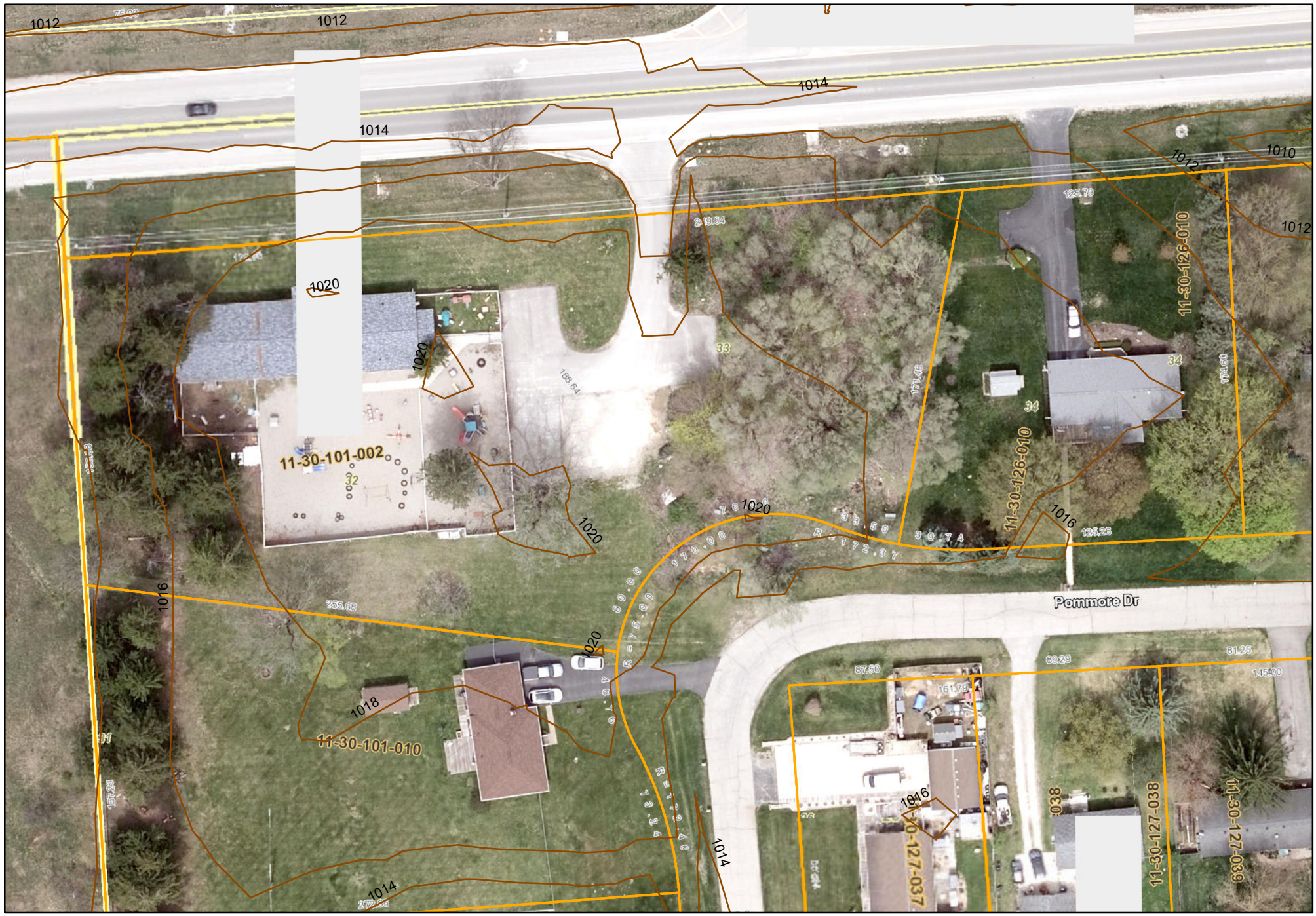
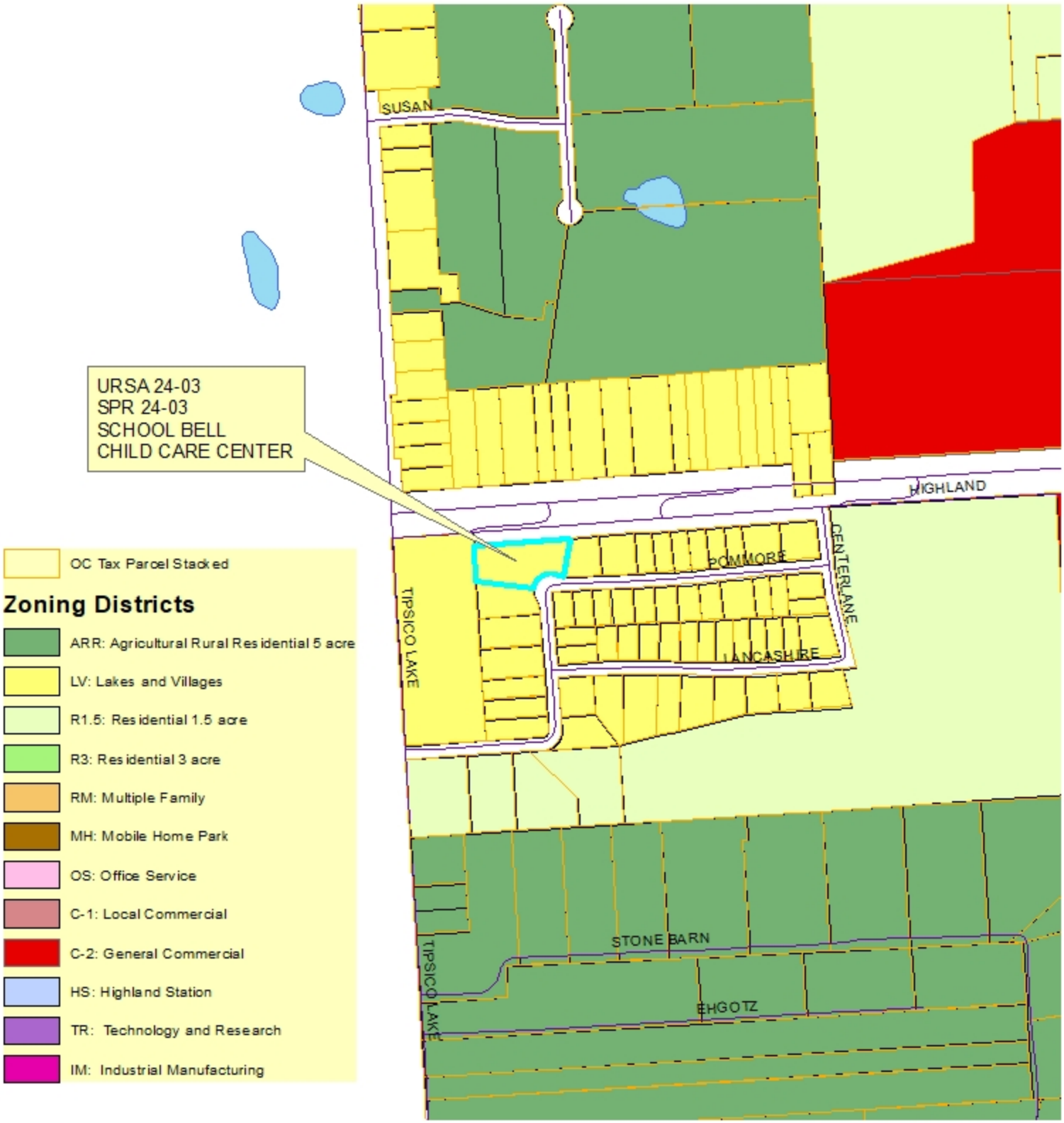

4501 W Highland
11-30-101-002
N
1012
1014
1020
1016
1018
11-30-101-002
11-30-101-010
11-30-126-010
11-30-127-037
11-30-127-038
11-30-127-039
Pommore Dr
90 45 0 90 Feet

CHARTER TOWNSHIP OF HIGHLAND
ZONING MAP



ENACTED: November 18, 2010

- [x] Site Plan Review
- [ ] Rezoning
- [ ] Use Requiring Special Approval
- [ ] Land Division
- [ ] Land Division & Combination
- [ ] Road Profile
- [ ] Other

PLAN REVIEW APPLICATION

Highland Township Planning Department, 205 N. John St, Highland, Michigan 48357 (248) 887-3791 Ext. 2

Date Filed: _____ **Fee:** _____ **Escrow:** _____ **Case Number:** _____

NOTICE TO APPLICANT AND OWNER

BY SIGNING THIS APPLICATION, THE APPLICANT AND OWNER ACKNOWLEDGE ONE OR THE OTHER OR BOTH ARE RESPONSIBLE FOR ALL APPLICATION AND CONSULTANT FEES THAT ARISE OUT OF THE REVIEW OF THIS REQUEST THE OWNER ALSO AUTHORIZES THE TOWNSHIP TO PLACE A SIGN ON THE PROPERTY, IF NECESSARY, TO INFORM THE PUBLIC OF THE PENDING MATTER BEING REQUESTED.

REQUIRED COPIES OF PLANS

INITIAL REVIEW: 2 HARD COPIES OF PLANS AND .PDF COPY OF PLANS
CONSULTANTS REVIEW OF APPROVED PLANS SUBJECT TO CONDITIONS: 5 COPIES AND .PDF COPY

1. APPLICANT INFORMATION

NAME: Marc Kasabasic
ADDRESS: 4501 West Highland Road
Milford, MI 48380
PHONE: 248-830-9642
EMAIL: mkasabasi@ltu.edu

OWNER INFORMATION

NAME: School in the Pines Inc. dba School Bell Childcare
ADDRESS: 4501 West Highland Road
Milford, MI 48380
PHONE: 248-887-3013
EMAIL: highland@schoolbellchildcare.com

2. PROPERTY INFORMATION

ADDRESS OR ADJACENT STREETS: 4501 West Highland Road | West Highland Road & South Tipsico Lake Road
LOT WIDTH: 179.86' LOT DEPTH: 156.08' LOT AREA: 1.62 AC
PARCEL IDENTIFICATION NUMBER(S): #11-30-101-002

3. PROJECT INFORMATION

PROJECT NAME: School Bell Childcare Addition
PRESENT ZONING: LV Lake & Village PROPOSED ZONING: _____
PRESENT USE: Day Care Center PROPOSED USE: _____

APPLICANT

SIGNATURE: Marc Kasabasic
PRINT NAME: Marc Kasabasic

On the ____day of _____,_____ before me, a Notary Public, personally appeared the above named person whose signature appears above, and who executed the foregoing instrument, and he/she acknowledged to me that he/she executed the same.

State Of Michigan
County Of Oakland

Notary Public: _____

OWNER

SIGNATURE: Federica Kasabasic
PRINT NAME: Federica Kasabasic

On the ____day of _____,_____ before me, a Notary Public, personally appeared the above named person whose signature appears above, and who executed the foregoing instrument, and he/she acknowledged to me that he/she executed the same.

State Of Michigan
County Of Oakland

Notary Public: _____

• If there are Co-Applicants and/or Co-Owners associated with this property(ies) to be acted upon, please submit a Notarized Co-Applicant's and/or Co-owner's "Interest in Property Certificate" with this application. The person signing this cover sheet will be considered the official designee for the group and all correspondence will be addressed to this person.

• A notarized letter giving the Applicant authorization to represent the Owner is also permitted in lieu of a signature on this application. The person signing this cover sheet, however, will be considered the official designee for the Owner and all correspondence will be addressed to this person.

HIGHLAND TOWNSHIP IMPACT ASSESSMENT
School Bell Childcare

Prepared for:

Property Owner
School of the Pines Inc. dba School Bell Childcare
Marc Kasabasic

Applicant
School of the Pines Inc. dba School Bell Childcare
Marc Kasabasic

Prepared by:

Jared Prather, E.I.T.

BOSS Engineering

3121 E. Grand River Howell, MI 48843
517.546.4836 fax 517.548.1670
www.bosseng.com

May 31st, 2024

DISCUSSION ITEMS

Name(s) and address(es) of person(s) responsible for preparation of the General Description and a brief statement of their qualifications.

Prepared by:

Jared Prather, E.I.T.
Project Engineer
Boss Engineering
3121 E Grand River
Howell, MI 48843

Prepared for:

Owner & Applicant:
School of the Pines Inc. dba School Bell Childcare / Marc Kasabasic
4501 W. Highland Road
Milford, MI 48380

General Site Description

The project site is on parcel #11-30-101-002 in Section 30, Highland Township, Oakland County, MI 48380.

The subject site is bordered:

- On the west by a large, open parcel 6.10 acres in size zoned Lake & Village (LV).
- On the north by the West Highland Road (M-59) MDOT Right of Way.
- On the east by a single-family residential parcel, 0.75 acres in size, zoned LV.
- On the southeast by Pommore Drive
- And on the south by a single-family residential parcel, 0.85 acres in size, zoned LV.

The subject site is an occupied parcel of land consisting of an operational day care center along West Highland Road with a driveway, paved parking lot, playground, fence separating the driveway from the playground, and wooded area in the east. Sanitary and water services are provided by existing onsite septic and well systems. The existing septic field and reserve septic field is on the southwest side of the playground and the well is on the northern edge of the parking lot. Along the southeastern property bend lies Pommore Drive (See the Existing Conditions Plan). The front of the property is a flat lawn space and the eastern half of the property has a moderately wooded area. There is currently one existing paved commercial drive approach from the north end of the subject property leading to the unstriped parking lot and gravel parking area from W Highland Road (M-59).

Natural Features

The parcel is developed. As described earlier, the property includes a day care building, a paved parking lot, and a playground. The day care center and playground occupy approximately the western half of the site with the paved parking lot in the middle of the site. The remaining eastern half of the site is moderately wooded with a collection of trees.

The site slopes from the center outwardly at 1-3% in all directions. The northern side of the parcel slopes toward W Highland Road (M-59) with slopes increasing from 2% to 6-10%, western side slopes toward the adjacent parcel field from 1-2% to 5-10%, eastern side sloping toward the adjacent property from 2% to 3-5%, and southern side sloping toward Pommore Drive from 2-3% to 10-20%. The site generally drains from the center to the north onto W Highland Road (M-59) with the remaining drainage following the site slopes.

The NRCS soils on the whole property are Fox Sandy Loam at 1-6% slope which is consistent with the general character of the slopes on the site.

Storm Water Management

Storm water will be managed onsite with the creation of a new storm water sewer network. The new school building, parking lot, and some of the modified playground area will be captured in catch basins and directed to the new underground detention system with a restricted discharge to the W Highland Road (M-59) MDOT right-of-way storm ditch and culvert through an overflow control structure. Detailed construction plans will be reviewed by the Township Engineer and the Soil Erosion Control plans will be reviewed and permit issued by the Livingston County Drain Commissioners office prior to construction commencing. Ongoing/periodic soil erosion inspections will occur per County requirements to ensure soil erosion is managed proactively.

Impact on Surrounding Land Use

The proposed special use will conform to existing development patterns and will not negatively impact adjacent properties with added lighting, noise, or air pollution. The proposed project seeks to expand the business operation of School Bell Childcare with the creation of a new schoolhouse building. The site development will comply with Township Ordinances and will meet the current Township, County, and State engineering standards. There will be minimal impact on surrounding land uses or development patterns as there will be no change to these uses. Additional lighting will be designed to illuminate the new schoolhouse building and parking lot and will not impact the adjacent residential homes.

Impact on Public Facilities and Services

The proposed updates to the existing site will not add any additional burden on the fire and police services. Fire trucks will use the M-59 right-of-way to access the site in case of a fire on either side of the site with an additional access behind the site from Pommore Drive. No hydrant coverage exists on the site. Refuse vehicles will have access to the onsite dumpster located at the southern end of the driveway to collect the garbage. The use increases the maximum overall school population to 96 students and 13 staff.

Impact on Public Utilities

Storm water will be detained onsite via the use of an underground detention system. Overall runoff along the northern end of the site toward W Highland Road (M-59) will be reduced below existing conditions. The storm water will be discharged at the restricted rate to the MDOT right-of-way culvert and ditch instead of the existing uncontrolled condition. Detailed construction plans would be reviewed by the Township Engineer and a Soil Erosion Control permit would be reviewed and issued by the Oakland County Drain Commissioner. Water & sanitary services will continue to be provided using the existing well and the existing and proposed septic systems onsite.

Storage or Handling of any Hazardous Materials

No storing or handling of any bulk hazardous materials is expected for this development.

Impact on Traffic and Pedestrians

A Trip Generation summary has been completed using the ITE 10th Edition Volume 2 manual and is included on the plans. The number of students will increase from 50 to 96 and would generate a maximum AM peak total of 75 trips and PM peak total of 76 trips from the arrival to the departure of the site. The entryway will be enlarged to 24 feet wide in conformance with the driveway width requirement along W Highland Road (M-59).

Special Provisions

A special land use permit application will be submitted with the site plan.

Description of all sources:

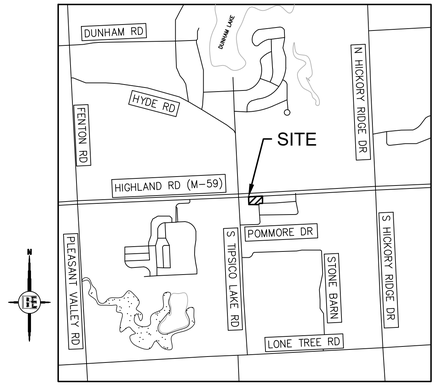
- Highland Township Zoning Ordinance and engineering standards
- Oakland County Drain Commissioner engineering standards
- NRCS Web Soil Survey
- Institute of Traffic Engineers (ITE) Trip General Manual, 10th Edition

PROPERTY DESCRIPTION:

PROPERTY DESCRIPTION PER OAKLAND COUNTY TAX ROLL:

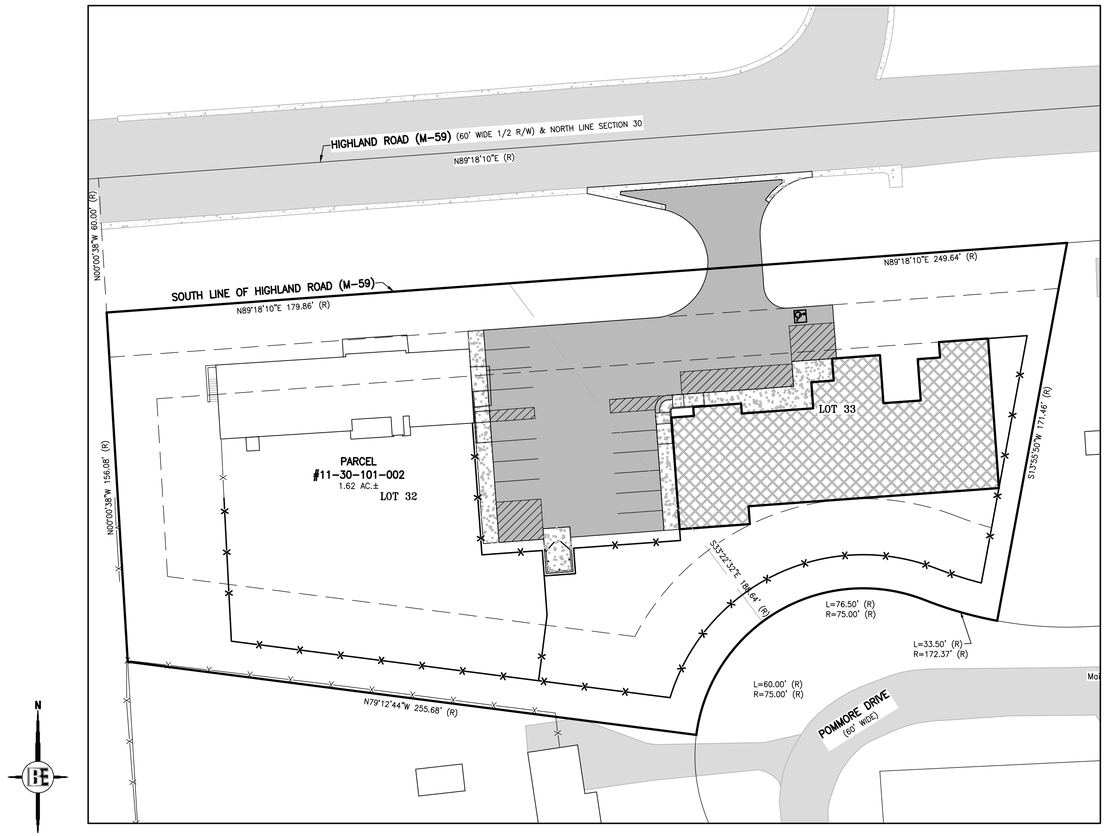
T3N, R7E, SEC 30 WEST HIGHLAND VILLAGE LOTS 32 & 33

SITE PLAN
FOR
SCHOOL BELL CHILDCARE ADDITION
PART OF NW QUARTER, SECTION 30 T3N, R7E
HIGHLAND CHARTER TOWNSHIP, OAKLAND COUNTY, MICHIGAN 48380



LOCATION MAP

NO SCALE



OVERALL SITE MAP

NO SCALE

SHEET INDEX

SHEET NO.	DESCRIPTION
1	COVER SHEET
2	GENERAL NOTES & LEGEND
3	EXISTING CONDITIONS & DEMOLITION PLAN
4	NATURAL FEATURES PLAN
5	SITE PLAN
6	GRADING & DRAINAGE PLAN
7	SOIL EROSION SEDIMENTATION CONTROL PLAN
8	UTILITY PLAN
9	VEHICLE CIRCULATION PLAN
10	LANDSCAPE PLAN
11	CONSTRUCTION DETAILS
12	CONSTRUCTION DETAILS
13	HIGHLAND TOWNSHIP STORM DETAILS
14	HIGHLAND TOWNSHIP STORM DETAILS
15	OAKLAND COUNTY DETAILS
	PLANS BY OTHERS Ci ENGINEERING SOLUTIONS
L	LIGHTING PHOTOMETRIC PLAN
A	ARCHITECTURAL PLANS

PREPARED FOR:

SCHOOL IN THE PINES INC.
dba SCHOOL BELL CHILDCARE
4501 WEST HIGHLAND ROAD
MILFORD, MI 48380
MARC KASABASIC
248.830.9642
mkasabasi@ltu.edu

STATE OF MICHIGAN — BRENT W. La VANWAY — ENGINEER — No. 38211 — LICENSED PROFESSIONAL ENGINEER

ARCHITECT:

Ci ENGINEERING SOLUTIONS
15 N WALNUT ST, SUITE 300
MOUNT CLEMENS, MI 480843
CHASE DIES
(586)-925-6646
cdies@ciengsolutions.com

PREPARED BY:

BEBOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670
CONTACT: BRENT LaVANWAY

INDEMNIFICATION STATEMENT

THE CONTRACTOR SHALL HOLD HARMLESS THE DESIGN PROFESSIONAL, MUNICIPALITY, COUNTY, STATE AND ALL OF ITS SUB CONSULTANTS, PUBLIC AND PRIVATE UTILITY COMPANIES, AND LANDOWNERS FOR DAMAGES TO INDIVIDUALS AND PROPERTY, REAL OR OTHERWISE, DUE TO THE OPERATIONS OF THE CONTRACTOR AND/OR THEIR SUBCONTRACTORS.

FOR SITE PLAN APPROVAL ONLY!
NOT FOR CONSTRUCTION

NO	BY	CK	REVISION	DATE

1

ISSUE DATE: 05/31/24
JOB NO: 24-048

GENERAL NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED TOWNSHIP, COUNTY, AND STATE OF MICHIGAN PERMITS.
2. A GRADING PERMIT FOR SOIL EROSION–SEDIMENTATION CONTROL SHALL BE OBTAINED FROM THE GOVERNING AGENCY PRIOR TO THE START OF CONSTRUCTION.
3. IF DUST PROBLEM OCCURS DURING CONSTRUCTION, CONTROL WILL BE PROVIDED BY AN APPLICATION OF WATER, EITHER BY SPRINKLER OR TANK TRUCK.
4. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH LOCAL MUNICIPAL STANDARDS AND SPECIFICATIONS.
5. PAVED SURFACES, WALKWAYS, SIGNS, LIGHTING AND OTHER STRUCTURES SHALL BE MAINTAINED IN A SAFE, ATTRACTIVE CONDITION AS ORIGINALLY DESIGNED AND CONSTRUCTED.
6. ALL BARRIER–FREE FEATURES SHALL BE CONSTRUCTED TO MEET ALL LOCAL, STATE AND A.D.A. REQUIREMENTS. WHERE EXISTING CONDITIONS AND/OR THE REQUIREMENTS OF THE PLANS WILL RESULT IN FINISHED CONDITIONS THAT DO NOT MEET ADA REQUIREMENTS, THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER PRIOR TO WORK COMMENCING.
7. ANY DISCREPANCY IN THIS PLAN AND ACTUAL FIELD CONDITIONS SHALL BE REPORTED TO THE DESIGN ENGINEER PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL SETBACKS, EASEMENTS AND DIMENSIONS SHOWN HEREON PRIOR TO BEGINNING CONSTRUCTION.
8. THE CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND RIGHT–OF–WAY, PUBLIC OR PRIVATE, PRIOR TO THE START OF CONSTRUCTION.
9. THE CONTRACTOR SHALL COORDINATE WITH ALL OWNERS TO DETERMINE THE LOCATION OF EXISTING LANDSCAPING, IRRIGATION LINES & PRIVATE UTILITY LINES. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING LANDSCAPING, IRRIGATION LINES, AND PRIVATE UTILITY LINES.
10. THE CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE UPON COMPLETION OF THE PROJECT.
11. THE CONTRACTOR SHALL MAINTAIN THE SITE IN A MANNER SO THAT WORKMEN AND PUBLIC SHALL BE PROTECTED FROM INJURY, AND ADJOINING PROPERTY PROTECTED FROM DAMAGE.
12. THE CONTRACTOR SHALL KEEP THE AREA OUTSIDE THE "CONSTRUCTION LIMITS" BROOM CLEAN AT ALL TIMES.
13. THE CONTRACTOR SHALL CALL MISS DIG A MINIMUM OF 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
14. ALL PAVEMENT REPLACEMENT AND OTHER WORKS COVERED BY THESE PLANS SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE TOWNSHIP, INCLUDING THE LATEST MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
15. THE CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE TO EXISTING UTILITIES.
16. NO ADDITIONAL COMPENSATION WILL BE PAID TO THE CONTRACTOR FOR ANY DELAY OR INCONVENIENCE DUE TO THE MATERIAL SHORTAGES OR RESPONSIBLE DELAYS DUE TO THE OPERATIONS OF SUCH OTHER PARTIES DOING WORK INDICATED OR SHOWN ON THE PLANS OR IN THE SPECIFICATION OR FOR ANY REASONABLE DELAYS IN CONSTRUCTION DUE TO THE ENCOUNTERING OR EXISTING UTILITIES THAT MAY OR MAY NOT BE SHOWN ON THE PLANS.
17. DURING THE CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL NOT PERFORM WORK BY PRIVATE AGREEMENT WITH PROPERTY OWNERS ADJACENT TO THE PROJECT.
18. IF WORK EXTENDS BEYOND NOVEMBER 15, NO COMPENSATION WILL BE DUE TO THE CONTRACTOR FOR ANY WINTER PROTECTION MEASURES THAT MAY BE REQUIRED BY THE ENGINEER.
19. NO TREES ARE TO BE REMOVED UNTIL MARKED IN THE FIELD BY THE ENGINEER.
20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PROPERTY BEYOND THE CONSTRUCTION LIMITS INCLUDING BUT NOT LIMITED TO EXISTING FENCE, LAWN, TREES AND SHRUBBERY.
21. TRAFFIC SHALL BE MAINTAINED DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL SIGNS AND TRAFFIC CONTROL DEVICES. FLAG PERSONS SHALL BE PROVIDED BY THE CONTRACTOR IF DETERMINED NECESSARY BY THE ENGINEER. ALL SIGNS SHALL CONFORM TO THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AT NO COST TO THE TOWNSHIP. NO WORK SHALL BE DONE UNLESS THE APPROPRIATE TRAFFIC CONTROL DEVICES ARE IN PLACE.
22. ALL DEMOLISHED MATERIALS AND SOIL SPOILS SHALL BE REMOVED FROM THE SITE AT NO ADDITIONAL COST, AND DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
23. ANY EXISTING APPURTENANCES SUCH AS MANHOLES, GATE VALVES, ETC. SHALL BE ADJUSTED TO THE PROPOSED GRADE AND SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
24. ALL PERMANENT SIGNS AND PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST REVISION OF THE MICHIGAN MUTCD MANUAL AND SHALL BE INCIDENTAL TO THE CONTRACT.
25. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL ITEMS REQUIRED FOR CONSTRUCTION OF THE PROJECT ARE INCLUDED IN THE CONTRACT. ANY ITEMS NOT SPECIFICALLY DESIGNATED IN THE PLANS SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
26. THE CONTRACTOR IS RESPONSIBLE FOR HAVING A SET OF APPROVED CONSTRUCTION PLANS, WITH THE LATEST REVISION DATE, ON SITE PRIOR TO THE START OF CONSTRUCTION. IN THE EVENT OF ANY QUESTIONS PERTAINING TO THE INTENT OF THE CONSTRUCTION PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT THE DESIGN ENGINEER FOR A FINAL DETERMINATION FROM THE DESIGN ENGINEER.
27. THE CONTRACTOR, NOT THE OWNER OR THE ENGINEER, ARE RESPONSIBLE FOR THE MEANS, METHODS, AND SEQUENCE OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR SAFE EXECUTION OF THE PROJECT SCOPE IN ACCORDANCE WITH THE APPROVED CONSTRUCTION PLANS.
28. THE CONTRACTOR IS RESPONSIBLE FOR PRESERVING CONSTRUCTION STAKING AS NECESSARY. CONTRACTOR TO NOTIFY CONSTRUCTION SURVEYOR OF REPLACEMENT STAKES NEEDED WHICH SHALL BE AT THE CONTRACTORS EXPENSE.
29. THE OWNER AND/OR CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING FRANCHISE UTILITY SERVICES (CABLE, ELECTRIC, GAS, ETC.) OWNER AND/OR CONTRACTOR SHALL WORK WITH UTILITY COMPANIES ON FURNISHING SITE UTILITY LAYOUTS AND PROVIDING CONDUIT CROSSINGS AS REQUIRED.
30. DAMAGE TO ANY EXISTING UTILITIES OR INFRASTRUCTURE (INCLUDING PAVEMENT, CURB, SIDEWALK, ETC.) SHALL PROMPTLY BE REPLACED IN KIND AND SHALL BE AT THE CONTRACTORS EXPENSE.
31. COORDINATION OF TESTING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND PER ALL CITY/TOWNSHIP/COUNTY REQUIREMENTS. COPIES OF ALL TEST REPORTS SHALL BE FURNISHED TO THE DESIGN ENGINEER.
32. PRIOR TO THE START OF CONSTRUCTION, PROTECTION FENCING SHALL BE ERECTED AROUND THE TREE DRIPLINE OF ANY TREES INDICATED TO BE SAVED WITHIN THE LIMITS OF DISTURBANCE.
33. THE CONTRACTOR SHALL MAINTAIN DRAINAGE OF THE PROJECT AREA AND ADJACENT AREAS. WHERE EXISTING DRAINAGE FACILITIES ARE IMPACTED/DISTURBED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE ANY NECESSARY TEMPORARY DRAINAGE PROVISIONS.
34. SOIL BORING LOGS ARE REPRESENTATIVE OF SPECIFIC POINTS ON THE PROJECT SITE, AND IF PROVIDED TO THE CONTRACTOR ARE FOR INFORMATIONAL PURPOSES ONLY.
35. WHERE CITY/TOWNSHIP STANDARD CONSTRUCTION DETAILS/SPECIFICATIONS ARE PROVIDED AND ARE IN CONFLICT WITH NOTES AND SPECIFICATIONS HEREIN, THE CITY/TOWNSHIP STANDARD SHALL GOVERN.

