehicular traffic is permitted beneath drip line at any time. All lawn areas are to be worked by hand.

3.2.6 Clear and grub areas within contract limits as required for site access and execution of the work.

3.2.7 Remove trees, plants, undergrowth, other vegetation and debris, except items indicated to remain.

3.2.8 Treat planting and lawn areas as required with herbicide per manufacturer recommendations to kill existing vegetation prior to planting, seeding and sodding.

3.2.9 Remove stumps and roots to a clear depth of 36" below subgrades. Remove stumps and roots to their full depth within 5'0" of underground structures, utility lines, footings, and paved areas.

3.3 DISPOSAL OF WASTE MATERIALS

3.3.1 Stockpile, haul from site and legally dispose of waste materials and debris. Accumulation is not permitted.

3.3.2 Maintain disposal routes, clear, clean and free of debris.

3.3.3 On site burning of combustible cleared materials is not permitted.

3.3.4 Upon completion of landscape preparation work, clean areas within contract limits, remove tools and equipment. Site to be clear, clean and free of materials and debris and suitable for site work operations.

3.3.5 Materials, items and equipment not scheduled for reinstallation or salvaged for the General Contractor are the property of the Landscape Contractor. Remove cleared materials from the site as the work progresses. Storage and sale of Landscape Contractors salvage items on site is not permitted.

END OF SECTION

FINISH GRADING AND TOPSOIL PLACEMENT

1.0 GENERAL

1.1 SUMMARY

1.1.1 Includes But Not Limited To

1. Perform finish grading and topsoil placement required to prepare site for installation of landscaping as described in Contract Documents.

1.2 SUBMITTALS

1.2.1 Quality Assurance

1. Submit test on imported topsoil and on site stockpiled topsoil by independent licensed testing laboratory prior to use. Imported topsoil shall meet minimum specified requirements and be approved by Landscape Architect prior to use.
2. Provide and pay for testing and inspection during topsoil operations. Laboratory, inspection services, and Soils Engineer shall be acceptable to the Landscape Architect.
3. Submit report stating location of source of imported topsoil and account of recent use.
4. Test for pH factor, mechanical analysis, and percentage of organic content.
5. Submit test reports to General Contractor.
6. Sub-Contractor, or testing agency to make recommendations on type of quantity of additives required to establish satisfactory pH factor and supply of nutrients to bring nutrients to satisfactory level for planting.

1.3 QUALITY ASSURANCE

1.3.1 Participate in pre-installation meeting with Landscape Architect.

1.4 PROJECT CONDITIONS

1.4.1 Also see Landscape Preparation Section.

1.4.2 Protect existing trees, plants, lawns, and other features designated to remain as part of the landscaping work.

1.4.3 Promptly repair damage to adjacent facilities caused by topsoil operations. Cost of repair at Subcontractor's expense.

1.4.4 Promptly notify the General Contractor and Landscape Architect of unexpected subsurface conditions.

2.0 PRODUCTS

2.1 MATERIALS

2.1.1 Topsoil: supplied and stockpiled topsoil proposed for use must meet the testing criteria results specified. Topsoil must conform to adjustments and recommendations from the soil test and by the Landscape Architect.

2.1.2 Existing topsoil: existing topsoil from on-site stockpile shall be utilized. All processing, cleaning, and preparation of this stored topsoil to render it acceptable for use is the responsibility of the Subcontractor.

2.1.3 Provide additional topsoil as required to complete the job. Topsoil must meet testing criteria results specified.

2.1.4 All processing, cleaning, and preparation of this supplied topsoil to render it acceptable for use is the responsibility of the Subcontractor.

2.1.5 Supplied and stockpiled topsoil, shall be fertile, friable, dark in color and representative of local productive soil, capable of sustaining vigorous plant growth and free of clay lumps, subsoil, noxious weeds or other foreign matter such as stones of 1" in any dimension, roots, sticks, and other extraneous material: not frozen or muddy. PH of soil range between 5.0 and 7.5

2.1.6 Soil shall not contain more than 2 percent of particles measuring over 2.0 mm in largest size

2.1.7 Prepared topsoil shall be used in planting mixtures as specified in Trees, Plants, and Ground Cover; all beds prepared as specified.

3.0 EXECUTION

3.1 EXAMINATION

3.1.1 Do not commence work of this Section until grading tolerances specified are met.

3.2 PREPARATION

3.2.2 Prior to grading, dig out weeds from planting areas by their roots and remove from site. Before placing top soil in landscape areas, remove rocks larger than 1 inch in any dimension and foreign matter such as building rubble, wire, cans, sticks, concrete, etc.

3.2.3 Prior to placing topsoil, remove any imported base material present in planting areas down to natural subgrade or other material acceptable to Landscape Architect.

3.3 PERFORMANCE

3.3.1 Site Tolerances

1. Total Topsoil Depth –
   - A. Lawn And Groundcover Planting Areas – 3 inches minimum compacted.
   - B. Shrub Planting Areas – 12 inches minimum throughout entire shrub bed area.
2. Elevation of topsoil relative to walks or curbs –
   - A. Seeded Lawn Areas – 1/4 inch below
   - B. Sodded Lawn Areas – 1 1/2 inches below
   - C. Shrub And Ground Cover Areas – 3 inches below

3.3.2 Do not expose or damage existing shrub or tree roots.

3.3.3 Redistribute approved existing top soil stored on site as a result of rough grading. Remove organic material, rocks and clods greater than 1 inch in any dimension, and other objectionable materials. Provide additional approved imported topsoil required for specified topsoil depth and bring surface to specified elevation relative to walk or curb.

3.3.4 For trees, shrubs, ground cover beds and plant mix for beds see Exterior Plants section.

3.3.5 Provide earth berming where indicated on Plans.

3.3.6 Berming to be free flowing in shape and design, as indicated, and to blend into existing grades gradually so that the toe of slope is not readily visible. Landscape Architect or General Contractor's representative to verify final contouring before planting.

3.3.7 Regardless of finish grading elevations indicated, it is intended that grading be such that proper drainage of surface water away from buildings will occur and that no low areas are created to allow ponding. Subcontractor to consult the General Contractor and Landscape Architect regarding variations in grade elevations before rough grading is completed.

3.3.8 Slope grade away from building for 12 feet minimum from walls at slope of 1/2 inch per ft minimum unless otherwise noted. High point of finish grade at building foundation shall be 6 inches minimum below finish floor level. Direct surface drainage in manner indicated on Drawings by molding surface to facilitate natural run-off of water. Fill low spots and pockets with top soil and grade to drain properly.

3.3.9 Rake all topsoil to remove clods, rocks, weeds, and debris.

3.3.10 Grade and shape area to bring surface to true uniform planes free from irregularities and to provide proper drainage and slopes per plans.

3.4 CLEANING

3.4.1 Upon completion of topsoil operations, clean areas within contract limits, remove tools, equipment, and haul all excess topsoil off-site. Site shall be clear, clean, free of debris, and suitable for site work operations.

END OF SECTION

LAWN SEEDING

1.0 GENERAL

1.1 SUMMARY

1.1.1 Includes But Not Limited To

1. Furnish and install seeded lawn as described in Contract Documents.

1.2 SUBMITTALS

1.2.1 Submit seed vendor's certification for required grass seed mixture, indicating percentages by weight, and percentage of purity, germination, and weed seed for each grass species.

1.3 DELIVERY AND STORAGE

1.3.1 Deliver seed and fertilizer materials in original unopened containers, showing weight, analysis, and name of manufacturer. Store in a manner to prevent wetting and deterioration.

1.4 PROJECT CONDITIONS

1.4.1 See landscape preparation section.

1.4.2 Work notification: Notify Landscape Architect of General Contractor's representative at least seven (7) working days prior to start of seeding operation.

1.4.3 Protect existing utilities, paving, and other facilities from damage caused by seeding operations.

1.4.4 Perform seeding work only after planting and other work affecting ground surface has been completed.

1.4.5 Provide hose and lawn watering equipment as required.

1.4.6 The irrigation system will be installed prior to seeding. Locate, protect, and maintain the irrigation system during seeding operations. Repair irrigation system components damaged during seeding operations at the Sub-Contractor's expense.

1.5 WARRANTY

1.5.1 See Landscape Maintenance and Warranty Section

2.0 PRODUCTS

2.1 MATERIALS

2.1.1 Topsoil for Seeded Areas: See Topsoil Placement and Drawings.

2.1.2 Lawn seeded areas: Fresh, clean and new crop seed mixture. Mixed by approved methods.

2.1.3 Seed mixture composed of the following varieties, mixed to the specified proportions by weight and tested to minimum percentages of purity and germination.

2.1.4 Irrigated Lawn Seed Mixture proportioned by volume as indicated below:

SEED TYPE	PROPORTION	PURITY	GERMINATION
Kentucky Bluegrass	50%	90%	75%
Penn Lawn Fescue	30%	95%	80%
Annual Ryegrass	20%	95%	80%

2.1.5 Non-Irrigated Seed Mixture proportioned by volume as indicated below:

SEED TYPE	PROPORTION	PURITY	GERMINATION
Penn Lawn Fescue	60%	90%	85%
Kentucky 28# Common Bluegrass	20%	90%	90%
Pennfine Perennial Rye	20%	90%	90%

2.1.6 Fertilizer: granular, non burning product composed of not less that 50% organic slow acting, guaranteed analysis professional fertilizer.

2.1.7 Ground Limestone: Used if required by soil test report: Containing not less than 85% of total carbonates and ground to such fineness that 50% will pass through a 100 mesh sieve and 90% will pass through a 20% mesh sieve.

2.1.8 Straw Mulch: Used in crimping process only. Clean oat or wheat straw well seasoned before bailing, free from mature seed-bearing status, or roots of prohibited or noxious weeds.

2.1.9 Water: Free of substance harmful to seed growth. Hoses or other methods to transpiration furnished by Sub Contractor.

3.0 EXECUTION

3.1 INSPECTION

3.1.1 Landscape Architect or General Contractor's representative must approve finish surfaces, grades, topsoil quality and depth. Do not start seeding work until unsatisfactory conditions are corrected.

3.2 PREPARATION

3.2.1 SURFACE PREPARATION

1. Seven days maximum prior to seeding, –
   - A. Treat Lawn areas if required with "Round-Up" by Monsanto, per label direction to kill existing vegetation prior to seeding.
   - B. Loosen topsoil areas to minimum depth of 4", dampen thoroughly, and cultivate to properly break up clods and lumps.
   - C. Rake area to remove clods, rocks, weeds, roots, debris, and stones over 1" in any dimension.
   - D. Grade lawn areas to smooth, free draining even surface with a loose, moderately coarse texture. Roll and rake, remove ridges, and fill depressions as required to drain.
   - E. Apply limestone to supplied topsoil if required by soil test report at rate determined by the soil test, to adjust pH of topsoil to not less than 6.0 no more that 6.8. Distribute evenly by machine and incorporate thoroughly into topsoil.
   - F. Apply fertilizers to indicated turf areas at a rate equal to 1 lb. of actual nitrogen 1,000 sq. ft. (43 lbs / acre).
   - G. Apply fertilizers by mechanical rotary or drop type distributor, thoroughly and evenly incorporated with soil to a depth of 1" by approved method. Fertilize areas inaccessible to power equipment with hand tools and incorporate into soil.
   - H. After lawn areas have been prepared, take no heavy objects over them except lawn rollers.
   - I. After preparation of lawn areas and with topsoil in semi-dry condition, roll lawn planting areas in two directions at approximately right angles with water ballast roller weighing 100 to 300 lbs according to soil type.
   - J. Rake or scarify and cut or fill irregularities that develop as required until area is true and uniform, free from lumps, depressions, and irregularities.
   - K. Restore prepared areas to specified condition if eroded, settled or otherwise disturbed after fine grading and prior to seeding.

3.3 INSTALLATION

3.3.1 SEEDING

1. Seed lawns only between April 1, and June 1, and fall seeding between August 15, and October 15, or at such other times acceptable to Landscape Architect.
2. Seed immediately after preparation of bed. Seed indicated areas within contract Limits and areas adjoining contract limits disturbed as a result of construction operations.
3. Perform seeding operations when the soil is dry and when the winds do not exceed five(5) miles per hour velocity.
4. Apply seed with a rotary or drop type distributor. Install seed evenly by sowing equal quantities in two (2) directions, at right angles to each other.
5. Sow seed at a rate of 300 lbs./acre.
6. After seeding, rake or drag surface of soil lightly to incorporate seed into top 1/8" of soil. Roll with light lawn roller.
7. Provide soil erosion planting mat where grade conditions required to stabilize the planting area.

3.3.2 HYDRO-SEEDING

1. Hydro-seeding: The application of grass seed and a wood cellulose fiber mulch tinted green shall be accomplished in one operation by use of an approved spraying machine.
   - A. Mix seed, fertilizer, and wood cellulose fiber in required amount of water to produce a homogeneous slurry. Add wood cellulous fiber after seed, water, and fertilizer have been thoroughly mixed and apply at the rate of 200 pounds per acre dry weight.
   - B. For hydro-seeding, wood cellulose fiber shall be used. Silva-Fiber Mulch by Weyerhaeuer Company, Tacoma, WA (800-443-9179).
   - C. Hydraulically spray material on ground to form a uniform cover impregnated with grass seed.
   - D. Immediately following application of slurry mix, make separate application of wood cellulose mulch at the rate of 1,000 pounds, dry weight, per acre.
   - E. Apply cover so that rainfall or applied water will percolate to underlying soil.

3.3.3 MULCHING

1. Place straw mulch on seeded areas within 24-hours after seeding.
2. Place straw mulch uniformly in a continuous blanket at a rate of 2-1/2 tons per acre, or two (2) 50 lb. bales per 1,000 sq. ft. of area. A mechanical blower may be used for straw mulch application when acceptable to the Landscape Architect.
3. Crimp straw into soil by use of a "crimper". Two passes in alternate direction required. Alternative methods on areas too small for crimper must be approved by the Landscape Architect or Owner's Representative.

3.3.3 ESTABLISH LAWN

1. Establish dense lawn of permanent grasses, free from lumps and depressions. Any area failing to show uniform germination to be reseeded; continue until dense lawn established.
2. Damage to seeded area resulting from erosion to be repaired by Sub Contractor.
3. In event Sub Contractor does not establish dense lawn during first germination period, return to project to refertilize and reseed to establish dense lawn.
4. Should the seeded lawn become largely weeds after germination, Sub Contractor is responsible to kill the weeds and reseed the proposed lawn areas to produce a dense turf, as specified.

3.4 CLEANING

3.4.1 Perform Cleaning during installation of the work and upon completion of the work to the approval of the Landscape Architect. Remove from site all excess materials, debris, and equipment. Repair damage resulting from seeding operations.

3.5 MAINTENANCE

3.5.1 See Landscape Maintenance and Warranty Section.

3.6 ACCEPTANCE

3.6.1 See Landscape Maintenance and Warranty Section.

END OF SECTION

LAWN SODDING

1.0 GENERAL

1.1 SUMMARY

1.1.1 Includes But Not Limited To

1. Furnish and install sodded lawn as described in Contract Documents.

1.2 QUALITY ASSURANCE

1.2.1 Sod: Comply with American Sod Producers Association (ASPA) classes of sod materials.

1.3 SUBMITTALS

1.3.1 Submit sod growers certification of grass species. Identify source location.

1.3.2 Submit manufacturer's certification of fertilizer.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Cut, deliver, and install sod within 24 hour period.

1.4.2 Do not harvest or transport sod when moisture content may adversely affect sod survival.

1.4.3 Protect sod from sun, wind, and dehydration prior to installation. Do not tear, stretch, or drop sod during handling and installation.

1.4.4 Sod which dries out before installation will be rejected.

1.5 PROJECT CONDITIONS

1.5.1 See Landscape Preparation section.

1.5.2 Work notification: Notify Landscape Architect or General Contractor's representative at least seven (7) working days prior to start of sodding operation.

1.5.3 Protect existing utilities, paving, and other facilities from damage caused by sodding operations.

1.5.4 Perform sodding work only after planting and other work affecting ground surface has been completed.

1.5.5 Restrict traffic from lawn areas until grass is established. Erect signs and barriers as required.

1.5.6 Provide hose and lawn watering equipment as required.

1.5.7 The irrigation system will be installed prior to sodding. Locate, protect, and maintain the irrigation system during sodding operations. Repair irrigation system components damaged during sodding operations at the Subcontractor's expense.

1.6 WARRANTY

1.6.1 See Landscape Maintenance and Warranty Section.

2.0 PRODUCTS

2.1 MATERIALS

2.1.1 Sod: An "approved" nursery grown blend of improved Kentucky Bluegrass varieties.

2.1.2 Sod containing Common Bermudagrass, Quackgrass, Johnsongrass, Poison Ivy, Nutsedge, Nimblewill, Canada Thistle, Timothy, Bentgrass, Wild Garlic, Ground Ivy, Perennial Sorrel, or Bromegrass weeds will not be acceptable.

2.1.3 Provide well rooted, healthy sod, free of diseases, nematodes and soil borne insects. Provide sod uniform in color, leaf texture, density, and free of weeds, undesirable grasses, stones, roots, thatch, and extraneous material; viable and capable of growth and development when planted.

2.1.4 Furnish sod, machine stripped in square pads or strips not more than 3'-0" long; uniformly 1" to 1-1/2" thick with clean cut edges. Mow sod before stripping.

2.1.5 Fertilizer: granular, non burning product composed of not less that 50% organic slow acting, guaranteed analysis professional fertilizer.

2.1.6 Type A: starter fertilizer containing 20% nitrogen, 12% phosphoric acid, and 8% potash by by weight or similar approved composition.

2.1.7 Ground Limestone: Used if required by soil test report: Containing not less than 85% of total carbonates and ground to such fineness that 50% will pass through a 100 mesh sieve and 90% will pass through a 20% mesh sieve.

2.1.8 Stakes: softwood, 3/4" x 8" long.

2.1.9 Water: Free of substance harmful to seed growth. Hoses or other methods to transpiration furnished by Sub Contractor.

2.1.10 Topsoil: see Topsoil Placement section.

3.0 EXECUTION

3.1 INSPECTION

3.1.1 Landscape Architect or General Contractor's representative must approve finish surfaces, grades, topsoil quality and depth. Do not start sodding work until unsatisfactory conditions are corrected.

3.2 PREPARATION

3.2.1 Surface Preparation:

1. Seven days maximum prior to sodding, –
   - a. Treat Lawn areas if required with herbicide per manufacturer recommendations to kill existing vegetation prior to sodding.
   - b. Loosen topsoil areas to minimum depth of 4", dampen thoroughly, and cultivate to properly break up clods and lumps.
   - c. Rake area to remove clods, rocks, weeds, roots, debris, and stones over 1" in any dimension.
   - d. Grade lawn areas to smooth, free draining even surface with a loose, moderately coarse texture. Roll and rake, remove ridges, and fill depressions as required to drain.
   - e. Apply limestone to supplied topsoil if required by soil test report at rate determined by the soil test, to adjust pH of topsoil to not less than 6.0 no more that 6.8. Distribute evenly by machine and incorporate thoroughly into topsoil.
   - f. Apply fertilizers to indicated turf areas at a rate equal to 1 lb. of actual nitrogen 1,000 sq. ft. (43 lbs / acre).
   - g. Apply fertilizers by mechanical rotary or drop type distributor, thoroughly and evenly incorporated with soil to a depth of 1" by approved method. Fertilize areas inaccessible to power equipment with hand tools and incorporate into soil.
   - h. After lawn areas have been prepared, take no heavy objects over them except lawn rollers.
   - i. After preparation of lawn areas and with topsoil in semi-dry condition, roll lawn planting areas in two directions at approximately right angles with water ballast roller weighing 100 to 300 lbs.
   - j. Rake or scarify and cut or fill irregularities that develop as required until area is true and uniform, free from lumps, depressions, and irregularities.
   - k. Restore prepared areas to specified condition if eroded, settled or otherwise disturbed after fine grading and prior to sodding.
   - l. Dampen dry soil prior to sodding.