INDEMNIFICATION STATEMENT

THE CONTRACTOR SHALL HOLD HARMLESS THE DESIGN PROFESSIONAL, MUNICIPALITY, COUNTY, STATE, AND ALL OF ITS SUB CONSULTANTS, PUBLIC AND PRIVATE UTILITY COMPANIES, AND LANDOWNERS FOR DAMAGES TO INDIVIDUALS AND PROPERTY, REAL OR OTHERWISE, DUE TO THE OPERATIONS OF THE CONTRACTOR AND/OR THEIR SUBCONTRACTORS.

CONTRACTOR TO FOLLOW MANUFACTURER SPECS/RECOMMENDATIONS THAT SUPERCEDE PLANS

GENERAL GRADING & SESC NOTES

1. THE CONTRACTOR SHALL HAVE IN PLACE ALL REQUIRED EROSION CONTROL METHODS AS INDICATED ON THE CONSTRUCTION PLANS AND AS REQUIRED BY GENERAL PRACTICE. SPECIFIC MEANS, METHODS AND SEQUENCES OF CONSTRUCTION MAY DICTATE ADDITIONAL SOIL EROSION CONTROL MEASURES BE NEEDED. THE CONTRACTOR SHALL COORDINATE WITH THE DESIGN ENGINEER ON THESE ANTICIPATED METHODS. ADDITIONAL SOIL EROSION CONTROL METHODS SHALL BE INCIDENTAL TO THE SCOPE OF WORK.
2. ACTUAL FIELD CONDITIONS MAY DICTATE ADDITIONAL OR ALTERNATE SOIL EROSION CONTROL MEASURES BE UTILIZED. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DEFICIENCIES OR FIELD CONDITIONS THAT WARRANT ADDITIONAL AND/OR ALTERNATIVE SESC MEASURES BE UTILIZED.
3. AT THE CLOSE OF EACH DAY, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING ALL CONSTRUCTION OPERATIONS, MATERIALS, DEBRIS, ETC ARE CONTAINED ON–SITE.
4. AT THE CLOSE OF EACH WORKING DAY, ALL DRAINAGE STRUCTURES SHALL BE FREE OF DIRT AND DEBRIS AT THE FLOW LINE.
5. ALL SOIL EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE PER MDEGLE REGULATIONS AND BEST PRACTICES, ALL SOIL EROSION CONTROL MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR.
6. THE SOIL EROSION CONTROL MEASURES SHALL BE KEPT IN PLACE UNTIL SUCH A TIME THAT THE SITE IS DETERMINED TO BE ESTABLISHED WITH ACCEPTABLE AMOUNT OF VEGETATIVE GROUND COVER.
7. ALL AREAS DISTURBED BY THE CONTRACTOR BEYOND THE NORMAL CONSTRUCTION LIMITS OF THE PROJECT SHALL BE SODDED OR SEEDED AS SPECIFIED OR DIRECTED BY THE ENGINEER.
8. AFTER REMOVAL OF TOPSOIL, THE SUBGRADE SHALL BE COMPACTED TO 95% OF ITS UNIT WEIGHT.
9. ALL GRADING IN THE PLANS SHALL BE DONE AS PART OF THIS CONTRACT. ALL DELETERIOUS MATERIAL SHALL BE REMOVED FROM THE SUBGRADE PRIOR TO COMPACTING.
10. ALL ROOTS, STUMPS AND OTHER OBJECTIONABLE MATERIALS SHALL BE REMOVED AND THE HOLE BACKFILLED WITH SUITABLE MATERIAL. WHERE GRADE CORRECTION IS REQUIRED, THE SUBGRADE SHALL BE CUT TO CONFORM TO THE CROSS–SECTION AS SHOWN IN THE PLANS.
11. ALL EXCAVATION UNDER OR WITHIN 3 FEET OF PUBLIC PAVEMENT, EXISTING OR PROPOSED SHALL BE BACKFILLED AND COMPACTED WITH SAND (MDOT CLASS II).

GENERAL LANDSCAPE NOTES

1. ALL PLANT MATERIAL SHALL CONFORM TO THE REQUIREMENTS AND SPECIFICATIONS OF THE GOVERNING MUNICIPALITY. ALL STOCK SHALL BE NURSERY GROWN, CONFORMING TO ANSI Z60.1 "AMERICAN STANDARD FOR NURSERY STOCK", AND IN ACCORDANCE WITH GOOD HORTICULTURAL PRACTICE. STOCK SHALL EXHIBIT NORMAL GROWTH HABIT AND BE FREE OF DISEASE, INSECTS, EGGS, LARVAE, & DEFECTS SUCH AS KNOTS, SUN–SCALD, INJURIES, ABRASIONS, OR DISFIGUREMENT. ALL PLANT MATERIAL SHALL BE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT.
2. ALL PLANT MATERIALS SHALL BE BALLED AND BURLAPPED OR CONTAINER STOCK. NO BARE ROOT STOCK IS PERMITTED. ALL PLANT BALLS SHALL BE FIRM, INTACT, AND SECURELY WRAPPED AND BOUND.
3. ALL PLANT BED MATERIALS SHALL BE EXCAVATED OF ALL BUILDING MATERIALS, OTHER EXTRANEOUS OBJECTS, AND POOR SOILS TO A MINIMUM DEPTH OF 12–INCHES AND BACKFILLED TO GRADE WITH SPECIFIED PLANTING MIX (SEE BELOW).
4. PLANTING MIXTURE SHALL CONSIST OF 5 PARTS TOPSOIL FROM ON–SITE (AS APPROVED), 4 PARTS COARSE SAND, 1 PART SPHAGNUM PEAT MOSS (OR APPROVED COMPOST), AND 5 LBS OF SUPERPHOSPHATE FERTILIZER PER CU. YD. OF MIX. INGREDIENTS SHALL BE THOROUGHLY BLENDED FOR UNIFORM CONSISTENCY.
5. ALL PLANT BEDS AND INDIVIDUAL PLANTS, NOT OTHERWISE NOTED SHALL BE MULCHED WITH A 4–INCH LAYER OF SHREDDED BARK MULCH. EDGE OF MULCH BEDS AS SHOWN. DECIDUOUS TREES IN LAWN AREAS SHALL RECEIVE A 5–FT DIAMETER CIRCLE OF MULCH AND CONIFER TREES 8–FT (PLANTED CROWN OF TREE) UNLESS OTHERWISE NOTED.
6. LANDSCAPE STONE SHALL BE INSTALLED WHERE NOTED OR INDICATED (HATCHED). STONE SHALL BE 3/4"–1–1/4" WASHED RIVER GRAVEL OR AS SELECTED AND SHALL BE INSTALLED TO A MINIMUM DEPTH OF 3–INCHES.
7. ALL LANDSCAPE BEDS, UNLESS OTHERWISE NOTED SHALL BE INSTALLED OVER WEED BARRIER FABRIC – WATER PERMEABLE FILTRATION FABRIC OF NON–WOVEN POLYPROPYLENE OR POLYESTER FABRIC. FABRIC SHALL BE OF SUITABLE THICKNESS FOR APPLICATION.
8. ALL PLANTS AND PLANT BEDS SHALL BE THOROUGHLY WATERED UPON COMPLETION OF PLANTING AND STAKING OPERATIONS.
9. THE CONTRACTOR SHALL GUARANTEE ALL PLANT MATERIALS FOR A PERIOD OF 1 YEAR FROM THE DATE THE WORK IS ACCEPTED, IN WRITING, BY THE LANDSCAPE ARCHITECT. THE CONTRACTOR SHALL REPLACE, WITHOUT COST TO THE OWNER, WITHIN A SPECIFIED PERIOD OF TIME, ALL DEAD PLANTS, AND ALL PLANTS NOT IN A VIGOROUS, THRIVING CONDITION, AS DETERMINED BY THE LANDSCAPE ARCHITECT, DURING AND AT THE END OF THE GUARANTEE PERIOD. REPLACEMENT STOCK SHALL CONFORM TO THE ORIGINAL SPECIFICATIONS.
10. EDGING SHALL BE PROVIDED FOR ALL LANDSCAPE BEDS NOT ADJACENT TO CONCRETE PAVEMENT. EDGING SHALL BE BLACK ALUMINUM EDGING, 3/16–INCH X 4–INCH. INSTALL PER MANUFACTURER'S INSTRUCTIONS, ALL EDGING SHALL BE INSTALLED IN STRAIGHT LINES OR SMOOTH CURVES WITHOUT IRREGULARITIES.
11. SOD SHALL BE DENSE, WELL ROOTED TURF, FREE OF WEEDS. IT SHALL BE COMPRISED OF A BLEND OF AT LEAST TWO KENTUCKY BLUE GRASSES AND ONE FESCUE. IT SHALL HAVE A UNIFORM THICKNESS OF 3/4–INCH AT TIME OF PLANTING, AND CUT IN UNIFORM STRIPS NOT LESS THAN 10–INCHES BY 18–INCHES. SOD SHALL BE KEPT MOIST AND LAID WITHIN 36–HOURS AFTER CUTTING.

    IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH A DENSE LAWN OF PERMANENT GRASSES, FREE OF LUMPS AND DEPRESSIONS. ALL SODDED AREAS THAT BROWN–OUT OR HAVE NOT FIRMLY KNITTED TO THE SOIL BASE WITHIN A PERIOD OF 1 MONTH SHALL BE REPLACED BY THE CONTRACTOR, AT NO COST TO THE OWNER.
12. ALL AREAS OF THE SITE THAT BECOME DISTURBED DURING CONSTRUCTION AND ARE NOT TO BE PAVED, STONED, LANDSCAPED, OR SODDED SHALL BE SEEDED AND MULCHED.

    SEED MIXTURE SHALL BE AS FOLLOWS:

KENTUCKY BLUEGRASS (CHOOSE 3 VARIETIES – ADELPHI, RUGBY, GLADE, OR PARADE)	30%
RUBY RED OR DAWSON RED FINE FESCUE	30%
ATLANTA RED FESCUE	20%
PENNFINE PERENNIAL RYE	20%

    THE ABOVE SEED MIXTURE SHALL BE SOWN AT A RATE OF 250 LBS PER ACRE. PRIOR TO SEEDING, THE TOPSOIL SHALL BE FERTILIZED WITH A COMMERCIAL FERTILIZER WITH A 10–0–10 ANALYSIS:

    10% NITROGEN – MIN 25% FROM A UREA FORMALDEHYDE SOURCE
    0 % PHOSPHATE
    10% POTASH – SOURCE POTASSIUM SULFATE OR POTASSIUM NITRATE

    THE FIRST FERTILIZER APPLICATION SHALL BE AT A RATE OF 10 LBS PER 1000 SQ FT OF BULK FERTILIZER.

    IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH A DENSE LAWN OF PERMANENT GRASSES, FREE OF LUMPS AND DEPRESSIONS. ANY PART OF THE AREA THAT FAILS TO SHOW A UNIFORM GERMINATION SHALL BE RE–SEEDED AND SUCH RE–SEEDING SHALL CONTINUE UNTIL A DENSE LAWN IS ESTABLISHED. DAMAGE TO SEEDED AREAS RESULTING FROM EROSION SHALL BE REPAIRED BY THE CONTRACTOR.
13. ALL AREAS OF THE SITE SCHEDULED FOR SEEDING OR SODDING SHALL FIRST RECEIVE A 6–INCH LAYER OF CLEAN, FRIABLE TOPSOIL. THE SOIL SHALL BE DISCED AND SHALL BE GRADED IN CONFORMANCE WITH THE GRADING PLAN.
14. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION OF ALL UTILITIES AND TO INFORM THE LANDSCAPE ARCHITECT OF ANY CONFLICTS PRIOR TO COMMENCING LANDSCAPING.

GENERAL UTILITY NOTES

1. BEDDING SHALL EXTEND A MINIMUM OF 4" BELOW THE PIPE, UNLESS OTHERWISE NOTED ON THE PLANS. BEDDING SHALL BE OF UNIFORM GRADATION MDOT 6AA STONE OR MDOT CLASS II GRANULAR MATERIAL FOR SANITARY AND STORM PIPE AND MDOT CLASS II GRANULAR MATERIAL ONLY FOR WATERMAIN.
2. WHERE UNSTABLE GROUND CONDITIONS ARE ENCOUNTERED, STONE BEDDING SHALL BE USED AS DIRECTED BY THE ENGINEER.
3. BACKFILL SHALL BE OF A SUITABLE MATERIAL AND SHALL BE FREE OF ANY ORGANIC MATERIALS AND ROCKS.
4. BACKFILL ABOVE THE PIPE SHALL BE OF GRANULAR MATERIAL MDOT CLASS II TO A POINT 12" ABOVE THE TOP OF THE PIPE. WHERE THE TRENCH IS NOT WITHIN THE INFLUENCE OF THE ROAD, SUITABLE SITE MATERIAL MAY BE COMPACTED AND UTILIZED FROM A POINT 12" ABOVE THE PIPE TO GRADE. WHERE THE TRENCH IS WITHIN A 1:1 INFLUENCE OF THE ROAD, GRANULAR MATERIAL, MDOT CLASS II OR III, IS TO BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 12" IN THICKNESS. COMPACTION SHALL BE 95% AS DETERMINED BY AASHTO T99.
5. 18" MINIMUM VERTICAL SEPARATION AND 10' HORIZONTAL SEPARATION IS TO BE MAINTAINED BETWEEN WATERMAIN AND SANITARY/STORM SEWER TO THE MAXIMUM EXTENT POSSIBLE.

GENERAL STORM NOTES

1. ALL STORM PIPE LENGTHS ARE SHOWN FROM C/L TO C/L OF STRUCTURE OR FROM C/L OF STRUCTURE TO DISCHARGE END OF FLARED END SECTION.
2. STORM PIPE MATERIALS SHALL BE AS FOLLOWS:
    - 2.1. RCP(REINFORCED CONCRETE PIPE): SHALL MEET THE REQUIREMENTS OF ASTM C76 WITH MODIFIED GROOVED TONGUE AND RUBBER GASKETS MEETING THE REQUIREMENTS OF ASTM C443. RCP TO BE EITHER CLASS IV OR V AS CALLED OUT ON THE PLANS.
3. STORM PIPE JOINTS SHALL MEET THE REQUIREMENTS OF ASTM D3212. HDPE AND PP PIPE GASKETS SHALL MEET THE REQUIREMENTS OF ASTM F477.
4. ALL STORM PIPE TO HAVE WATERTIGHT PREMIUM JOINTS, UNLESS OTHERWISE NOTED ON THE PLANS.
5. STORM DRAINAGE STRUCTURES SHALL BE FURNISHED WITH STEPS WHICH SHALL BE STEEL ENCASED WITH POLYPROPYLENE PLASTIC OR EQUIVALENT. STEPS SHALL BE SET AT 16" CENTER TO CENTER.
6. FLARED END SECTIONS DISCHARGING STORM WATER SHALL RECEIVE A MINIMUM OF 10 SQ YDS OF PLAIN COBBLESTONE RIP RAP WITH A MINIMUM STONE SIZE OF 6" AND SHALL BE PLACED ON A GEOTEXTILE FABRIC WRAP.
7. ALL CATCH BASINS WITHIN THE ROADWAY SHALL INCLUDE INSTALLATION OF 6" DIAMETER PERFORATED PIPE SUBDRAIN.
8. STORM DRAINAGE STRUCTURE COVERS SHALL BE OF THE FOLLOWING (OR APPROVED EQUAL):

COVER	USE	FRAME	GRATE/BACK
'A'	MANHOLE	1040	TYPE 'B'
'D'	PARKING LOTS	1040/5100	TYPE 'M1' GRATE OR 5105 TYPE 'M1' GRATE
'E'	LAWN	1040	TYPE 'O2' GRATE

GENERAL SANITARY NOTES

1. ALL SANITARY PIPE LENGTHS ARE SHOWN FROM C/L OF STRUCTURE TO C/L OF STRUCTURE.
2. SANITARY PIPE MATERIALS SHALL BE AS FOLLOWS:
    - 2.1. HDPE DR–11 (SANITARY FORCEMAIN)
3. ALL PVC SDR SANITARY SEWER PIPE SHALL MEET THE REQUIREMENTS OF ASTM D3034 AND D2241. PVC SCHD 40 PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785. GASKET JOINTS FOR SANITARY PIPE SHALL MEET THE REQUIREMENTS OF ASTM D3139 AND D3212.
4. SANITARY STRUCTURES SHALL BE FURNISHED WITH STEPS WHICH SHALL BE STEEL ENCASED WITH POLYPROPYLENE PLASTIC OR EQUIVALENT. STEPS SHALL BE SET AT 16" CENTER TO CENTER.
5. ALL NEW MANHOLES SHALL BE MINIMUM 4' DIAMETER, PRECAST MANHOLE SECTIONS AND AN ECCENTRIC CONE. PRECAST MANHOLE JOINTS SHALL BE INSTALLED WITH BUTYL ROPE MEETING THE REQUIREMENTS OF ASTM C990.
6. MANHOLES SHALL BE CONSTRUCTED WITH FLOW CHANNEL WALLS THAT ARE FORMER, AT A MINIMUM, TO THE SPRINGLINE OF THE PIPE.
7. ALL NEW MANHOLES SHALL HAVE AN APPROVED FLEXIBLE, WATERTIGHT SEALS WHERE PIPES PASS THROUGH MANHOLE WALLS.
8. ALL MANHOLES SHALL BE PROVIDED WITH WATERTIGHT COVERS. COVERS TO BE EJCO 1040 TYPE 'A' SOLID COVER.
9. A MAXIMUM OF 12" OF GRADE ADJUSTMENT RINGS SHALL BE USED TO ADJUST THE FRAME ELEVATION. BUTYL ROPE SHALL BE USED BETWEEN EACH ADJUSTMENT RING.
10. SANITARY SEWER LATERALS SHALL HAVE A MINIMUM SLOPE OF 1.0%.
11. CLEANOUTS SHALL BE INSTALLED EVERY 100', AT ALL BENDS AND STUBS.

GENERAL WATERMAIN NOTES

1. WATERMAIN PIPE MATERIALS SHALL BE AS FOLLOWS:
    - 1.1. D.I.P. CL.52 (WATERMAIN)
    - 1.2. HDPE DR–9 (WATER LATERAL – CURB STOP TO STUB)
2. WATERMAIN FITTINGS SHALL BE OF DUCTILE IRON WITH CEMENT MORTAR LINING AND MECHANICAL JOINTS CONFORMING TO AWWA C110.
3. WATERMAINS SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C651. BAC–T SAMPLES SHALL BE TAKEN IN ACCORDANCE WITH R235.11110 OF THE ADMINISTRATIVE RULES PROMULGATED UNDER MICHIGAN SAFE DRINKING WATER ACT, 1976 PA 399, AS AMENDED.
4. ALLOWABLE LEAKAGE OR HYDROSTATIC PRESSURE TESTING SHALL BE IN ACCORDANCE WITH AWWA C600 AND C605.
5. MAXIMUM DEFLECTION AT PIPE JOINTS SHALL BE IN ACCORDANCE WITH PIPE MANUFACTURERS CURRENT RECOMMENDATIONS AND AWWA SPECIFICATIONS.
6. A FULL STICK OF PIPE SHALL BE LAID CENTERED AT A PIPE CROSSING IN ORDER TO MAINTAIN THE MAXIMUM SEPARATION OF WATERMAIN JOINT TO THE CROSSING PIPE.
7. WATERMAIN SHALL BE INSTALLED WITH A MINIMUM OF 5.5' OF COVER FROM FINISHED GRADE TO TOP OF PIPE AND NO MORE THAN 8' OF COVER, UNLESS SPECIAL CONDITIONS WARRANT.
8. WATERMAIN VALVES SHALL BE IRON BODY RESILIENT WEDGE GATE VALVES, NON–RISING STEMS, COUNTERCLOCKWISE OPEN, AWWA C509.
9. THE BREAKAWAY FLANGE AND ALL BELOW GRADE FITTINGS SHALL HAVE STAINLESS STEEL NUTS AND BOLTS.

LINES & HATCHES LEGEND

PROPOSED (PR)	EXISTING (EX)	
~900~	~900~	CONTOUR
T/C XXX.XXX + T/C XXX.XX	+ 922.08	SPOT ELEVATION
—SN—	—SN—	SANITARY SEWER
—SL—	—SL—	SANITARY LEAD
—FM—	—FM—	FORCE MAIN
—PS—	—PS—	PRESSURE SEWER
—ST—	—ST—	STORM SEWER
—WM—	—WM—	WATER MAIN
—WL—	—WL—	WATER LEAD
—FO—	—FO—	FIBER OPTIC
—OH—	—OH—	OVERHEAD WIRE
—C—	—C—	CABLE
—E—	—E—	ELECTRIC
—G—	—G—	GAS
—T—	—T—	TELEPHONE
—X—	—X—	FENCE
—□—		SILT FENCE
— · · —	— · · —	WETLAND BOUNDARY
▬ ▬ ▬		LIMITS OF GRADING/CLEARING
▬ ¦ ▬		LIMITS OF DRAINAGE
▬▬▬		MODIFIED CURB
⛶	⛶	CONCRETE
▩	⛶	HIGH STRENGTH CONCRETE
▭	▨	ASPHALT
■	▨	HIGH STRENGTH ASPHALT
⛶	⛶	WETLAND
SAN #1		SANITARY SEWER LABEL
CB 01		STORM SEWER LABEL
GV 12		WATER MAIN LABEL
54T		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)

LIGHTING LEGEND

PROPOSED (PR)	EXISTING (EX)	
■-●-■	▨-●-▨	DOUBLE FIXTURE LIGHT POLE
●-■	●-▨	SINGLE FIXTURE LIGHT FIXTURE
⊓	⊓	WALL MOUNTED LIGHT FIXTURE
✺	✺	GROUND LIGHT FIXTURE
+0.1		FOOT CANDLES ON SITE
×2.5		FOOT CANDLES OFF SITE
5		FOOT CANDLES CONTOURS
⌖		CANOPY MOUNTED LIGHT FIXTURE

LANDSCAPE LEGEND

✳	EXISTING CONIFER TREE	○	EXISTING DECIDUOUS TREE
⊕	PROPOSED CONIFER TREE	⊕	PROPOSED DECIDUOUS TREE
○	PROPOSED TREE PROTECTION	⊗	PROPOSED ORNAMENTAL TREE
		● ● ● ● ● ●	PROPOSED DECIDUOUS SHRUBS
⛶	SOD	✹ ✹	PROPOSED GRASSES & PERENNIALS
⛶	SEED	⬡	PROPOSED LANDSCAPE BOULDER
⛶	MULCH		

SYMBOL LEGEND

◄—	STORM DRAINAGE FLOW
↓	GUY WIRE
-o-	POWER POLE
T PAD	TRANSFORMER PAD
E	ELECTRICAL RISER
E	U.G. ELECTRIC MARKER
Ⓔ	ELECTRICAL METER
AC UNIT	AIR CONDITIONING UNIT
T	TELEPHONE RISER
T	U.G. TELEPHONE MARKER
G	GAS RISER
G	U.G. GAS MARKER
⊗G	GAS METER
C TV	CABLE TV RISER
C TV	U.G. CABLE TV MARKER
MB	MAILBOX
▣	WELL
Ⓦ	WATER MANHOLE
⊗	GATE VALVE (EXISTING)
●	GATE VALVE (PROPOSED)
-☌	HYDRANT (EXISTING)
-●	HYDRANT (PROPOSED)
▤	CATCH BASIN (EXISTING)
⊕	YARD CATCH BASIN (EXISTING)
■	CATCH BASIN (PROPOSED)
○	STORM MANHOLE (EXISTING)
●	STORM MANHOLE (PROPOSED)
(	END SECTION (EXISTING)
◆	END SECTION (PROPOSED)
○	SANITARY MANHOLE (EXISTING)
●	SANITARY MANHOLE (PROPOSED)
PC	PUMP CHAMBER
-⌖-	TRAFFIC SIGN
⊥	SIGN (EXISTING)
⊥	SIGN (PROPOSED)
◒	SOIL BORING
○	STEEL ROD SET
●	STEEL ROD OR PIPE FOUND
□	WOOD LATH SET
□	HUB SET
◉	MONUMENT FOUND
◐	SECTION CORNER
GP	GAS PUMP
Ⓐ	ANTENNA
⊗	SATELLITE DISH
NP	NEWSPAPER BOX
PM	PARKING METER
PB	PHONE BOOTH
♿	HANDICAP SYMBOL
BM	BENCHMARK
☼	LIGHT POLE

ABBREVIATIONS

FFE	FINISHED FLOOR ELEVATION
BFE	BASEMENT FLOOR ELEVATION
GFE	GARAGE FLOOR ELEVATION
FG	FINISHED GRADE
T/A	TOP OF ASPHALT
T/C	TOP OF CONCRETE/CURB
T/W	TOP OF WALK
T/P	TOP OF PIPE
B/P	BOTTOM OF PIPE
F/L	FLOW LINE
RIM	RIM ELEVATION (AT FLOW LINE)
INV	INVERT ELEVATION
MH	MANHOLE
CB	CATCH BASIN
RY	REAR YARD
YD	YARD DRAIN
RD	ROOF DRAIN
FES	FLARED END SECTION
CMP	CORRUGATED METAL PIPE
CPP	CORRUGATED PLASTIC PIPE
RCP	REINFORCED CONCRETE PIPE
HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
DIP	DUCTILE IRON PIPE
GV	GATE VALVE
GVW	GATE VALVE IN WELL
GVB	GATE VALVE IN BOX
HYD	HYDRANT
FDC	FIRE DEPARTMENT CONNECTION
UP	UTILITY POLE
NFV	NOT FIELD VERIFIED
TBR	TO BE REMOVED
L.	LIBER
P.	PAGE
L.C.R.	LIVINGSTON COUNTY RECORDS
(M&R)	MEASURED AND RECORD
L.O.B.	POINT OF BEGINNING

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS 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 LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE APPARENT OR IF THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
(TOLL FREE)
FOR THE LOCATION OF UNDERGROUND FACILITIES

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT
SCHOOL BELL CHILDCARE

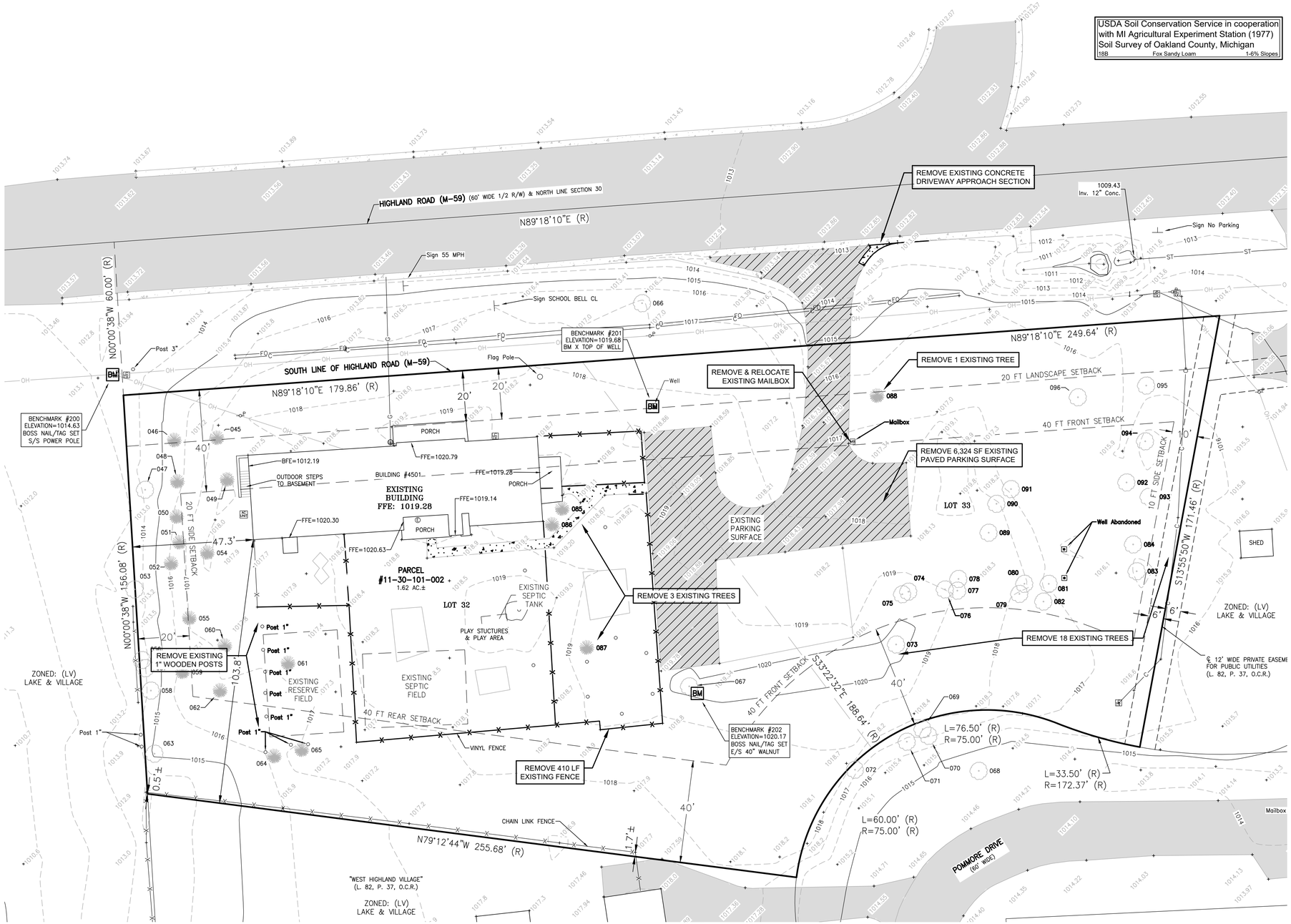
PREPARED FOR
SCHOOL IN THE PINES INC. dba SCHOOL BELL CHILDCARE
4501 WEST HIGHLAND ROAD
MILFORD, MI 48380
248.830.9642

TITLE
GENERAL NOTES & LEGEND

NO	BY	REVISION PER	DATE
–	–	–	–

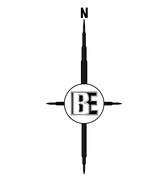
DESIGNED BY: BL
DRAWN BY: JP
CHECKED BY:
SCALE: NO SCALE
JOB NO: 24–048
DATE: 05/31/24
SHEET NO. 2

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND



USDA Soil Conservation Service in cooperation with MI Agricultural Experiment Station (1977)
Soil Survey of Oakland County, Michigan

18B	Fox Sandy Loam	1-6% Slopes



PARCEL INFORMATION:

PARCEL ID: #11-30-101-002
LOT ACREAGE: 1.62 AC. ±
ZONING: LAKE & VILLAGE (LV)
ADDRESS: 4501 W HIGHLAND ROAD, MILFORD, MI 48380
CLIENT: SCHOOL BELL CHILDCARE

PROPERTY DESCRIPTION PER OAKLAND COUNTY TAX ROLL:

T3N, R7E, SEC 30 WEST HIGHLAND VILLAGE
LOTS 32 & 33

GENERAL SURVEY NOTES:

1. BEARINGS ARE BASED ON MICHIGAN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE.
2. SUBSURFACE UTILITIES NOT LOCATED FOR THIS SURVEY MAY EXIST. IT IS THE RESPONSIBILITY OF THE OWNER OF THE RESPECTIVE UTILITY TO ACCURATELY LOCATE SUCH UTILITIES.
3. EASEMENTS OR RESTRICTIONS OF RECORD NOT DEPICTED ON THIS DRAWING MAY EXIST.
4. POST-PROCESSING. (NAVD88 DATUM)
5. CONTOURS ARE SHOWN AT 1 FOOT INTERVALS.
6. THE LOCATIONS OF UNDERGROUND UTILITIES, AS SHOWN ON THIS DRAWING ARE APPROXIMATE. THE LOCATIONS ARE BASED ON PHYSICAL FIELD LOCATIONS OF STRUCTURES ALONG WITH MISS DIG MARKINGS IN THE FIELD.
7. ALL WORK SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY, THE COUNTY, AND THE STATE OF MICHIGAN.
8. ALLOW THREE WORKING DAYS BEFORE YOU DIG, CALL MISS DIG TOLL FREE 1-800-482-7171.

SITE BENCHMARKS (NAVD88 DATUM):

- **BM #200** = BOSS NAIL/TAG SET S/S POWER POLE ELEV.=1014.63
- **BM #201** = BM X TOP OF WELL ELEV.=1019.68
- **BM #202** = BOSS NAIL/TAG SET E/S 40" WALNUT ELEV.=1020.17

DEVELOPMENT: TWENTY-TWO (22) TREES ARE TO BE REMOVED FOR THE DEVELOPMENT OF THE SITE - ALL IN THE EAST, UNDEVELOPED AREA. NO TREES ARE TO BE RELOCATED. REMOVED TREES ARE WITHIN THE PROPOSED BUILDING OUTLINE AND WHERE IMPACTED BY THE EXPANDED PARKING LOT. MATURE TREES AROUND THE PERIMETER OF THE SITE WILL BE PRESERVED DURING CONSTRUCTION. PORTIONS OF THE EXISTING LOT AREA WILL BE UTILIZED FOR TOPSOIL STOCKPILING AND MATERIAL STAGING AREAS (AS NOTED ON THE PLAN).

TREE REMOVAL INVENTORY

TREE NUMBER	TREE SPECIES	TREE COMMON NAME	TREE DIAMETER	TREE CONDITION
73	CARYA GLABRA	PIGNUT HICKORY	14	FAIR
74	ACER RUBURM	RED MAPLE	11	FAIR
75	ACER RUBURM	RED MAPLE	12	FAIR
76	CARYA GLABRA	PIGNUT HICKORY	17	FAIR
77	CARYA GLABRA	PIGNUT HICKORY	11	FAIR
78	ACER RUBURM	RED MAPLE	7	POOR
79	JUGLANS NIGRA	BLACK WALNUT	12	POOR
80	JUGLANS NIGRA	BLACK WALNUT	12	POOR
81	JUGLANS NIGRA	BLACK WALNUT	15	POOR
82	JUGLANS NIGRA	BLACK WALNUT	13	POOR
83	JUGLANS NIGRA	BLACK WALNUT	19	FAIR
84	PICEA ABIES	NORWAY SPRUCE	9	GOOD
85	PICEA ABIES	NORWAY SPRUCE	9	GOOD
86	PICEA ABIES	NORWAY SPRUCE	8	GOOD
87	PICEA ABIES	NORWAY SPRUCE	19	GOOD
88	PICEA ABIES	NORWAY SPRUCE	14	GOOD
89	JUGLANS NIGRA	BLACK WALNUT	15	GOOD
90	JUGLANS NIGRA	BLACK WALNUT	12	POOR
91	ACER RUBURM	RED MAPLE	10	FAIR
92	JUGLANS NIGRA	BLACK WALNUT	14	POOR
93	JUGLANS NIGRA	BLACK WALNUT	10	FAIR
94	JUGLANS NIGRA	BLACK WALNUT	18	POOR

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN HEREON ARE APPROXIMATE AND NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION OF ALL UTILITIES AND PROPOSED UTILITY CROSSINGS AND SHALL BE RESPONSIBLE FOR THE PROTECTION OF SAME. CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND TO EXIST BETWEEN THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

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4501 WEST HIGHLAND ROAD
MILFORD, MI 48380
248.830.9642

TITLE
EXISTING CONDITIONS & DEMOLITION PLAN

NO	BY	REVISION PER	DATE
		-	-

DESIGNED BY: BL
DRAWN BY: JP
CHECKED BY:
SCALE: 1"=20'
JOB NO: 24-048
DATE: 05/31/24
SHEET NO. 3

BOSS Engineering

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

LEGEND

- NATURAL FEATURE TYPE BOUNDARY
- EXISTING DRAINAGE FLOW
- 1000 EXISTING 1-FT CONTOURS

N

SCALE: 1 INCH = 20 FEET

USDA Soil Conservation Service in cooperation with MI Agricultural Experiment Station (1977) Soil Survey of Oakland County, Michigan

18B	Fox Sandy Loam	1-6% Slopes

NATURAL FEATURES AND STEWARDSHIP PLAN NARRATIVE

PROJECT INFORMATION:

SITE SIZE: 1.62 AC

STATUS: PARTIALLY DEVELOPMENT, MATURE TREES

NATURAL FEATURES IDENTIFICATION INCLUDING AN EXISTING TREE INVENTORY WERE COMPLETED DURING A SITE VISIT ON MARCH 8TH, 2024. THE SITE IS DEVELOPED AND INCLUDES A DAY CARE CENTER BUILDING, PLAYGROUND, PARKING LOT AND DRIVEWAY. THE DEVELOPED AREA IS SURROUNDED BY MATURE TREES INCLUDING A SMALL WOODLOT DIRECTLY TO THE EAST.

WETLANDS & FLOODPLAIN: THERE ARE NO WETLANDS OR FLOODPLAIN AREAS ON SITE. THE CLOSEST WETLAND AREAS BASED ON SOIL SURVEY AND AERIAL DATA ARE APPROXIMATELY 500-FEET WEST AND 650-FT SOUTH OF THE SITE. NORTH ORE CREEK IS APPROXIMATELY 1/2-MILE NORTH.

SOILS: ALL SOILS ON THE SITE ARE CLASSIFIED AS FOX SANDY LOAM (18B, 1-6% SLOPES) PER USDA NRCS SOIL SURVEY DATA. FOX SANDY LOAM IS GENERALLY HIGHLY PERMEABLE. THIS SOIL CLASSIFICATION CAN ALSO MEAN THAT IT HAS HIGHER EROSION POTENTIAL ON STEEPER SLOPES (>10%). THE SITE IS CONSISTENT WITH THE CLASSIFICATION, WITH LESS EROSION POTENTIAL, EXCEPT WHERE IT ABUTS POMMORE DRIVE WHERE TOPOGRAPHY HAS BEEN GRADED AT AN APPROXIMATELY 20% SLOPE WITHIN THE ROAD R.O.W.

TREES: ALL TREES LARGER THAN 6-IN DBH WERE INVENTORIED DURING THE SITE VISIT. THE INVENTORIED TREES ALONG WITH THEIR APPROXIMATE RELATIVE CANOPY SIZES ARE SHOWN ON THE PLAN AT LEFT AND THE LIST OF TREES INCLUDING TAG NUMBER, COMMON & BOTANICAL NAMES, SIZES, CONDITION AND NOTES, IS INCLUDED ON THIS SHEET. THE WEST SIDE OF THE SITE IS DOMINATED BY SEVERAL LARGE NORWAY SPRUCE (9-36-INCH DBH, AVG 20) WITH A FEW SMALLER NORWAY SPRUCE (8-9-INCH DBH) ON THE EAST SIDE OF THE EXISTING PLAYGROUND. THE EAST SIDE OF THE SITE IS UNDEVELOPED AND DOMINATED BY LARGE DECIDUOUS TREES, MANY MULTI-STEMMED AND IN POOR CONDITION INCLUDING RED OAK, BLACK WALNUT, RED MAPLE & PIGNUT HICKORY. SIZES RANGE FROM 6-INCH DBH THROUGH 19-INCH DBH. THERE IS (1) GOOD CONDITION LARGE RED OAK AT 43-INCH DBH (AT THE SOUTH END OF THE PARKING AREA) AND (1) GOOD CONDITION LARGE WHITE OAK AT 40-INCH DBH (IN THE HIGHLAND ROAD / M-59 R.O.W.).

THREATENED, ENDANGERED SPECIES: NONE WERE OBSERVED ON SITE DURING THE TIME OF THE SITE VISIT.

TREE INVENTORY LIST

Tree#	Botanical Name	Common Name	DBH	Other Dia	Condition	Notes
45	Pinus resinosa	Red Pine	25		Good	
46	Picea abies	Norway Spruce	20		Good	
47	Acer ruburm	Red Maple	6		Good	
48	Pinus resinosa	Red Pine	25		Good	
49	Picea abies	Norway Spruce	21		Good	
50	Picea abies	Norway Spruce	21		Good	
51	Picea abies	Norway Spruce	11		Good	
52	Picea abies	Norway Spruce	13		Good	
53	Juglans nigra	Black Walnut	8		Good	
54	Picea abies	Norway Spruce	20		Good	
55	Picea abies	Norway Spruce	36		Good	
56	Quercus rubra	Red Oak	10		Good	
57	Quercus alba	White Oak	18		Good	
58	Quercus rubra	Red Oak	10		Good	
59	Picea abies	Norway Spruce	20		Good	
60	Picea abies	Norway Spruce	19		Good	
61	Picea abies	Norway Spruce	24		Good	
62	Picea abies	Norway Spruce	21		Good	
63	Juglans nigra	Black Walnut	18		Good	
64	Picea abies	Norway Spruce	18		Good	
65	Picea abies	Norway Spruce	18		Good	
66	Quercus alba	White Oak	40		Good	
67	Quercus rubra	Red Oak	43		Good	
68	Ulmus pumila	Siberian Elm	13	10	Fair	
69	Acer ruburm	Red Maple	8		Fair	
70	Acer ruburm	Red Maple	6		Poor	Multi
71	Acer ruburm	Red Maple	6.5		Fair	
72	Acer ruburm	Red Maple	8		Fair	
73	Carya glabra	Pignut Hickory	14		Fair	
74	Acer ruburm	Red Maple	11		Fair	
75	Acer ruburm	Red Maple	12		Fair	
76	Carya glabra	Pignut Hickory	17		Fair	
77	Carya glabra	Pignut Hickory	11		Fair	
78	Acer negundo	Boxelder	7	3	Poor	
79	Juglans nigra	Black Walnut	12	10	Poor	Triple 8
80	Juglans nigra	Black Walnut	12	11	Poor	Triple 10
81	Juglans nigra	Black Walnut	15	11	Poor	Triple 6
82	Juglans nigra	Black Walnut	13	13	Poor	Quint
83	Juglans nigra	Black Walnut	19	18	Fair	Triple 14
84	Picea abies	Norway Spruce	9		Good	
85	Picea abies	Norway Spruce	9		Good	
86	Picea abies	Norway Spruce	8		Good	
87	Picea abies	Norway Spruce	19		Good	
88	Picea abies	Norway Spruce	14		Good	
89	Juglans nigra	Black Walnut	15	7		
90	Juglans nigra	Black Walnut	12	11	Poor	Multi octi
91	Acer ruburm	Red Maple	10		Fair	
92	Juglans nigra	Black Walnut	14		Poor	
93	Juglans nigra	Black Walnut	10		Fair	
94	Juglans nigra	Black Walnut	18	18	Poor	Triple, 16
95	Juglans nigra	Black Walnut	10		Fair	
96	Juglans nigra	Black Walnut	13	10	Good	Quad

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE PLANS ARE APPROXIMATE AND NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE EXACT LOCATIONS AND ELEVATIONS BEFORE THE CONSTRUCTION LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONSTRUCT THE PROPOSED UTILITIES IN SUCH A MANNER AS TO AVOID CONFLICTS WITH EXISTING UTILITIES. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND TO EXIST OR IF THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171

BE BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT: SCHOOL BELL CHILDCARE
SCHOOL IN THE PINES INC. dba SCHOOL BELL CHILDCARE
4501 WEST HIGHLAND ROAD
HOWELL, MICHIGAN
24&25,30,29&2

PREPARED FOR:

TITLE: NATURAL FEATURES PLAN

NO	BY	REVISION PER	DATE
1			

DESIGNED BY: BL
DRAWN BY: JP
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 24-048
DATE: 05/31/24
SHEET NO. 4

BOSS Engineering

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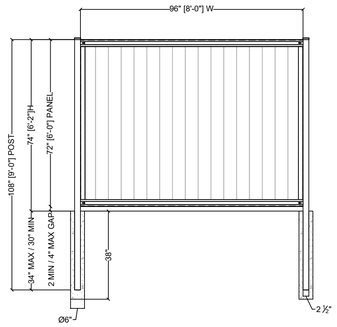
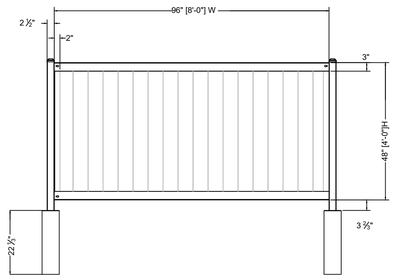
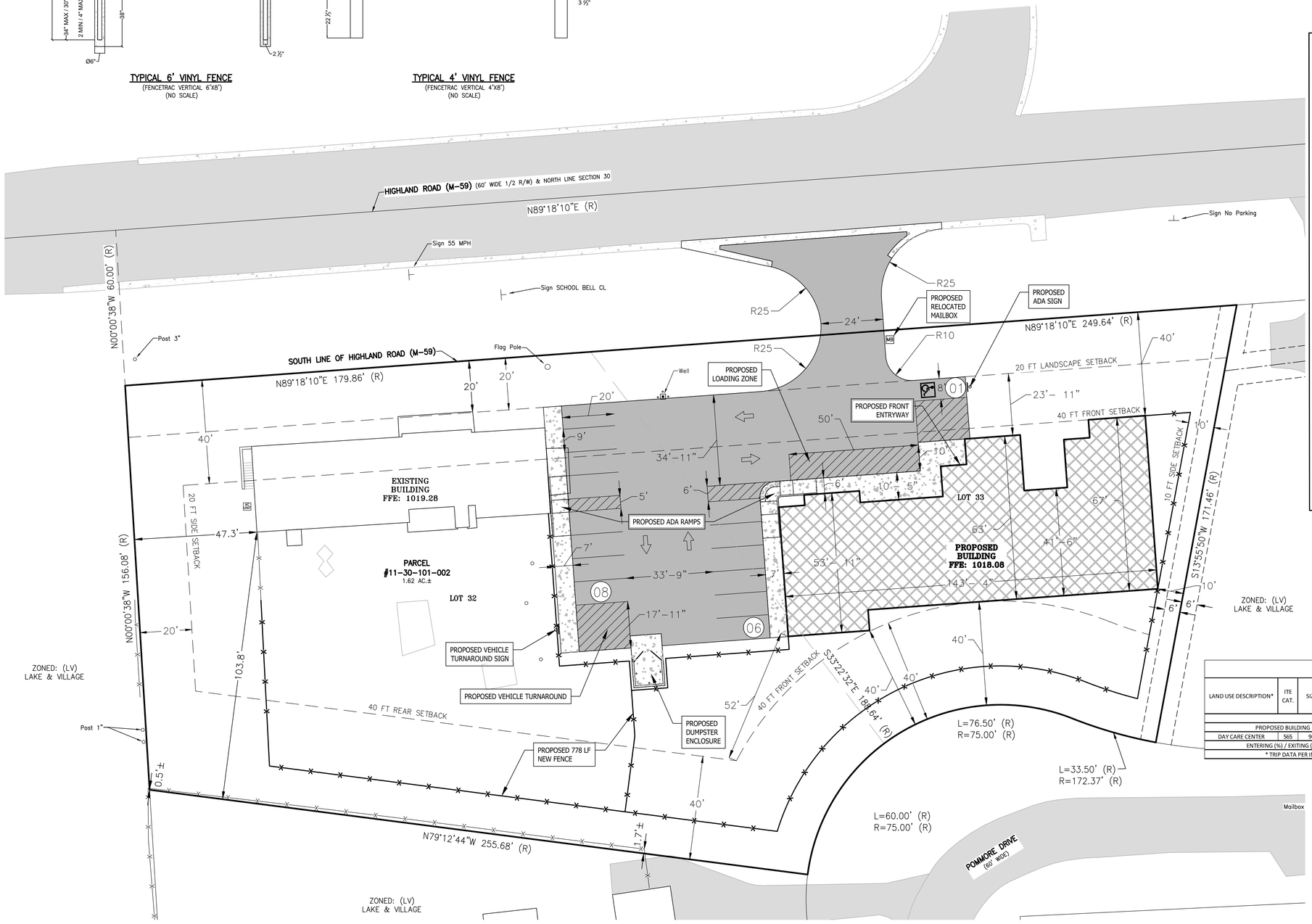
SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

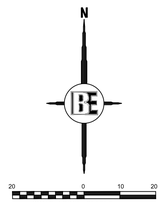


TYPICAL 6' VINYL FENCE
(FENCETRAC VERTICAL 6'X8')
(NO SCALE)



TYPICAL 4' VINYL FENCE
(FENCETRAC VERTICAL 4'X8')
(NO SCALE)





SITE DATA:

HIGHLAND TOWNSHIP
PARCEL #11-30-101-002
4501 WEST HIGHLAND ROAD, MILFORD, MI 48380
1.62 AC ±

ZONING: LAKE & VILLAGE (LV)
SCHOOL DISTRICT: HURON VALLEY SCHOOLS

EXISTING SITE USE: SCHOOL BELL CHILDCARE
EXISTING CHILDCARE BLDG SF: 3,600 GSF ±
EXISTING PLAYGROUND SF: 10,313 GSF ±

MAX. LOT COVERAGE: 35.0% BLDG,
BUILDABLE AREA: 0.79 AC ± (34,363 SQ FT)
EXISTING LOT COVERAGE: 5.09% BLDG, 14.6% IMPERVIOUS
PROPOSED LOT COVERAGE: 15.4% BLDG, 34.7% IMPERVIOUS

MIN. LOT AREA REQUIRED FOR ZONING: 1.00 ACRE
EX. LOT AREA: 1.62 AC ± (70,754 SQ FT) + 0.03 AC ± (1,744 SF) DRIVEWAY APPROACH & CURB
MIN. LOT WIDTH: 120 FT TOTAL EXISTING LOT WIDTH: 156.08 FT

IMPERVIOUS AREAS =

PROPOSED ASPHALT PARKING	10,248 SF (0.24 AC)
PROPOSED ASPHALT DRIVEWAY APPROACH - *OFFSITE*	*1,359 SF (0.03 AC)*
PROPOSED CONCRETE WALK	1,764 SF (0.04 AC)
PROPOSED CONCRETE CURB - *OFFSITE*	*385 SF (0.01 AC)*
PROPOSED DUMPSTER PAD	240 SF (0.01 AC)
EXISTING BUILDING	3,600 SF (0.08 AC)
PROPOSED BUILDING	7,621 SF (0.17 AC)
SUBTOTAL:	25,217 SF (0.58 AC)

PERVIOUS AREAS =

MODIFIED PLAYGROUND	13,196 SF (0.30 AC)
EXISTING LAWN/VEGETATION	34,085 SF (0.78 AC)
SUBTOTAL:	47,281 SF (1.08 AC)

TOTAL SITE AREAS =
TOTAL: 70,754 SF (1.62 AC) + 1,359 SF (0.03 AC) + 385 SF (0.01 AC)

MIN. BLDG. SETBACKS REQUIRED:		EXISTING BLDG SETBACKS:	PROPOSED BLDG SETBACKS:
RIGHT-OF-WAY:	33-FT	33-FT	33-FT
FRONT:	40-FT	20-FT	40-FT
SIDE:	30-FT: 10-FT MIN SIDE	47-FT	10-FT
REAR:	40-FT	103-FT	52-FT
MAX BLDG HGT:	28-FT	25-FT (2-STORY)	27-FT (1-STORY)

PARKING CALCULATION:
THE EXISTING BUILDING WILL CONTINUE TO BE USED FOR DAY CARE PURPOSES. PRIMARY CARE, INCLUDING STAFFING AND CHILDCARE, WILL INSTEAD OCCUR IN THE PROPOSED BUILDING. THE NEW BUILDING WILL HAVE 13 EMPLOYEES AND BE LICENSED FOR 96 CHILDREN. THE NUMBER OF REQUIRED SPACES ONSITE IS EQUAL TO 2 SPACES + 1 SPACE/8 CHILDREN WHICH TOTALS 14 REQUIRED SPACES, INCLUDING 1 VEHICLE ACCESSIBLE SPACE.

TOTAL PROVIDED PARKING: 15 SPACES (INCLUDING 1 VEHICLE ACCESSIBLE SPACE)

GENERAL NOTES:
SUBSURFACE UTILITIES NOT LOCATED FOR THIS SURVEY MAY EXIST. IT IS THE RESPONSIBILITY OF THE OWNER OF THE RESPECTIVE UTILITY TO ACCURATELY LOCATE SUCH UTILITIES.

ALL WORK SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY, THE COUNTY, AND THE STATE OF MICHIGAN.

ALLOW THREE WORKING DAYS BEFORE YOU DIG, CALL MISS DIG TOLL FREE 1-800-482-7171

VEHICLE TRIP GENERATION TABLE

LAND USE DESCRIPTION*	ITE CAT.	SIZE	UNIT	WEEKDAY AM PEAK (7-9AM) TRIPS TOTAL	IN	OUT	PASS-BY	WEEKDAY PM PEAK (4-6PM) TRIPS TOTAL	IN	OUT	PASS-BY	REMARKS
PASSENGER CAR												
PROPOSED BUILDING												
DAY CARE CENTER	565	96	STUDENTS	75	40	35	-	76	36	40	-	
ENTERING (%) / EXITING (%)				100%	53%	47%	-	100%	47%	53%	-	

* TRIP DATA PER INSTITUTE OF TRAFFIC ENGINEERS (ITE) TRIP GENERATION MANUAL 10TH EDITION -VOLUME 2

FOR SITE PLAN APPROVAL ONLY!
NOT FOR CONSTRUCTION

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT: SCHOOL BELL CHILDCARE
PREPARED FOR: SCHOOL IN THE PINES INC. dba SCHOOL BELL CHILDCARE
4501 WEST HIGHLAND ROAD
HIGHLAND, MI 48380
248.830.9642
TITLE: SITE PLAN

NO	BY	REVISION PER	DATE
1		-	-

DESIGNED BY: BL
DRAWN BY: JP
CHECKED BY:
SCALE: 1"=20'
JOB NO: 24-048
DATE: 05/31/24
SHEET NO. 5

BOSS Engineering

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SITE BENCHMARKS (NAVD88 DATUM):

- **BM #200** = BOSS NAIL/TAG SET S/S POWER POLE ELEV.=1014.63
- **BM #201** = BM X TOP OF WELL ELEV.=1019.68
- **BM #202** = BOSS NAIL/TAG SET E/S 40" WALNUT ELEV.=1020.17

OUTFLOW COMPARATIVE TABLE				
DRAINAGE AREA (CFS)	2-YR STORM	10-YR STORM	50-YR STORM	100-YR STORM
EXISTING	0.73	1.28	2.09	2.5
PROPOSED	0.034	0.042	0.05	0.147
TO REMAIN	0.56	0.93	1.46	1.73
IMPROVEMENT	0.136	0.308	0.58	0.623

STORM WATER MANAGEMENT NARRATIVE:

THE STORM WATER MANAGEMENT OF THE SITE WILL INCLUDE AN ONSITE STORM SEWER NETWORK LEADING TO AN UNDERGROUND DETENTION SYSTEM. THE UNDERGROUND DETENTION SYSTEM WILL BE CONSTRUCTED TO CAPTURE AND DETAIN THE 100-YEAR STORM EVENT WHICH WILL RESULT IN A LOWER RATE OF DISCHARGE TO THE WEST HIGHLAND ROAD (M-59) RIGHT-OF-WAY THAN THE EXISTING CONDITIONS CURRENTLY ALLOW.