3.3 INSTALLATION

3.3.1 Sodding:

1. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod strips. Do not overlay edges. Stagger strips to offset joints in adjacent course. Remove excess sod to avoid othering of adjacent grass. Provide sod pad top flush with adjacent curbs, sidewalks, drains, and seeded areas.
2. Do not lay dormant sod or install sod on saturated, frozen soil.
3. Install initial row of sod in a straight line, beginning at the bottom of slopes, perpendicular to direction of the sloped area. Place subsequent rows parallel to and lightly against previously installed row.
4. Peg sod on slopes greater than 3 to 1 or in centerline of swales to prevent slippage at a rate of 2 stakes per yard of sod.
5. Water sod thoroughly with a fine spray immediately after laying to obtain moisture penetration through sod into top 4 inches of topsoil.
6. Roll with light lawn roller in two directions perpendicular to each other to ensure contact with sub grade.
7. Install sod at indicated areas within contract limits and areas adjoining contract limits disturbed as a result of construction operations.
8. Damage to sodded area resulting from erosion to be repaired by Subcontractor.

3.4 CLEANING

3.4.1 Perform Cleaning during installation of the work and upon completion of the work to the approval of the Landscape Architect. Remove from site all excess materials, debris, and equipment. Repair damage resulting from sodding operations.

3.5 MAINTENANCE

3.5.1 See Landscape Maintenance and Warranty Section.

3.6 ACCEPTANCE

3.6.1 See Landscape Maintenance and Warranty Section.

END OF SECTION

PEA GROUP
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STATE OF MICHIGAN
KIMBERLY DIETZEL
NO. 1741
LANDSCAPE ARCHITECT

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

CLIENT
TRINITY REAL ESTATE INVESTMENTS
26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE
CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
LANDSCAPE SPECIFICATIONS

PEA JOB NO.	2016-304
P.M.	JBT
DN.	KD
DES.	KD

DRAWING NUMBER:
L-1.3

EXTERIOR PLANTS

1.0 GENERAL

1.1 SUMMARY

1.1.1 Includes But Not Limited To

1. Furnish and install landscaping plants as described in Contract Documents.

1.2 QUALITY ASSURANCE

1.2.1 Plant names indicated, comply with "Standardized Plant Names" as adopted by the latest edition of the American Joint Committee of Horticultural Nomenclature. Names of varieties not listed conform generally with names accepted by the nursery trade. Provide stock true to botanical name and legibly tagged.

1.2.2 Comply with sizing and grading standards of the latest edition of "American Standard for Nursery Stock". A plant shall be dimensioned as it stands in its natural position.

1.2.3 All plants shall be nursery grown under climatic conditions similar to those in the locality of the project for a minimum of two years.

1.2.4 Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable, at no additional charge. Larger plants shall not be cut back to size indicated.

1.2.5 Provide "specimen" plants with a special height, shape, or character of growth. Landscape Subcontractor is to tag specimen trees or shrubs at the source of supply. The Landscape Subcontractor shall inspect all plant material at source prior to Landscape Architect's approval. Landscape Subcontractor shall accompany Landscape Architect on final selection trip. The Landscape Architect will inspect specimen selections for suitability and adaptability to selected location. When specimen plants cannot be purchased locally, provide sufficient photographs of the proposed specimen plants for approval.

1.2.6 Plants may be inspected and approved at the place of growth for compliance with specification requirements for quality, size, and variety.

1.2.7 Approval of plant selection at the place of growth shall not impair the right of inspection and rejection upon delivery at the site or during progress of the work.

1.2.8 Provide percolation testing by filling plant pits with water and monitoring length of time for water to completely percolate into soil. Submit test results to Landscape Architect prior to starting work.

1.2.9 Before proceeding with work, check and verify dimensions and quantities. Report variations between Drawings and site to Landscape Architect before proceeding with work of this section.

1.2.10 Plant totals are for convenience only and are not guaranteed. Verify amounts shown on Drawings. All plantings indicated on Drawings are required unless indicated otherwise.

1.3 SUBMITTALS

1.3.1 Provide and pay for material testing. Testing agency shall be acceptable to the Landscape Architect. Provide the following data:

1. The loss of weight by ignition and moisture absorption capacity shall be tested for peat moss.

1.3.2 Submit the following material samples to Landscape Architect:

1. Peat moss, shredded hardwood bark mulch, planting accessories, pre-emergent herbicides, and plant fertilizers.

1.3.3 Submit the following materials certification to Landscape Architect:

1. Topsoil source and ph value, peat moss, and plant fertilizer.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Deliver fertilizer materials in original, unopened and undamaged containers showing weight, analysis, and name of manufacturer. Store in manner to prevent wetting and deterioration.

1.4.2 Take all precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected.

1.4.3 Spray deciduous plants in foliage with an approved "Anti-Desiccant" immediately after digging to prevent dehydration.

1.4.4 Dig, pack, transport, and handle plants with care to ensure protection against injury.

1.4.5 Inspection certificates required by law shall accompany each shipment invoice or order to stock on arrival. The certificate shall be filed with the General Contractor's representative.

1.4.6 Protect all plants from drying out. If plants cannot be planted immediately upon delivery, properly protect them with soil, shredded hardwood bark mulch, or in a manner acceptable to the General Contractor's representative.

1.4.7 Water heeled in plantings daily.

1.4.8 No plant shall be bound with rope or wire in a manner that could damage or break the branches.

1.4.9 Cover plants transported on open vehicles with a protective covering to prevent wind burn.

1.4.10 Frozen or muddy topsoil is not acceptable.

1.5 PROJECT CONDITIONS

1.5.1 See Landscape Preparation Section.

1.5.2 Work notification: notify Landscape Architect at least seven working days prior to installation of plant material.

1.5.3 Protect existing utilities, paving, and other facilities from damage caused by landscaping operations.

1.5.4 A complete list of plants, including a schedule of sizes, quantities, and other requirements is shown on the proposal form. In the event that quantity discrepancies or material omissions occur in the proposal form, Subcontractor shall notify the Landscape Architect during the proposal bidding process.

1.5.5 An irrigation system will be installed prior to planting. Locate, protect, and maintain the irrigation system during planting operations. Repair irrigation system components, damaged during planting operations, at the Landscape Subcontractor's expense.

1.5.6 The Landscape Subcontractor shall inspect existing soil conditions in all areas of the site where his operations will take place, prior to the beginning of work. It is the responsibility of the Landscape Subcontractor to notify the General Contractor's representative and the Landscape Architect in writing of any conditions which could affect the survivability of plant material to be installed.

1.6 WARRANTY

1.6.1 See Landscape Maintenance and Warranty Standards.

2.0 PRODUCTS

2.1 MATERIALS

2.1.1 Plants: Provide plants typical of their species or variety; with normal, densely developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sunscald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids and open spaces.

1. Dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock". Cracked or mushroomed balls are not acceptable.
2. All trees shall have clay or clay loam balls. Trees with sand balls will be rejected.
3. Provide tree species that mature at heights over 25'-0" with a single, main trunk. Trees that have the main trunk forming a "Y" shape are not acceptable.
4. Plants planted in rows shall be matched in form, (see specimen stock).
5. Plants larger than those specified in the plant list may be used when acceptable to the Landscape Architect.
6. No pruning wounds shall be present with a diameter of more than 1" and such wounds must show vigorous bark on all edges.
7. Evergreen trees shall be unsheared and branched to the ground.
8. Shrubs and small plants shall meet the requirements for spread and height indicated on the drawings.
9. Plant materials shall be subject to approval by the Landscape Architect as to size, health, quality, and character.
10. Bare root trees are not acceptable.
11. Provide plant materials from licensed nursery or grower.

2.1.2 Bare root plants: dug with adequate fibrous roots, to be covered with a uniformly thick coating of mud by being puddled immediately after they are dug or packed in moist straw or peat moss.

2.1.3 Container grown stock: grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm, and whole.

1. No plants shall be loose in the container.
2. Container stock shall not be root bound.
3. Single stemmed or thin plants will not be accepted.
4. Side branches shall be generous, well twigged, and the plant as a whole well bushed to the ground.
5. Plants shall be in a moist, vigorous condition, free from dead wood, bruises or other root or branch injuries.

2.1.4 Collected stock consists of plants growing under natural conditions in soils and climate as exist at location to be planted, in locations lending themselves to proper collecting practices. Root system (balls) to be at least twenty-five (25%) percent larger than specified for nursery grown material.

2.1.5 Specimen stock: all specimen designated plantings are to be nursery grown, fully developed, excellent quality, and typical example of the species. Plants designated to be planted in rows must be matched, symmetrical, and uniform in height, spread, caliper, and branching density.

1. Matched plantings should be obtained from the same nursery and, preferably, from the same row or line. All specimen material will be approved by the Landscape Architect at nursery.

2.1.6 Topsoil for planting mix: fertile, friable, natural topsoil of loamy character, without admixture of subsoil material, obtained from a well drained arable site, reasonably free from clay, lumps, coarse sands, stones, plants, roots, sticks, and other foreign materials with acidity range of between ph 6.0-6.8 for ericaceous plants.

2.1.7 Peat moss: brown to black in color, weed and seed free granulated raw peat.

1. Provide ASTM D2607 sphagnum peat moss with a ph below 6.0 for ericaceous plants.

2.1.8 Planting mixture Type A - trees: standard planting backfill shall be a mixture of ½native soil (excavated from plant pits), ¼topsoil, and ¼sand. Add fertilizer Type "A" and "B" to planting mixture per manufacturer's requirements. Follow planting details.

2.1.9 Planting mixture Type B for perennial flowers, groundcover beds, and ericaceous plants: planting backfill shall be a mixture of 1/3 screened topsoil, 1/3 sand and 1/3 peat. Al existing soil shall be excavated and removed. Adding fertilizer types "A" and "B" to mixture per manufacturer's requirements. Follow planting details. Planting mixture Type C for annual flower beds: same as Type "B". Submit a sample to the Landscape Architect for approval prior to installation.

2.1.10 Plant fertilizer Type A to be "Drimanure" applied per manufacturer recommendations.

2.1.11 Plant fertilizer Type B to be "14-14-14". Apply per manufacturer recommendations.

2.1.12 Bone Meal - 5 lbs. per cubic yard of soil mixes.

2.1.13 Lime to be ground dolomitic limestone, ninety-five (95%) percent passing through #100 mesh screen. Use to adjust soil pH only, under direction of Landscape Architect.

2.1.14 Sand to be clean, coarse, ungraded conforming to ASTM-C-3 for fine aggregates.

2.1.15 Anti-Desiccant: protective film emulsion providing a protective film over plant surfaces; permeable to permit transpiration. Mixed and applied in accordance with Manufacturer's instructions.

2.1.16 Shredded bark mulch shall be double processed, dark shredded hardwood bark that is clean, free of debris and sticks. Materials shall be uniform in size, shape, and texture. Submit samples to Landscape Architect for approval prior to installation. Install mulch to finish grade, level smooth, without ridges, humps, or depressions.

2.1.17 Water: free of substances harmful to plant growth. Hoses or other methods of transportation shall be furnished by Sub Contractor.

2.1.18 Stakes for staking :(3) Three Hardwood, 2" x 2" x 8'-0" long. Driven a min. of 18" deep firmly into subgrade prior to backfilling. Stakes for guying: Hardwood, 2" x 2" x 36" long.

2.1.19 Guying/staking material: Wit 2"-3" wide fabric straps, connect from tree to stake. Remove after (1) year, allow for flexibility. (Do not use wire & hose)

2.1.20 Tree wrap: standard waterproofed tree wrapping paper, 2-1/2" wide, made of 2 layers of crepe kraft paper weighing not less than 30 lbs. per ream, cemented together with asphalt. Secure tree wrap with biodegradable material at top and bottom. Remove after first winter.

2.1.21 Twine: two-ply jute material.

2.2 MEASUREMENTS

2.2.1 Measure height and spread of specimen plant materials with branches in their normal positions as indicated on Drawings or Plant List.

2.2.2 The measurements for height shall be taken from the ground level to the average height of the top of the plant and not the longest branch.

2.2.3 Measurement should be average of plant, not greatest diameter. For example, plant measuring 15 inches in widest direction and 9 inches in narrowest direction would be classified as 12 inch stock.

2.2.4 Plants properly trimmed and transplanted should measure same in every direction.

2.2.5 Measure caliper of trees 6 inches above surface of ground.

2.2.6 Where caliper or other dimensions of plant materials are omitted from Plant List, plant materials shall be normal stock for type listed.

2.2.7 Plant materials larger than those specified may be supplied, with prior written approval of Landscape Architect, and:

1. If complying with Contract Document requirements in all other respects.
2. If at no additional cost to Owner.
3. If sizes of roots or balls are increased proportionately.

2.2.8 The height of the trees, specified by height, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated on the drawings.

3.0 EXECUTION

3.1 INSPECTION

3.1.1 Landscape Architect or General Contractor's representative must approve proposed planting areas and conditions of installation. Do not start planting work until unsatisfactory conditions are corrected.

3.1.2 Individual plant locations shall be staked on the project site by the Landscape Contractor and approved by the Landscape Architect before any planting pits are dug. The Landscape Architect reserves the right to adjust plant material locations to meet field conditions, without additional cost to the General Contractor / Owner.

3.1.3 Accurately stake plant material according to the Drawings. Stakes shall be above grade, painted a bright color, and labeled with the name of the plant material to be installed at that location.

3.2 TIME OF PLANTING

3.2.1 Evergreen material: Plant Evergreen materials between September 1 and October 15 or in spring before new growth begins. If project requirements require planting at other times, plants shall be sprayed with anti-desiccant prior to planting operations.

3.2.2 Deciduous material: Plant deciduous materials in a dormant condition. If deciduous trees are planted in leaf, they shall be sprayed with anti-desiccant prior to planting operation.

3.2.3 Planting times other than those indicated must be acceptable to the Landscape Architect.

3.3 PREPARATION

3.3.1 General: See Landscape Preparation Section

3.3.2 Vegetation Removal

1. Strip existing grass and weeds, including roots from all bed areas leaving the soil surface one (1") inch below finish grade.
2. Herbicide: as required to prepare area for new planting applied to all ground cover, evergreen and shrubbery beds and all mulch areas before application of preemergence herbicide, per manufacture's recommendations. Clean area of all dead material after five (5) days.
3. Pre-Emergence Herbicide: applied per manufacturer recommendations to same area where "Herbicide" has been applied and to planting bed areas, after area is cleared of dead vegetation.
4. Herbicides to be applied by licensed applicator as required by the State.
5. Excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds. Provide plant pits per planting details. Depth of pit shall accommodate the root system. Scarify the bottom of the pit to a depth of 6".
6. Roughen sides of excavations.
7. Provide premixed planting mixture Type "A" for use around the balls and roots of all deciduous and evergreen tree plantings.

3.3.3 Ground Cover Beds, Perennial Flower Beds, and Ericaceous Plant Beds

1. Excavate existing soil to 12" depth over entire bed area and remove soil from site. Scarify bottom of bed to a 4" depth. Set plants according to drawings and backfill entire bed with premixed planting mixture "Type B". Ground Cover shall be planted after bed has been backfilled with plant mix and mulched. Plant ground cover through mulch and into plant mix.

3.3.4 Mass Shrub Beds / Hedge Beds:

1. Excavate existing soil to 18" depth over entire bed area and remove soil from site. Scarify bottom of the bed to a 4" depth. Set plants according to drawings and Specifications. Backfill entire bed with (premixed) specified planting mixture Type "A".

3.3.5 Annual Flower Beds:

1. Excavate existing soil to 8" depth over entire bed area and remove soil from site. Scarify bottom of bed to a 4" depth. Backfill entire bed to an 8" depth with premixed planting mixture "Type B".

3.4 INSTALLATION

3.4.1 Planting shall be performed only by experienced workman familiar with planting procedures under the supervision of a qualified supervisor.

3.4.2 Planting pits shall be round, with vertical sides and flat bottoms, and sized in accordance with outlines and dimensions shown on the planting details.

3.4.3 See drawings for planting details.

3.4.4 If obstructions are encountered that are not indicated, do not proceed with planting operations until alternative plant locations have been selected and approved in writing by the Landscape Architect. Where location or spacing dimensions are not clearly shown, request clarification by the Landscape Architect.

3.4.5 Set plant material in the planting pit to proper grade and alignment.

1. Set plants upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structure.
2. Set plant material so it is flush to finish grade after settling, or 1-2" higher in poorly drained soil, or as directed by Landscape Architect.
3. No filling will be permitted around the trunks or stems.
4. Do not cover top of root ball with soil.
5. Backfill pit with planting mixture. Do not use frozen or muddy mixtures for backfilling.
6. Form a ring of soil around the edge of the planting pit to retain water.

3.4.6 After balled and burlapped plants are set, tamp planting mixture around of balls and fill all voids and remove air pockets.

3.4.7 Remove all burlap, ropes, and wires from top 1/3 of balls.

3.4.8 Space ground cover plants in accordance with indicated dimensions. Adjust spacing as necessary to evenly fill planting bed with indicated quantity of plants. Plant to within 12" of trunks and shrubs and to within 6" of planting bed.

3.4.9 Spread and arrange roots of bare rooted plants in their natural position. Work in planting mixture. Do not mat roots together. Cut all broken and frayed roots before installing planting mixture.

3.4.10 Water immediately after planting.

3.4.11 Apply pre-emergent herbicide to bed areas per manufacturer's recommendations before mulching.

3.5 MULCHING

3.5.1 Mulch trees and shrub planting pits and shrub beds with shredded hardwood bark mulch 3" deep to dripline immediately after planting. Leave 3" circle of bare soil around tree trunk. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.

3.5.2 Mulch shall not be placed in contact with trunks or stems.

3.5.3 Mulch ground cover beds with shredded bark mulch 2" to 3" deep prior to planting.

3.5.4 Plant ground cover through mulch.

3.6 WRAPPING, GUYING, AND STAKING

3.6.1 Inspect trees for injury to trunks, evidence of insect infestation and improper pruning before wrapping.

3.6.2 Wrap trunks of all trees spirally from bottom to top with specified tree wrap and secure in place.

3.6.3 Stake deciduous trees under 4" caliper. Stake evergreen trees under 6'-0" tall and over with metal fence post, three (3)per tree.

3.6.4 Stake/guy all trees immediately after installation. When high winds or other conditions which may effect tree survival or appearance occur during the warranty period, the Sub-Contractor shall immediately repair the staking/guying.

3.6.5 Guy deciduous trees 4" caliper and over. Stake evergreen trees 6'-0" tall and over with metal fence post, three (3) per tree.

3.6.6 All work shall be acceptable to the Landscape Architect/Owner's representative.

3.7 PRUNING

3.7.1 Remove or cut back broken, damaged, and unsymmetrical growth of new wood.

3.7.2 Multiple leader plants: preserve the leader which will best promote the symmetry of the plant. Do not prune terminal leader.
Cut branches flush with the trunk of the main branch, at a point beyond a lateral shoot or bud a distance of not less than ½the diameter of the supporting branch. Make cut on an angle.

3.7.3 Prune evergreens only to remove broken or damaged branches.

3.8 MAINTENANCE

3.8.1 See Landscape Maintenance and Warranty Standards.

3.9 CLEANING

3.9.1 Perform cleaning during installation of the work and upon completion of the work. Remove from all site excess materials, soil, debris, and equipment. Repair damage resulting from planting operations.

END OF SECTION

LANDSCAPE MAINTENANCE AND WARRANTY STANDARDS

1.0 GENERAL

1.1 SUMMARY

1.1.1 Includes But Not Limited To

1. Provide maintenance for new landscaping as described in Contract Documents.
2. The requirements of the Section include a one (1) year warranty period from date of acceptance of installation performed by the General Contractor's Representative and Landscape Architect.

2.0 PRODUCTS - Not Used

3.0 EXECUTION

3.1 PERFORMANCE

3.1.1 Acceptance of Installation

1. At the completion of all landscape installation, or pre-approved portions thereof, the Landscape Subcontractor shall request in writing an inspection for Acceptance of Installation in which the Landscape Subcontractor, Landscape Architect, and General Contractor's Representative shall be present.
   - a. Following the acceptance inspection a punch list will be issued by the Landscape Architect.
   - b. Upon completion of all punch list items, the Landscape Architect and/or General Contractor's Representative shall reinspect the project and issue a written statement of Acceptance of Installation and establish the beginning of the Project Warranty Period.
   - c. At the time of acceptance all plant material shall be of vigorous health.
   - d. It is the responsibility of the Landscape Subcontractor to make the written request for inspection of installation in a timely fashion.
   - e. If there is plant material loss prior to the Landscape Subcontractor's written request for inspection of installation, the Landscape Contractor shall make all replacements of this dead material at no additional cost These replacements are not considered to be the required one (1) replacement of dead plant material by the Landscape Subcontractor during the one (1) year project warranty period, as outlined below.
2. Landscape work may be inspected for acceptance in parts agreeable to the General Contractor's Representative and Landscape Architect provided work offered for Inspection is complete, including maintenance as required.
3. For work to be inspected for partial acceptance, the Landscape Subcontractor shall provide a drawing outlining work completed and supply a written statement requesting acceptance of this work completed to date.