STORMWATER RUNOFF SUMMARY:

	2-YR	10-YR	50-YR	100-YR
EXISTING PEAK OUTFLOW RATES	0.73 CFS	1.28 CFS	2.09 CFS	2.50 CFS
POST-DEVELOPMENT PEAK RUNOFF STORM EVENT	0.034 CFS	0.042 CFS	0.050 CFS	0.147 CFS
EXISTING RUNOFF TO REMAIN FROM STORM EVENT	0.560 CFS	0.930 CFS	1.46 CFS	1.73 CFS

COMPARING ALL POST-DEVELOPMENT PEAK RUNOFF FLOWS TO THE PRE-DEVELOPMENT PEAK RUNOFF FLOWS, ALL STORM EVENTS SEE A REDUCTION IN STORMWATER FLOW TO M-59. SEE BELOW FOR REDUCTION OF FLOWS.

REDUCTION OF FLOW:	2-YR	10-YR	50-YR	100-YR
	0.136 CFS	0.308 CFS	0.580 CFS	0.623 CFS

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

FROM	TO	DRAIN AREA	ACRES A	RUNOFF COEFF C	EQUIV. AREA A * C	INTENSITY I	TIME OF CONC. T_C	ADD'L RUNOFF Q	RUNOFF (CFS) Q	PIPE LENGTH (LF)	PIPE DIA. (IN)	VELOCITY FLOWING FULL (FPS)	HYDRAULIC GRADIENT SLOPE %	ACTUAL SLOPE USED	MANNING COEFFICIENT	MANNING FLOW CAPACITY	MANNING'S VELOCITY (FT/SEC)	TIME (MIN)	HG ELEV UPPER END	HG ELEV LOWER END	RIM ELEV UPPER END	RIM ELEV LOWER END	INVERT UPPER END	INVERT LOWER END
4	3	4	0.159	0.678	0.11	4.375	15.00		0.47	56	12	1.80	0.16%	0.32%	0.013	2.02	2.57	0.36	1013.64	1013.47	1017.20	1017.16	1012.84	1012.67
3	BASIN	3	0.082	0.793	0.07	4.336	15.36		0.75	8	12	1.99	0.19%	0.32%	0.013	2.02	2.57	0.05	1013.47	1013.44	1017.16	-	1012.67	1012.64
BASIN	2	BASIN	-	-	-	-	15.00		0.75	28	12	1.99	0.19%	0.32%	0.013	2.02	2.57	0.18	1010.56	1010.47	-	1016.80	1009.76	1009.67
100-YEAR PIPE FLOW CALCULATION FOR OCS																								
2	1	ALL	0.42	0.75	0.31	6.24	15.36		1.95	54	15	2.35	0.20%	0.24%	0.013	3.17	2.59	0.35	1010.67	1010.54	1016.80	-	1009.67	1009.54

OAKLAND COUNTY DETENTION BASIN CALCULATIONS

AREA (ACRES)	IMPERVIOUS FACTOR	ACRE IMPERVIOUS
0.37	0.8	0.30
0.02	0.5	0.01
0.02	0.2	0.00

COMPOUND C: 0.74

TOTAL DRAINAGE AREA: 0.42 ACRES

WATER QUALITY VOLUME V_{WQ}

V_{WQ}= 3,630(C)(A) = 1128 FT^3

V_F= 0.15(V_{WQ}) = 169 FT^3

WATER QUALITY RATE FOR MECHANICAL STRUCTURE

T_C = MAX TIME OF CONCENTRATION = 15.38 MIN

Q_{WQ}= (C)(A)30.2/(T_C+9.17)$^{.81}$ = 0.70 CFS

CHANNEL PROTECTION VOLUME CONTROL - REQUIRED

V_{CP-R} = 4,719(C)(A) = 1467 FT^3

CHANNEL PROTECTION VOLUME CONTROL - PROVIDED

In-Situ Infiltration rate = 1 IN/HR

Are upstream infiltration BMP's provided? NO

Basin Footrpint Infiltration Area Required = 587 FT^2

V_{CP-P} = 0 FT^3

CHANNEL PROTECTION RATE CONTROL (EXTENDED DETENTION VOLUME)

V_{ED} = 6,897(C)(A) = 2144 FT^3

EXTENDED DETENTION OUTLET RATE

Q_{ED} = V_{ED}/(48hr) = 0.012 CFS

H_{ED} = V_{ED}/4,666 $(H)^{1/2}$ = 1.0 1" HOLES

H = 4.00 FT

$ELEV_{ED}$ = 1011.75

100-YEAR ALLOWABLE OUTLET RATE

Q_{DRAIN} = Restricted Drain Rate = 0.2 CFS/ACRE

Q_{VRR} = 1.1055 - 0.206LN(A) = 1.000 CFS/ACRE

Q_{100P} = (LESSER OF Q_{DRAIN} & Q_{VRR})*A = 0.084 CFS

CONTACT OAKLAND COUNTY DRAIN COMMISSION FOR ALLOWABLE RELEASE RATE

100-YEAR DETENTION VOLUME

V_{100R} = 18985 (C)(A) = 5901 FT^3

Q_{100IN} = (C)(A)83.3/(T_c+9.17)$^{0.81}$ = 1.94 CFS

R = 0.206-.15(ln(Q_{100P}/Q_{100IN}) = 0.6768

V_{100D} = V_{100R}*R-V_{CP-P} = 3993 FT^3

Is $V_{100D} \geq V_{ED}$? YES

V_{100D} = 3993 FT^3

UNDERGROUND DETENTION STORAGE PROVIDED

ELEVATION	AREA (FT^2)	DEPTH (FT)	VOLUME (FT^3)	TOTAL VOLUME (FT^3)	
1014.26	15.90	0.5	305.98	5,038	**DHWL**
1013.76	14.94	0.5	527.58	4,732	
1013.26	13.27	0.5	636.38	4,204	
1012.76	11.26	0.5	693.30	3,568	
1012.26	9.07	0.5	711.20	2,874	
1011.76	6.83	0.5	693.30	2,163	
1011.26	4.64	0.5	636.35	1,470	
1010.76	2.63	0.5	527.61	834	
1010.26	0.97	0.5	305.98	306	
1009.76	0.00				**BOTTOM OF STORAGE**

OUTLET CONTROL STRUCTURE

Q_{ED} ACTUAL

H_{ED} = 1 (1" HOLES)

A_{ED} = 0.0055 FT^2

$Q_{ED-ACTUAL}$ = $(A_{ED})(0.62 \times (2 \times 32.2 \times h)^{0.5})$ = 0.054 CFS

Q_{100ALL} OUTLET

$Q_{100-ACTUAL}$ = Q_{100P} - $Q_{ED-ACTUAL}$ = 0.030 CFS

A_{100} = $Q_{100-ACTUAL}$ / (0.62 * (2 *32.2 * ($ELEV_{DHWL}$ - $ELEV_{ED}$))$^{0.5}$) = 0.004 FT^2

AREA OF 1 INCH DIAMETER ORIFICE = 0.005 FT^2

ORIFICES = A100 / 0.005 = 0.0 ORIFICES

OVERFLOW SPILLWAY DESIGN

Design Flow Rate: Q_{100IN} = 1.94 CFS

Depth of Spillway: H_{WEIR} = 6 INCHES

Width of Spillway: L_{WEIR} = $Q_{100IN}/3.33H_{WEIR}^{3/2}$= 1.6 FT

BASIN DESIGN SUMMARY		
FOREBAY SIZE REQUIRED =	169	FT^3
FOREBAY SIZE PROVIDED =	0	FT^3
BASIN SIZE REQUIRED =	3993	FT^3
BASIN SIZE PROVIDED =	5,038	FT^3

ORIFICE DESIGN SUMMARY			
ELEVATION	# OF HOLES	METER OF HOLES	
1009.76	1.0	1	-INCH
1011.75	0.0	1	-INCH

OVERFLOW SPILLWAY SUMMARY		
WIDTH OF OVERFLOW SPILLWAY =	2	FT

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3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
(TOLL FREE)
FOR THE LOCATION OF UNDERGROUND FACILITIES

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

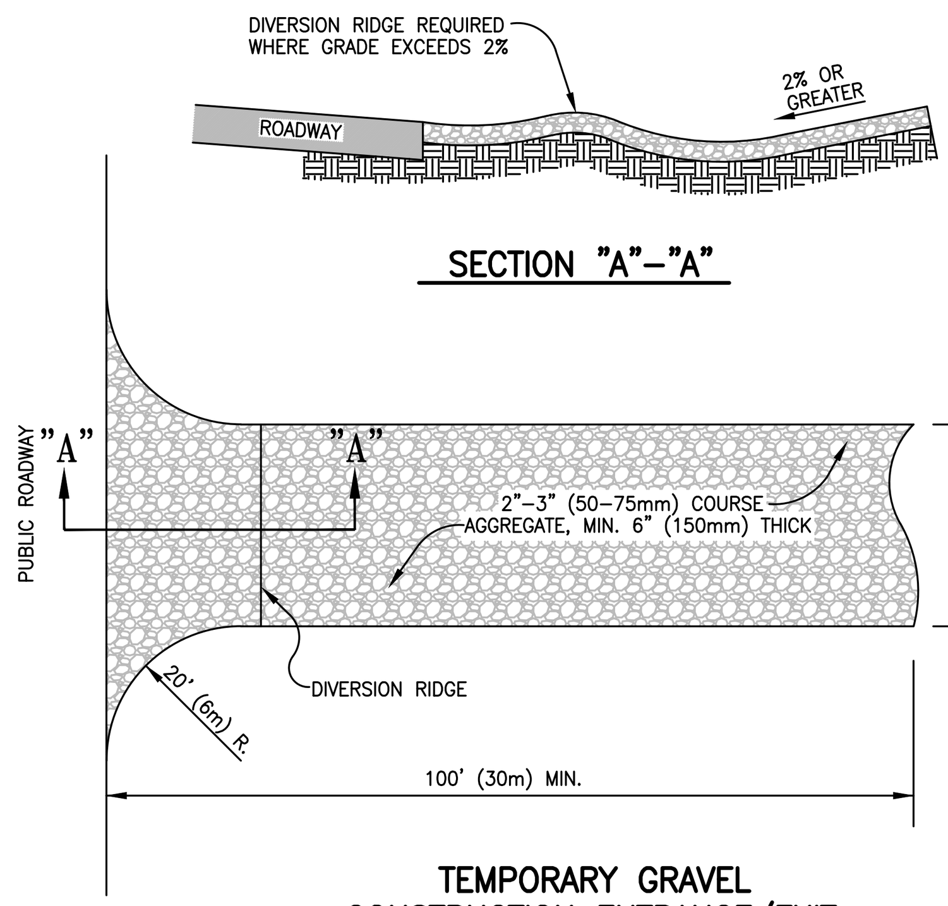
PROJECT
SCHOOL BELL CHILDCARE

PREPARED FOR
SCHOOL IN THE PINES INC. dba SCHOOL BELL CHILDCARE
4501 WEST HIGHLAND ROAD
MILFORD, MI 48380
248.830.9642

TITLE
GRADING & DRAINAGE PLAN

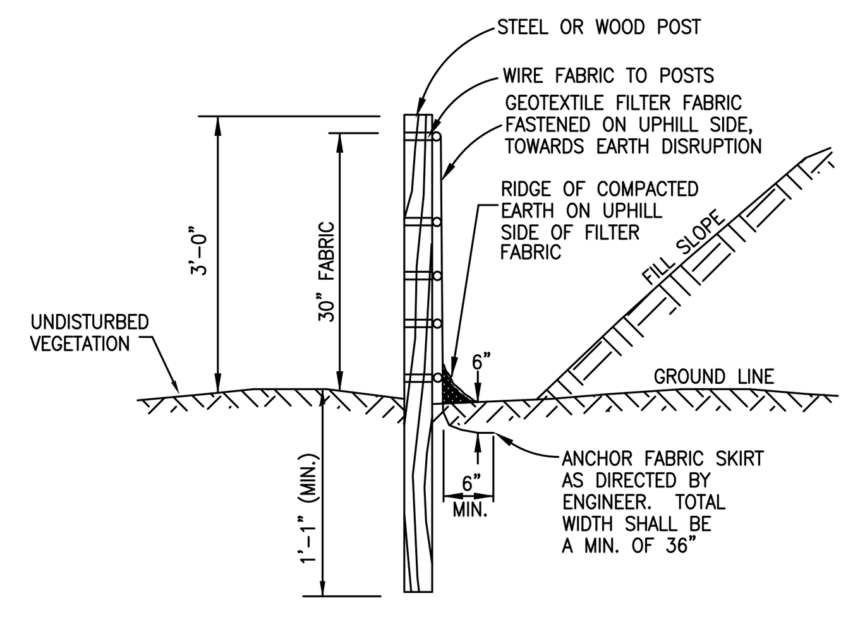
DATE	REVISION PER	BY	NO
-		-	-

DESIGNED BY: BL
DRAWN BY: JP
CHECKED BY:
SCALE: 1"=20'
JOB NO: 24-048
DATE: 05/31/24
SHEET NO. 6



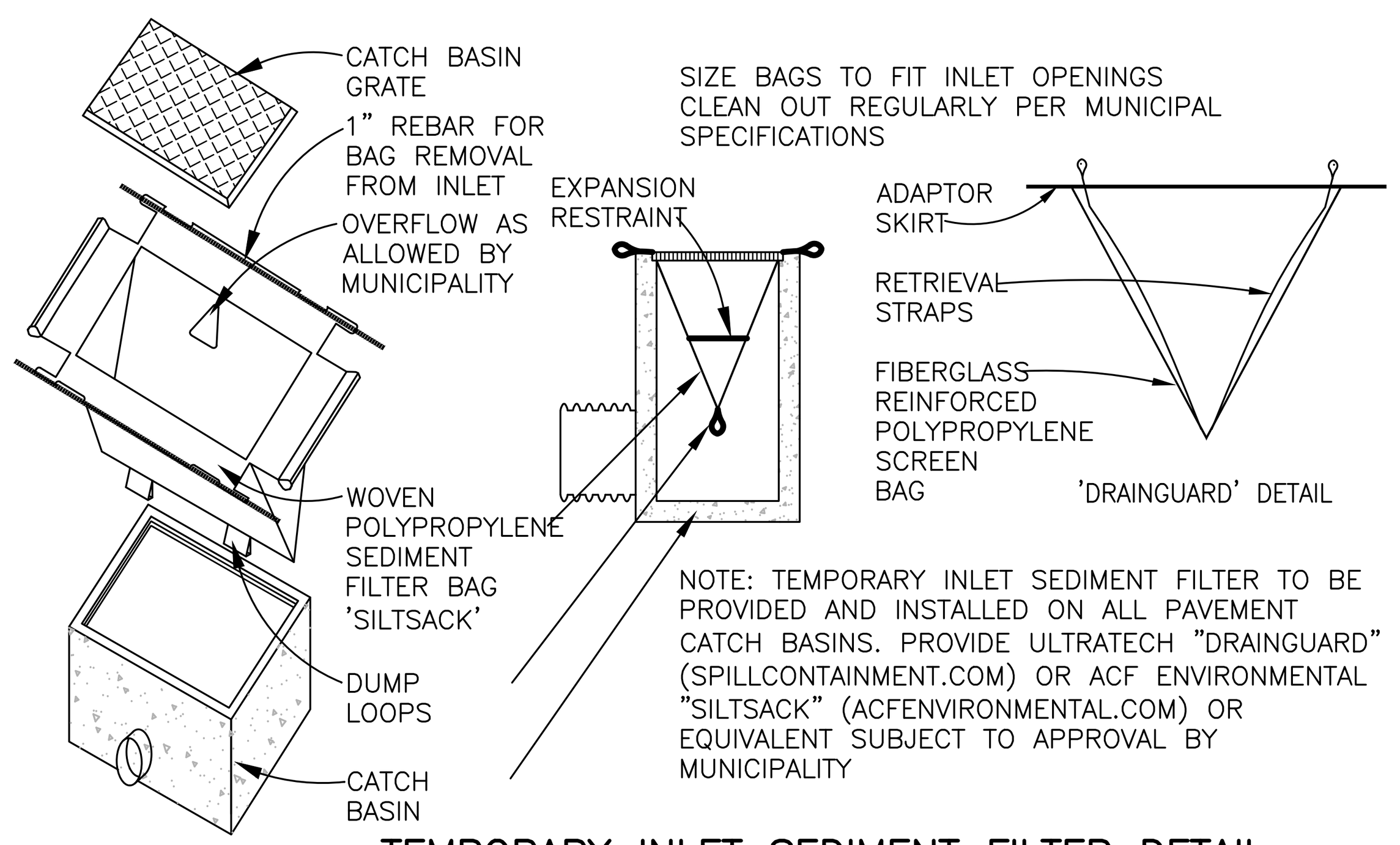
TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

NO SCALE



SILT FENCE DETAIL

NO SCALE



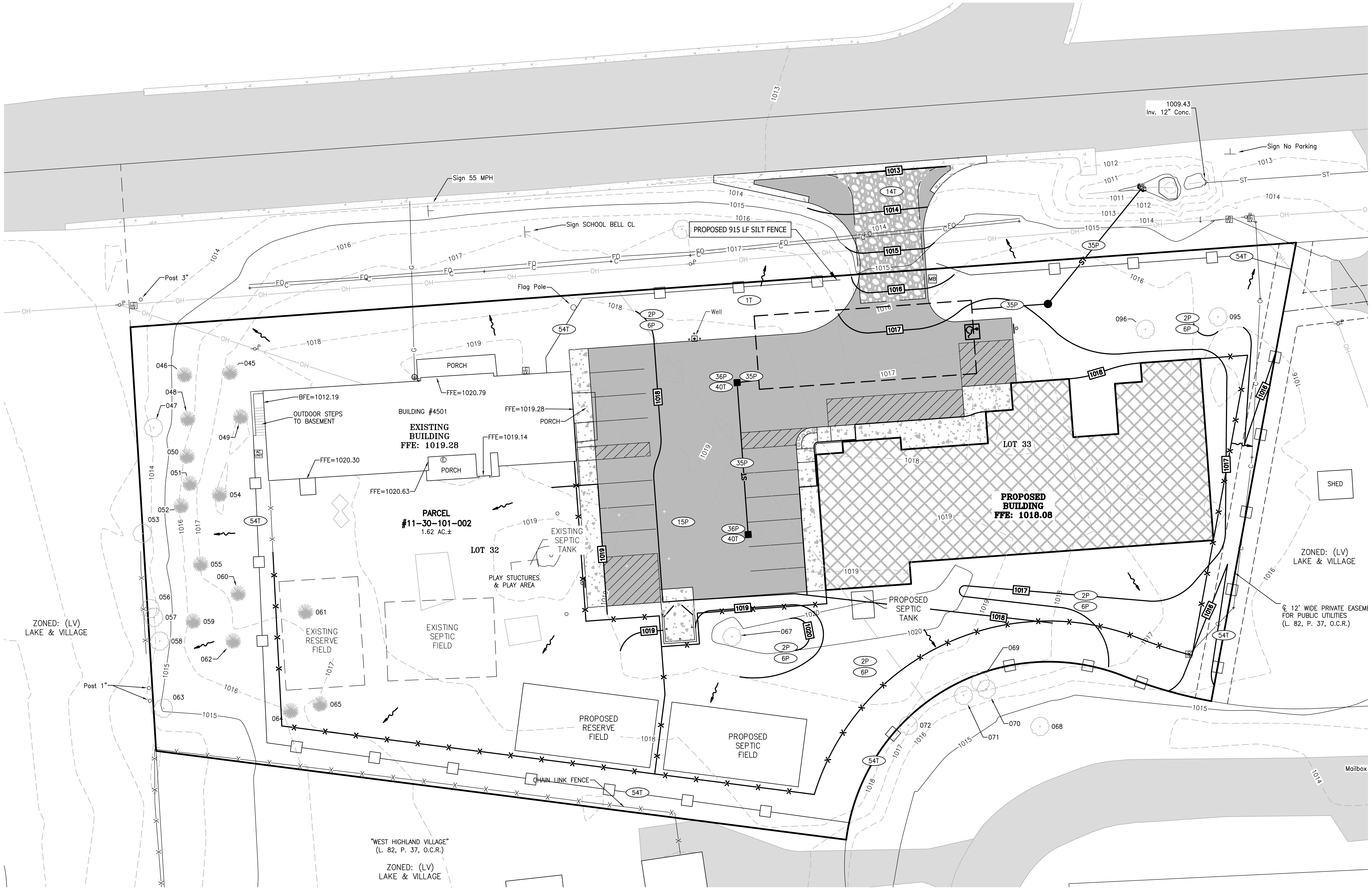
NOTE: TEMPORARY INLET SEDIMENT FILTER TO BE PROVIDED AND INSTALLED ON ALL PAVEMENT CATCH BASINS. PROVIDE ULTRATECH "DRAINGUARD" (SPILLCONTAINMENT.COM) OR ACF ENVIRONMENTAL "SILTSACK" (ACFENVIRONMENTAL.COM) OR EQUIVALENT SUBJECT TO APPROVAL BY MUNICIPALITY

TEMPORARY INLET SEDIMENT FILTER DETAIL

(NO SCALE)

DEVELOPMENT: TWENTY-TWO (22) TREES ARE TO BE REMOVED FOR THE DEVELOPMENT OF THE SITE – ALL IN THE EAST, UNDEVELOPED AREA. NO TREES ARE TO BE RELOCATED. REMOVED TREES ARE WITHIN THE PROPOSED BUILDING OUTLINE AND WHERE IMPACTED BY THE EXPANDED PARKING LOT. MATURE TREES AROUND THE PERIMETER OF THE SITE WILL BE PRESERVED DURING CONSTRUCTION. PORTIONS OF THE EXISTING LOT AREA WILL BE UTILIZED FOR TOPSOIL STOCKPILING AND MATERIAL STAGING AREAS (AS NOTED ON THE PLAN).

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND



SOIL EROSION CONTROL MEASURES

Symbol	No.	Measure	Description
1T	1	STRIPPING & STOCKPILING TOPSOIL	TOPSOIL MAY BE STOCKPILED ABOVE BORROW AREAS TO ACT AS A DIVERSION. STOCKPILE SHOULD BE TEMPORARILY SEEDED
2P	2	SELECTIVE GRADING & SHAPING	WATER CAN BE DIVERTED TO MINIMIZE EROSION. FLATTER SLOPES EASE EROSION PROBLEMS
6P	6	SEEDING WITH MULCH AND/OR MATTING	FACILITATES ESTABLISHMENT OF VEGETATIVE COVER. EFFECTIVE FOR DRAINAGEWAYS WITH LOW VELOCITY. EASILY PLACED IN SMALL QUANTITIES BY INEXPERIENCED PERSONNEL. SHOULD INCLUDE PREPARED TOPSOIL BED
14T	14	AGGREGATE COVER	STABILIZES SOIL SURFACE, THUS MINIMIZING EROSION. PERMITS CONSTRUCTION TRAFFIC IN ADVERSE WEATHER. MAY BE USED AS PART OF PERMANENT BASE CONSTRUCTION OF PAVED AREAS
15P	15	PAVING	PROTECTS AREAS WHICH CANNOT OTHERWISE BE PROTECTED, BUT INCREASES RUNOFF VELOCITY. IRREGULAR SURFACE WILL HELP SLOW VELOCITY
35P	35	STORM SEWER	SYSTEM REMOVES COLLECTED RUNOFF FROM SITE, PARTICULARLY FROM PAVED AREAS. CAN ACCEPT LARGE CONCENTRATIONS OF RUNOFF. CONDUCTS RUNOFF TO MUNICIPAL SEWER SYSTEM OR STABILIZED OUTFALL LOCATION. USE CATCH BASINS TO COLLECT SEDIMENT
36P	36	CATCH BASIN, DRAIN INLET	COLLECTS HIGH VELOCITY CONCENTRATED RUNOFF. MAY USE FILTER CLOTH OVER INLET
40T	40	INLET SEDIMENT FILTER	EASY TO SHAPE. COLLECTS SEDIMENT. MAY BE CLEANED AND EXPANDED AS NEEDED
54T	54	SILT FENCE	USES GEOTEXTILE FABRIC AND POST OR POLES. EASY TO CONSTRUCT AND LOCATE AS NECESSARY. (SEE DETAIL THIS SHEET)

T= TEMPORARY, P= PERMANENT
TOTAL DISTURBED AREA= 1.18 AC.

SURFACE WATER & COUNTY DRAINS
WETLAND – APPROXIMATELY 800 FT WEST TO S TIPSICO LAKE RD
LAKES – APPROXIMATELY 4,250 FT NORTH TO DUNHAM LAKE
BASINS – APPROXIMATELY 1,110 FT SOUTH AT S TIPSICO LAKE RD
PONDS – APPROXIMATELY 855 FT SOUTHEAST AT POMMORE DR

PROPOSED CONST. SCHEDULE FOR THE YEAR 2024

ACTIVITY	MAY	JUNE	JULY	AUG	SEPT	OCT
DEMO & CLEAR		—				
MASS GRADING		—	—			
UNDERGROUND UTILITY			—	—		
FINAL GRADING					—	
SEED & MULCH						—

CONTROLS & MEASURES NARRATIVE

ACTIVITY	DESCRIPTION
MAINTAIN LANDSCAPING, REPLACE MULCH	COLLECT GRASS, TREE, AND SHRUB CLIPPINGS. DISPOSE IN APPROVED CONTAINER. REPLACE DEAD SOD, TREES AND SHRUBS.
CLEAN INLETS	REMOVE LITTER, SEDIMENT, AND DEBRIS. DISPOSE OF IN APPROVED LANDFILL.
COLLECT LITTER	DISPOSE OF WITH INLET DEBRIS.
SWEEP PARKING LOT	REMOVE MUD, DIRT, GREASE AND OIL WITH PERIODIC SWEEPING
DUST CONTROL	SPRINKLE WATER AS NEEDED

CONTROLS & MEASURES POST CONSTRUCTION SEQUENCE

ACTIVITY	WEEKLY	MONTHLY	AS REQUIRED
MAINTAIN LANDSCAPING, REPLACE MULCH	X	X	X
CLEAN INLETS		X	X
COLLECT LITTER	X		X
SWEEP PARKING LOT		X	X

CONSTRUCTION SEQUENCE

THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT EROSION IS MINIMIZED AND THAT COMPLIANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS, REGULATIONS, AND ORDINANCES IS MAINTAINED THROUGHOUT EXECUTION OF THIS PROJECT.

1 DAYS	1.	INSTALL SILT FENCE AS SHOWN ON PLANS.
5 DAYS	2.	ROUGH GRADE AND INSTALL STORM DRAINAGE.
1 DAY	3.	INSTALL INLET PROTECTION ON STORM INLETS.
180 DAY	4.	START BLDG. CONSTRUCTION
4 DAYS	5.	INSTALL PAVEMENT
4 DAYS	6.	FINE GRADE AROUND BUILDING, SPREAD TOPSOIL, SEED OR SOD AS APPLICABLE.
1 DAY	7.	REMOVE ALL EROSION CONTROL STRUCTURES.
1 DAY	8.	REMOVE ACCUMULATED SILT FROM ALL EXISTING DRAINAGE.

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3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171 (TOLL FREE) FOR THE LOCATION OF UNDERGROUND FACILITIES

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT: SCHOOL BELL CHILDCARE

PREPARED FOR: SCHOOL IN THE PINES INC. dba SCHOOL BELL CHILDCARE
4501 WEST HIGHLAND ROAD
MILFORD, MI 48380
248.830.9642

TITLE: SOIL EROSION SEDIMENTATION CONTROL PLAN

NO	BY	REVISION PER	DATE
–	–	–	–

DESIGNED BY: BL
DRAWN BY: JP
CHECKED BY:
SCALE: 1"=20'
JOB NO: 24-048
DATE: 05/31/24
SHEET NO. 7

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

DYODS™
Design Your Own Detention System

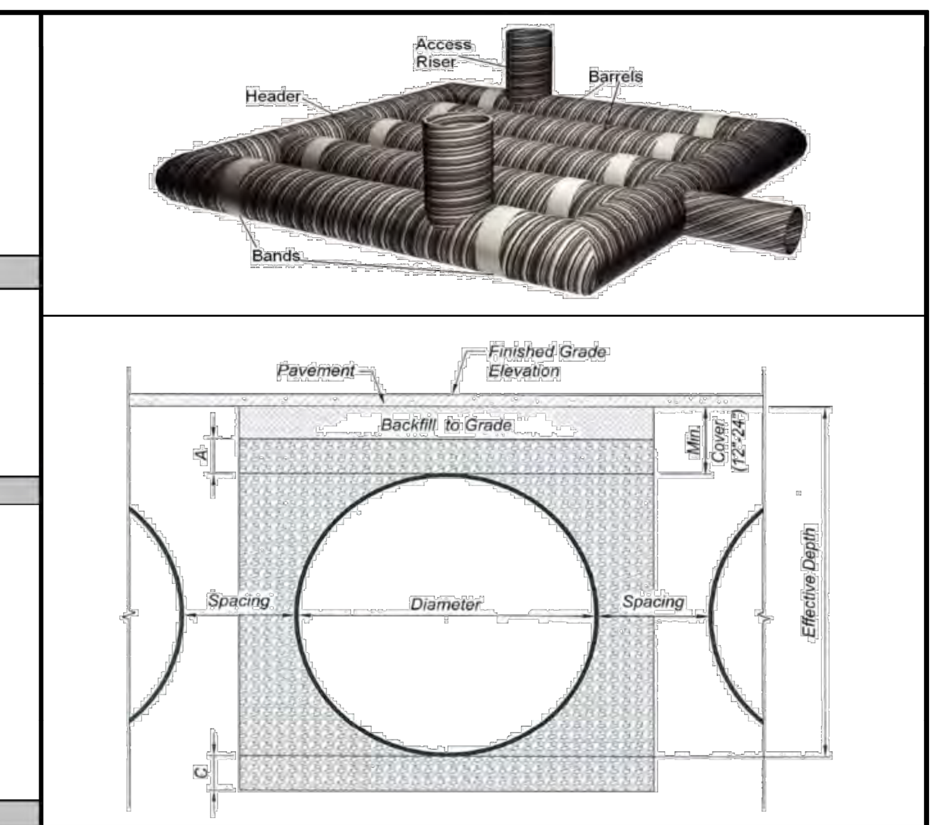
CONTECH STORMWATER SOLUTIONS INC.

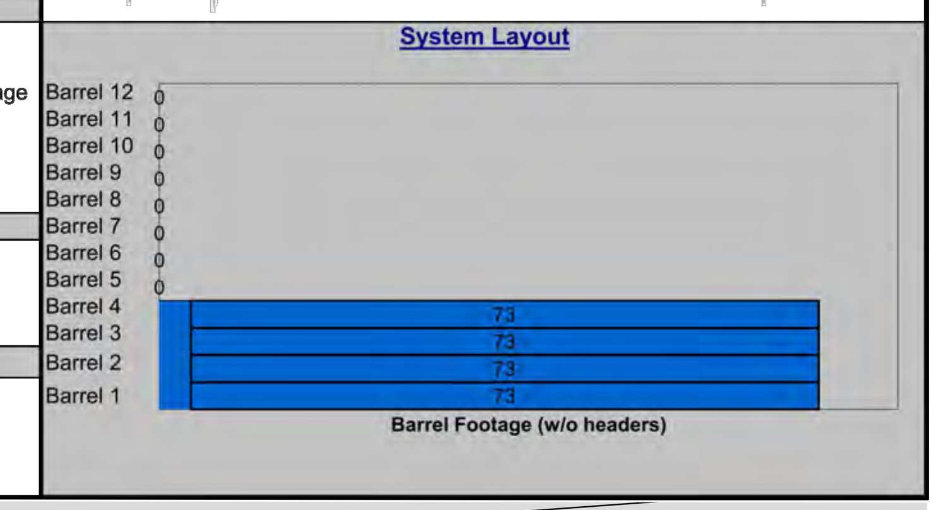
CONTECH CMP DETENTION SYSTEMS

For design assistance, drawings, and pricing send completed worksheet to:
dyods@contech-cpi.com

Project Summary		
Date:	4/16/2024	
Project Name:	School Bell Childcare	
City / County:	Highland/Oakland	
State:	MI	
Designed By:	JMP	
Company:	Boss Engineering	**Enter Information in Blue Cells**
Telephone:	517-546-4836	
Corrugated Metal Pipe Calculator		
Storage Volume Required (cf):	5,000	
Limiting Width (ft):	26.00	
Invert Depth Below Asphalt (ft):	6.00	
Solid or Perforated Pipe:	Perforated	
Shape Or Diameter (in):	54	15.90 ft^2 Pipe Area
Number Of Headers:	1	
Spacing between Barrels (ft):	2.25	
Stone Width Around Perimeter of System (ft):	0	
Depth A: Porous Stone Above Pipe (in):	0	
Depth C: Porous Stone Below Pipe (in):	0	
Stone Porosity (0 to 40%):	0	
System Sizing		
Pipe Storage:	5,038 cf	
Porous Stone Storage:	0 cf	
Total Storage Provided:	5,038 cf	100.8% Of Required Storage
Number of Barrels:	4 barrels	
Length per Barrel:	73.0 ft	
Length Per Header:	24.8 ft	
Rectangular Footprint (W x L):	24.75 ft x 77.5 ft	
CONTECH Materials		
Total CMP Footage:	317 ft	
Approximate Total Pieces:	18 pcs	
Approximate Coupling Bands:	17 bands	
Approximate Truckloads:	5 trucks	
Construction Quantities**		
Total Excavation:	427 cy	
Porous Stone Backfill For Storage:	133 cy stone	
Backfill to Grade Excluding Stone:	107 cy fill	

***Construction quantities are approximate and should be verified upon final design*





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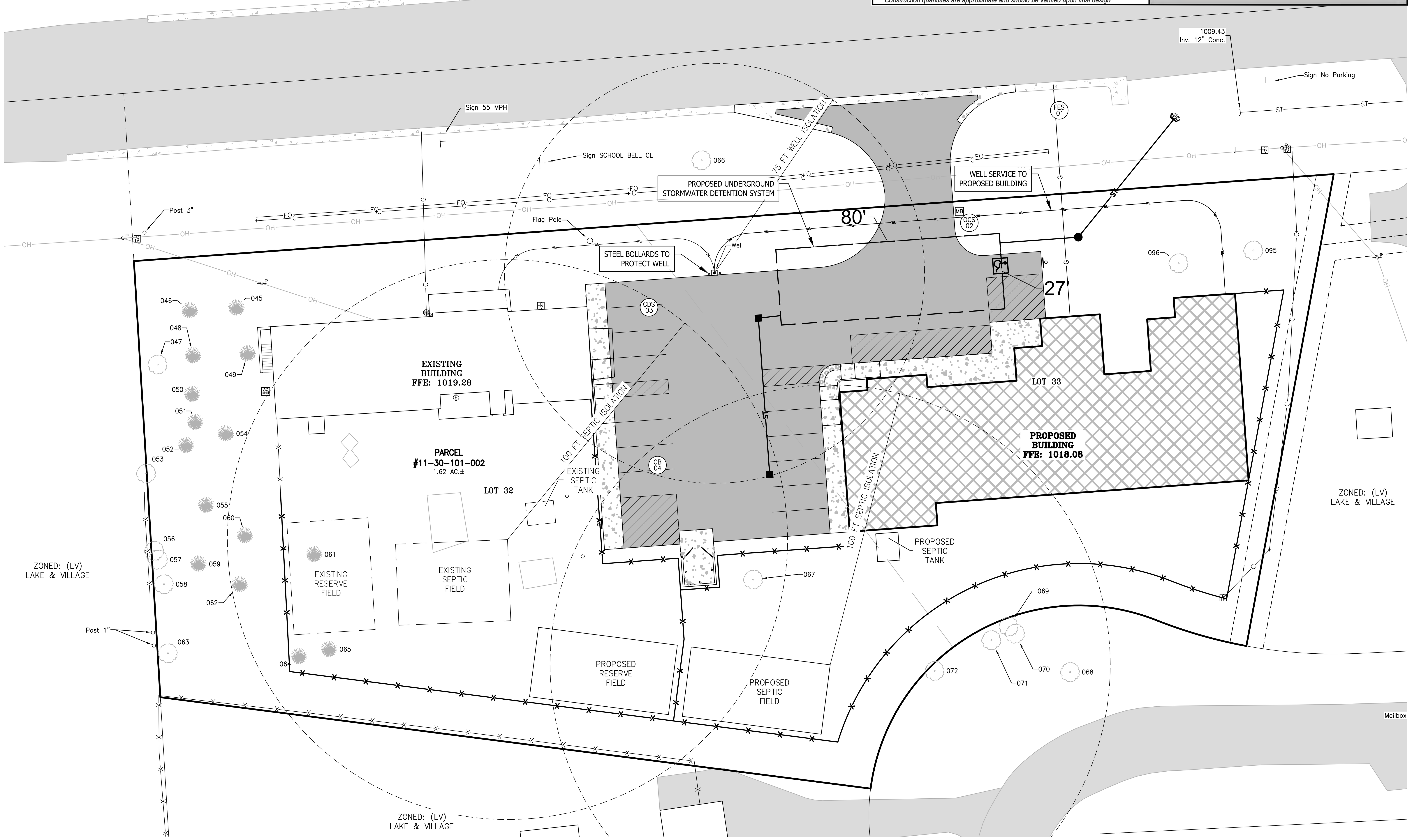
SCALE: 1 INCH = 20 FEET

STRUCTURE FRAMES & COVERS				
COVER	TYPE	USE	EAST JORDAN (OR EQUAL)	TYPE OF COVER OR GRATE
A	MH	ALL	1040	TYPE 'B'
D	CB & INLET	PARKING LOTS	1040 5100	TYPE 'M1' GRATE 5105 TYPE 'M1' GRATE
E	CB & INLET	LAWN AREA OR DITCH	1040	TYPE 'O2'



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3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT: SCHOOL BELL CHILDCARE

PREPARED FOR: SCHOOL IN THE PINES INC. dba SCHOOL BELL CHILDCARE
4501 WEST HIGHLAND ROAD
MILFORD, MI 48380
248.830.9642

TITLE: UTILITY PLAN

NO	BY	REVISION PER	DATE
-	-	-	-

DESIGNED BY: BL
DRAWN BY: JP
CHECKED BY:
SCALE: 1"=20'
JOB NO: 24-048
DATE: 05/31/24
SHEET NO. 8

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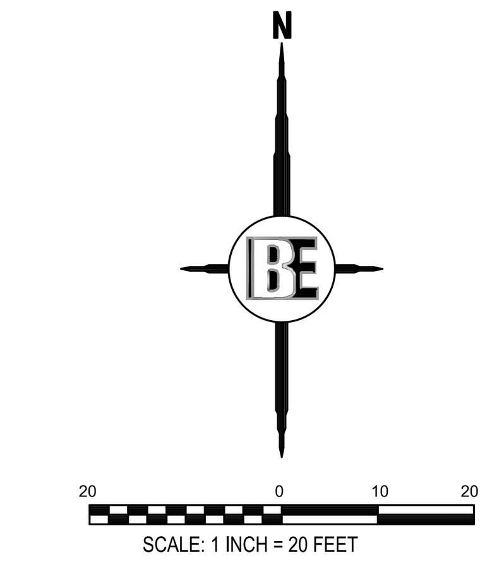
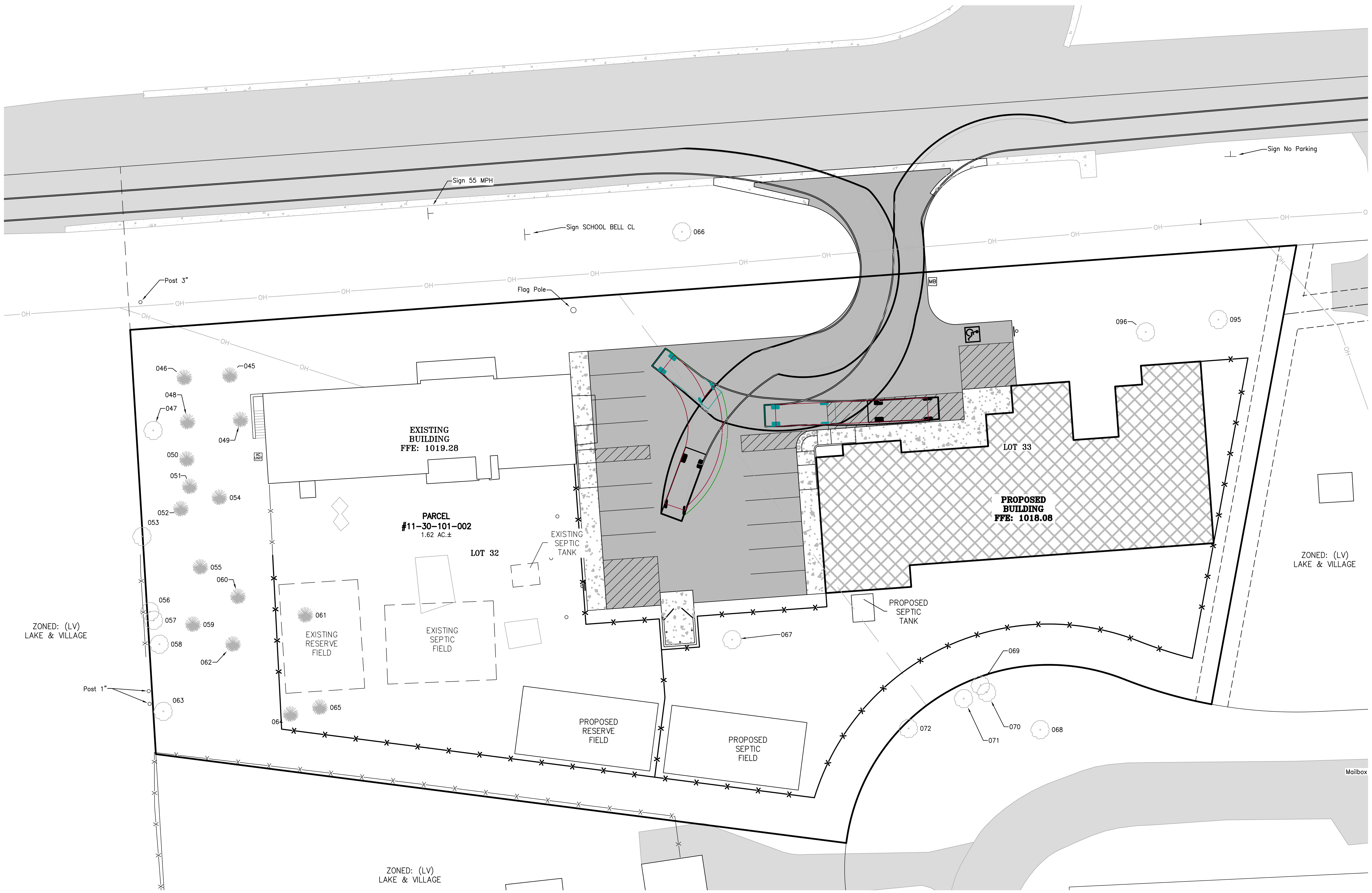
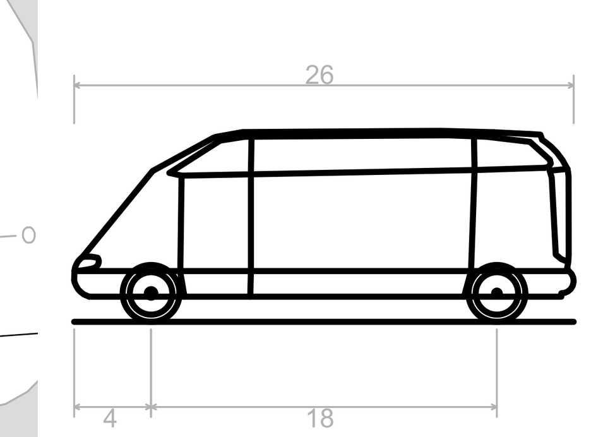
SEE SHEET 2 FOR GENERAL NOTES AND LEGEND







UPS Truck	
Overall Length	26.000ft
Overall Width	8.000ft
Overall Body Height	9.942ft
Min Body Ground Clearance	1.312ft
Track Width	8.000ft
Lock-to-lock time	2.00s
Wall to Wall Turning Radius	26.000ft

EMERGENCY VEHICLE ACCESS NARRATIVE:
FIRE TRUCKS WILL USE THE WEST HIGHLAND ROAD (M-59) RIGHT OF WAY FOR PRIMARY ACCESS. ADDITIONALLY, POMMORE DRIVE BEHIND THE SITE CAN ALSO BE USED AS A SECONDARY ACCESS POINT.

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3 WORKING DAYS
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3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

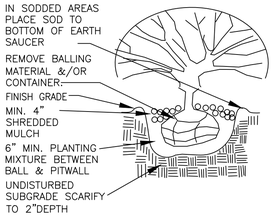
PROJECT
SCHOOL BELL CHILDCARE

PREPARED FOR
SCHOOL IN THE PINES INC. dba SCHOOL BELL CHILDCARE
4501 WEST HIGHLAND ROAD
MILFORD, MI 48380
248.830.9642

TITLE
VEHICLE CIRCULATION PLAN

NO	BY	REVISION PER	DATE
-			-
-			-

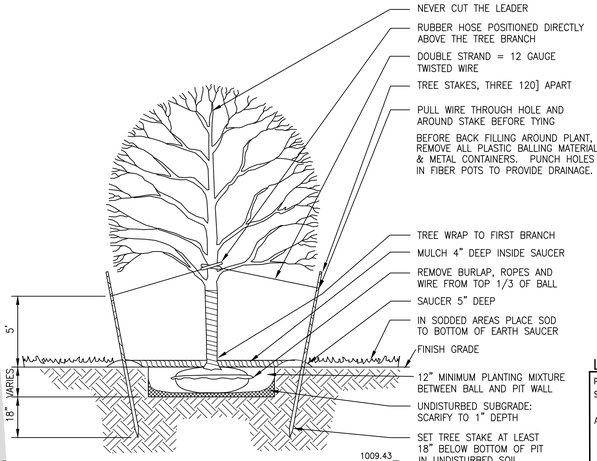
DESIGNED BY:	BL
DRAWN BY:	JP
CHECKED BY:	
SCALE:	1"=20'
JOB NO:	24-048
DATE:	05/31/24
SHEET NO.	9



SHRUB PLANTING DETAIL
(NO SCALE)

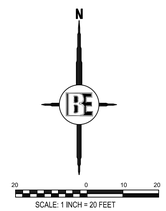
PLANT LIST

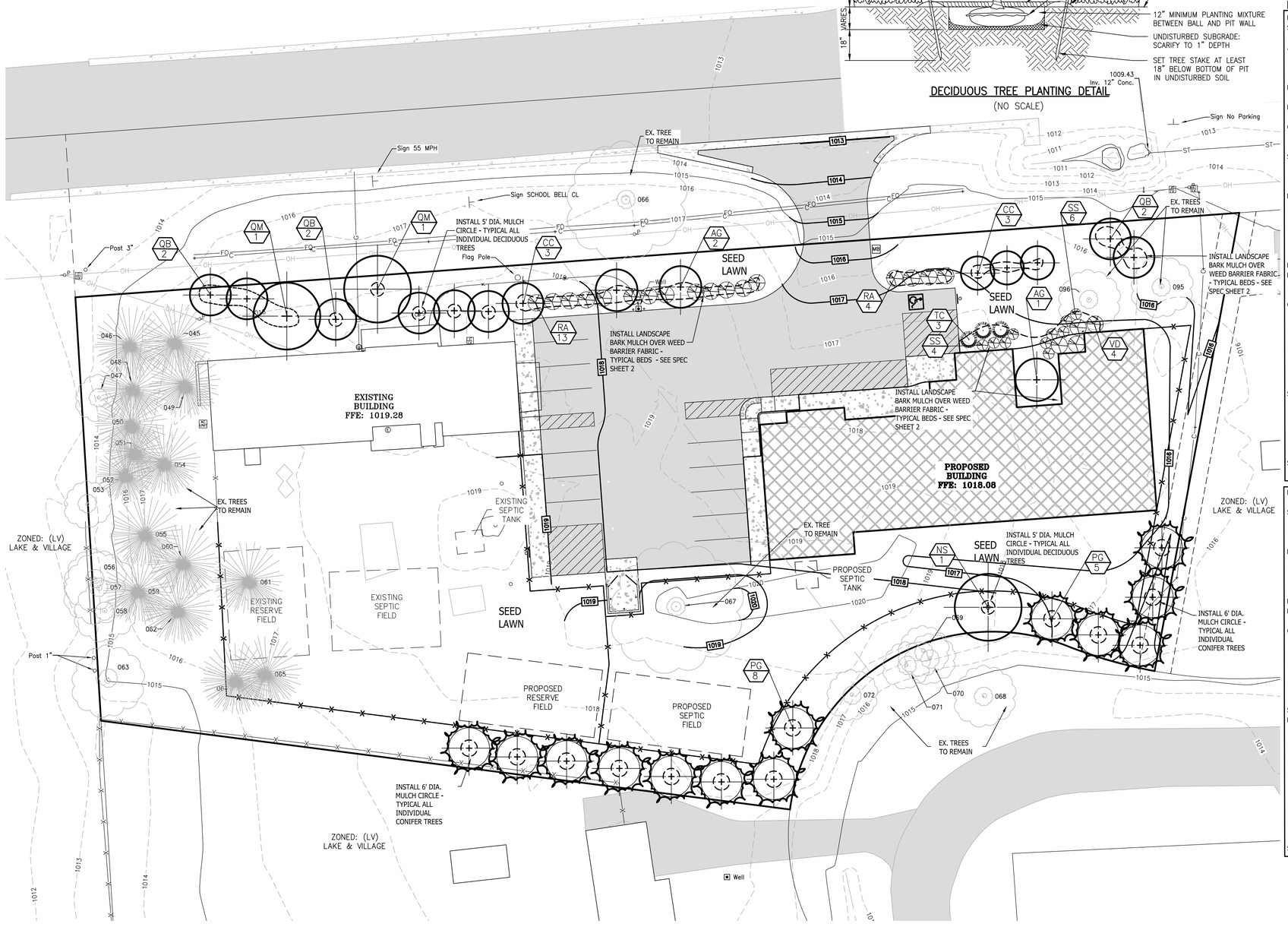
KEY	QUAN.	BOTANICAL NAME	COMMON NAME	SIZE	REMARK
DECIDUOUS TREES					
AG	3	Amelanchier x Grandiflora 'Autumn Brillance'	Autumn Brilliance Serviceberry	6' hgt.	B-B
CC	6	Cercis canadensis The Rising Sun ('JNJ')	Rising Sun Redbud	2" cal.	B-B
NS	1	Nyssa sylvatica 'Northern Splendor'	Northern Splendor Black Gum	2.5" cal.	B-B
QM	2	Quercus macrocarpa 'JFS-KW3'	Urban Pinnacle Oak	2.5" cal.	B-B
QB	6	Quercus bicolor 'Bonnie and Mike'	Beacon Oak (Columnar)	2.5" cal.	B-B
CONIFER TREES					
PG	13	Picea glauca	White Spruce	6' hgt.	B-B
DECIDUOUS SHRUBS					
RA	17	Rhus aromatica 'Lacette'	Lacette Fragrant Sumac	24"/#3	Cont.
DP	10	Symphoricarpos sp.	Proud Berry Coralberry	18"/#3	Cont.
TC	3	Taxus canadensis	Canada Yew	36"/#5	Cont.
VD	9	Viburnum dentatum 'Christom'	Blue Muffin Arrowwood Viburnum	36"/#5.	Cont.



DECIDUOUS TREE PLANTING DETAIL
(NO SCALE)

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND





LANDSCAPE CALCULATIONS

PROJECT INFORMATION:	
SITE SIZE / AREA OF WORK:	1.62 AC TOTAL SITE
	LV (LAKES AND VILLAGES)
ADJACENT ZONING / USES:	EAST - LV / SINGLE-FAMILY RESIDENTIAL
	WEST - LV (LAKES AND VILLAGES)
	NORTH - M-59 RIGHT-OF-WAY
	SOUTH - LV/ SINGLE-FAMILY RESIDENTIAL
PARKING LOT:	14 NEW SPACES + 1 ADA SPACE PROVIDED IN 1 PARKING LOT (15 TOTAL SPACES)
REQUIRED:	
GENERAL:	SECTION 12.03 (B) (4) THE PRESERVATION AND INCORPORATION OF EXISTING TREES IS ENCOURAGED
SCREENING BETWEEN LAND USES	SECTION 12.04 SCREENING BETWEEN LAND USES MIN 6FT HEIGHT VISUAL SCREEN REQUIRED FOR "INTENSE USE" PLAN COMMISSION SHALL DETERMINE TYPE CONIFER HEDGE, SOLID WALL, OR DECORATIVE FENCE
PARKING LOT LANDSCAPING:	SECTION 12.05 (A) 1 TREE + 3 SHRUBS / 8 SPACES. SEPARATE LANDSCAPE ISLANDS MIN. 200 SQFT EACH THE PLANNING COMMISSION MAY APPROVE AN EQUIVALENT AMOUNT OF LANDSCAPE PLANTINGS AT THE PERIMETER OF PARKING LOTS WHERE LANDSCAPING WITHIN PARKING LOTS WOULD BE IMPRACTICAL DUE TO THE SIZE OF THE PARKING LOT, DETRIMENTAL TO SAFE AND EFFICIENT TRAFFIC FLOW, OR WOULD CREATE AN UNREASONABLE BURDEN FOR MAINTENANCE AND SNOW PLOWING.
REQUIRED LANDSCAPING ADJACENT TO ROAD PUBLIC RIGHTS-OF-WAY:	SECTION 12.05 (B) PARKING LOTS SHALL BE SCREENED FROM VIEW THAT ARE VISIBLE FROM ALL RIGHTS-OF-WAY BY A LANDSCAPED BERM, WALL, OR SUFFICIENT PLANTINGS 3 FEET IN HEIGHT.
GREENBELTS:	SECTION 12.06 MINIMUM 20 FEET IN WIDTH FOR ALL NON-RESIDENTIAL PROPERTIES FRONTING HIGHLAND ROAD (M-59) AND 12 FEET IN WIDTH FOR ALL OTHER NON-RESIDENTIAL USES. MIN 1 TREE/ 30 LI.FT FRONTAGE ROW (NOT INCL. DRIVES) THE GREENBELT SHALL BE LANDSCAPED WITH A MINIMUM OF 1 DECIDUOUS TREE FOR EVERY 30 LINEAL FEET, OR FRACTION THEREOF OF FRONTAGE ABUTTING A PUBLIC ROAD RIGHT-OF-WAY. THE REMAINDER OF THE GREENBELT SHALL BE LANDSCAPED WITH TREES, GRASSES, GROUND COVERS, AND SHRUBS.
SITE LANDSCAPING	SECTION 12.07 AT LEAST 15% OF THE SITE AREA, EXCLUDING EXISTING PUBLIC RIGHTS-OF-WAY SHALL BE LANDSCAPED. SUCH SITE ARE MAY INCLUDE A COMBINATION OF THE PRESERVATION OF EXISTING TREE COVER, PLANTING OF NEW TREES AND PLANTING MATERIAL, LANDSCAPE PLAZAS, GARDENS, AND BUILDING FOUNDATION PLANTING BEDS. SITE AREA LANDSCAPING SHALL BE PROVIDED TO TO SCREEN POTENTIALLY. OBJECTIONABLE SITE FEATURES SUCH AS, BUT NOT LIMITED TO, RETENTION/DETENTION UNITS, LOADING AREAS, AND TRASH AREAS.
SCREENING OF TRASH CONTAINERS	SECTION 12.09 SCREENED ON ALL SIDES WITH OPAQUE FENCE OR WALL AND GATE AT LEAST 6FT HIGH.