3.1.2 Project Warranty

1. The Project Warranty Period begins upon written preliminary acceptance of the project installation by the Landscape Architect and General Contractor's representative.
2. The Landscape Subcontractor shall guarantee trees, shrubs, ground cover beds and seeded or sodded areas through construction and for a period of one (1) year after date of Acceptance of Installation against defects including death and unsatisfactory growth, except for defects resulting from neglect, abuse or damage by others or unusual phenomena or incidents which are beyond Landscape Subcontractor's control.

3.1.3 Maintenance During One (1) Year Project Warranty

1. To insure guarantee standards, the following maintenance procedures for trees, shrubs, and ground covers shall be executed during construction and for the full Project Warranty Periods.
   - a. Landscape Subcontractor shall be responsible for only one (1) replacement of any plant materials during the one (1) year Project Warranty Period. These include those which are dead or in the opinion of the Landscape Architect are in an unhealthy or unsightly condition, or having lost natural shape, resulting from dieback, excessive pruning, or inadequate or improper maintenance as part of the guarantee.
   - b. Prior to any replacements, Landscape Subcontractor shall review individual plants in question with Landscape Architect to determine reason for plant demise.
2. Replacements must meet the standards specified on the Landscape plans and in the specifications, i.e. quality, species of plant material and planting procedures to receive approval of replacement materials by Landscape Architect.
3. Costs for replacements are assumed part of bid quotations and therefore will not result in an additional cost to General Contractor or Landscape Architect.
4. Areas damaged as a result of replacement operation are to be restored by Landscape Subcontractor at no cost to the General Contractor or Landscape Architect.
5. The Landscape Subcontractor shall be responsible for watering all plantings through the warranty period and shall keep guy wires taut, raise tree balls which settle, furnish and apply sprays as necessary to keep the plantings free of disease and insects until the end of the warranty period.
6. The Landscape Subcontractor shall remove and replace trees, shrubs or other plants found to be dead or in unhealthy condition.
   - a. Rejected plants and materials shall be removed promptly.
   - b. Replacements shall be made during the following normal planting schedule.
   - c. Trees and shrubs which are in doubt shall be replaced, unless, in the opinion of the Landscape Architect, it is advisable to extend Project Warranty Period for full growing Season.
7. The Landscape Contractor shall apply anti-desiccants on evergreen trees and evergreen shrub beds within 150' of major streets and drives, no later than December 1, during the one (1) year project warranty.
8. The first spring after plant installation the contractor shall check all trees to insure twine has rotted from around the trunk. If twine is still present, it shall be removed and disposed of off-site.
9. All stakes, guy wires, tree wrap paper, dead twigs and branches shall be removed from tree and plant materials at the end of this warranty period.

3.1.4 Maintenance of Seeded Lawn Areas

1. The Landscape Subcontractor shall maintain seeded lawn areas.
   - a. Water, fertilize, weed, and apply chemicals until a dense lawn of permanent grasses, free from lumps and depressions or any bare spots, none of which is larger than one (1) foot of area up to a maximum of 3% of the total seeded lawn area is established.
   - b. Seeded lawn that fails to show a uniform growth and/or germination shall be reseeded until a dense cover is established, regardless of what season the seed was installed.
2. The Landscape Subcontractor shall maintain and mow all lawn areas for until acceptance of installation (typically 3 mows) . When lawn reaches 3" in height it shall be cut to 2" in height.
3. The Owner assumes cutting responsibilities following the Acceptance of Installation of the seeded lawn.
4. At conclusion of Project Warranty Period and after receiving Written Final Acceptance by General Contractor's representative and Landscape Architect, the Owner shall assume all seeded lawn maintenance responsibilities.

3.1.5 Maintenance of Sodded Lawn Areas

1. The Landscape Subcontractor shall maintain sodded lawn areas.
   - a. Water, fertilize, spot weed, apply herbicides, fungicides, insecticides and resod until a full uniform, smooth stand of sod is knitted to topsoil, and accepted by the Landscape Architect or his or her representative.
2. Water sod thoroughly, as required to establish proper rooting.
3. Repair, rework, and resod all areas that have washed out or are eroded. Replace undesirable or dead areas with new sod.
4. Mow lawn areas once as soon as sod has rooted sufficiently and knitted to the topsoil. Cut back to 2" height. Not more than 40% of grass leaf shall be removed at any single mowing. Excess clipping to be removed by the Landscape Subcontractor. The Landscape Subcontractor shall be responsible for lawn mowing until acceptance of installation (typically 3-mows).
5. The Owner assumes mowing responsibilities following the Acceptance of Installation of the sodded lawn.
6. At conclusion of Project Warranty Period and after receiving Written Final Acceptance by General Contractor's representative and Landscape Architect, the Owner shall assume all sodded lawn maintenance responsibilities.

3.1.6 Final Acceptance Upon Conclusion of the Warranty Period

1. At the conclusion of the Project Warranty Period the Landscape Subcontractor shall request a project inspection for final acceptance in which the Landscape Contractor, Landscape Architect and Owner's Representative shall be present.
2. After the inspection for final acceptance, a punch list will be issued by the Landscape Architect. Upon completion of all punch list items, the Landscape Architect and the Owner's Representative shall reinspect the project and issue a Written Statement of Final Acceptance.

END OF SECTION

NOTE: The Owners may at their option elect to utilize a Construction Manager in lieu of a General Contractor for all matters pertaining to these specifications and the site work.

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CAUTION!!
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CLIENT
TRINITY REAL ESTATE INVESTMENTS
26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE
CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

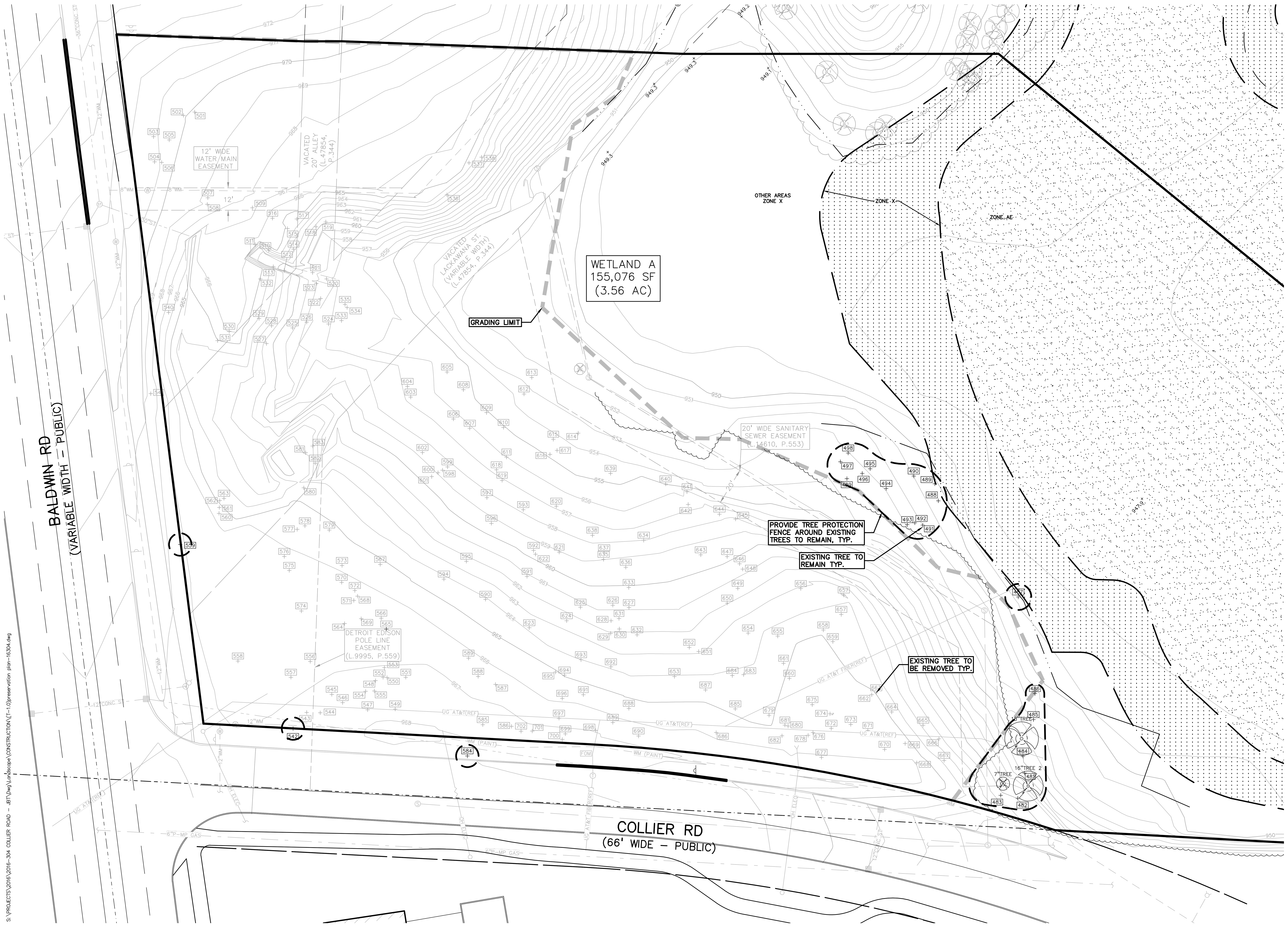
REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
LANDSCAPE SPECIFICATIONS

PEA JOB NO.	2016-304
P.M.	JBT
DN.	KD
DES.	KD

DRAWING NUMBER:
L-1.4



LEGEND

- IRON FOUND
- IRON SET
- NAIL FOUND
- NAIL & CAP SET
- BRASS PLUG SET
- MONUMENT FOUND
- MONUMENT SET
- SEC. CORNER FOUND
- R RECORDED
- M MEASURED
- C CALCULATED

EXISTING

- ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
- UNDERGROUND CABLE TV, CATV PEDESTAL
- TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
- ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
- GAS MAIN, VALVE & GAS LINE MARKER
- WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
- SANITARY SEWER, CLEANOUT & MANHOLE
- STORM SEWER, CLEANOUT & MANHOLE
- COMBINED SEWER & MANHOLE
- SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
- POST INDICATOR VALVE
- WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF
- MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
- UNIDENTIFIED STRUCTURE
- SPOT ELEVATION
- CONTOUR LINE
- FENCE
- GUARD RAIL
- STREET LIGHT
- SIGN
- CONCRETE
- ASPHALT
- GRAVEL SHOULDER
- WETLAND

REFERENCE DRAWINGS

WATER MAIN	OHM GIS MAPPING, DATED 7-19-18
SANITARY SEWER	OHM GIS MAPPING, DATED 7-19-18
STORM SEWER	OHM GIS MAPPING, DATED 7-19-18
TELEPHONE	AT&T SKETCHES, DATED 7-12-18
GAS	CONSUMERS ENERGY MAP# 03-60-50-3, DATED 01-31-18
OTHER	WINDSTREAM DRAWING DATED 7-23-18

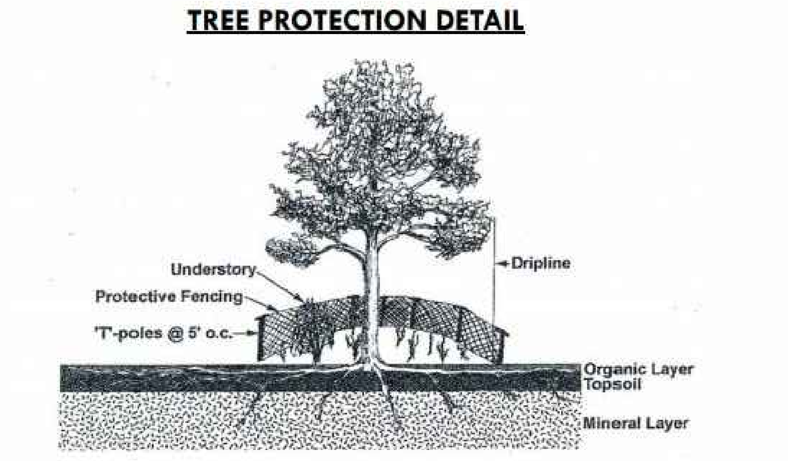
DESCRIPTION	SURVEYED TREES	REPLACEMENT TREES
Non-regulated trees	47	0
Removed - Landmark Trees (26")	1	3
Removed - Regulated Trees	164	164
Previous Mass - Grading	-	0
Saved Trees	23	0
Totals	227	

KEY:

- 2782 = EXISTING TREE / TAG TO REMAIN
- 2782 = EXISTING TREE / TAG TO BE REMOVED
- = TREE PROTECTION FENCING

SEE SHT. L-1.0 FOR TREE REPLACEMENT CALCULATIONS AND NOTES

TREE PROTECTION DETAIL



TREE PROTECTION NOTES

- Identify on site all trees or areas of trees which are being proposed to be preserved with fluorescent orange spray paint (chalk base) or by red flagging tape.
- Erect barriers of four (4) foot high fencing staked with metal "T-posts" five (5) feet on center or all such trees or groups of trees proposed to remain
- Protective barriers are to be erected prior to any clearing or grubbing on the site, and barriers are to remain in tact until approved by the City to be removed, or when a Certificate of Occupancy is Issued.
- Keep clear all debris or fill, equipment, and material from within the required protective barrier.
- During construction, the owner, developer, or agent shall not cause or permit any activity within the fence line of any protected tree or group of trees including, but not limited to, the storage of equipment, dumpsters, boulders, dirt, and excavated material, building or waste material, or any other material harmful to the life of a tree.
- No damaging attachment, wires (other than cable wires for trees), signs, or permits may be fastened to any tree protected by this Ordinance.

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STATE OF MICHIGAN · KIMBERLY DIETZEL · NO. 1741 · LANDSCAPE ARCHITECT

NORTH

0 15 30 60
SCALE: 1" = 30'

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

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

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3500 BALDWIN ROAD
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REVISIONS	
ENG. REVIEW #1	10-11-21
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ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
TREE PRESERVATION PLAN