PROVIDED:	
SCREENING BETWEEN LAND USES:	PROPOSE: 6 NEW CONIFER TREES, 1 NEW DECIDUOUS TREE, 5 EXISTING DEICIDUOUS TREES SCREEN SOUTH. 3 EXISTING DECIDUOUS TREES SCREEN EAST.
PARKING LOT LANDSCAPING:	(15 SPACES TOTAL) X (1 TREES/8 SPACES) = 1.75 TREES = 2 TREES (15 SPACES TOTAL) X (3 SHRUBS/8 SPACES) = 5.25 SHRUBS = 6 SHRUBS PROPOSE LANDSCAPING AT THE PERIMETER OF THE LOT DUE TO SMALL SIZE OF LOT FOR SAFE AND EFFICIENT TRAFFIC FLOW.
LANDSCAPING ADJACENT TO PUBLIC RIGHTS-OF-WAY:	4-FOOT HIGH-OPACITY DECIDUOUS SHRUB ROW ALONG M59 SIDE OF LOT (17) SHRUBS
GREENBELTS:	HIGHLAND ROAD/M59: 20 FEET 425/30 LINEAL FEET = 15 DECIDUOUS TREES 1 EXISTING DECIDUOUS TREE + 14 DECIDUOUS TREES POMMORE DRIVE: 20 FEET 35.50+76.50+60.00= 172 LINEAL FEET, 172/30 LINEAL FEET = 6 DECIDUOUS TREES 5 EXISTING DECIDUOUS TREES + 1 DECIDUOUS TREE
SITE LANDSCAPING: LANDSCAPED AREA	REQUIRED: 7.507 SQFT X (.15) = 1058S SQ.FT. OR 0.243 ACRE PROVIDED: WEST SIDE YARD: 7053 SQFT EAST SIDE YARD: 2943 SQFT FOUNDATION PLANTING: 914 SQFT REAR YARD: 5205 SQFT TOTAL LANDSCAPED: 16115 SQFT OR 0.370 ACRE CONSISTING OF PRESERVED TREES AND LAWN AREAS AND FOUNDATION PLANTINGS (AC COUNT)
SCREENING OF TRASH CONTAINERS:	PROVIDED BY 6' HEIGHT WALLED ENCLOSURE WITH GATE INCLUDED

BE BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

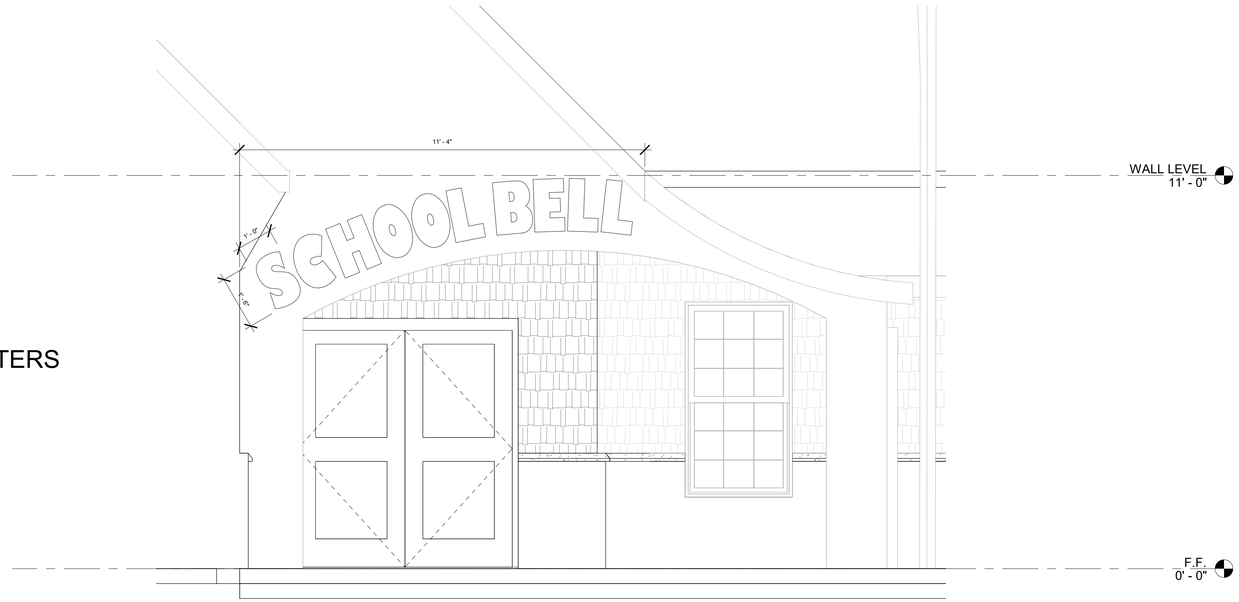
PROJECT: SCHOOL BELL CHILDCARE
PREPARED FOR: SCHOOL IN THE PINES INC. dba SCHOOL BELL CHILDCARE
4501 WEST HIGHLAND ROAD
HIGHLAND, MI 48356
248.830.9642
TITLE: LANDSCAPE PLAN

NO	BY	REVISION PER	DATE
		-	-

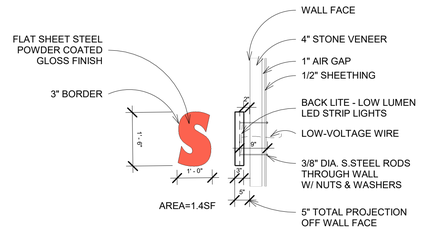
DESIGNED BY: TC
DRAWN BY: TC
CHECKED BY: PC
SCALE: 1" = 20'
JOB NO: 24-048
DATE: 05/31/24
SHEET NO. 10

SIGNAGE AREA CALCULATIONS

-10 INDIVIDUAL WALL MOUNTED LETTERS
-1.4 SF PER LINEAR FT OF BUILDING
-14 SF TOTAL WALL AREA



1 FRONT SIGNAGE NORTH ELEVATION - M-59 FRONTAGE
1/2" = 1'-0"



FONT: GILL SANS ULTRA BOLD CONDENSED

2 LETTER DETAILS
1/2" = 1'-0"

mkasabasic@ltu.edu

Consultant
Address
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Phone
Fax
e-mail

Consultant
Address
Address
Phone
Fax
e-mail

Consultant
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No.	Description	Date

SCHOOL BELL CHILDCARE

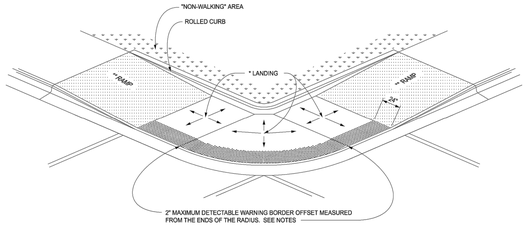
FRONT SIGNAGE

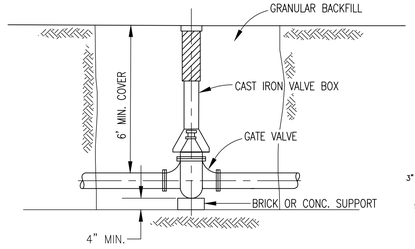
Project number	003
Date	6/12/2024
Drawn by	MAK
Checked by	

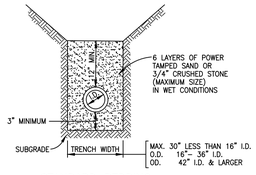
A10

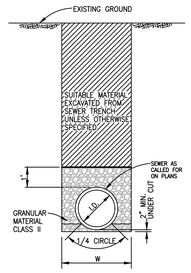
Scale 1/2" = 1'-0"

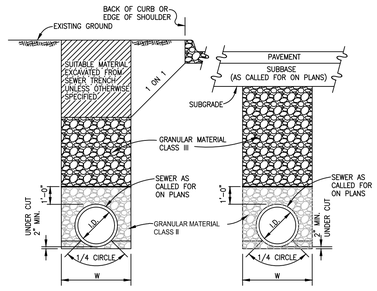
6/12/2024 12:15:59 PM

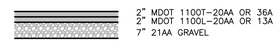


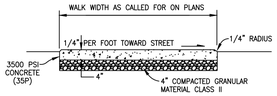


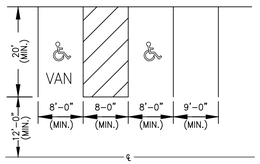


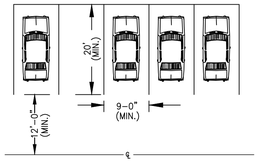


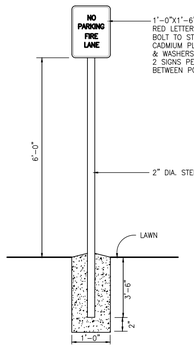


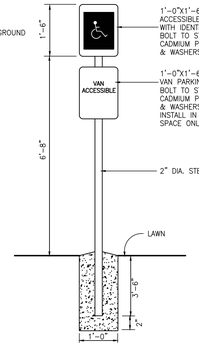


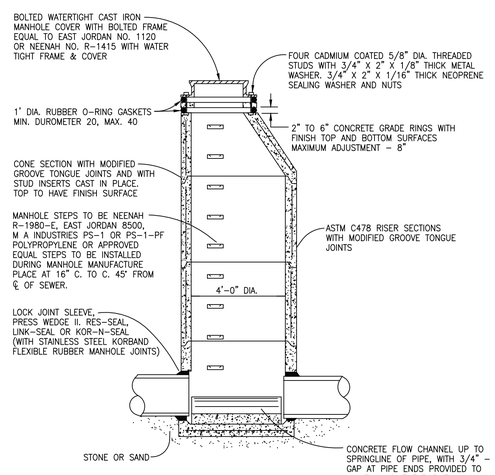


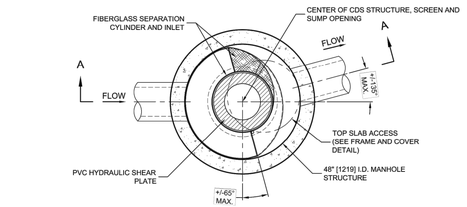


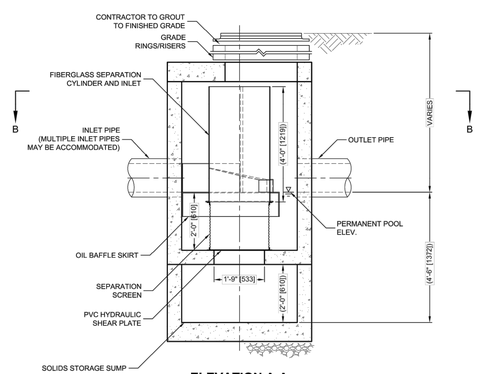


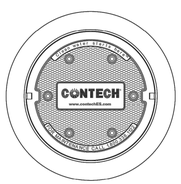












SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

(RADIAL DETECTABLE WARNING SHOWN)

MDOT
Michigan Department of Transportation
DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
CURB RAMP AND
DETECTABLE WARNING DETAILS

(SPECIAL DETAIL)	11/08/2023	R-28-K	SHEET
FHWA APPROVAL	PLAN DATE		4 OF 7
			SECT

STANDARD GATE VALVE & BOX

(NO SCALE)

STANDARD BEDDING FOR WATER PIPE

(NO SCALE)

ASPHALT SECTION

(NO SCALE)

4" CONCRETE SIDEWALK

(NO SCALE)

NO PARKING SIGN DETAIL

(NO SCALE)

HANDICAP PARKING SIGN DETAIL

(NO SCALE)

SEWER NOT UNDER ROADBED

(REF. MDOT DETAIL IV–83D)
NO SCALE

SEWER UNDER ROADBED OR WITHIN INFLUENCE OF ROADBED

(REF. MDOT DETAIL IV–83D)
NO SCALE

TYPICAL BARRIER FREE PARKING SPACE

(NO SCALE)

TYPICAL PARKING SPACE

(NO SCALE)

STANDARD ECCENTRIC SANITARY MANHOLE

(ON 8" THROUGH 24" DIAMETER SEWERS)
(NO SCALE)

PLAN VIEW B-B

N.T.S.

ELEVATION A-A

N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS2015-4-C DESIGN NOTES

THE STANDARD CDS2015-4-C 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
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS

FRAME AND COVER

(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

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 CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
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.

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9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS2015-4-C
INLINE CDS
STANDARD DETAIL

PLAN

SECTION

DUMPSTER ENCLOSURE DETAIL

(NO SCALE)

BOLLARD DETAIL

(NO SCALE)

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS 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 LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE APPARENT OR IF THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1–800–482–7171
(TOLL FREE)
FOR THE LOCATION OF UNDERGROUND FACILITIES

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

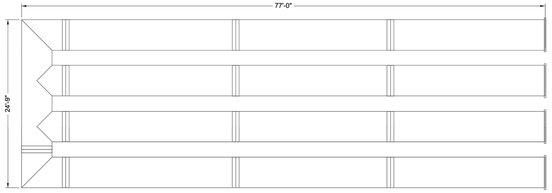
PROJECT
SCHOOL BELL CHILDCARE

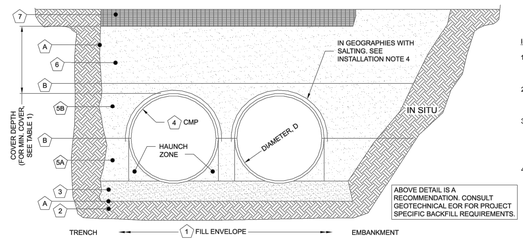
PREPARED FOR
SCHOOL IN THE PINES INC. dba SCHOOL BELL CHILDCARE
4501 WEST HIGHLAND ROAD
MILFORD, MI 48380
248.830.9642

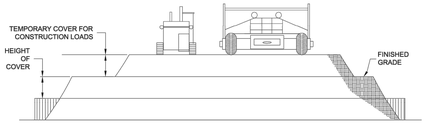
TITLE
CONSTRUCTION DETAILS

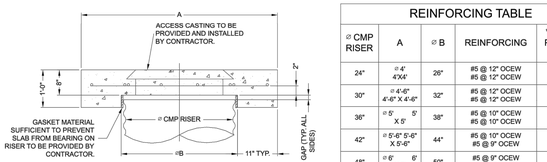
NO	BY	REVISION PER	DATE
–	–	–	–

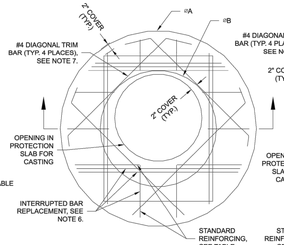
DESIGNED BY: BL
DRAWN BY: JP
CHECKED BY:
SCALE: NO SCALE
JOB NO: 24–048
DATE: 05/31/24
SHEET NO. 11

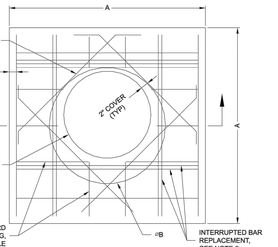


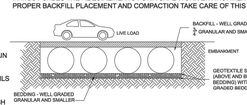


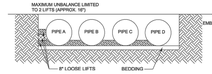


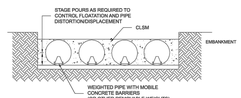


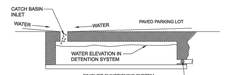












SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 315 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 5,000 CF
- PIPE STORAGE VOLUME = 5,006 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 5,006 CF

PIPE DETAILS
- DIAMETER = 54"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = SOLID
- BARREL SPACING = 27"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"

ASSEMBLY
SCALE: 1" = 10'

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 $2\frac{2}{3}$" x $\frac{1}{2}$" 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.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

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

DYO48754 School Bell Childcare
Underground Detention System
Howell, MI
DETENTION SYSTEM

PROJECT No.: 33757
SEQ. No.: 48754
DATE: 4/18/2024
DESIGNED: DYO
DRAWN: DYO
CHECKED: DYO
APPROVED: DYO
SHEET NO.: 1

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT
- ULTRAFLO ALSO AVAILABLE FOR SIZES 18" - 120" WITH 3/4"x 3/4"x 7 1/2" CORRUGATION

MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. BACKFILL USING CONTROLLED LOW-STRENGTH MATERIAL (CLSM, "FLASH FILL" OR "FLOWABLE FILL") MAY BE USED WHEN THE SPACING BETWEEN THE PIPES WILL NOT ALLOW FOR PLACEMENT AND ADEQUATE COMPACTION OF THE BACKFILL. CONTACT CONTECH FOR FURTHER EVALUATION.
4. IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, A GEOMEMBRANE BARRIER IS RECOMMENDED OVER THE UPPER HALF OF THE PIPE. THE GEOMEMBRANE 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.

TABLE 2: SOLID STANDARD

CMP DETENTION AND CMP DRAINAGE STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** OR PER ENGINEER OF RECORD	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 FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** (APPROVED REGIONAL EQUIVALENTS INCLUDE CA-7)	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE FOUNDATION SOILS CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5A	CRITICAL BACKFILL	**AASHTO M 145: A-1, A-2, A-3 ***	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A THREE LIFT (24") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WELL GRADED GRANULAR MATERIAL WHICH MAY CONTAIN SMALL AMOUNTS OF SILT OR CLAY AND MAXIMUM PARTICLE SIZE OF 3" (PER AASHTO 26.3.8.1 AND 12.4-1.3).	
5B	BACKFILL	**AASHTO M 145: A-1, A-2, A-3**		
6	COVER MATERIAL	UP TO MIN. COVER - SEE 5A AND 5B ABOVE ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROAD BASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	OPTIONAL GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5A INCLUDE CA-7, CODOT #67, MIDOT 2G, 34G, OR 21AA STONE OR GRAVEL; #8; #57; MIDOT 6A, 2G, 3G, 34G.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

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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

DYO48754 School Bell Childcare
Underground Detention System
Howell, MI
DETENTION SYSTEM

PROJECT No.: 33757 SEQ. No.: 48754 DATE: 4/18/2024
DESIGNED: DYO DRAWN: DYO
CHECKED: DYO APPROVED: DYO
SHEET NO.: 1

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

SECTION VIEW

REINFORCING TABLE

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

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800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO48754 School Bell Childcare
Underground Detention System
Howell, MI
DETENTION SYSTEM

PROJECT No.: 33757 SEQ. No.: 48754 DATE: 4/18/2024
DESIGNED: DYO DRAWN: DYO
CHECKED: DYO APPROVED: DYO
SHEET NO.: 1

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, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT 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.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO48754 School Bell Childcare
Underground Detention System
Howell, MI
DETENTION SYSTEM

PROJECT No.: 33757 SEQ. No.: 48754 DATE: 4/18/2024
DESIGNED: DYO DRAWN: DYO
CHECKED: DYO APPROVED: DYO
SHEET NO.: 1

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS 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 LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE APPARENT OR IF THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
(TOLL FREE)
FOR THE LOCATION OF UNDERGROUND FACILITIES

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT
SCHOOL BELL CHILDCARE

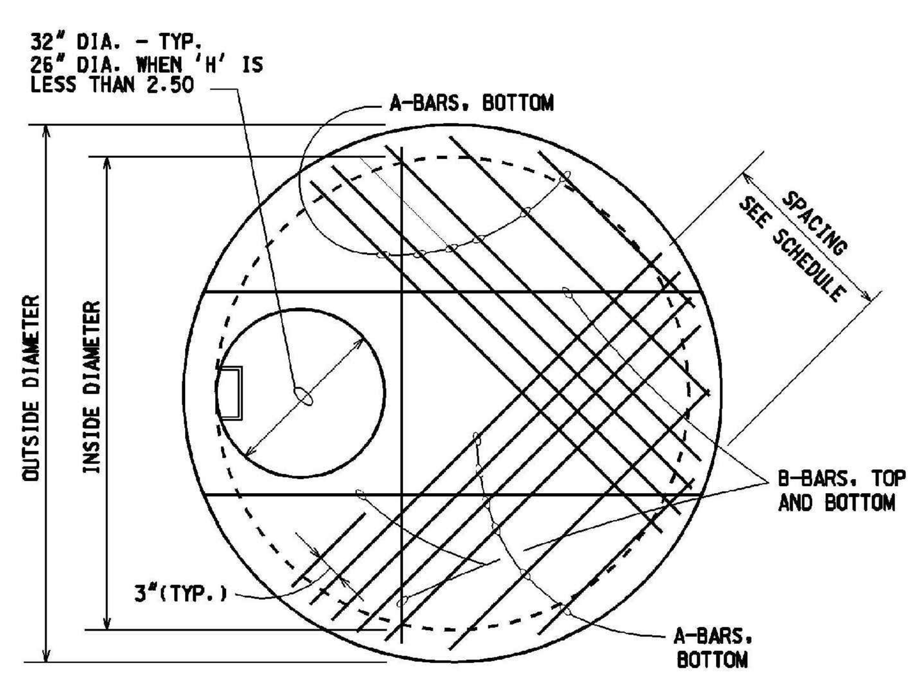
PREPARED FOR
SCHOOL IN THE PINES INC. dba SCHOOL BELL CHILDCARE
4501 WEST HIGHLAND ROAD
MILFORD, MI 48380
248.830.9642

TITLE
CONSTRUCTION DETAILS

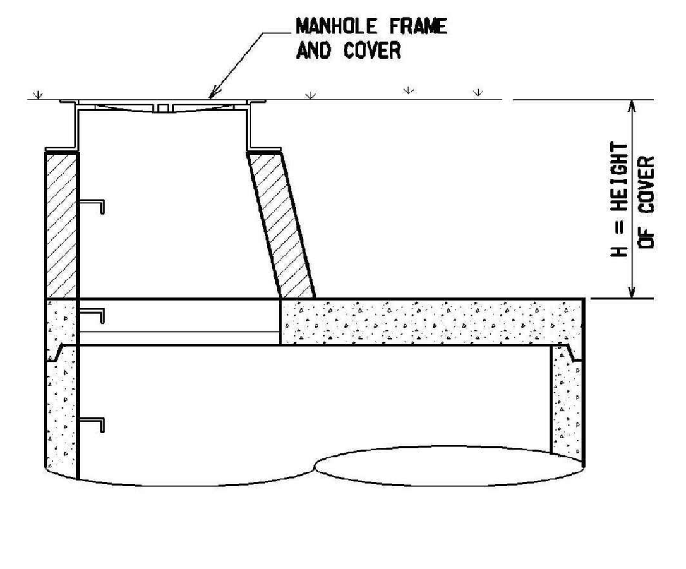
NO	BY	REVISION PER	DATE
–	–	–	–

DESIGNED BY: BL
DRAWN BY: JP
CHECKED BY:
SCALE: NO SCALE
JOB NO: 24–048
DATE: 05/31/24
SHEET NO. 12

BOSS BE Engineering

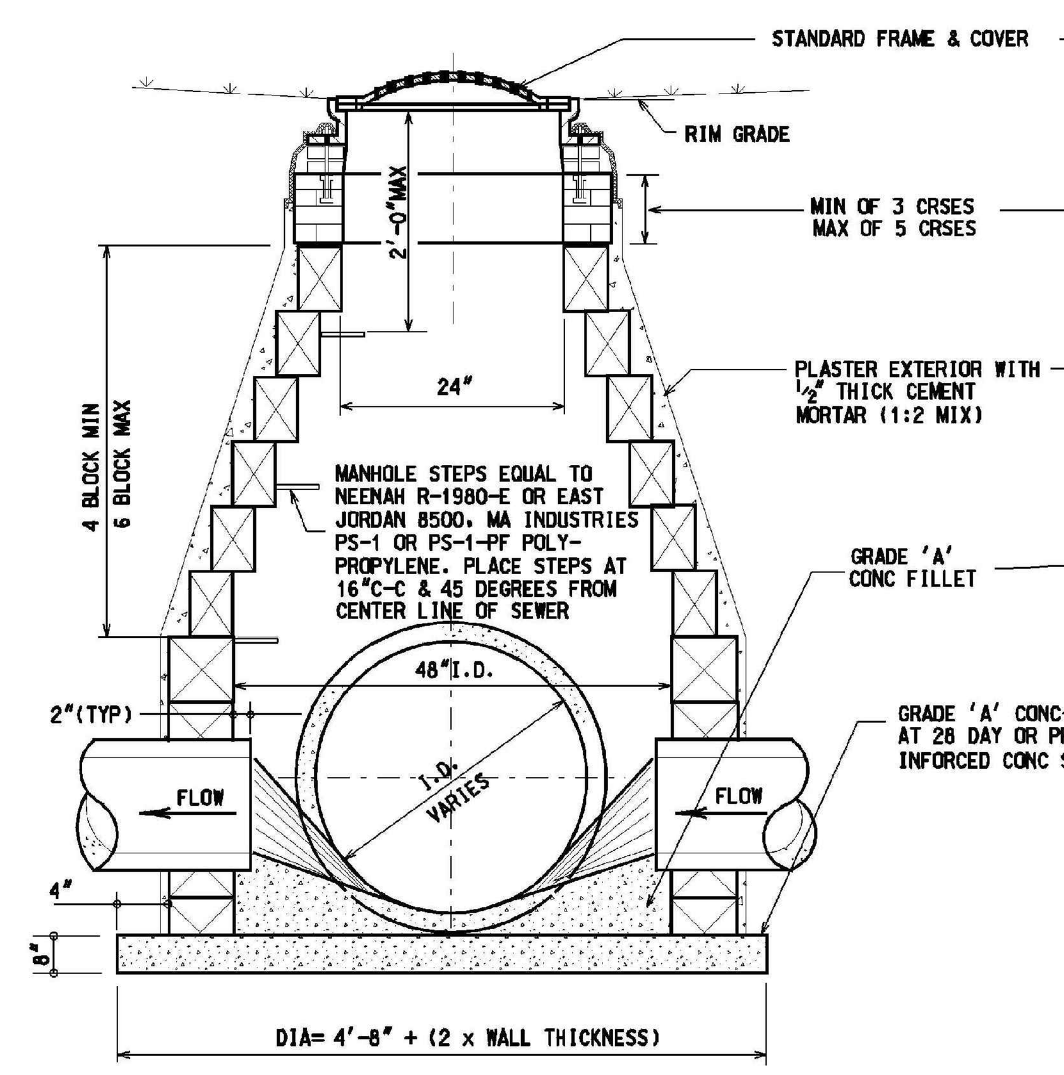


PLAN

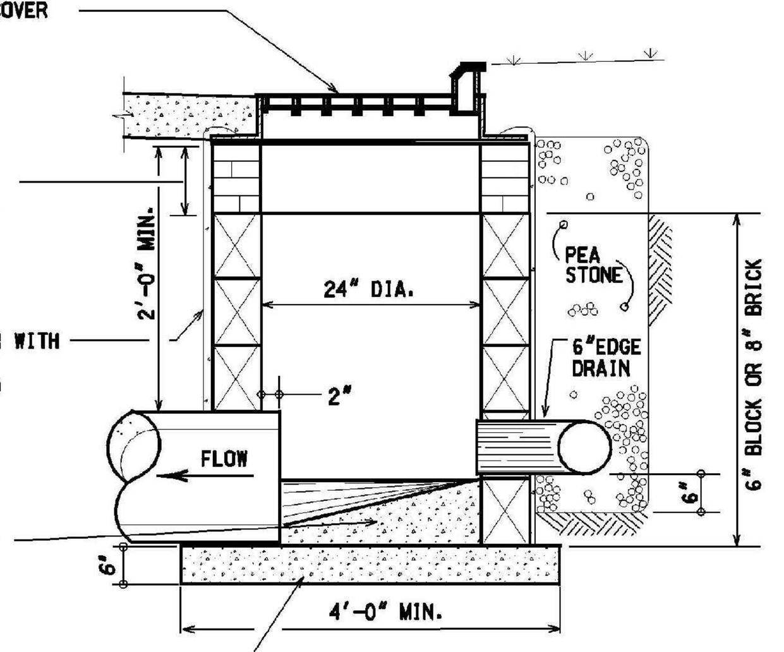


SECTION

INSIDE DIA.	SLAB THICKNESS	MAX. HEIGHT OF COVER	REINFORCEMENT		
			A-BARS EA. SIDE		B-BARS TOP & BOTTOM
			NO. SIZE	SPACING	
4'-0"	8"	8'-0"	(4)-#5	3 @ 3"	(3)-#5
5'-0"	8"	8'-0"	(6)-#5	3 @ 3" 2 @ 6"	(3)-#5
6'-0"	8"	8'-0"	(5)-#6	4 @ 8"	(3)-#5
7'-0"	8"	8'-0"	(7)-#6	6 @ 6"	(3)-#5
8'-0"	8"	8'-0"	(9)-#6	8 @ 6"	(3)-#5
9'-0"	10"	8'-0"	(11)-#6	10 @ 6"	(3)-#5
10'-0"	10"	8'-0"	(13)-#7	12 @ 6"	(3)-#5



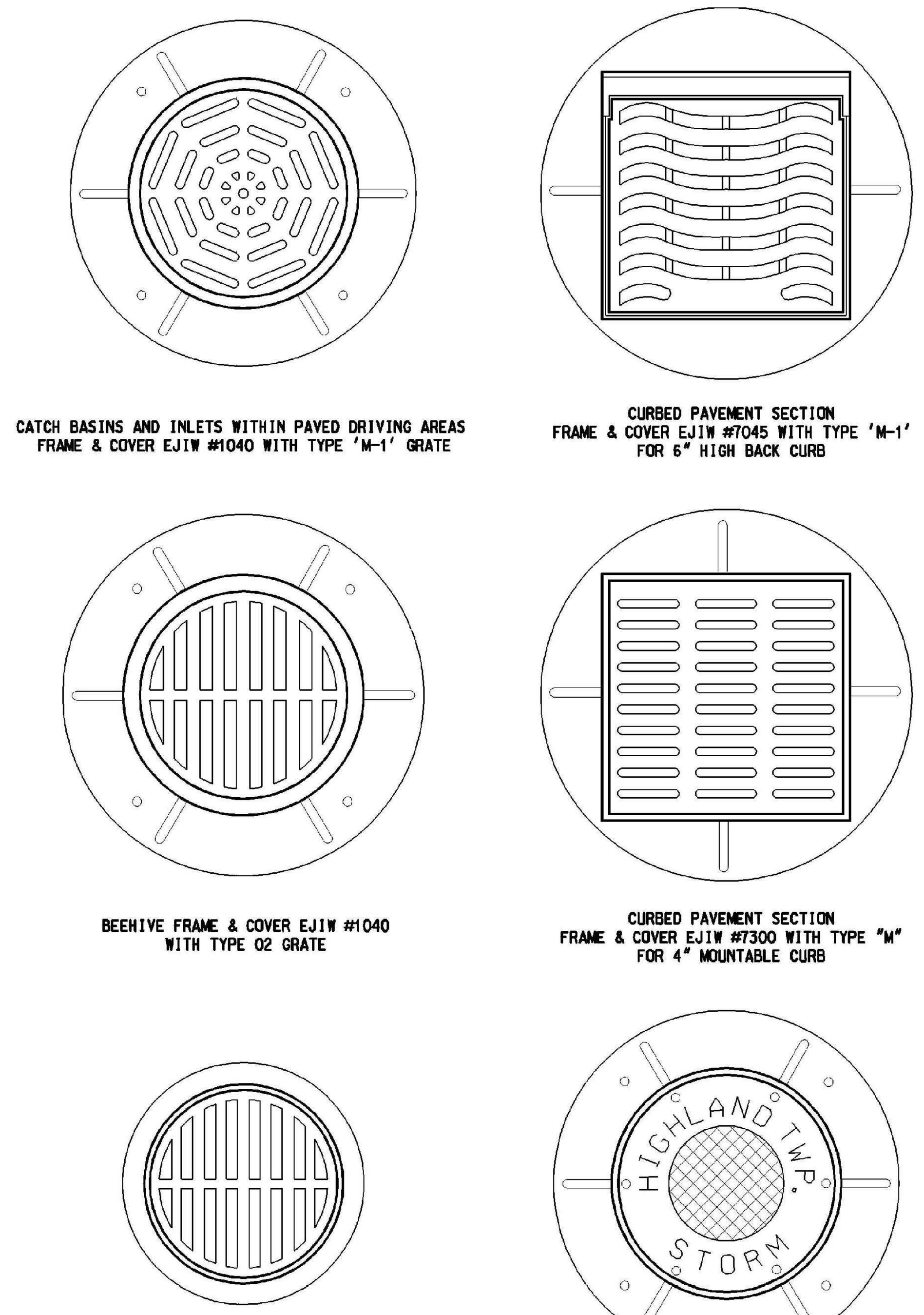
TYPE A-N INLET



NOTES:

1. IF CLEARANCE IS LESS THAN 2'-0" BETWEEN SUB-GRADE & TOP OF PIPE BACKFILL WILL SHALL CONSIST OF A DRY SAND-CEMENT MIXTURE COMPACTED IN PLACE
2. 4" M.D.O.T. GRANULAR MATERIAL CLASS II OR 6A AGGREGATE BEDDING REQUIRED UNDER ALL STRUCTURES UNLESS OTHERWISE DIRECTED.

LOW HEAD MANHOLE
TYPE C INLET



CATCH BASINS AND INLETS WITHIN PAVED DRIVING AREAS FRAME & COVER EJIW #1040 WITH TYPE 'M-1' GRATE

CURBED PAVEMENT SECTION FRAME & COVER EJIW #7045 WITH TYPE 'M-1' FOR 6" HIGH BACK CURB

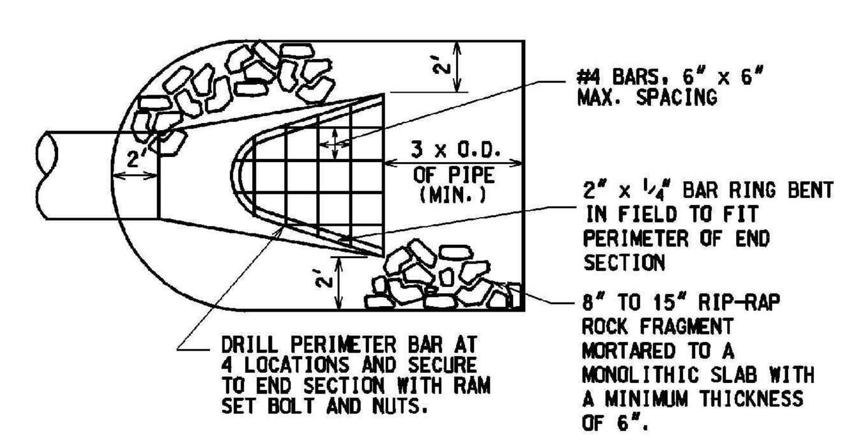
BEEHIVE FRAME & COVER EJIW #1040 WITH TYPE O2 GRATE

CURBED PAVEMENT SECTION FRAME & COVER EJIW #7300 WITH TYPE "M" FOR 4" MOUNTABLE CURB

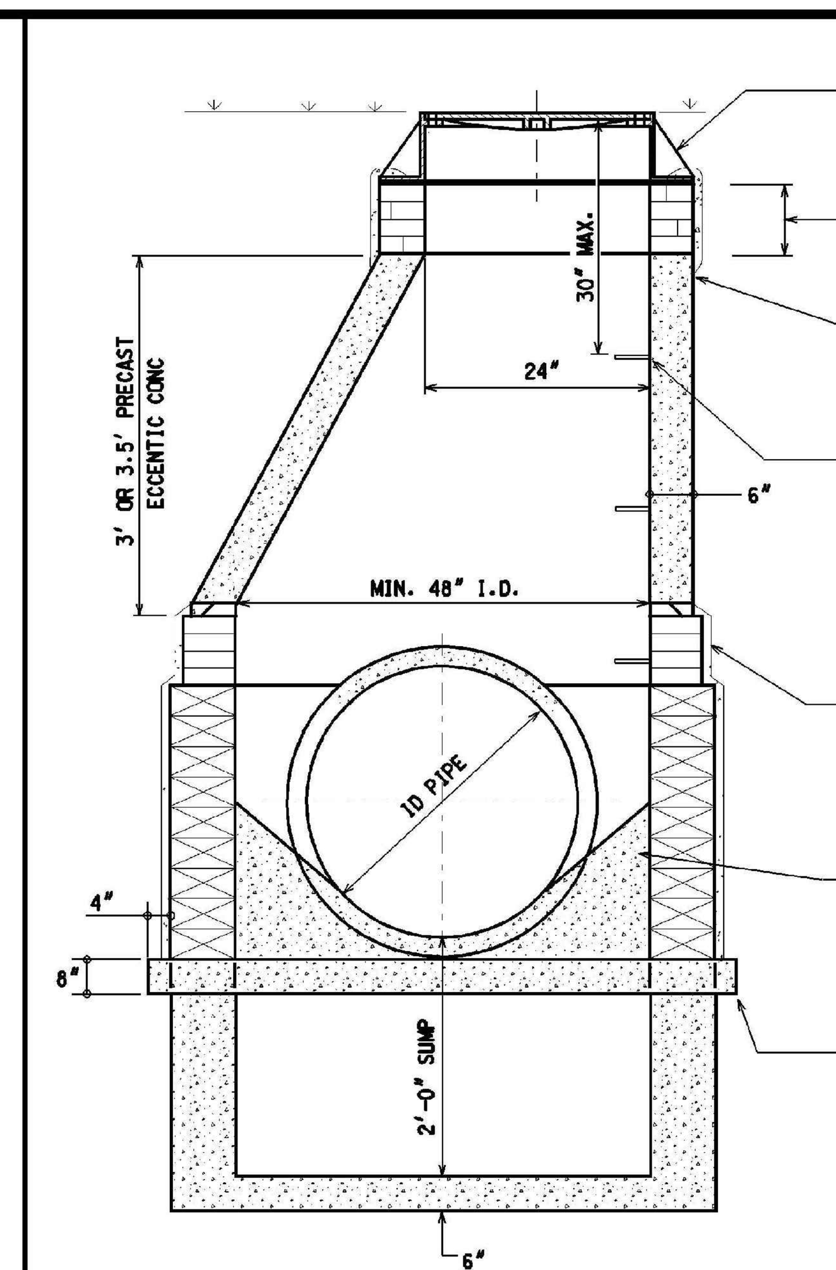
REAR YARD FRAME & COVER FOR 2'-0" DIA. INLET EJIW #1130 WITH TYPE O1 BEEHIVE GRATE

STORM SEWER FRAME & COVER EJIW #1040 WITH TYPE 'B' COVER

FRAMES AND COVERS

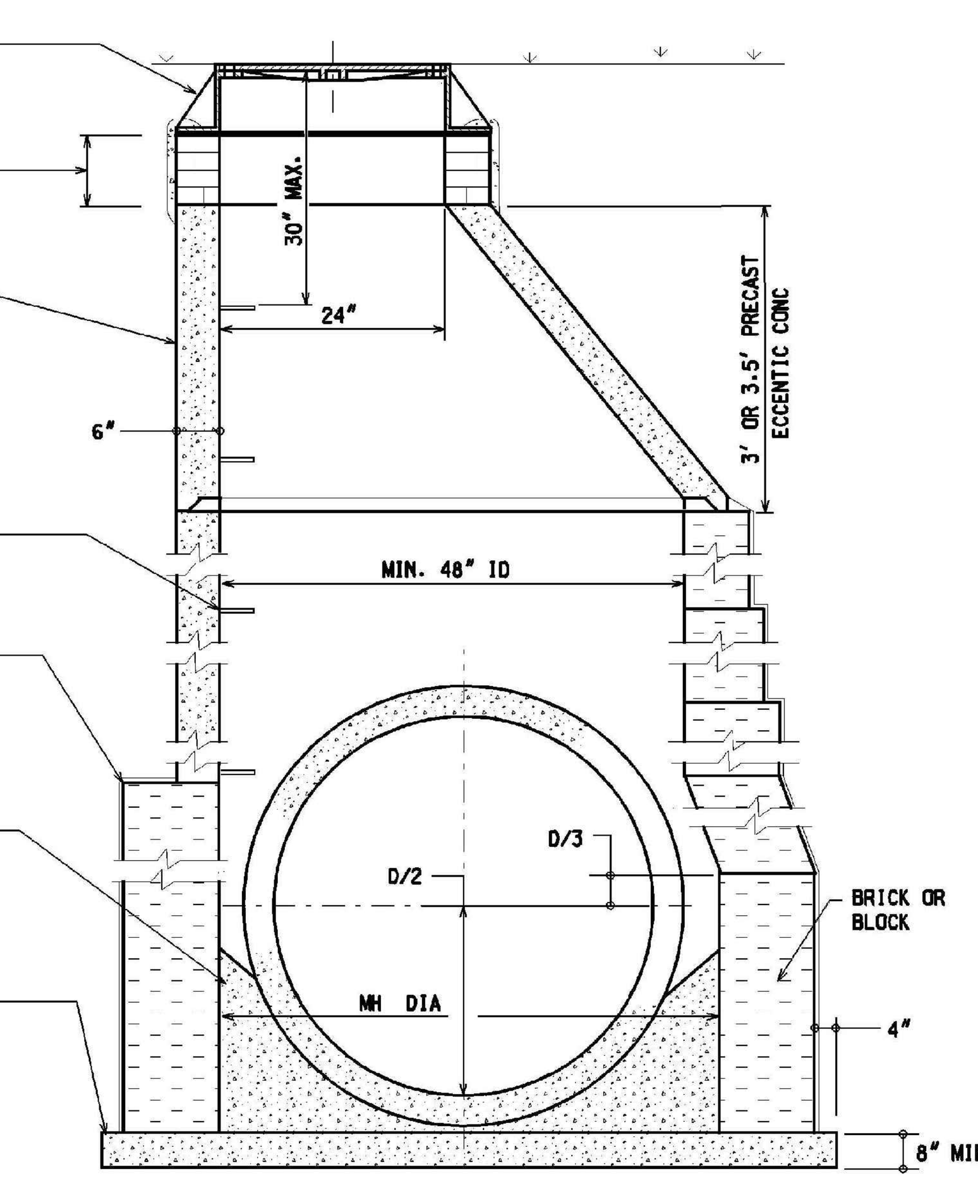


END SECTION AND BAR SCREEN DETAIL
INCLUDING RIP-RAP



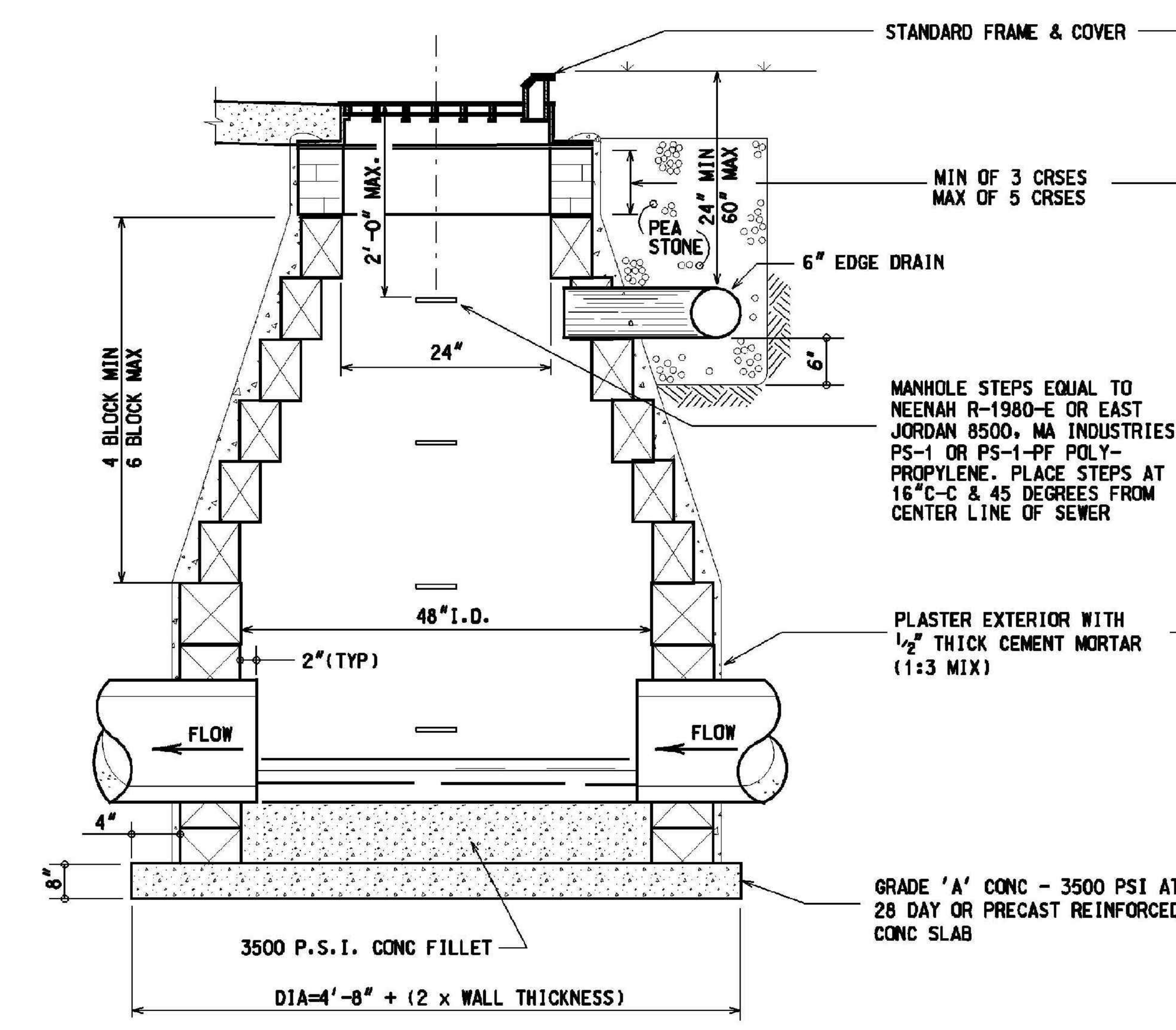
27" & LARGER PIPE SHALL BE POINTED INSIDE

STORM MANHOLE
FOR 42" PIPE AND SMALLER

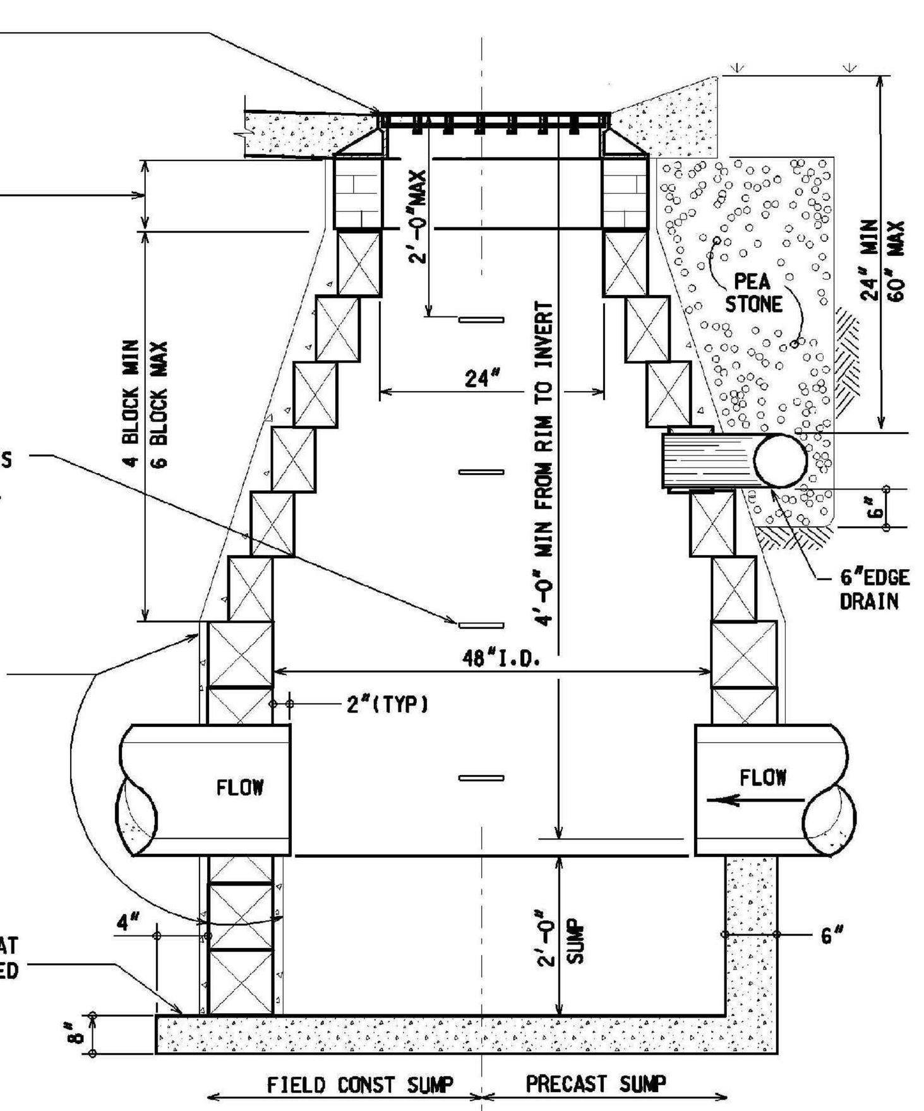


MH DIA	72"	78"	84"	96"	102"	108"	126"
D=SEWER PIPE ID SIZE	48"	54"	60"	66"	72"	84"	96"

STORM MANHOLE
FOR 48" PIPE AND LARGER



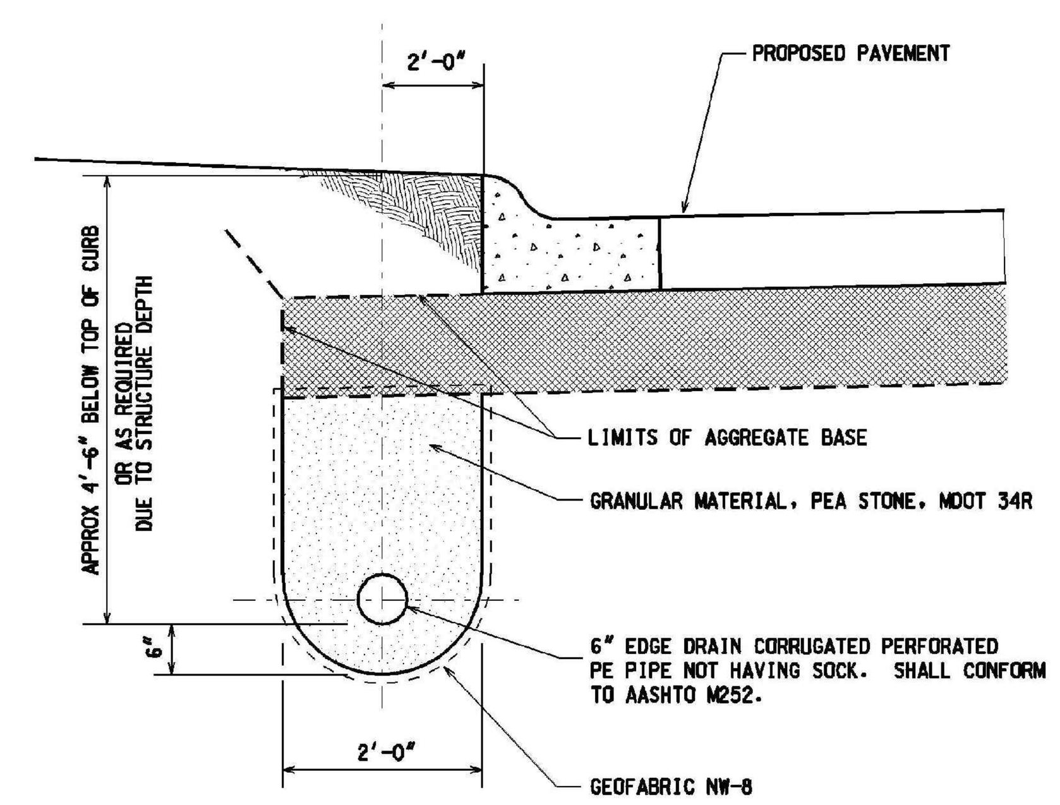
TYPE "A" INLET



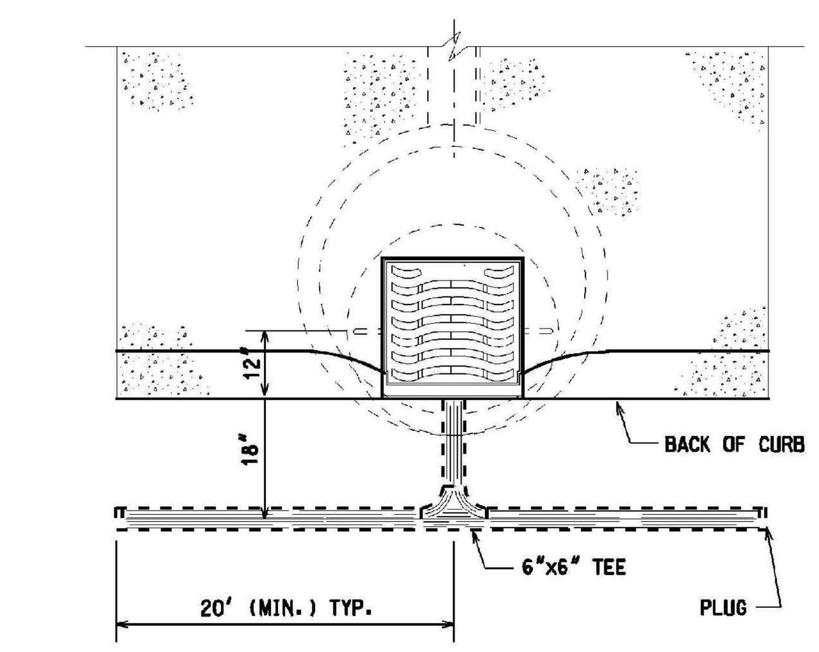
TYPE "B" CATCH BASIN

NOTES:

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT ENGINEERING DESIGN STANDARDS AND SPECIFICATIONS OF HIGHLAND TOWNSHIP.
2. IT SHALL BE THE OWNER'S ENGINEER AND CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES.
3. ALL SEWER TRENCHES UNDER THE 45 DEGREE ZONE OF INFLUENCE LINE OF EXISTING OR PROPOSED PAVEMENTS, BIKE PATHS, SIDEWALKS OR DRIVE APPROACHES SHALL BE BACKFILLED WITH MDOT CLASS II SAND COMPACTED TO AT LEAST 95% OF MAXIMUM UNIT WEIGHT.
4. ALL STORM SEWER SHALL BE INSTALLED ON CLASS "B" BEDDING OR BETTER.
5. JOINTS FOR STORM SEWER SHALL BE PREMIUM JOINTS (TONGUE AND GROOVE WITH RUBBER GASKETS).
6. LEAD MATERIAL SHALL BE 4" DIA. (MIN.) PVC SCHEDULE 40 OR SDR 23.5. LEAD CONNECTIONS MAY ONLY BE AT STRUCTURES.
7. CONTACT THE TOWNSHIP ENGINEER 48 HOURS PRIOR TO STORM SEWER INSTALLATION TO SCHEDULE OBSERVATION. FULL TIME OBSERVATION IS REQUIRED FOR ALL UNDERGROUND STORM SEWER AND LEACHING SYSTEM CONSTRUCTION. CONTACT MICHAEL DARGA WITH HUBBELL, ROTH & CLARK, INC. 248-454-6532.
8. BEFORE YOU DIG CALL MISS DIG AT 1-800-482-7171.
9. ALL MORTAR AND CONCRETE WORK SHALL BE PROTECTED FROM FREEZING (40° F. AND FALLING) FOR A MINIMUM OF 48 HOURS.
10. PIPE FOR STORM SEWERS WITHIN THE PUBLIC ROAD RIGHT-OF-WAY OR PRIVATE ROAD EASEMENT SHALL BE RCP, C-76, CLASS IV OR V RCP.
11. DOUBLE WALLED HDPE MEETING THE REQUIREMENTS OF ASTM F2306.



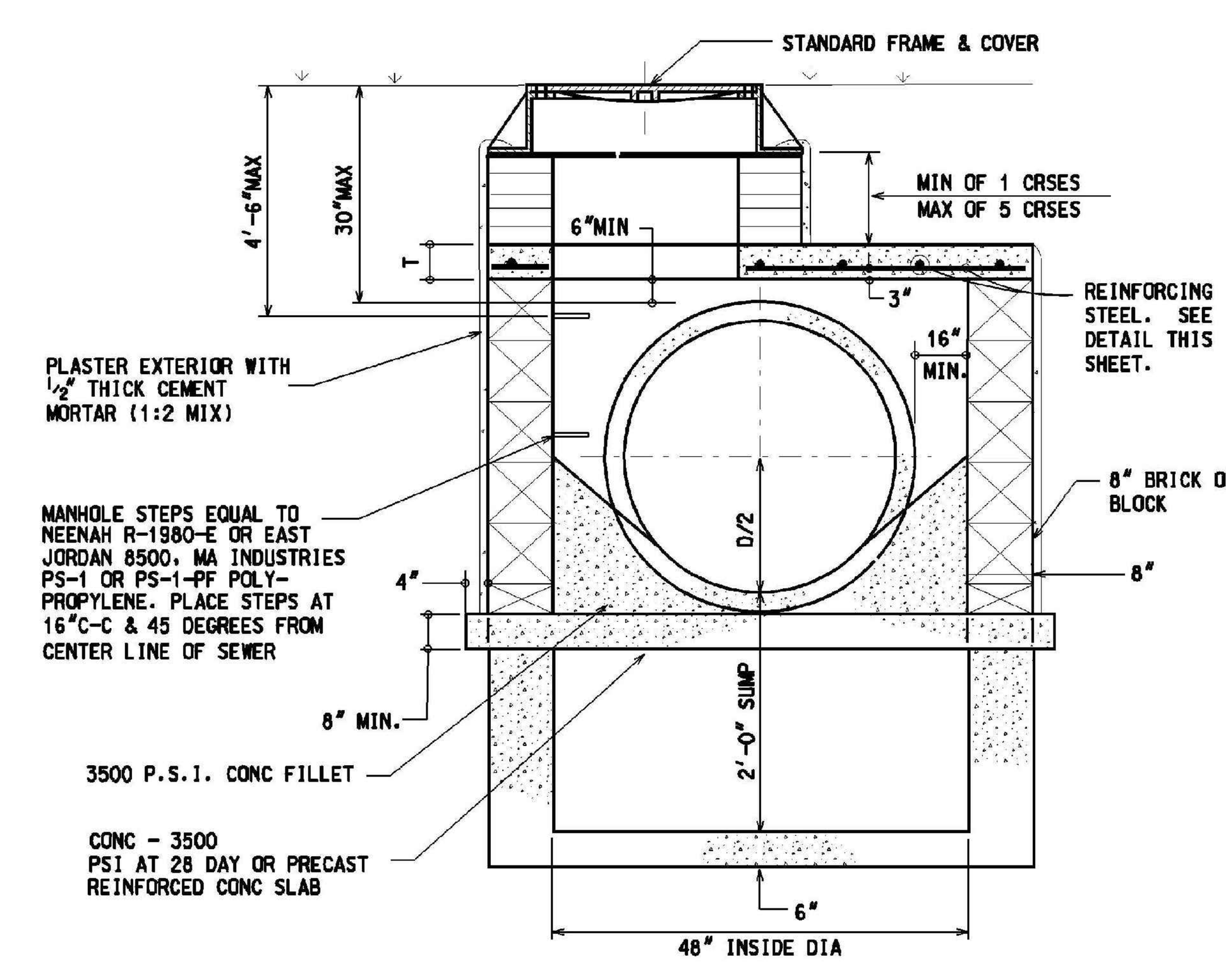
EDGE DRAIN DETAIL



NOTES:

1. LENGTH OF 6" EDGE DRAIN TO BE DETERMINED BY THE TOWNSHIP.
2. EDGE DRAIN SHALL BE INSTALLED AT ALL CATCH BASINS & INLETS WITHIN LIMITS OF PAVEMENT OF A ROADWAY. 20' (MIN.) IN EACH DIRECTION.