PEA JOB NO.	2016-304
P.M.	JBT
DN.	KD
DES.	KD

DRAWING NUMBER:
T-1.0

TAG NO.	DBH	LATIN NAME	COMMON NAME	COND	COMMENT	REGULATED (REG.) / NOT REGULATED (N)	LANDMARK (L)	SAVE (S) / REMOVE (X)
481	9	Carya ovata	Shagbark Hickory	Fair		REG	-	S
482	18	Quercus rubra	Red Oak	fair		REG	-	S
483	7	Acer saccharinum	Silver Maple	Good		N (SPECIES)	-	S
484	26	Quercus paulutris	Pin Oak	Fair		REG	-	S
485	13	Prunus serotina	Wild Black Cherry	Very Poor		N (COND.)	-	S
486	12	Prunus serotina	Wild Black Cherry	Very Poor		N (COND.)	-	S
487	12	Populus deltoides	Cottonwood	Good		N (SPECIES)	-	S
488	10	Prunus serotina	Wild Black Cherry	Poor		REG	-	S
489	24	Quercus velutina	Black Oak	Fair		REG	-	S
490	7	Prunus serotina	Wild Black Cherry	Poor		REG	-	S
491	6	Quercus rubra	Red Oak	Fair		REG	-	S
492	12	Quercus rubra	Red Oak	Fair		REG	-	S
493	28	Quercus rubra	Red Oak	Fair		REG	-	S
494	10	Quercus rubra	Red Oak	Poor		REG	-	S
495	12	Prunus serotina	Wild Black Cherry	Very Poor		N (COND.)	-	S
496	12	Prunus serotina	Wild Black Cherry	Very Poor		N (COND.)	-	S
497	16	Quercus velutina	Black Oak	Fair		REG	-	S
498	20	Quercus velutina	Black Oak	Fair		REG	-	S
499	12	Quercus velutina	Black Oak	Fair		REG	-	S
501	27	Acer saccharinum	Silver Maple	Poor		N (SPECIES)	-	X
502	22	Morus rubra	Red Mulberry	Poor		N (SPECIES)	-	X
503	16	Catalpa speciosa	Catlapa	Good		N (SPECIES)	-	X
504	10	Acer saccharinum	Silver Maple	Very Poor	Almost dead	N (SPECIES)	-	X
505	14	Acer saccharinum	Silver Maple	Very Poor	Almost dead	N (SPECIES)	-	X
506	19	Acer saccharinum	Silver Maple	Poor		N (SPECIES)	-	X
507	7	Ulmus americana	American Elm	Very Poor		N (COND.)	-	X
508	7	Ulmus pumila	Siberian Elm	Poor		N (SPECIES)	-	X
509	8	Ulmus pumila	Siberian Elm	Very Poor		N (SPECIES)	-	X
510	9	Ulmus americana	American Elm	Very Poor		N (COND.)	-	X
511	8	Acer negundo	Box elder	Poor		N (SPECIES)	-	X
512	9	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
513	27	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
514	10	Ulmus americana	American Elm	Very Poor		N (COND.)	-	X
515	10	Ulmus americana	American Elm	Very Poor		REG./REPLACE	-	X
516	23	Ulmus pumila	Siberian Elm	Very Poor		N (SPECIES)	-	X
517	7	Acer negundo	Box elder	Very Poor		N (SPECIES)	-	X
518	11	Acer negundo	Box elder	Very Poor		N (SPECIES)	-	X
519	7	Gymnocladus dioicus	Kentucky Coffee	Very Poor		REG./REPLACE	-	X
520	8	Populus alba	White Poplar	Poor		N (SPECIES)	-	X
521	7	Gymnocladus dioicus	Kentucky Coffee	Poor		REG./REPLACE	-	X
522	9	Populus alba	White Poplar	Poor		N (SPECIES)	-	X
523	8	Populus alba	White Poplar	Fair		N (SPECIES)	-	X
524	8	Acer rubrum	Red Maple	Fair		REG./REPLACE	-	X
525	9	Juglans nigra	Black Walnut	Poor		REG./REPLACE	-	X
526	9	Gymnocladus dioicus	Kentucky Coffee	Poor		REG./REPLACE	-	X
527	6	Acer negundo	Box elder	Very Poor		N (SPECIES)	-	X
528	7	Morus alba	White Mulberry	Poor		N (SPECIES)	-	X
529	9	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
530	38	Populus alba	White Poplar	Poor		N (SPECIES)	-	X
531	10	Acer platanoides	Norway Maple	Poor		REG./REPLACE	-	X
532	7	Populus alba	White Poplar	Poor		N (SPECIES)	-	X
533	9	Salix babylonica	Weeping Willow	Poor		N (SPECIES)	-	X
534	7	Salix babylonica	Weeping Willow	Poor		N (SPECIES)	-	X
535	12	Salix babylonica	Weeping Willow	Poor		N (SPECIES)	-	X
536	12	Populus deltoides	Cottonwood	Fair		N (SPECIES)	-	X
537	14	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
538	8	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
539					539 Not used	N(SIZE)	#N/A	S
540	12	Populus deltoides	Cottonwood	Fair		N (SPECIES)	-	X
541	28	Acer saccharinum	Silver Maple	Very Poor		N (SPECIES)	-	X
542	**12**	**Quercus alba**	**White Oak**	**Fair**		REG	-	S
543	13	Quercus alba	White Oak	Poor		REG./REPLACE	-	X
544	16	Ulmus americana	American Elm	Fair		REG./REPLACE	-	X
545	10	Quercus alba	White Oak	Good		REG./REPLACE	-	X
546	8	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
547	10	Prunus serotina	Wild Black Cherry	Fair		REG./REPLACE	-	X
548	16	Quercus alba	White Oak	Good		REG./REPLACE	-	X
549	10	Acer negundo	Box elder	Very Poor		N (SPECIES)	-	X
550	6	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
551	7	Quercus bicolor	White Oak	Fair		REG./REPLACE	-	X
552	18	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
553	13	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
554	10	Prunus serotina	Wild Black Cherry	Fair		REG./REPLACE	-	X
555	12	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
556	13	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
557	8	Acer negundo	Box elder	Very Poor		N (SPECIES)	-	X
558	22	Quercus palustris	Pin Oak	Good		REG./REPLACE	-	X
559	**10**	**Ulmus americana**	**American Elm**	**Poor**		REG	-	S
560	1	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
561	8	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
562	10	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
563	6	Ulmus americana	American Elm	Very Poor		N (COND.)	-	X
564	6	Quercus alba	White Oak	Fair		REG./REPLACE	-	X
565	7	Ulmus americana	American Elm	Very Poor		REG./REPLACE	-	X
566	7	Quercus alba	White Oak	Fair		REG./REPLACE	-	X
567	8	Quercus velutina	Black Oak	Poor		REG./REPLACE	-	X
568	8	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
569	13	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
570	6	Quercus alba	White Oak	Poor		REG./REPLACE	-	X
571	8	Quercus velutina	Black Oak	Poor		REG./REPLACE	-	X
572	14	Quercus velutina	Black Oak	Poor		REG./REPLACE	-	X
573	11	Juglans nigra	Black Walnut	Fair		REG./REPLACE	-	X
574	6	Quercus rubra	Red Oak	Poor		REG./REPLACE	-	X
575	18	Juglans nigra	Black Walnut	Good		REG./REPLACE	-	X
576	11	Juglans nigra	Black Walnut	Good		REG./REPLACE	-	X
577	9	Juglans nigra	Black Walnut	Good		REG./REPLACE	-	X
578	6	Juglans nigra	Black Walnut	Good		REG./REPLACE	-	X
579	13	Prunus serotina	Wild Black Cherry	Very Poor		N (COND.)	-	X
580	9	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
581	11	Prunus serotina	Wild Black Cherry	Very Poor		REG./REPLACE	-	X
582	12	Acer saccharinum	Silver Maple	Very Poor		N (SPECIES)	-	X
583	13	Prunus serotina	Wild Black Cherry	Very Poor		REG./REPLACE	-	X
584	**8**	**Picea Abies**	**Norway Spruce**	**Poor**		REG	-	S
585	9	Acer negundo	Box elder	Very Poor		N (SPECIES)	-	X
586	12	Quercus rubra	Red Oak	Good		REG./REPLACE	-	X
587	18	Quercus rubra	Red Oak	Good		REG./REPLACE	-	X
588	9	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
589	13	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
590	8	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
591	13	Prunus serotina	Wild Black Cherry	Fair		REG./REPLACE	-	X
592	13	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
593	9	Prunus serotina	Wild Black Cherry	Fair		REG./REPLACE	-	X
594	14	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
595	12	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
596	12	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
597	9	Juglans nigra	Black Walnut	Fair		REG./REPLACE	-	X
598	7	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
599	6	Prunus serotina	Wild Black Cherry	Very Poor		N (COND.)	-	X
600	9	Prunus serotina	Wild Black Cherry	Very Poor		REG./REPLACE	-	X
601	9	Prunus serotina	Wild Black Cherry	Very Poor		N (COND.)	-	X
602	7	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
603	20	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
604	13	Quercus rubra	Red Oak	Poor		REG./REPLACE	-	X
605	7	Quercus rubra	Red Oak	Very Poor		REG./REPLACE	-	X
606	19	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
607	10	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
608	7	Quercus velutina	Black Oak	Poor		REG./REPLACE	-	X
609	23	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
610	6	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
611	6	Juglans nigra	Black Walnut	Fair		REG./REPLACE	-	X
612	19	Quercus alba	White Oak	Fair		REG./REPLACE	-	X
613	6	Populus alba	White Poplar	Fair		N (SPECIES)	-	X
614	10	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
615	12	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
616	9	Juglans nigra	Black Walnut	Fair		REG./REPLACE	-	X
617	7	Ulmus americana	American Elm	Very Poor		REG./REPLACE	-	X
618	12	Prunus serotina	Wild Black Cherry	Fair		REG./REPLACE	-	X
619	18	Quercus velutina	Black Oak	Good		REG./REPLACE	-	X
620	14	Prunus serotina	Wild Black Cherry	Fair		REG./REPLACE	-	X
621	16	Quercus rubra	Red Oak	Good		REG./REPLACE	-	X
622	6	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
623	16	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
624	6	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
625	20	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
626	10	Prunus serotina	Wild Black Cherry	Very Poor		N (COND.)	-	X
627	11	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
628	10	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
629	8	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
630	26	Quercus velutina	Black Oak	Very Good		REG./REPLACE	-	X
631	10	Prunus serotina	Wild Black Cherry	Very Poor		N (COND.)	-	X
632	12	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
633	14	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
634	6	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
635	16	Quercus velutina	Black Oak	Poor		REG./REPLACE	-	X
636	11	Prunus serotina	Wild Black Cherry	Fair		REG./REPLACE	-	X
637	10	Prunus serotina	Wild Black Cherry	Very Poor		N (COND.)	-	X
638	10	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
639	20	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
640	11	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
641	9	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
642	11	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
643	10	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
644	8	Quercus velutina	Black Oak	Poor		REG./REPLACE	-	X
645	13	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
646	16	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
647	14	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
648	15	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
649	6	Quercus alba	White Oak	Fair		REG./REPLACE	-	X
650	10	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
651	8	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
652	10	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
653	6	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
654	6	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
655	26	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
656	11	Quercus rubra	Red Oak	Good		REG./REPLACE	-	X
657	9	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
658	8	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
659	10	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
660	13	Quercus velutina	Black Oak	Poor		REG./REPLACE	-	X
661	16	Quercus velutina	Black Oak	Poor		REG./REPLACE	-	X
662	18	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
663	9	Prunus serotina	Wild Black Cherry	Very Poor		N (COND.)	-	X
664	15	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
665	20	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
666	7	Quercus alba	White Oak	Poor		REG./REPLACE	-	X
667	12	Quercus rubra	Red Oak	Poor		REG./REPLACE	-	X
668	9	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
669	6	Quercus alba	White Oak	Fair		REG./REPLACE	-	X
670	14	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
671	8	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
672	18	Quercus rubra	Red Oak	Poor		REG./REPLACE	-	X
673	8	Quercus rubra	Red Oak	Poor		REG./REPLACE	-	X
674	7	Quercus rubra	Red Oak	Poor		REG./REPLACE	-	X
675	9	Quercus velutina	Black Oak	Poor		REG./REPLACE	-	X
676	18	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
677	14	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
678	13	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
679	13	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
680	15	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
681	14	Quercus velutina	Black Oak	Poor		REG./REPLACE	-	X
682	8	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
683	18	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
684	16	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
685	8	Quercus rubra	Red Oak	Poor		REG./REPLACE	-	X
686	26	Quercus velutina	Black Oak	Very Good		REG./REPLACE	LANDMARK	X
687	12	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
688	16	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
689	6	Quercus bicolor	Swamp White Oak	Poor		REG./REPLACE	-	X
690	8	Ulmus americana	American Elm	Fair		REG./REPLACE	-	X
691	18	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
692	12	Prunus serotina	Wild Black Cherry	Poor		REG./REPLACE	-	X
693	9	Prunus serotina	Wild Black Cherry	Fair		REG./REPLACE	-	X
694	12	Prunus serotina	Wild Black Cherry	Fair		REG./REPLACE	-	X
695	21	Prunus serotina	Wild Black Cherry	Fair		REG./REPLACE	-	X
696	9	Ulmus americana	American Elm	Fair		REG./REPLACE	-	X
697	11	Quercus velutina	Black Oak	Fair		REG./REPLACE	-	X
698	18	Quercus rubra	Red Oak	Fair		REG./REPLACE	-	X
699	16	Quercus velutina	Black Oak	Very Good		REG./REPLACE	-	X
700	8	Ulmus americana	American Elm	Good		REG./REPLACE	-	X
701	16	Quercus velutina	Black Oak	Good		REG./REPLACE	-	X
702	6	Ulmus americana	American Elm	Poor		REG./REPLACE	-	X
ADDITIONAL TREES TO BE REPLACED								
5045	20	Carya laciniosa	Shellbark Hickory	Good		REG./REPLACE		X
No tag	6	Quercus alba	White Oak	Good		REG./REPLACE		X
No tag	7	Querucus rubra	Red oak	Good		REG./REPLACE		X
No tag	7	Querucus rubra	Red oak	Good		REG./REPLACE		X
No tag	7	Acer platanoides	Norway Mapple	Fair		REG./REPLACE		X
No tag	7	Acer platanoides	Norway Mapple	Fair		REG./REPLACE		X
618	10	Prunus serotina	Black Cherry	Fair		REG./REPLACE		X

NOTE:

~~ STRIKETHROUGH = TREES TO BE REMOVED

BOLD = TREE TO REMAIN

(N) SPECIES OR DEAD ARE EXEMPT FROM REPLACEMENT CALCULATIONS

REG/REPLACE = REGULATED TREES THAT ARE TO BE REMOVED AND REPLACED

LEGEND

- IRON FOUND
- IRON SET
- NAIL FOUND
- NAIL & CAP SET
- BRASS PLUG SET
- MONUMENT FOUND
- MONUMENT SET
- SEC. CORNER FOUND
- R RECORDED
- M MEASURED
- C CALCULATED

EXISTING

- ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
- UNDERGROUND CABLE TV, CATV PEDESTAL
- TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
- ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
- GAS MAIN, VALVE & GAS LINE MARKER
- WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
- SANITARY SEWER, CLEANOUT & MANHOLE
- STORM SEWER, CLEANOUT & MANHOLE
- COMBINED SEWER & MANHOLE
- SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
- POST INDICATOR VALVE
- WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF
- MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
- UNIDENTIFIED STRUCTURE
- SPOT ELEVATION
- CONTOUR LINE
- FENCE
- GUARD RAIL
- STREET LIGHT
- SIGN
- CONCRETE
- ASPHALT
- GRAVEL SHOULDER
- WETLAND

REFERENCE DRAWINGS

WATER MAIN	OHM GIS MAPPING, DATED 7-19-18
SANITARY SEWER	OHM GIS MAPPING, DATED 7-19-18
STORM SEWER	OHM GIS MAPPING, DATED 7-19-18
TELEPHONE	AT&T SKETCHES, DATED 7-12-18
GAS	CONSUMERS ENERGY MAP# 03-60-50-3, DATED 01-31-18
OTHER	WINDSTREAM DRAWING DATED 7-23-18

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

CAUTION!!

THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

PEA GROUP

TROY ■ WASHINGTON TWP
BRIGHTON ■ DETROIT
t: 844.813.2949

www.peagroup.com

STATE OF MICHIGAN
KIMBERLY DIETZEN
No. 1741
LANDSCAPE ARCHITECT

CLIENT

TRINITY REAL ESTATE INVESTMENTS
26677 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE

CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

REVISIONS	
ENG. REVIEW #1	10-11-21
ENG. REVIEW #2	11-01-21

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE

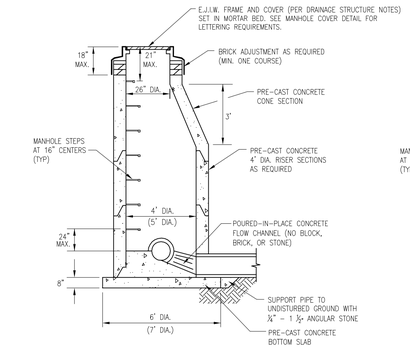
TREE PRESERVATION LIST

PEA JOB NO.	2016-304
P.M.	JBT
DN.	KD
DES.	KD

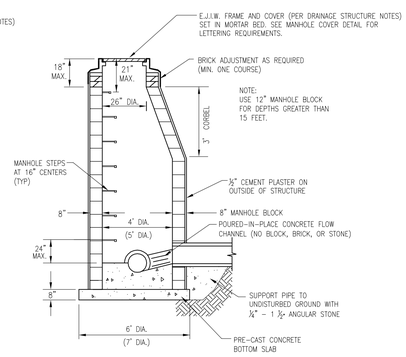
DRAWING NUMBER:

T-1.1

S:\PROJECTS\2016\2016-304 COLLIER ROAD - AUBURN HILLS\Landscape\CONSTRUCTION\[T-1.0]preservation plan-16304.dwg

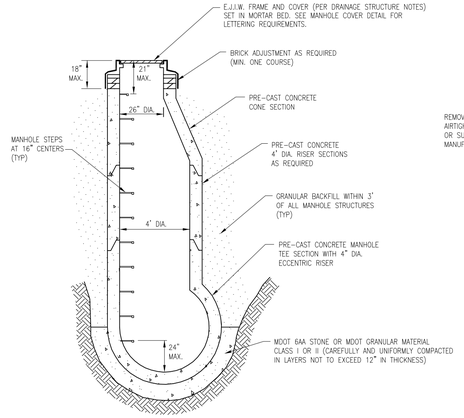


PRE-CAST MANHOLE

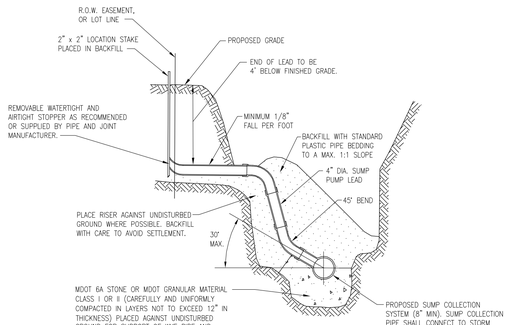


BLOCK MANHOLE

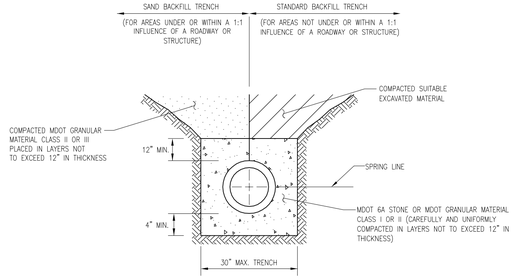
STANDARD MANHOLE DETAILS



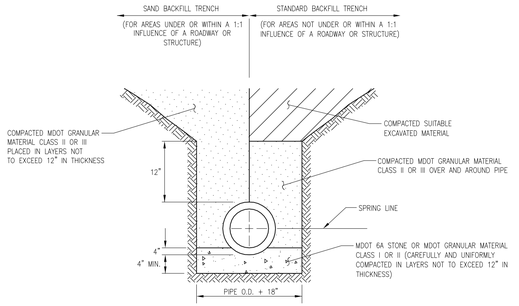
PRE-CAST TEE MANHOLE DETAIL



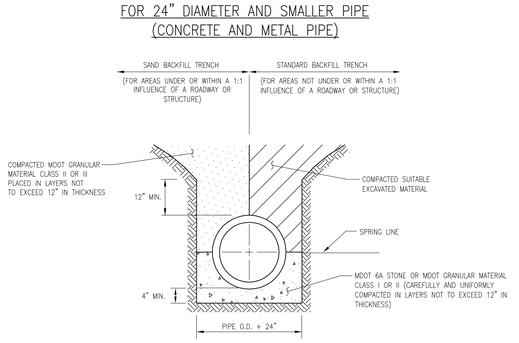
HOUSE LEAD DETAIL FOR 4" DIA. PLASTIC SUMP PUMP LEADS



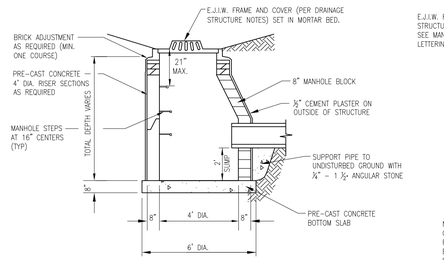
BEDDING AND TRENCH BACKFILL DETAIL FOR 18" DIAMETER AND SMALLER PIPE (PVC AND HDPE PIPE)



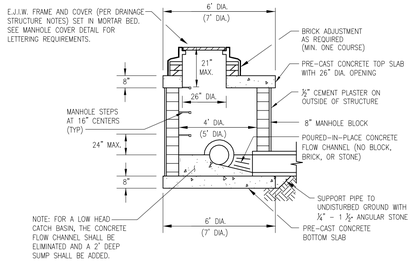
BEDDING AND TRENCH BACKFILL DETAIL FOR 24" DIAMETER AND SMALLER PIPE (CONCRETE AND METAL PIPE)



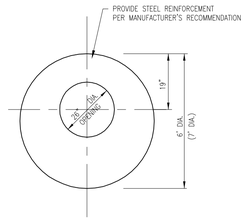
BEDDING AND TRENCH BACKFILL DETAIL FOR 27" DIAMETER AND LARGER PIPE (CONCRETE AND METAL PIPE)



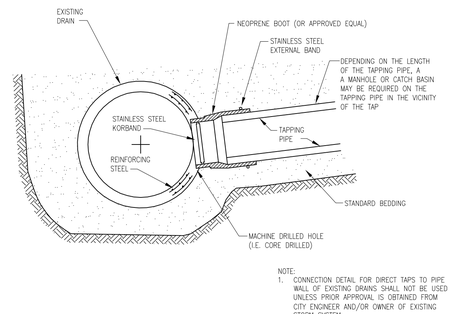
CATCH BASIN DETAIL



LOW HEAD MANHOLE AND CATCH BASIN DETAIL

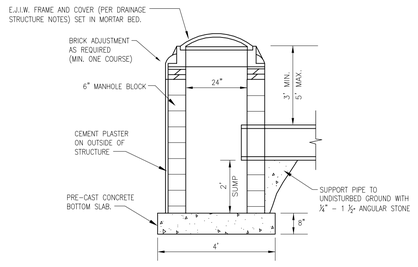


PRE-CAST CONCRETE TOP SLAB DETAIL, 8" THICK



NOTE:
1. CONNECTION DETAIL FOR DIRECT TAPS TO PIPE WALL OF EXISTING DRAINS SHALL NOT BE USED UNLESS PRIOR APPROVAL IS OBTAINED FROM CITY ENGINEER AND/OR OWNER OF EXISTING STORM SYSTEM
2. USE KOR-N-TEE FOR NON-CONCRETE TO CONCRETE TAPS. USE LINK-SEAL, A-LOCK OR APPROVED EQUAL FOR CONCRETE TO CONCRETE TAPS.

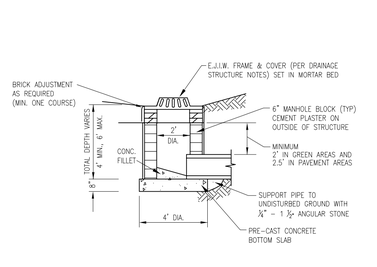
KOR-N-TEE TAP FOR CONCRETE PIPE



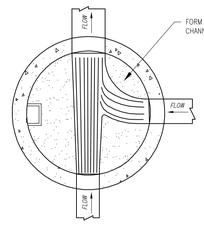
2' DIA. CATCH BASIN DETAIL

NOT TO SCALE

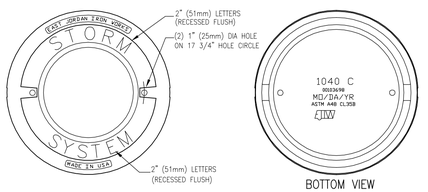
NOTE:
1. 2' DIA. CATCH BASIN SHALL NOT BE USED UNLESS PRIOR APPROVAL IS OBTAINED FROM CITY ENGINEER.

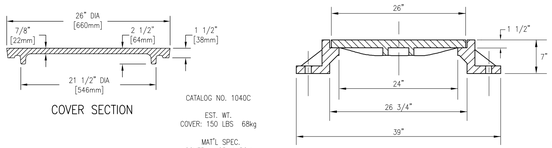


2' DIA. INLET DETAIL



CHANNEL DETAIL

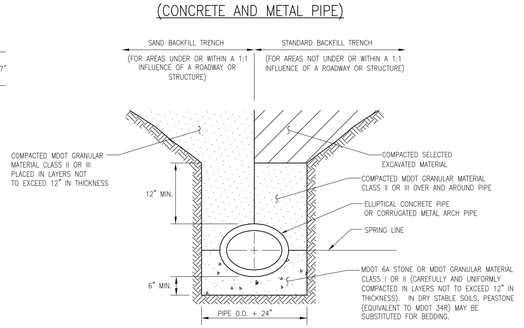




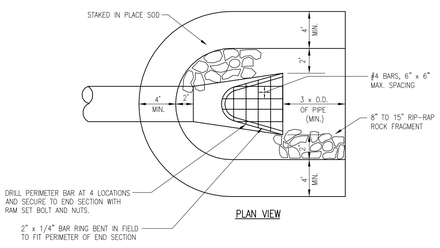
CAST IRON MANHOLE COVER E.J.I.W. 1040

NOTE:
1. LETTERING SHALL BE USED ONLY FOR PUBLIC STORM SYSTEM. ALL OTHERS SHALL HAVE NO LETTERING.

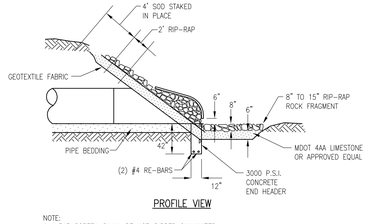
BEDDING AND TRENCH BACKFILL DETAIL FOR 27" DIAMETER AND LARGER PIPE (CONCRETE AND METAL PIPE)



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



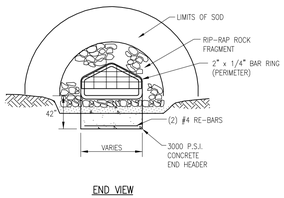
PLAN VIEW



PROFILE VIEW

NOTE:
1. BAR SCREEN SHALL BE HOT-DIPPED GALVANIZED.

END SECTION AND BAR SCREEN DETAIL



END VIEW

OHM

CITY/VILLAGE/TOWNSHIP: CITY OF AUBURN HILLS
COUNTY: OAKLAND COUNTY
RANGE: 3E
TOWN: 10N
SECTION:
PROJ MGR: JLK
ENGINEER: JLK
CAD'D:
BID DATE:
DATE: DEC 2007
REVISIONS:

CLIENT: CITY OF AUBURN HILLS
DATE:
REVISIONS:

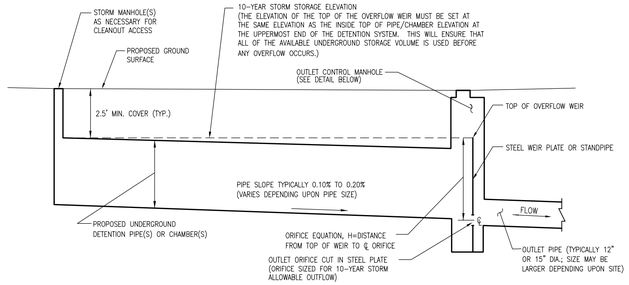
JOB # AH-STM DET
SCALE H: N.T.S V: N.T.S
HORIZ DATUM
VERT DATUM
DATE:
REVISIONS:

34000 Plymouth Road | Livonia, MI 48150 | P (734) 522-6711 | F (734) 522-6427 | WWW.OHM-ADVISORS.COM

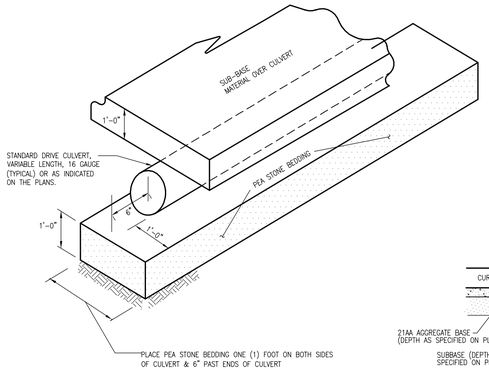
CITY OF AUBURN HILLS
STANDARD STORM SEWER DETAILS

SHEET 1 OF 2

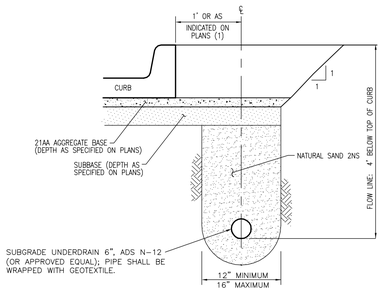
DRAWING PATH S:\CIVIT\AuburnHillsCity\Standards_CADD\STORM SEWER DETAILS\AH-STM DET.dwg Oct 28, 2009 - 10:48am



DETENTION SYSTEM PROFILE

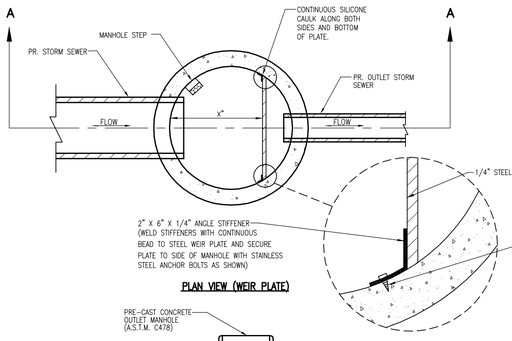


DRIVE CULVERT BEDDING DETAIL

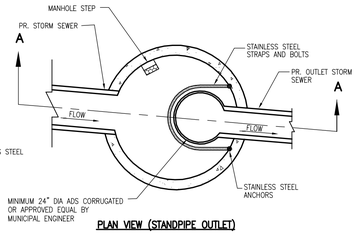


NOTES:
1. LOCATION MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
2. ALL UNDERDRAIN SHALL BE APPROVED PLASTIC PIPE PER MDOT SECTION 909.07. METAL PIPE SHALL NOT BE USED.
3. ALL UNDERDRAIN SHALL OUTLET TO DRAINAGE STRUCTURE.
4. UNDERDRAIN CONNECTIONS (AT LOW POINTS) SHALL BE MADE AS CLOSE TO THE STRUCTURE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

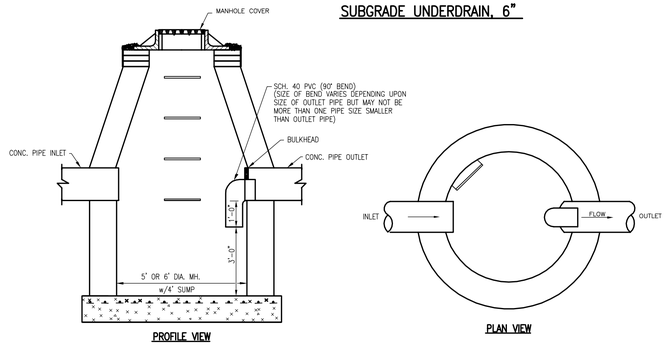
SUBGRADE UNDERDRAIN, 6"



PLAN VIEW (WEIR PLATE)



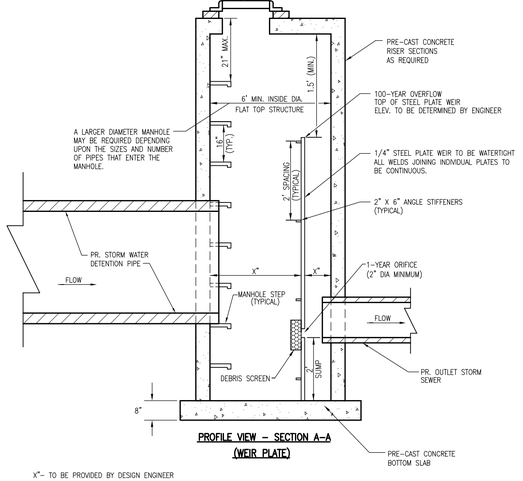
PLAN VIEW (STANDPIPE OUTLET)



PROFILE VIEW **PLAN VIEW**

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

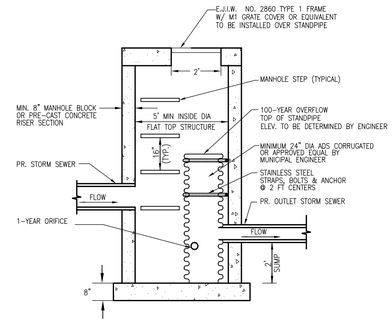
(FOR OUTLET PIPES LARGER THAN 18" IN DIAMETER AN ALTERNATE DESIGN MUST BE APPROVED BY THE CITY ENGINEER)



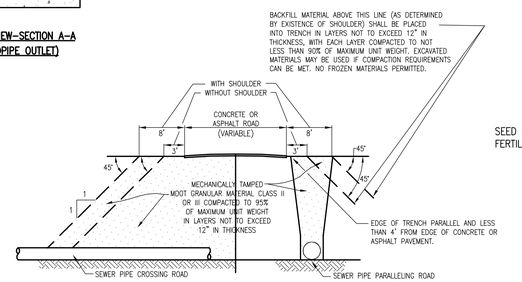
PROFILE VIEW – SECTION A-A (WEIR PLATE)

X"- TO BE PROVIDED BY DESIGN ENGINEER

TYPICAL UNDERGROUND DETENTION AND OUTLET MANHOLE DETAILS



PROFILE VIEW-SECTION A-A (STANDPIPE OUTLET)



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

STORM SEWER CONSTRUCTION NOTES

GENERAL NOTES:
1. All materials and workmanship shall be in accordance with the standards and specifications of the City of Auburn Hills.
2. No storm sewer is to be installed without the City's inspector present.
3. Notify MISS DIG (1-800-482-7171) at least three working days prior to the start of construction.
4. Trenches that are to be left open overnight shall be enclosed with suitable fencing and lighted barricades, unless otherwise approved by the city.
5. All end sections 18" and larger shall be provided with a galvanized bar screen.
6. Hinged bar grates will be required for headwalls per OCDC or MDOT standards, whichever is stricter.
7. All vertical and horizontal bars shall be tack-welded to the angle frame.
8. The bar grate screen shall be hot-dipped galvanized after fabrication is complete.
9. The design engineer shall furnish The City of Auburn Hills with mylar "Record Drawings" of the water main plans as well as an electronic copy of the plans on a computer disk using the most recent release of AutoCAD, upon job completion. Plans shall locate all storm sewer and structures.

STORM SEWER NOTES:
1. Type and class of pipe shall be as specified on plans.
2. Concrete Pipe Requirements:
   - 2.1. The contractor shall provide reinforced concrete pipe as specified on the plans.
   - 2.2. All round reinforced concrete pipe shall meet the requirements of ASTM C76, Standard Specifications for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe, with modified grooved tongue and rubber gasket meeting the requirements of ASTM C443, Standard Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
   - 2.3. All elliptical reinforced concrete pipe shall meet the requirements of ASTM C507, Standard Specifications for Reinforced Concrete Elliptical Culvert Storm Drain and Sewer Pipe, with tongue and grooved joints with bituminous (DeWitt #10) joint material meeting the requirements of C443. Elliptical concrete pipe joints shall also be wrapped per ASTM C877, Standard Specification for External Sealing Bands for Concrete Pipe, Manholes and Precast Box Sections. In addition, elliptical concrete pipe of 42" equivalent size and larger shall require inside concrete pointing.
   - 2.4. The inside joint of pipe over 27" diameter shall be pointed with mortar upon completion of backfilling operations.
3. Plastic Pipe Requirements:
   - 3.1. 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.
   - 3.2. All plastic storm sewer pipe shall have a smooth interior.
   - 3.3. PVC pipe shall meet the requirements of ASTM F949, Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings, with push-on type joints meeting the requirements of ASTM D3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals, and F477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
   - 3.4. HDPE pipe shall meet the requirements of AASHTO M294 and ASTM D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials, with push-on type joints meeting the requirements of ASTM D3212 and F477.
4. Bedding Requirements:
   - 4.1. Bedding shall be used as called for on the details.
   - 4.2. 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.
   - 4.3. All pipes entering or leaving a manhole shall be adequately supported with ¼"-1½" angular stone fill from undisturbed earth to springline.
   - 4.4. Bedding shall extend a minimum of 4" below pipe, unless otherwise noted on construction plans. Bedding shall be uniform in grade. However, if the existing native soils meet the requirements for MDOT granular material class II (minimum 4" thick), then the storm sewer may be laid directly on the compacted native subgrade soils.
5. Backfill Requirements:
   - 5.1. 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 methods.
   - 5.2. Where trench is within a 1:1 influence of streets, alleys, sidewalks, driveways and parking areas, sand backfill shall be used which shall consist of MDOT granular material Class II or III compacted in layers not to exceed 12" in thickness to a density of 95% as determined by AASHTO T99.
   - 5.3. All backfill placed within a 1:1 influence of structures shall be approved sand, placed in 12" layers and compacted.
   - 5.4. No frozen material shall be buried more than 4' below the final elevation of the ground.

DRAINAGE STRUCTURE REQUIREMENTS:
Contractor shall construct manholes with precast reinforced concrete in lieu of concrete, brick and block manholes in accordance with the following conditions:
1. Precast reinforced concrete section with modified groove tongue joint shall conform to ASTM C-478, Standard Specification for Precast Reinforced Concrete Manhole Sections, with rubber gasket.
2. 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.
3. 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.
4. Structures for sewers larger than 18", or those not meeting the opening requirements, may be built of block or brick up to a minimum of 8" above the top of sewer, with precast units being used above this point. Where precast units rest on the block or brick, the groove in the precast unit shall be filled with mortar.
5. Block used for standard catch basins and manholes shall be 8" (for 0'-15' deep) and 12" (for 15'-25' deep). Block used for 2' diameter inlets and catch basins shall be 6".
6. All vertical openings in concrete block structure walls shall be completely filled with mortar. All vertical wall joints shall be cement pointed.
7. Plaster all outside masonry surfaces with 1:2½ masonry cement (type II) 1/2" thick.
8. 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', 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.
9. Manhole steps shall be steel, encased with polypropylene plastic or approved equivalent to M.A. Industries, Inc., PS-1 for brick, or PS-1B for block, East Jordan Iron Works 8503 (or approved equal). Manhole steps shall be placed at 16" centers.
10. Catch basin steps shall be East Jordan Iron Works 8503 plastic coated (or approved equal).
11. Manhole frame and cover shall be East Jordan Iron Works 1040, type "C" solid cover or as per construction drawings.
12. Catch Basin and inlet frame and cover shall be:
    - 12.1. East Jordan Iron Works 5105, type "M1" cover (with trout logo) with straight face curb and gutter (or approved equal).
    - 12.2. East Jordan Iron Works 5105, type "M1" cover (with trout logo) with mountable curb and gutter and integral curb and gutter (or approved equal).
    - 12.3. East Jordan Iron Works 1040, type "O2" cover (beehive) to be used on open ditches and swales, rear yard catch basin (or approved equal). If within 8' of road, type "N" cover (low beehive) shall be used. East Jordan Iron Works 1040, type "A" cover to be used on all 2' cleanouts and structures not located at storm water collection points (or approved equal).
13. Frames shall be set in full bed of mortar and the side shall be overlapped to prevent leakage.
14. A minimum of one course of brick must be used and a maximum of 5 courses of brick can be used to adjust a structure. All bricks and blocks used for adjustment shall be concrete.
15. 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.
16. Concrete base for manhole, catch basin, and inlet shall be MDOT grade 30P (Min.), 8" thick, 3000 psi.
17. 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.

SUMP PUMP LEAD REQUIREMENTS:
1. All sump pump leads connected to a drain shall be pre-manufactured.
2. Sump pump leads shall be (1) SDR 35, non-perforated, solid wall PVC, (2) ARMCO Truss Pipe, or (3) approved equal, with premium joints.
3. Sump collection system pipes shall be connected at drainage structures. 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.
4. Ends of all 4" sump pump leads shall be temporarily capped and their location staked, witnessed and recorded.
5. All sump pump leads are to be taken to the property line, easement line or as indicated on the plan.
6. Sump pump cleanouts shall be a minimum inside diameter of 24" and be constructed at changes of alignment ends of sump pump mains or as indicated on the plan.

RESTORATION REQUIREMENTS:
1. All disturbed areas within the right-of-way shall be restored as follows, unless otherwise noted on construction drawings: Finish Grade. Place 3" thickness of "quality" topsoil acceptable to the engineer. Apply sod or seed and fertilizer as follows:

	LOCATION	SODDING/ SEEDING REQUIREMENTS	FERTILIZER REQUIREMENT
SEED AND FERTILIZER	Slopes & ditch banks, etc.	MDOT "Roadside" mix (20% Perennial Rye, 10% Kentucky Blue, 40% Red Fescue, 30% Hard Fescue) applied at 220 lbs/acre	240 lbs/acre of chemical fertilizer nutrients in equal proportions of Nitrogen, Phosphoric Acid and Potash. (Must be a slow-release fertilizer)
	Other areas	MDOT "Class A" mix (20% Perennial Rye, 30% Kentucky Blue, 50% Red Fescue) applied at 220 lbs/acre	240 lbs/acre of chemical fertilizer nutrients in equal proportions of Nitrogen, Phosphoric Acid and Potash. (Must be a slow-release fertilizer)
SOD	Ditch bottoms, slopes exceeding 3:1, and at structures	3" Topsoil with Class A Sod	

2. Apply straw mulch at the rate of 2-3 bales/1000 square feet.
3. The contractor shall be responsible to insure the growth of all seeded areas, and shall re-seed as necessary to accomplish this.

OHM
34000 Plymouth Road | Livonia, MI 48150 | P (734) 522-6711 | F (734) 522-6427 | WWW.OHM-ADVISORS.COM

CITY OF AUBURN HILLS
STANDARD STORM SEWER DETAILS

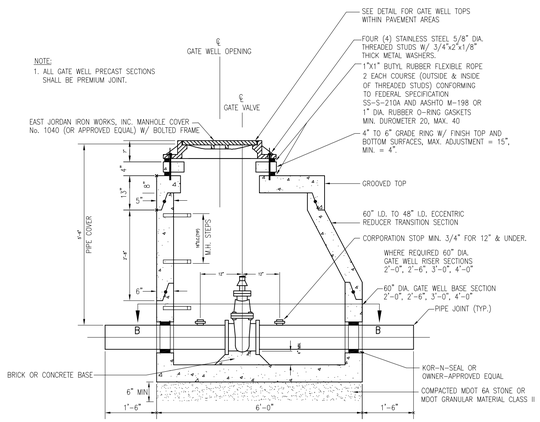
CITY/VILLAGE/TOWNSHIP: CITY OF AUBURN HILLS
COUNTY: OAKLAND COUNTY
JOB #: AH-STM DET
SCALE: H: N.T.S V: N.T.S
HORZ DATUM:
VERT DATUM:
DATE:
REVISIONS:

DATE	BY	CHKD	ENGINEER	PROJMGR	SECTION	TOWN	RANGE
NOV 2007			JLK	JLK		10N	3E

CLIENT: CITY OF AUBURN HILLS
DATE:
REVISIONS:

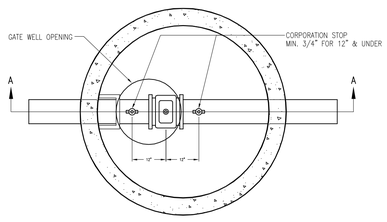
SHEET 2 OF 2

DRAWING PATH: S:\CVT\AuburnHillsCityStandards_CAD\STORM SEWER DETAILS\AH-STM DET.dwg Nov 15, 2007 - 11:43am

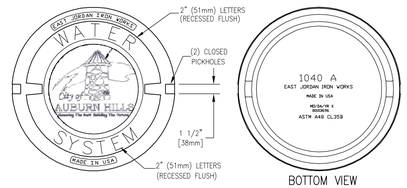


NOTE:
1. ALL GATE WELL PRECAST SECTIONS SHALL BE PREMIUM JOINT.

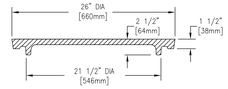
6", 8" AND 12" GATE WELL
(A-A)



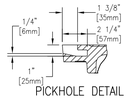
6", 8" AND 12" GATE WELL TYPICAL
(PLAN VIEW, B-B)



BOTTOM VIEW



COVER SECTION



PICKHOLE DETAIL

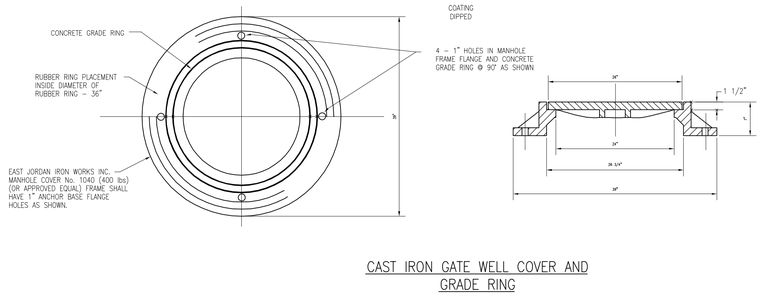
CATALOG NO. 1040A

EST. WT.
COVER: 150 LBS 68kg

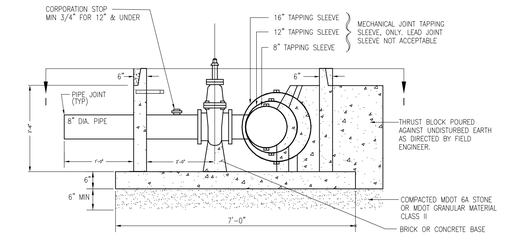
MAT'L SPEC.
COVER – GRAY IRON ASTM A48 CL35

LOAD RATING
HEAVY DUTY

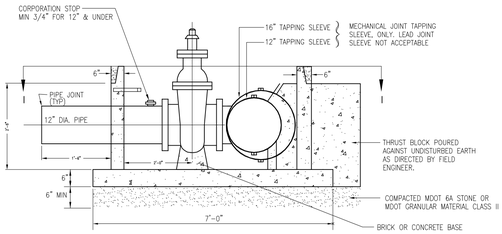
COATING
DIPPED



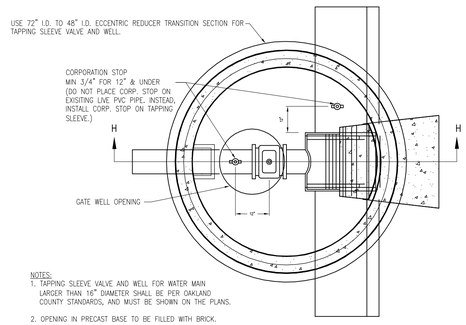
CAST IRON GATE WELL COVER AND GRADE RING



16" x 8", 12" x 8", 8" x 8" TAPPING SLEEVE, VALVE & WELL
(H-H)



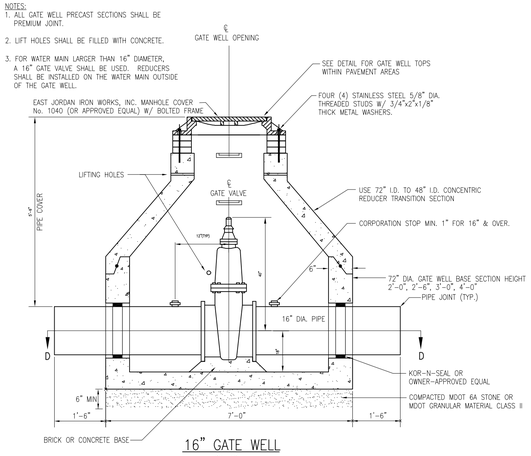
16"x12", 12"x12" TAPPING SLEEVE, VALVE & WELL
(H-H)



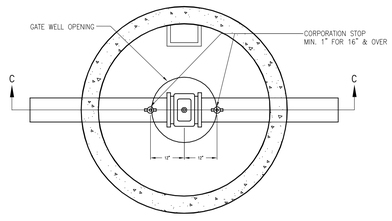
NOTES:
1. TAPPING SLEEVE VALVE AND WELL FOR WATER MAIN LARGER THAN 16" DIAMETER SHALL BE PER OAKLAND COUNTY STANDARDS, AND MUST BE SHOWN ON THE PLANS.
2. OPENING IN PRECAST BASE TO BE FILLED WITH BRICK.

TAPPING SLEEVE VALVE & WELL TYPICAL
(PLAN VIEW, I-I)

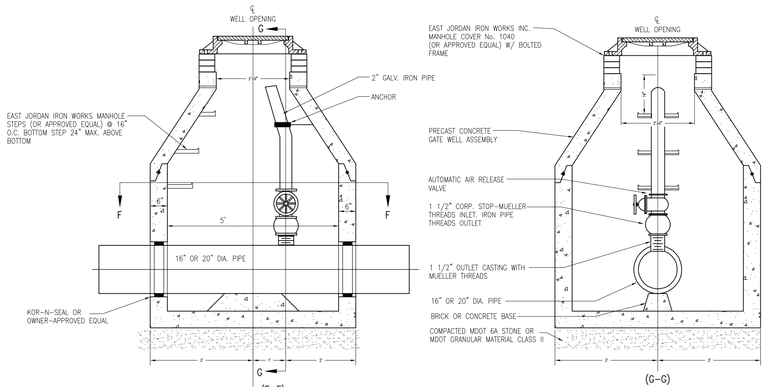
NOTES:
1. ALL GATE WELL PRECAST SECTIONS SHALL BE PREMIUM JOINT.
2. LIFT HOLES SHALL BE FILLED WITH CONCRETE.
3. FOR WATER MAIN LARGER THAN 16" DIAMETER, A 16" GATE VALVE SHALL BE USED. REDUCERS SHALL BE INSTALLED ON THE WATER MAIN OUTSIDE OF THE GATE WELL.



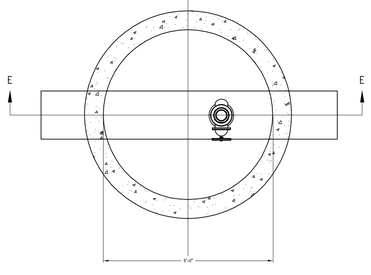
16" GATE WELL
(C-C)



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

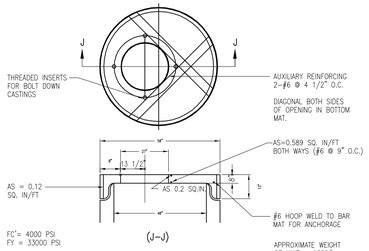


NOTES:
1. ALL AIR RELEASE WELLS SHALL BE PRECAST STRUCTURES.
2. ALL AIR RELEASE VALVES SHALL BE AUTOMATIC PER AUBURN HILLS DPW REQUIREMENTS.



(PLAN VIEW, F-F)

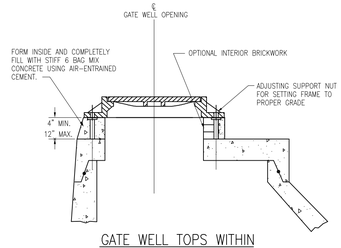
STANDARD AIR RELEASE VALVE & WELL
FOR 16" & 20" WATER MAIN



(J-J)

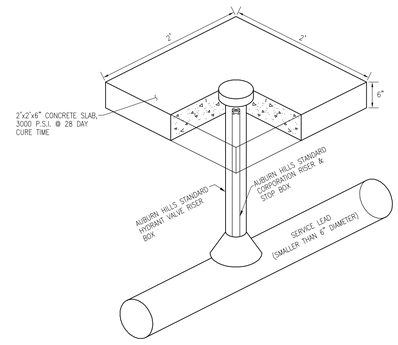
GROOVED TOP DETAIL

NOTE:
1. AS DENOTES CROSS-SECTION AREA OF REINFORCING STEEL, IN SQUARE INCHES PER FOOT.



GATE WELL TOPS WITHIN PAVEMENT AREAS

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



STOP BOX IN PAVEMENT DETAIL

NOTES:
1. TWO HOLE ARCH PATTERN (ERIE PATTERN) TYPE WITH 1" UPPER AND 5' EXTENDED LENGTH WITH 42" ROD (TORD STOP BOX PART NO. EA1–50–40–42R OR APPROVED EQUAL); SMALL BOX REQUIRED FOR 3/4" AND 1" SERVICE; LARGE BOX REQUIRED FOR 1–1/2" AND 2" SERVICE; HYDRANT VALVE BOX REQUIRED FOR 3" AND 4" SERVICE; GATE WELL REQUIRED FOR 6" AND LARGER SERVICE.
2. 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.

DRAWING PATH: S:\CVT\AuburnHillsCity\Standards_CADD\WATER MAIN DETAILS\AH-WM DET.dwg Oct 29, 2009 - 10:48am

OHM

COUNTY: OAKLAND COUNTY
CITY/VILLAGE/TOWNSHIP: CITY OF AUBURN HILLS
JOB #: AH-WM DET
SCALE: H: N.T.S. V: N.T.S.
HORIZ DATUM
VERT DATUM
DATE:
REVISIONS:

DATE: DEC 2007 | BID DATE | CADD | ENGINEER JLK | PROJ MGR JLK | SECTION | TOWN 1ON | RANGE 3E

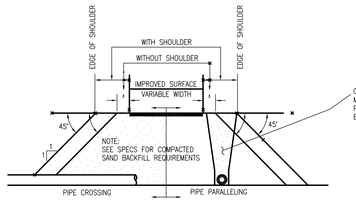
CLIENT: CITY OF AUBURN HILLS

REVISIONS: REVISED (CASTING LOGO UPDATED) 5/1/09 | DATE:

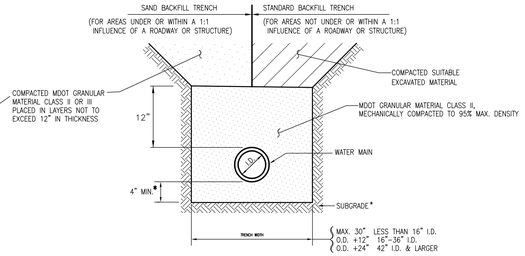
34000 Plymouth Road | Livonia, MI 48150 | P (734) 522-6711 | F (734) 522-6427 | WWW.OHM-ADVISORS.COM

CITY OF AUBURN HILLS
STANDARD WATER MAIN DETAILS

SHEET 1 OF 3

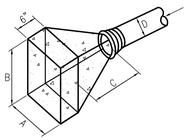


BACKFILL IN THE AREA OF STREETS, ALLEYS SIDEWALKS, DRIVES & PARKING LOTS

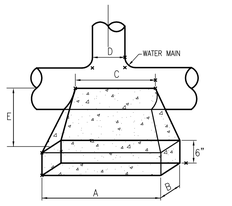


STANDARD BEDDING AND TRENCH BACKFILL DETAIL FOR WATER MAIN

* NOTE: 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.

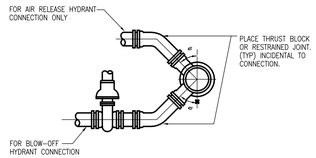


FOR PLUGS			
D	A	B	C MIN.
20"	7'	5'	2.5'
16"	4'-10"	4'-10"	2'
12"	4'-4"	3'	1'-9"
10"	3'	2'	1'-6"
8"	2'-10"	2'-6"	1'-6"
6"	1'-6"	1'-6"	3"

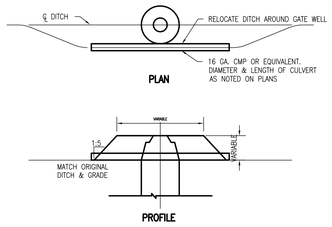


FOR TEES AND TAPPING SLEEVES				
D	A	B	C	E MIN.
20"	6.5'	4.5'	3.5'	3'
16"	4'-8"	4'-8"	2.5'	2.75'
12"	4'	3'	2.5'	2.5'
10"	3'	2'	2'	2.25'
8"	2'-6"	2'	2'	2.25'
6"	2'	2'	2'	2.25'

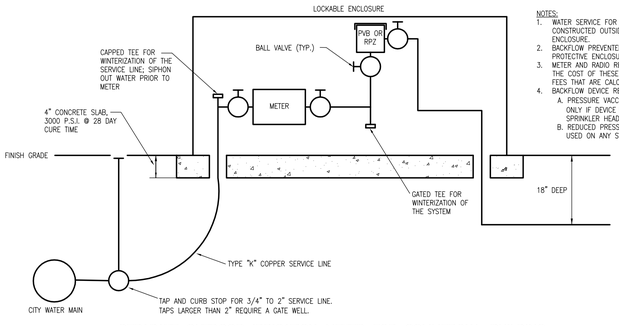
THRUST BLOCK DETAILS



HYDRANT AIR RELEASE AND BLOW-OFF CONNECTION

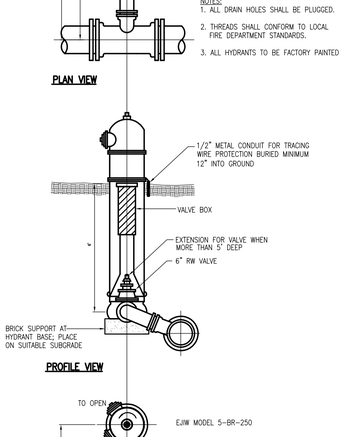


DITCH ENCLOSURE AT GATE WELL OR HYDRANT

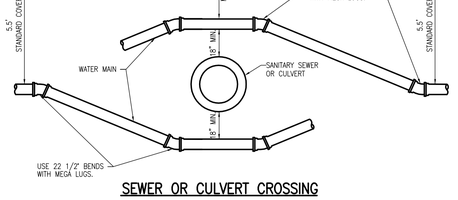


NOTES:
1. WATER SERVICE FOR LANDSCAPE IRRIGATION MUST BE CONSTRUCTED OUTSIDE OF BUILDING, INSIDE A PROTECTIVE ENCLOSURE.
2. BACKFLOW PREVENTER MAY BE PLACED OUTSIDE OF PROTECTIVE ENCLOSURE IF NECESSARY.
3. METER AND RADIO READ DEVICE ARE SUPPLIED BY CITY. THE COST OF THESE DEVICES IS INCLUDED IN THE TAP FEES THAT ARE CALCULATED BY THE DPW.
4. BACKFLOW DEVICE REQUIREMENTS:
   A. PRESSURE VACCUUM BREAKER (PVB) CAN BE UTILIZED ONLY IF DEVICE IS 12" HIGHER THAN HIGHEST SPRINKLER HEAD
   B. REDUCED PRESSURE BACKFLOW PREVENTER CAN BE USED ON ANY SYSTEM

SEPARATE OUTDOOR IRRIGATION METER FOR COMMERCIAL BUILDING

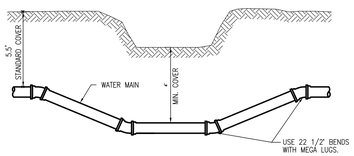


DETAIL OF HYDRANT SETTINGS

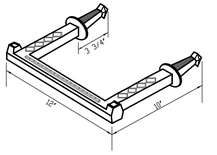


SEWER OR CULVERT CROSSING

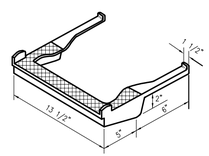
NOTE:
BENDS CAN BE ELIMINATED FOR MINOR VERTICAL DEFLECTIONS IN DUCTILE IRON PIPE (1° OR LESS). IN THIS CASE, THE PIPE MAY BE DEFLECTED UP TO 4° PER JOINT.



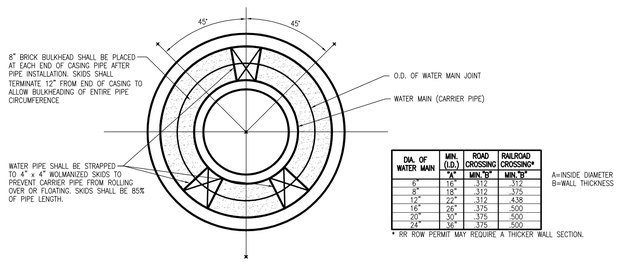
DITCH OR STREAM CROSSING



MANHOLE STEP
M.A. PSI-375



STANDARD MANHOLE STEP
E.J.I.W. 8502

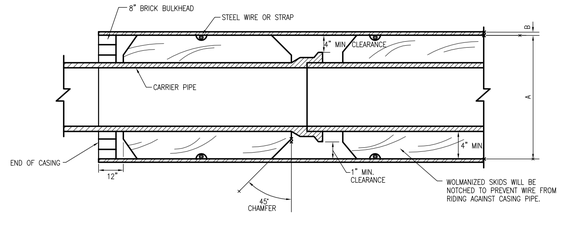


DIA. OF WATER MAIN	MIN. (I.D.)	ROAD CROSSING	RAILROAD CROSSING*
	"A"	MIN. "B"	MIN. "B"
6"	16"	.312	.312
8"	18"	.312	.375
12"	22"	.312	.438
16"	26"	.375	.500
20"	30"	.375	.500
24"	36"	.375	.500

A=INSIDE DIAMETER
B=WALL THICKNESS

* RR ROW PERMIT MAY REQUIRE A THICKER WALL SECTION.

PIPE BARREL SUPPORT FOR WATER MAIN CONSTRUCTED IN CASING PIPE



NOTE:
1. CASING SHALL BE SPIRAL WELDED STEEL PIPE A.S.T.M. A-252, GR. 2.
2. 4" MINIMUM CLEARANCE BETWEEN MAX. O.D. AT A JOINT OF THE PIPE AND THE I.D. OF THE CASING PIPE FOR THE TOP 90° OF THE CASING
3. 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
4. IF THE CONTROLLING AGENCY PERMIT REQUIREMENTS INDICATE THAT SAND OR GROUT MUST BE PLACED BETWEEN THE CASING PIPE AND CARRIER PIPE, THEN THE SAND OR GROUT SHALL BE PLACED IN ACCORDANCE WITH THE PERMIT SPECIFICATIONS.

STANDARD CASING SECTION

WATER MAIN 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 Auburn Hills current Standards and Specifications.
2. No water main is to be installed without the City inspection.
3. Notify MISS DIG (1-800-482-7171) at least three (3) working days prior to start of construction.
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 at (313) 833-4682, 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.
6. Unless otherwise specified on plans, top of all water mains shall be 5.5 ft. below existing or proposed road centerline, or 5.5 ft below existing or proposed ground, whichever results in lower elevation.
7. An 18" minimum vertical clearance between storm or sanitary shall be maintained.
8. All required cross connection devices shall be installed as required by the local plumbing inspector and in accordance with the standards of the Michigan Department of Public Health.
9. Tracing wire shall be provided for all water main, regardless of pipe material. 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, 12-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 ½" 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 #P054007/09964 or approved equal. In addition, underground marking tape shall be placed 1' above the top of PVC or HDPE water main. Underground marking tape shall be Magnatech 3" wide, foil-backed tape, #31-022 by Empire Level Manufacturing Corp., 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 AWWA-C600/C651.
11. When temporary water main jumpers are used during water main construction, a dual check valve backflow preventer (A.S.S.E. Std. # 1024) shall be placed on the jumper hose that is connected to the new water main. Contact Gary Bendes at the City of Auburn Hills (248-391-3777) before the water main jumper is installed for inspection.
12. Where water main is located under pavement, the City shall not be responsible for repairing pavement within the easement in the event that maintenance or repairs to the water main become necessary.
13. The design engineer shall furnish the City of Auburn Hills with mylar "Record Drawings" of the water main plans as well as an electronic copy of the plans on a computer disk using the most recent release of AutoCAD upon job completion. Plans shall locate all water mains, hydrants, and gate valves and wells.
14. The materials specified below may be subsituted 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:
1. All water main shall be ductile iron or concrete. HDPE or PVC water main may be permitted upon city approval. Water main shall be per the following specification.
   1.a. Ductile Iron pipe shall be ANSI 1-A21.51 (AWWA-C151) std. wall thickness, 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.
   1.b. Pre-stressed Concrete Cylinder pipe (P.C.C.P.) shall be AWWA C-301 specification for sizes larger than 24".
   1.c. Polyvinyl Chloride (PVC) pipe shall meet the requirements of ANSI/AWWA C909-98 (including any appendices) as amended for the pressure class of 200 psi (SDR 14). PVC may only be used for 8" or 12" mains or 2" water services. All fittings for PVC shall be ductile iron, as specified in ANSI 1-A21.10 (AWWA-C110) as amended.
   1.d. High Density Polyethylene (HDPE) pipe shall meet the requirements of AWWA C906 (SDR 11) with blue shell or blue stripe.
2. Water services up to 2" shall be either Type K soft copper or PVC with tracing wire meeting the requirements of AWWA 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 General Notes, Item #9 for tracing wire requirements). All water services greater than 2" shall follow the standards listed in Water Main Note #1.
3. 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').
4. Polywrap may be required by the city and shall be placed around the water main.
5. Mega lugs shall be placed at all valves, bends, tees, plugs, hydrants and mechanical fittings. Surrounding joints shall be restrained using field lok gaskets or approved equal and shall be per the manufacturer's joint restraining schedule.
6. 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/A21.11-90 for rubber gasket joints for ductile iron pressure pipes and fittings. Bolt manufacturer's certificate of compliance must accompany each shipment.
7. 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 12" in thickness to a density of 95% as determined by AASHTO 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 with a 1:1 influence of structures shall be approved sand, placed in 1' 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.
8. PVC Installation Specifications:
   8.a. Where pipe must be cut, machine beveling shall be provided as specified by the manufacturer, unless the cut end will be butted against a fitting with an approved bolt-type joint. The factory beveled end of the spigot must be removed when the spigot will be butted against a fitting.
   8.b. All PVC pipe deflections shall be made using mechanical fittings. PVC pipe shall not be placed or connected by "breaking" or "opening" joints (0° deflection). Physically bending the pipe is not allowed either. Each individual length of PVC pipe shall be placed in a straight line.
   8.c. PVC water main shall not be exposed to sunlight for more than one (1) week. The contractor shall provide an opaque covering to shield all parts of pipe. Such pipe that is not adequately protected will be rejected.
   8.d. PVC water main shall not be installed when temperatures are below zero (0) degrees Fahrenheit.
   8.e. Pipe shall be joined per the manufacturer's recommendation. Push-on type joints shall not be installed past the "home" mark on the pipe, or otherwise disrupt the required elastomeric gasket.
   8.f. PVC water main shall not be used in areas where any petroleum products are found or suspected to exist in the soils or surrounding area.
   8.g. Extreme care must be used when attaching fittings. Mechanical joints to PVC pipe must distribute the loading evenly to avoid damage and potential breaks or weak points in the pipe.
   8.h. Extreme care must be used when bringing PVC pipe into and out of structures. A uniform annular space must be created to eliminate any potential point loading on the pipe. Point loading and pipe movement at the structure joint can cause the pipe to split.
   8.i. Rubber "boots" or "sleeves" are required for pipes entering structures (similar to sanitary sewer "boots").
   8.j. Taps shall not be made on PVC water main that is bent, or otherwise in tension.
   8.k. A Ford or McDonald double-banded brass tapping saddle shall be provided for all taps to PVC water main.
   8.l. All taps shall be made with a sharp bit and high speed tap, as recommended by the manufacturer.

VALVE & SLEEVE NOTES:
1. Gate Valves shall be ductile iron body, fully bronze mounted, E.J.I.W. resilient wedge, non-rising stem, opening counterclockwise conforming to City of Detroit Water Department specifications and to AWWA C509 or C515.
2. All gate valves 6" or larger shall be placed in a well; curb stops and boxes are required for water main 2" or smaller. 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 larger than 2" and smaller than 6".
3. All gate valves with operating nuts at a distance greater than 5' below ground surface shall be provided with an extension stem. The length of the extension shall be such that it will be within 5' of ground surface when an extension stem is used. It shall be held in place by two extension stem guide assemblies. Each assembly shall be comprised of a "J" bracket and "L" bracket supplied by E.J.I.W. The stem guides shall be located opposite from each other, and shall be suitably fastened to the wall of the gate well. In addition, a "stop" shall be welded to the extension stem in a location that will prevent the extension stem from slipping off the operating nut. Details of extension stem and method of installation shall be approved by the engineer prior to installation.
4. All pre cast concrete gate well sections shall be manufactured to conform with ASTM C478, standard specifications for precast reinforced concrete manhole sections, except wall thickness shall be as shown on these details. All joints for precast concrete gate well sections shall be "modified grooved tongue" with gasket manufactured to conform with ASTM C443, standard specification for joints for circular concrete sewer and culvert pipe using rubber gaskets.
5. All gate well covers shall be E.J.I.W. #1040A with bolted frame and have the Auburn Hills Logo imprinted on it (see detail on sheet 1), or approved equal. All cover bolts shall be stainless steel.
6. Tapping sleeves 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 must be a mechanical tapping sleeve.

HYDRANT NOTES:
1. All hydrants shall be E.J.I.W. #5BR-250-Traffic Model and shall conform to AWWA Spec. C-502 as amended, 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.
2. 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.
3. Inlet connection shall be 6" mechanical joint, ASA-A21-11. Stem threads shall be sealed with double "O" rings and shall be permanently lubricated with all weather grease.
4. Hose connections: Two (2) 4 1/2" pumper nozzles, one (1) with Harrington Integral Hydrant Storz nozzle (part# 946081/EIJW# 54036D) and one (1) with City of Detroit Fire Department (DFD) threads. The Storz nozzle shall have a brass metal face seal and hard anodized aluminum Storz ramps and lugs. The aluminum's finish shall be hardcoat anodized to Mil-A-8625f, Type 3 dark gray. The adapter shall be made of forged or extruded 6061-T6 aluminum. The blind cap shall have hard anodized aluminum Storz ramps and lugs, made of forged or extruded 6061-T6 aluminum. The center cap shall be equipped with a suction seal. The cap shall be connected to the adapter or the hydrant with a 0.125" vinyl coated aircraft cable.
5. Operating Nut: (1) 1 1/2" P-F pentagon, open left. 5.5' 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.
6. Hydrants shall be painted red above the ground and black below, with a finish coat of Glamortex 501 enamel, color 314 vermilion, or approved equal. Top flange shall be painted with JDL Industries (305) 599-2022, Bright White Reflective paint, color No.1460 or taped with 3M Scotchlite High Intensity Reflective Tape #3870. Nozzle cap shall be painted per Auburn Hills Fire Dept. requirements: White - 4" mains, Red - 6" mains (Paint #4431-01), Orange - 8" mains (Paint #4431-24), Green - 12" mains (Paint #4431-10), Blue - 16" or larger mains (Paint #4431-12). Paint can be obtain at Tractor Supply Company using the associated Paint Numbers. DO NOT paint Storz nozzle.

DRAWING PATH: S:\CIVIL\AuburnHillsCity\Standards_CADD\WATER MAIN DETAILS\AH-WM DET.dwg May 01, 2009 - 9:50am

OHM

CITY/VILLAGE/TOWNSHIP: CITY OF AUBURN HILLS
COUNTY: OAKLAND COUNTY
JOB #: AH-WM DET
SCALE: H: N.T.S. V: N.T.S.
HORIZ DATUM
VERT DATUM
DATE:
REVISIONS:

DATE:	BID DATE	CADD	ENGINEER	PROJ MGR	SECTION	TOWN	RANGE
DEC 2007			JLK	JLK		1ON	3E

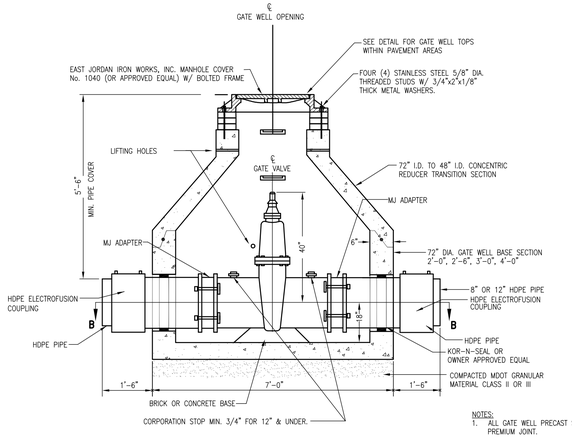
CLIENT: CITY OF AUBURN HILLS

REVISIONS:
DATE:
REVISED (WATER MAIN NOTE #5; CASING PIPE MINIMUMS) 11/13/08
REVISED (HYDRANT NOTE #6) 04/30/09

34000 Plymouth Road | Livonia, MI 48150 | P (734) 522-6711 | F (734) 522-6427

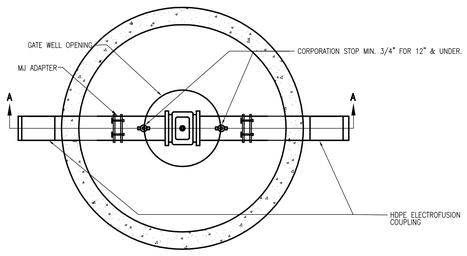
CITY OF AUBURN HILLS
STANDARD WATER MAIN DETAILS

SHEET
2
OF 3

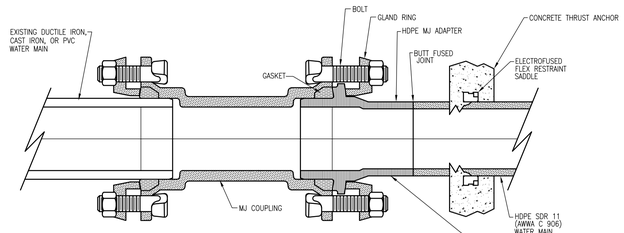


NOTES:
1. ALL GATE WELL PRECAST SECTIONS SHALL BE PREMIUM JOINT.
2. LIFT HOLES SHALL BE FILLED WITH CONCRETE.
3. FOR WATER MAIN LARGER THAN 16" DIAMETER, A 16" GATE VALVE SHALL BE USED. REDUCERS SHALL BE INSTALLED ON THE WATER MAIN OUTSIDE OF THE GATE WELL.
4. USE A 5' DIAMETER GATE WELL FOR 8" HDPE ASSEMBLY AND USE A 6' DIAMETER GATE WELL FOR A 12" HDPE ASSEMBLY.

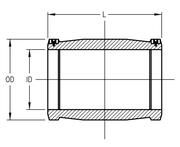
8" AND 12" GATE WELL FOR HDPE WATER MAIN
(A-A)



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

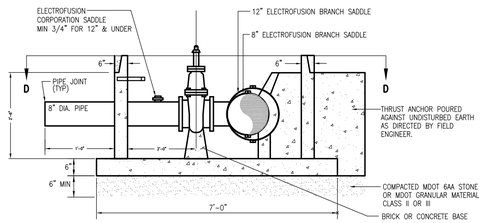


HDPE WATER MAIN JOINT RESTRAINT
(FOR CONNECTING HDPE PIPE TO DUCTILE IRON PIPE)

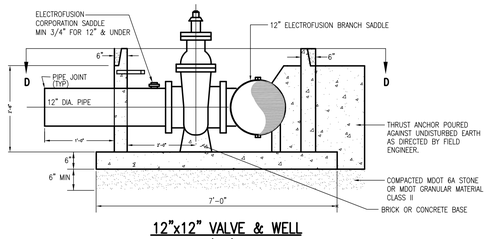


ELECTROFUSION DIPS COUPLINGS

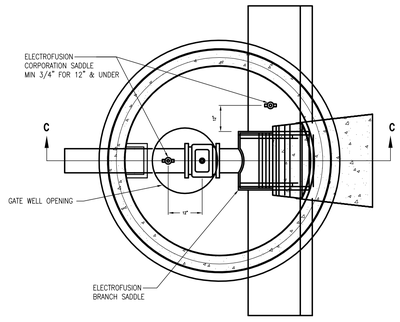
NOMINAL SIZE	INSIDE DIA (MAX) ID	INSIDE DIA (MIN) ID	OUTSIDE DIA (NOMINAL) OD	OVERALL LENGTH (NOMINAL) L
4"	4.84	4.810	6.06	6.93
6"	6.96	6.910	8.74	8.19
8"	9.13	9.060	11.14	9.53
10"	11.15	11.14	13.66	11.02
12"	13.29	13.25	16.22	13.07



12"x8", 8"x8" VALVE & WELL
(C-C)

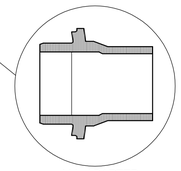


12"x12" VALVE & WELL
(C-C)



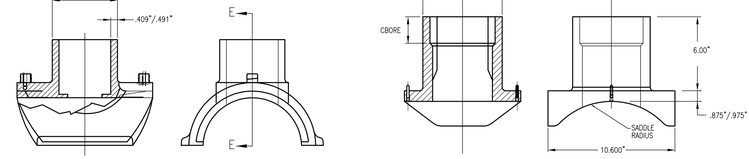
VALVE & WELL TYPICAL
(PLAN VIEW, D-D)

EQUIVALENT DUCTILE IRON PIPE SIZES (DIPS)		
NOMINAL PIPE SIZE (DIPS)	O.D. SIZE (INCHES)	CLASS 150 SDR 11 MIN WALL THICKNESS (INCHES)
6"	6.90	0.627
8"	9.05	0.823
10"	11.10	1.009
12"	13.20	1.200
16"	17.40	1.582
20"	21.60	1.964
24"	25.60	2.345



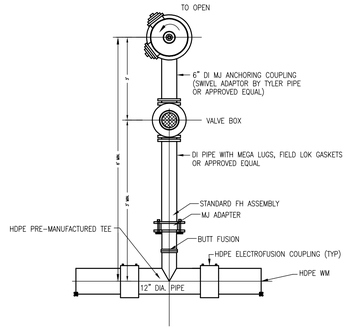
MJ ADAPTER

DIAMETER DIPS	DR	OVERALL LENGTH	BOLT LENGTH REQUIRED	WEIGHT
6"	11	8.25"	4 1/2"	4.4
8"	11	8.25"	5"	7.3
10"	11	8.75"	5"	11.3
12"	11	8.75"	5"	15.8
16"	11	9.97"	6"	33.0
20"	11	10.22"	6"	51.0
24"	11	10.22"	6 1/2"	71.7

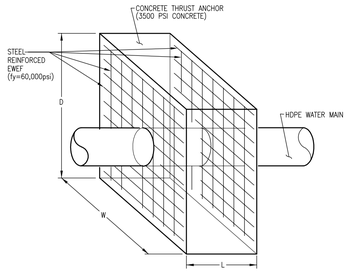


8" SDR 11 OUTLETS

ELECTROFUSION BRANCH SADDLE DETAILS



FIRE HYDRANT ASSEMBLY
WITH HDPE PRE-MANUFACTURED TEE



THE "L" DIMENSION IS CENTERED ON THE PIPE THRUST ANCHOR THAT WRAPS AROUND THE PIPE.

CONCRETE THRUST ANCHOR FOR HDPE PIPE

PIPE SIZE	THRUST BLOCK SIZE (W x D x L)	REINFORCEMENT
6"	2' x 2' x 12"	#5 @ 12" EWEF *
8"	2.5' x 2.5' x 12"	#5 @ 12" EWEF
12"	4' x 4' x 20"	#6 @ 12" EWEF
16"	5' x 5' x 26"	#6 @ 9" EWEF
20"	6.5' x 6.5' x 32"	#7 @ 12" EWEF
24"	8' x 8' x 36"	#8 @ 12" EWEF

* EWEF = EACH WAY, EACH FACE

NOTE:
VARIATIONS TO THE W AND D DIMENSIONS CAN BE MADE ON A CASE BY CASE BASIS DEPENDING ON THE DEPTH REQUIREMENTS FOR WATER MAIN FOR THAT PARTICULAR PROJECT. IF CHANGES ARE MADE TO THE SIZE, THE DESIGN ENGINEER WILL BE REQUIRED TO SUBMIT CALCULATIONS SUPPORTING THE REVISED SIZE, INCLUDING ANY CHANGES TO THE REINFORCING STEEL.

HIGH-DENSITY POLYETHYLENE (HDPE) WATER MAIN NOTES

1. HDPE pipe shall be manufactured from high density PE 3408 polyethylene resin and shall have a standard dimension ratio (SDR) of 11 or less and a minimum working pressure rating pipe of 160 psi. The SDR is the outside diameter of the pipe divided by the minimum wall thickness.
2. HDPE pipe, appurtenances, and installation methods shall conform to the most current edition of AWWA standard C906.
3. All HDPE materials must be listed and approved for use under ANSI/NSF Standard 14.
4. All pipes shall be made of virgin material as defined in ASTM D3350 with an established hydrostatic design basis of 160 psi. for water at 73.4°F. 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.
5. A certificate of "Compliance with Specification" shall be furnished for all materials supplied.
6. 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.
7. 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.
8. Tracing wire shall be provided per the City's specifications and details for all water mains. Wire shall be copper, 12 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 tracing 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.
9. Pipe and fittings must be marked as prescribed by AWWA C906 and NSF. Pipe markings will include nominal size, OD base, dimension ratio, pressure class, working pressure rating, AWWA C906, manufacturer's name, manufacturer's production code including day, month, year extruded, and manufacturer's plant and extrusion line; and optional NSF logo. Permanent identification of piping service shall be provided by co-extruding longitudinal blue stripes into the outside of the pipe (stripes printed on the outside surface of the pipe shall not be acceptable) or the pipe material shall be black with a blue shell.
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 receive training in the proper methods for handling and installing the HDPE pipe by a qualified representative.
11. The mechanical joint end must meet outside diameter requirements for connection to ANSI/AWWA C111/A21 and ANSI/AWWA C153/A21.53 mechanical joints. The adapter through-bore inside diameter is equal to SDR11 DIPS HDPE pipe. Butt-fusion ends must meet AWWA C906 DIPS requirements for butt fusion to SDR11.
12. Bolts, nuts, gaskets, and glands meeting ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 are recommended. Install mechanical joint components in accordance with manufacturer's recommendations.
13. Connections to HDPE pipe shall not be made 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.
14. The HDPE pipe must be properly aligned at all transitions to conventional or HDPE water main and appurtenances.
15. Under no circumstances shall HDPE pipe be pressure tested when the temperature of the pipe is above 80°F.
16. 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.
17. The newly installed polyethylene water main will be disinfected and samples checked for complete disinfection by the City of Auburn Hills DPW. The number of samples and sampling points will be determined by the city.
18. Water service saddles on HDPE water main shall be "VA" Eletrofusion Service Saddles by Friatec, Inc. or approved equal.

ADDITIONAL NOTES FOR WATER MAIN PIPE BURSTING PROJECTS

19. The method approved for rehabilitation of existing water mains by pipe bursting and installation of new HDPE pipe is T.T. Technologies GRUNDOCRACK SYSTEMS, 800-533-2078) or approved equal. All contractors must be licensed to use the particular technology proposed for this work.
20. 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.
21. 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.
22. Prior to construction, the Contractor shall develop a temporary water system 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 by the City of Auburn Hills DPW.
23. 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.

OHM
34000 Plymouth Road | Livonia, MI 48150 | P (734) 522-6711 | F (734) 522-6427 | WWW.OHM-ADVISORS.COM

COUNTY: OAKLAND COUNTY
CITY/VILLAGE/TOWNSHIP: CITY OF AUBURN HILLS
JOB #: AH-WM DET
SCALE: H: N.T.S. V: N.T.S.
HORZ DATUM
VERT DATUM
DATE:
REVISIONS:
DATE:

DATE	BID DATE	CADD	ENGINEER	PROJ MGR	SECTION	TOWN	RANGE
NOV 2007			JMC	JEK		1	2E

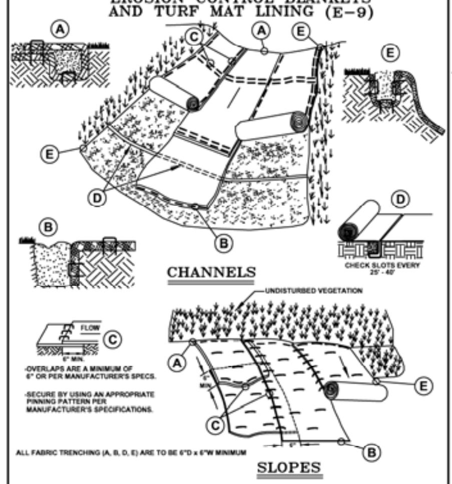
CLIENT: CITY OF AUBURN HILLS
DATE:
REVISIONS:

CITY OF AUBURN HILLS
STANDARD WATER MAIN DETAILS

SHEET 3 OF 3

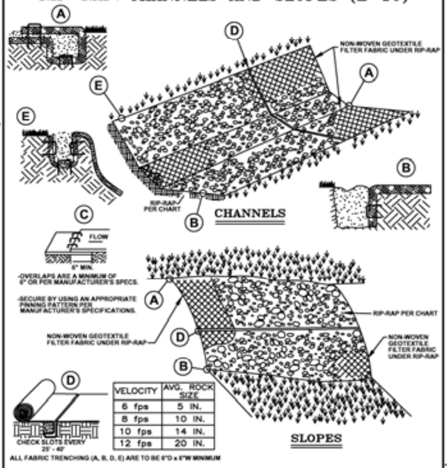
DRAWING PATH: S:\CVT\AuburnHillsCity\Standards_CADD\WATER MAIN DETAILS\AH-WM DET.dwg Nov 07, 2007 - 11:17am

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.

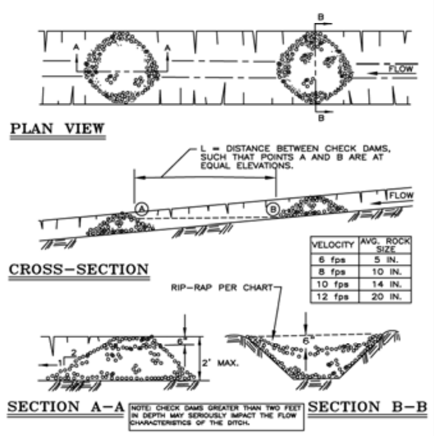
RIP-RAP: CHANNELS AND SLOPES (E-10)



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 STRESSES OF THE SLOPE/CHANNEL.

CHECK DAMS (E-3)

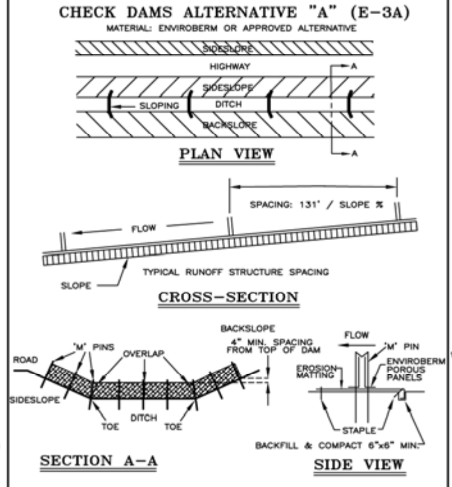


VELOCITY	AVG. ROCK SIZE
6 fps	5 IN.
8 fps	10 IN.
10 fps	14 IN.
12 fps	20 IN.

-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)

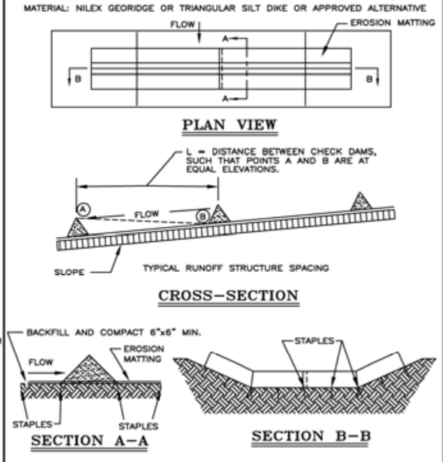
MATERIAL: ENVIROBERM OR APPROVED ALTERNATIVE



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

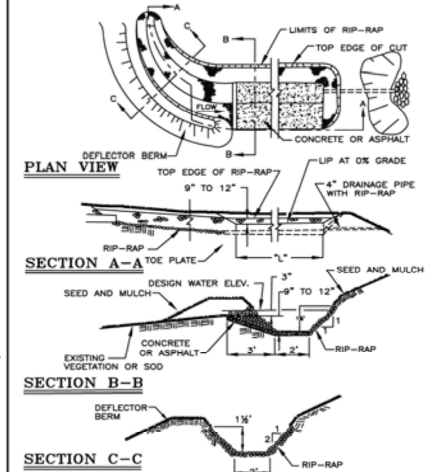
CHECK DAMS ALTERNATIVE "B" (E-3B)

MATERIAL: NILEX GEORIDGE OR TRIANGULAR SILT DIKE OR APPROVED ALTERNATIVE

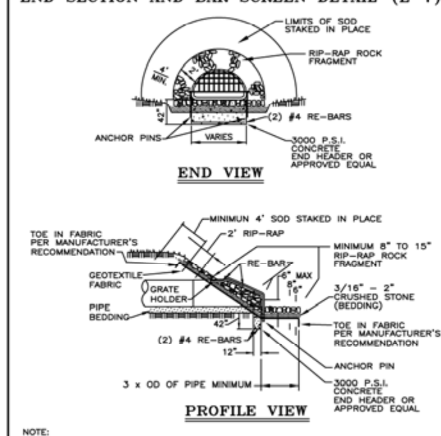


-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

LEVEL SPREADER (E-4)



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

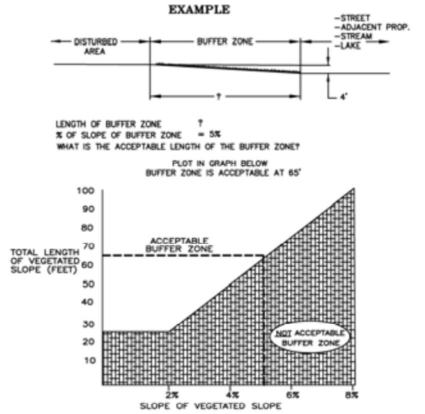


NOTE:
-BAR SCREEN DETAILS PER MDOT ROAD & BRIDGE STANDARD PLANS, STEEL GRATES FOR END SECTIONS. BARS ARE TO BE CUT OFF AT EDGE OF END SECTION.
-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

VEGETATIVE BUFFER ZONE (SP-1)

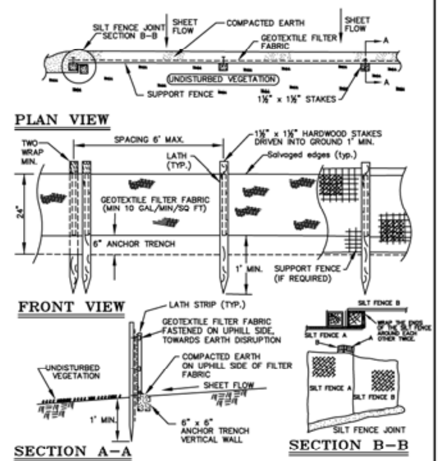
THE GRAPH SHOWN BELOW IS USED TO DETERMINE THE ADEQUACY OF AN EXISTING VEGETATIVE BUFFER ZONE FOR USE AS A SEDIMENT FILTER. THIS GRAPH IS ONLY APPLICABLE IF THE VEGETATION IS 90% DENSE AND AT LEAST 1" IN LENGTH OVER EVERY SQUARE FOOT OF DISTURBED SOIL. AN AREA COVERED WITH WEEDS, OR BUSHES AND TREES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

EXAMPLE



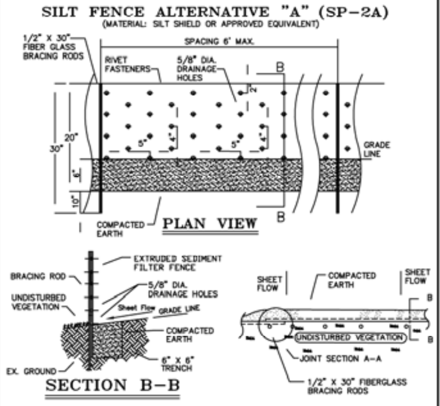
SILT FENCE (SP-2)

(MATERIAL: AMOCO PRO PEX 2130 OR APPROVED EQUIVALENT)

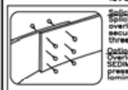


SILT FENCE ALTERNATIVE "A" (SP-2A)

(MATERIAL: SILT SHIELD OR APPROVED EQUIVALENT)



2% GRADE MAXIMUM SLOPE

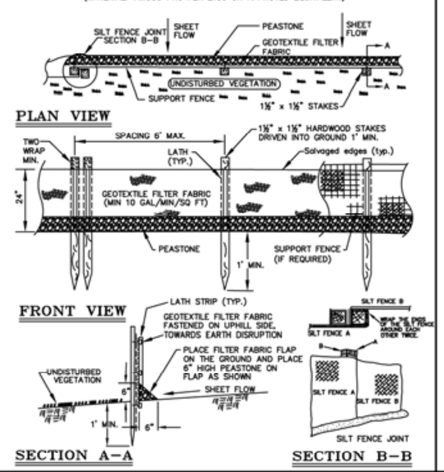


Splicing Procedure:
Splicing EXTRUDED SEDIMENT FILTER FENCE is achieved beginning with an overlap of a min. of 8" of the EXTRUDED SEDIMENT FILTER FENCE ends secured with six of our plastic ratchet rivet push-in fasteners. Locate three, evenly spaced, vertically, at least 2" from each edge of the splice.

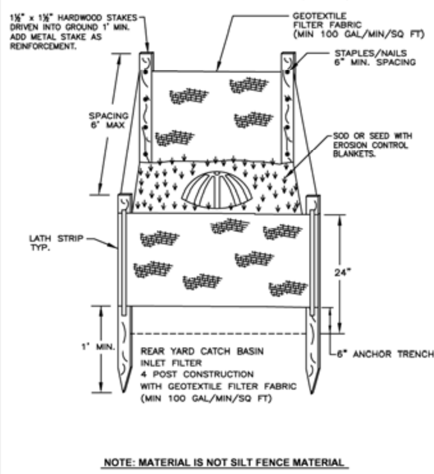
Optional Heat Splicing:
Overlap a minimum of eight inches. Melt a thin layer of EXTRUDED SEDIMENT FILTER FENCE with torch from top to bottom. Immediately press both layers together for a minimum of 5 second. Check for total lamination from top to bottom of material. (Do not apply heat to filter)

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

(MATERIAL: AMOCO PRO PEX 2130 OR APPROVED EQUIVALENT)

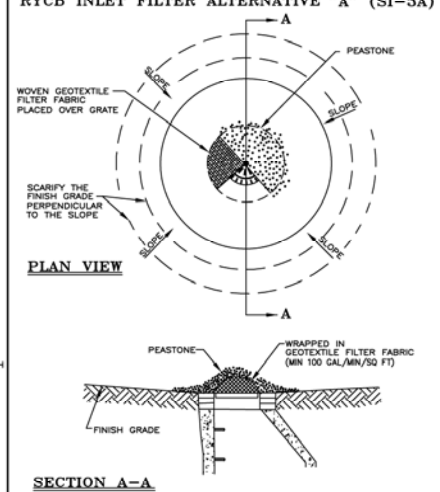


RYCB INLET FILTER (SI-3)



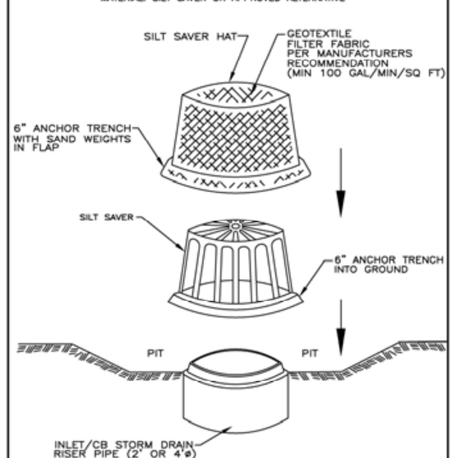
NOTE: MATERIAL IS NOT SILT FENCE MATERIAL.

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



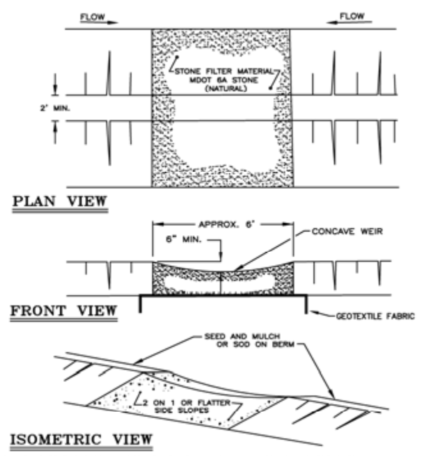
RYCB INLET FILTER ALTERNATIVE "B" (SI-3B)

MATERIAL: SILT SAVER OR APPROVED ALTERNATIVE



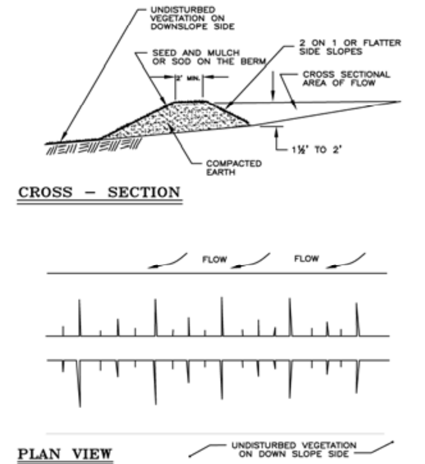
(NOTE: NO PIT REQUIRED WHEN FRAME AND COVER OR GRATE AND COVER ARE IN PLACE.)

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

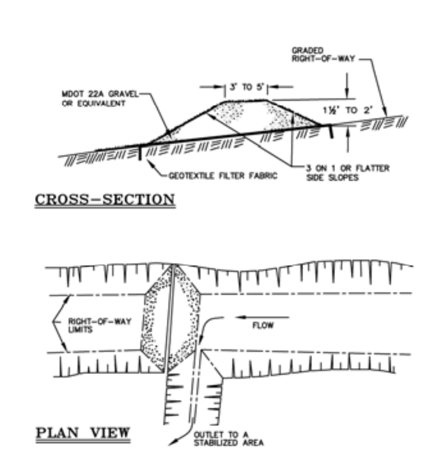


PLACE GEOTEXTILE FABRIC UNDER STONE WITH 6 INCH MIN. OVERLAP AND TRENCHED IN 6 INCH MIN.

EARTH DIVERSION BERM (E-2)



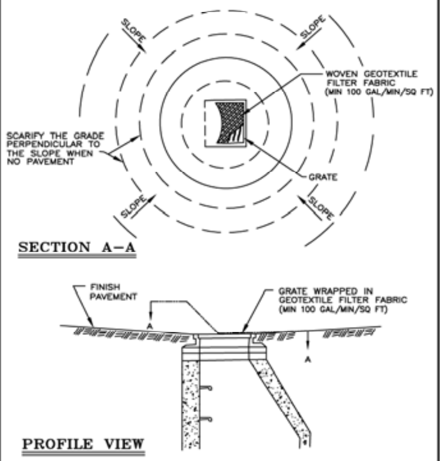
GRAVEL INTERCEPTOR DIKE (SP-6)



-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.

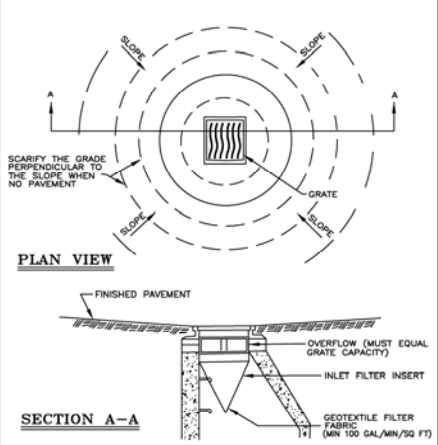
LOW POINT INLET FILTER (SI-2)

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

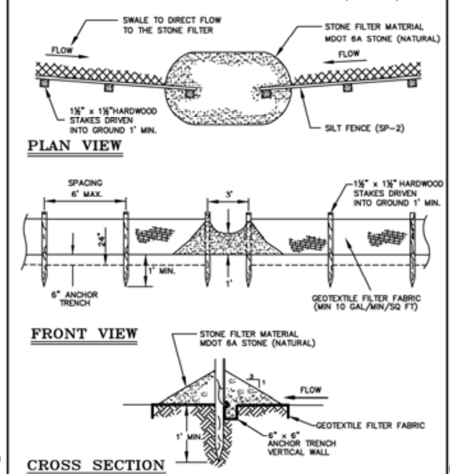


LOW POINT INLET FILTER ALT. "A" (SI-2A)

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

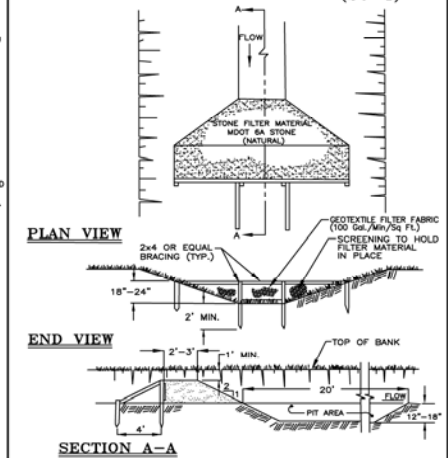


SILT FENCE GRAVEL FILTER (SP-3)



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

DITCH SEDIMENT TRAP (SO-4)

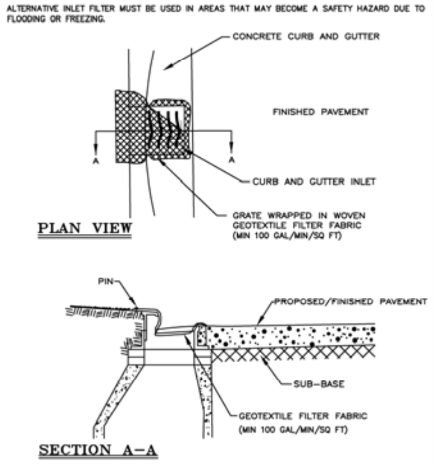


NOTE:
-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THE SHEET OR IN THE WRC SOIL EROSION MANUAL.

CURB AND GUTTER INLET FILTER (SI-4)

(BEFORE AND AFTER PAVING)

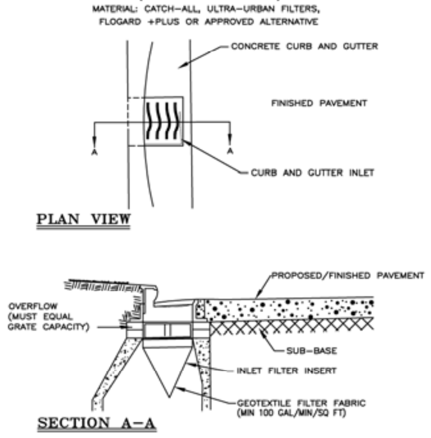
ALTERNATIVE INLET FILTER MUST BE USED IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING.



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

(BEFORE AND AFTER PAVING)

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

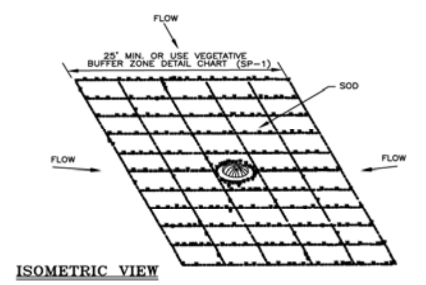


SOD INLET FILTER (SI-1)

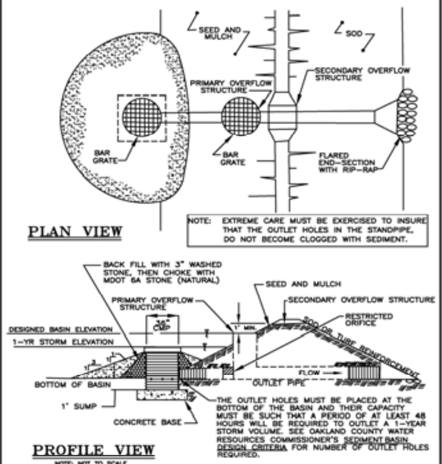
DEFINITION: SOD INLET FILTERS ARE PADS OF SOD PLACED AROUND A STORM DRAIN INLET OR CATCH BASIN.

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.

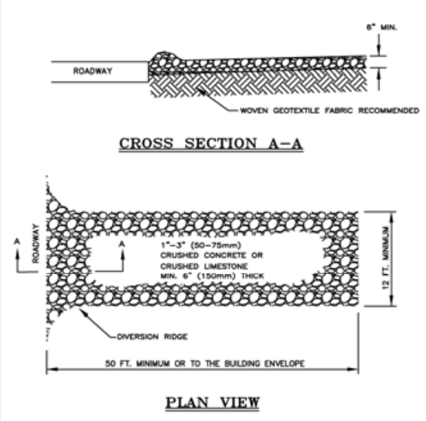
WHERE APPLICABLE: SOD INLET FILTERS SHOULD ONLY BE USED TO HANDLE LIGHT CONCENTRATIONS OF SEDIMENT. THEY ARE BEST USED AFTER FINAL GRADING IS COMPLETE AND DURING THE ESTABLISHMENT OF A VEGETATIVE COVER.



TEMPORARY DETENTION BASIN OUTLET STONE FILTER (SO-2)

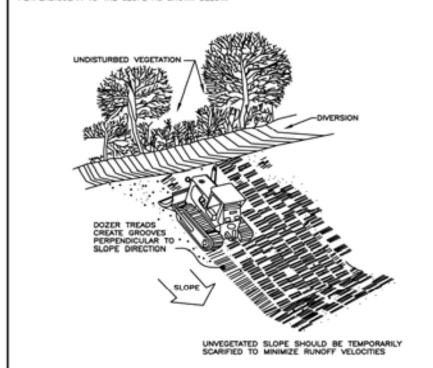


TEMPORARY STONE ACCESS DRIVE (SP-9)



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

Data Source / Source Date: N/A

Rev. No.:	Rev. By:	Rev. Date:	Description:
1	lz	3-22-07	PROPOSED DETAIL EDITS
2	lz	2-26-09	STANDARDS COMMITTEE APPROVAL / NAME CHANGES
3	DS	3-25-11	SILT FENCE ALTERNATIVE "A" DETAIL (SP-2A) ADDED
4	DS	4-16-13	STANDARDS COMMITTEE APPROVAL / NOTE CHANGES

ORIG. DATE:	01/01/01
SCALE:	NONE
DESIGNED BY:	WRC
DRAWN BY:	Mapping

WRC WATER RESOURCES COMMISSIONER Jim Nash

ONE PUBLIC WORKS DRIVE, BLDG 95 WEST
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