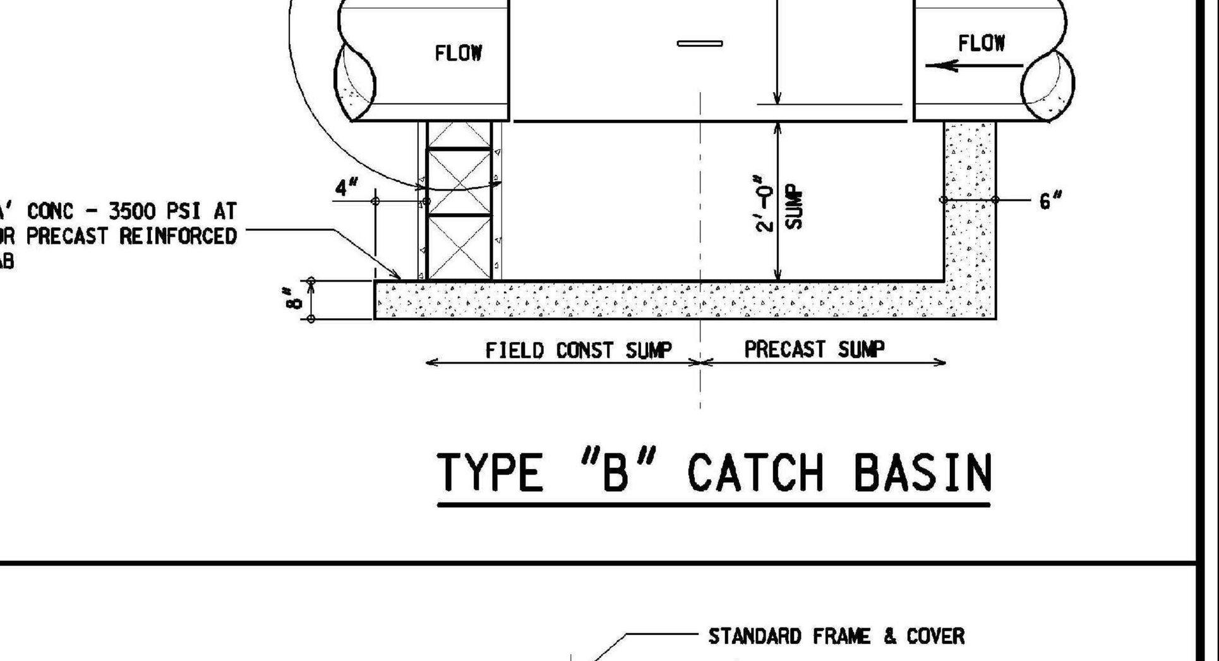
6" EDGE DRAIN



LOW-HEAD STORM
SEWER STRUCTURE

HRC
Hubbell, Roth & Clark, Inc.
CONSULTING ENGINEERS
105 W. GRAND RIVER AVE.
HOWELL, MICHIGAN 48843
PHONE: (248) 454-6300
DIRECT PHONE: (517) 552-9199
FAX: (517) 552-6099
WEB SITE: http://www.hrc-engr.com

DATE	ADDITIONS AND/OR REVISIONS
DESIGNED	M.P.D.
DRAWN	T.E.W.
CHECKED	J.B.
APPROVED	G.E.H.

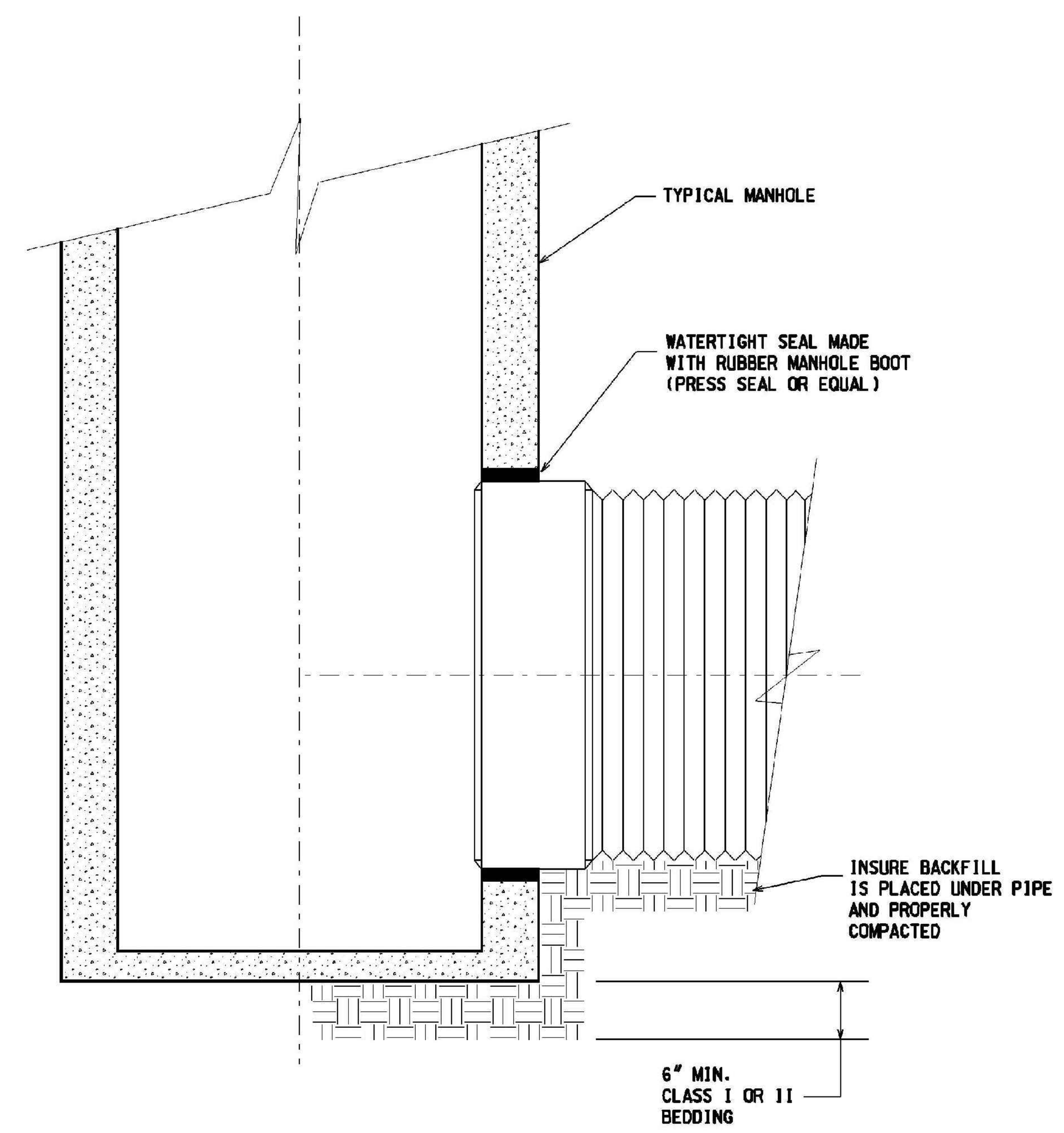


HIGHLAND TOWNSHIP

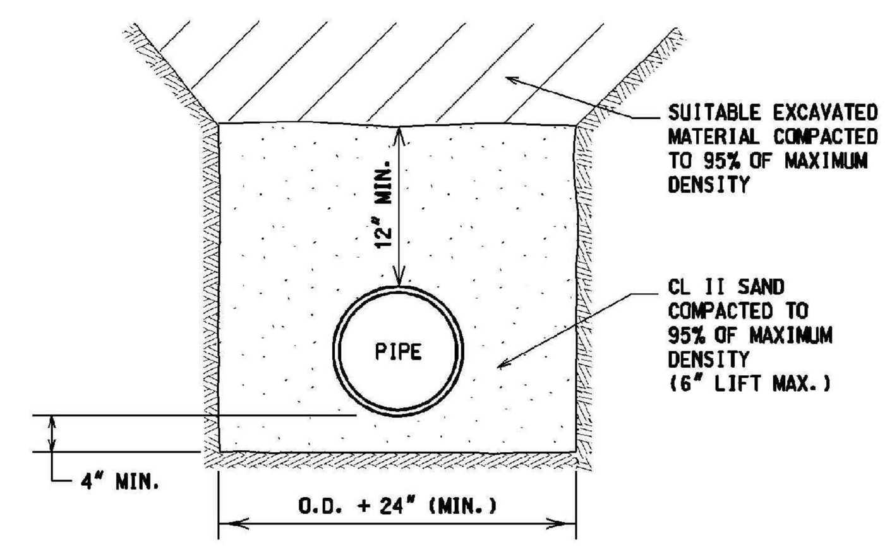
HIGHLAND TOWNSHIP DESIGN STANDARDS

STORM SEWER DETAILS

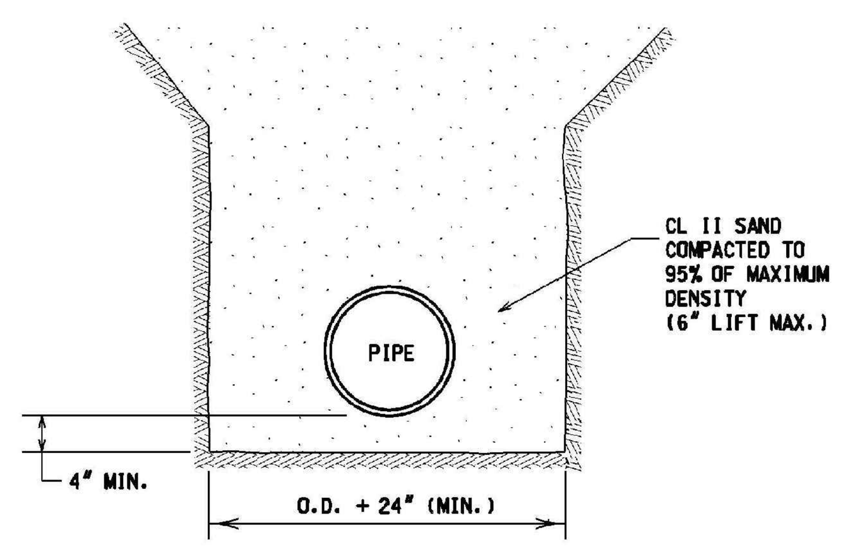
HRC JOB NO.	SCALE
20050368	NONE
DATE SEPTEMBER 2005	SHEET NO. 1 OF 2



WATERTIGHT MANHOLE CONNECTION
HDPE TO CONCRETE DETAIL

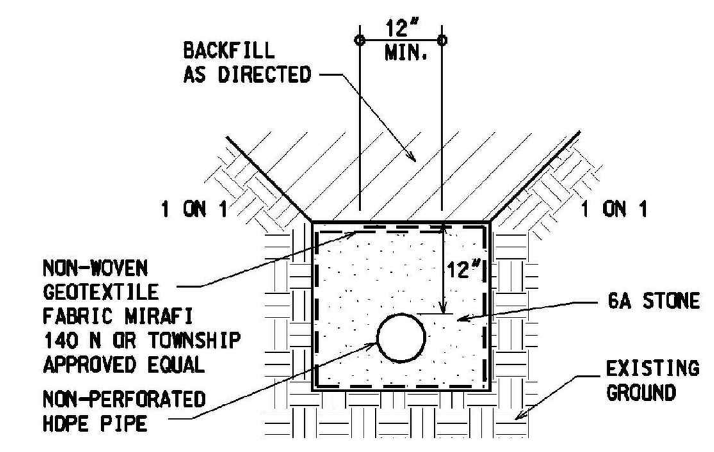


BEDDING DETAIL - TRENCH B

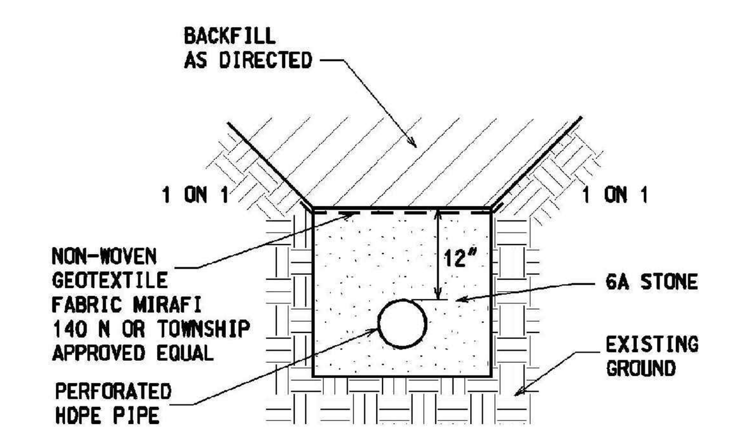


BEDDING DETAIL - TRENCH A

(REQUIRED FOR INSTALLATION UNDER PAVEMENT OR WITHIN THE INFLUENCE OF ROAD BED.)



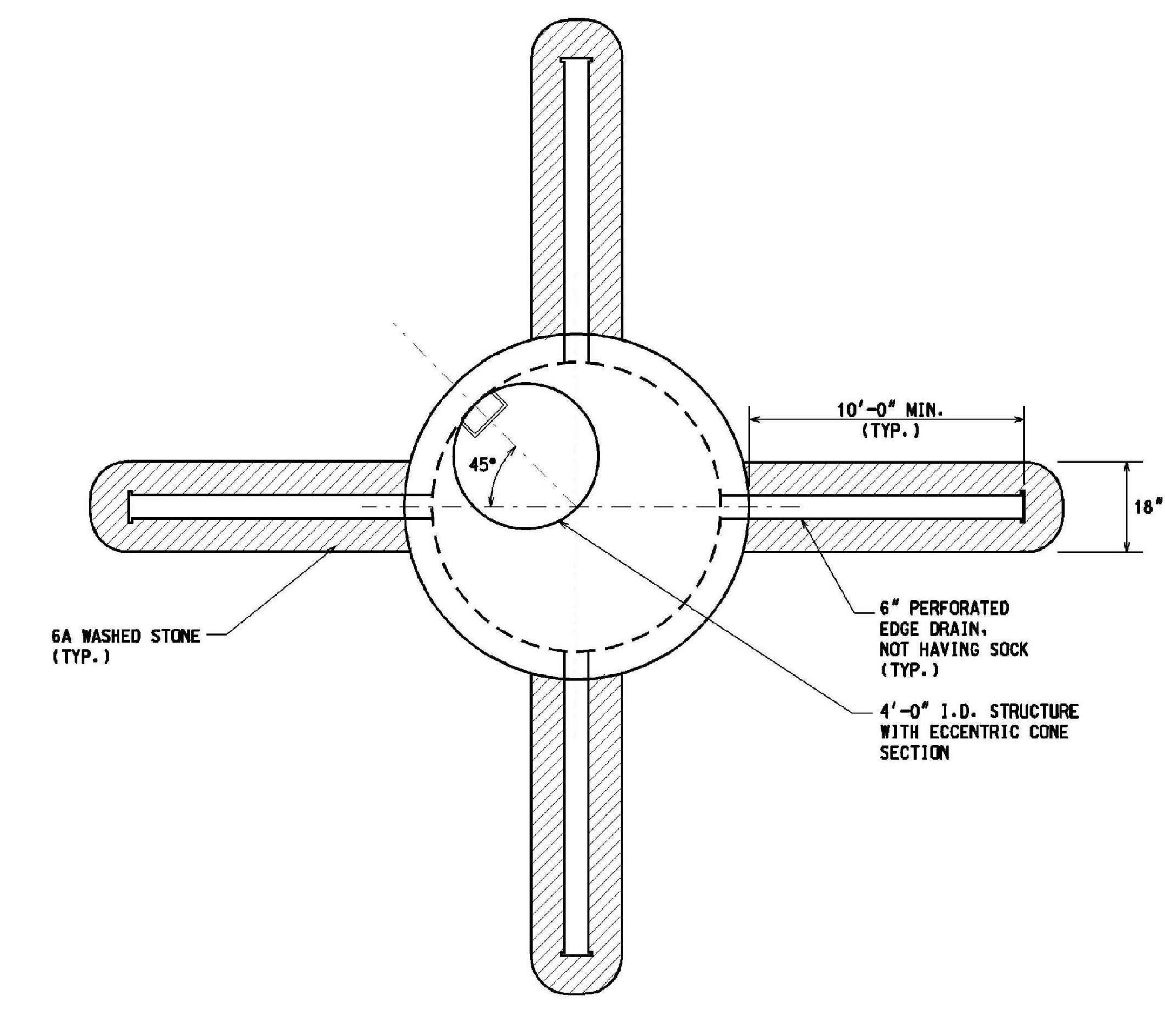
HDPE PIPE TRENCH DETAIL
FOR DETENTION SYSTEMS
WITHOUT GROUNDWATER
RECHARGE



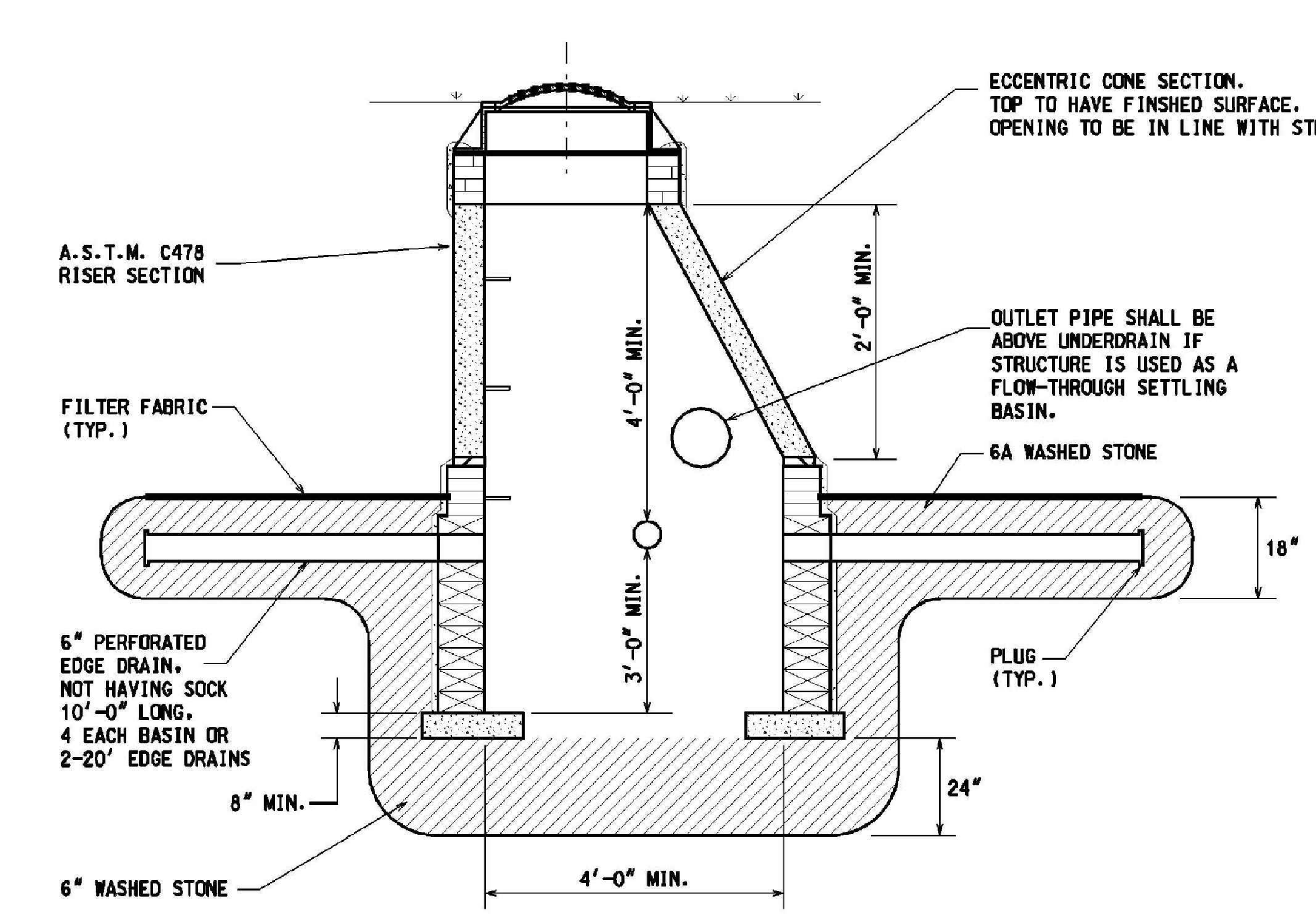
HDPE PIPE TRENCH DETAIL
FOR DETENTION/RETENTION SYSTEMS
WITH GROUNDWATER
RECHARGE

NOTES:

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT ENGINEERING DESIGN STANDARDS AND SPECIFICATIONS OF HIGHLAND TOWNSHIP.
2. IT SHALL BE THE OWNER'S ENGINEER AND CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES.
3. ALL SEWER TRENCHES UNDER THE 45 DEGREE ZONE OF INFLUENCE LINE OF EXISTING OR PROPOSED PAVEMENTS, BIKE PATHS, SIDEWALKS OR DRIVE APPROACHES SHALL BE BACKFILLED WITH MDOT CLASS II SAND COMPACTED TO AT LEAST 95% OF MAXIMUM UNIT WEIGHT.
4. ALL STORM SEWER SHALL BE INSTALLED ON CLASS "B" BEDDING OR BETTER.
5. JOINTS FOR STORM SEWER SHALL BE PREMIUM JOINTS (TONGUE AND GROOVE WITH RUBBER GASKETS).
6. LEAD MATERIAL SHALL BE 4" DIA. (MIN.) PVC SCHEDULE 40 OR SDR 23.5. LEAD CONNECTIONS MAY ONLY BE AT STRUCTURES.
7. CONTACT THE TOWNSHIP ENGINEER 48 HOURS PRIOR TO STORM SEWER INSTALLATION TO SCHEDULE OBSERVATION. FULL TIME OBSERVATION IS REQUIRED FOR ALL UNDERGROUND STORM SEWER AND LEACHING SYSTEM CONSTRUCTION. CONTACT MICHAEL DARGA WITH HUBBELL, ROTH & CLARK, INC. 248-454-6532.
8. BEFORE YOU DIG CALL MISS DIG AT 1-800-482-7171.
9. ALL MORTAR AND CONCRETE WORK SHALL BE PROTECTED FROM FREEZING (40° F. AND FALLING) FOR A MINIMUM OF 48 HOURS.
10. PIPE FOR STORM SEWERS WITHIN THE PUBLIC ROAD RIGHT-OF-WAY OR PRIVATE ROAD EASEMENT SHALL BE RCP, C-76, CLASS IV OR V RCP.
11. DOUBLE WALLED HDPE MEETING THE REQUIREMENTS OF ASTM F2306.

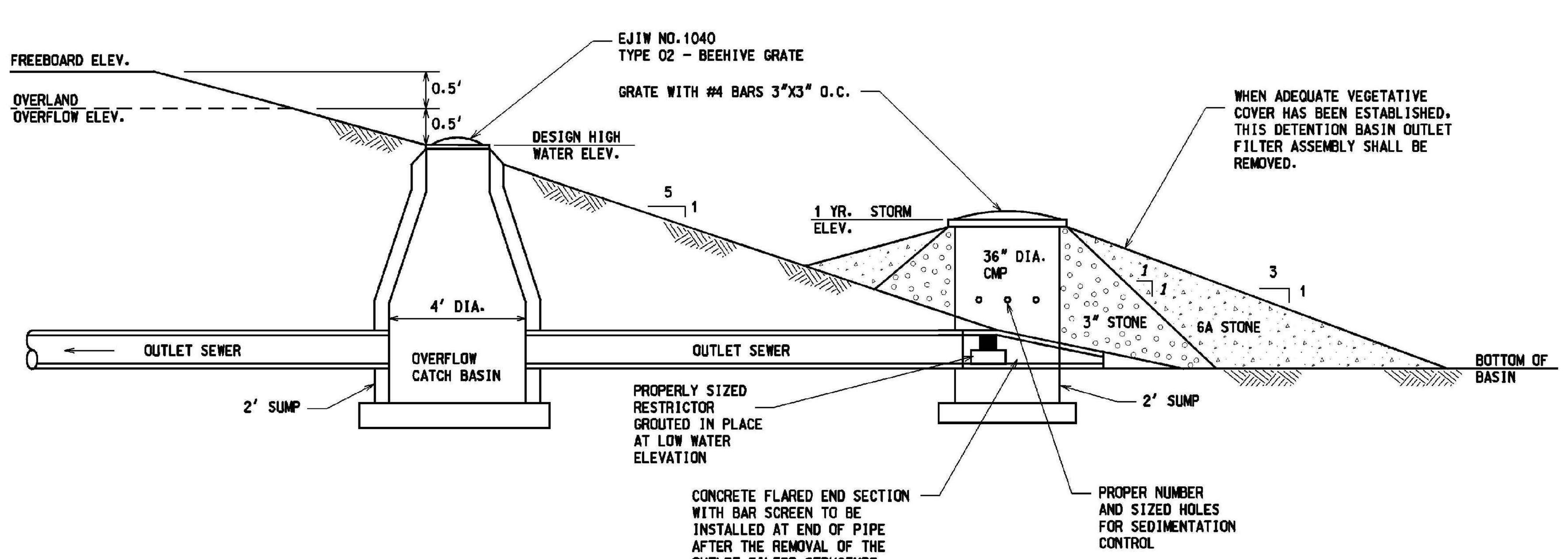


PLAN VIEW



SECTION

STANDARD LEACHING BASIN

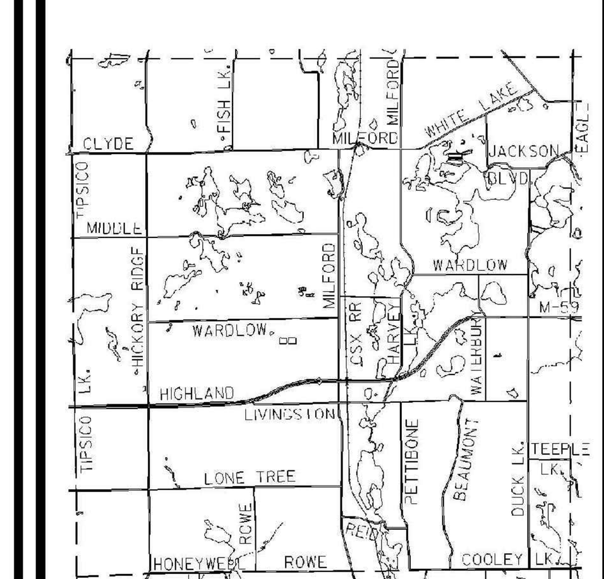


DETENTION POND OUTLET STRUCTURE DETAIL

HRC
Hubbell, Roth & Clark, Inc.
CONSULTING ENGINEERS

105 W. GRAND RIVER AVE.
HOWELL, MICHIGAN 48843
PHONE: (248) 454-6300
DIRECT PHONE: (517) 552-9199
FAX: (517) 552-6099
WEB SITE: http://www.hrc-engr.com

DATE	ADDITIONS AND/OR REVISIONS
DESIGNED	M.P.D.
DRAWN	T.E.W.
CHECKED	J.B.
APPROVED	G.E.H.

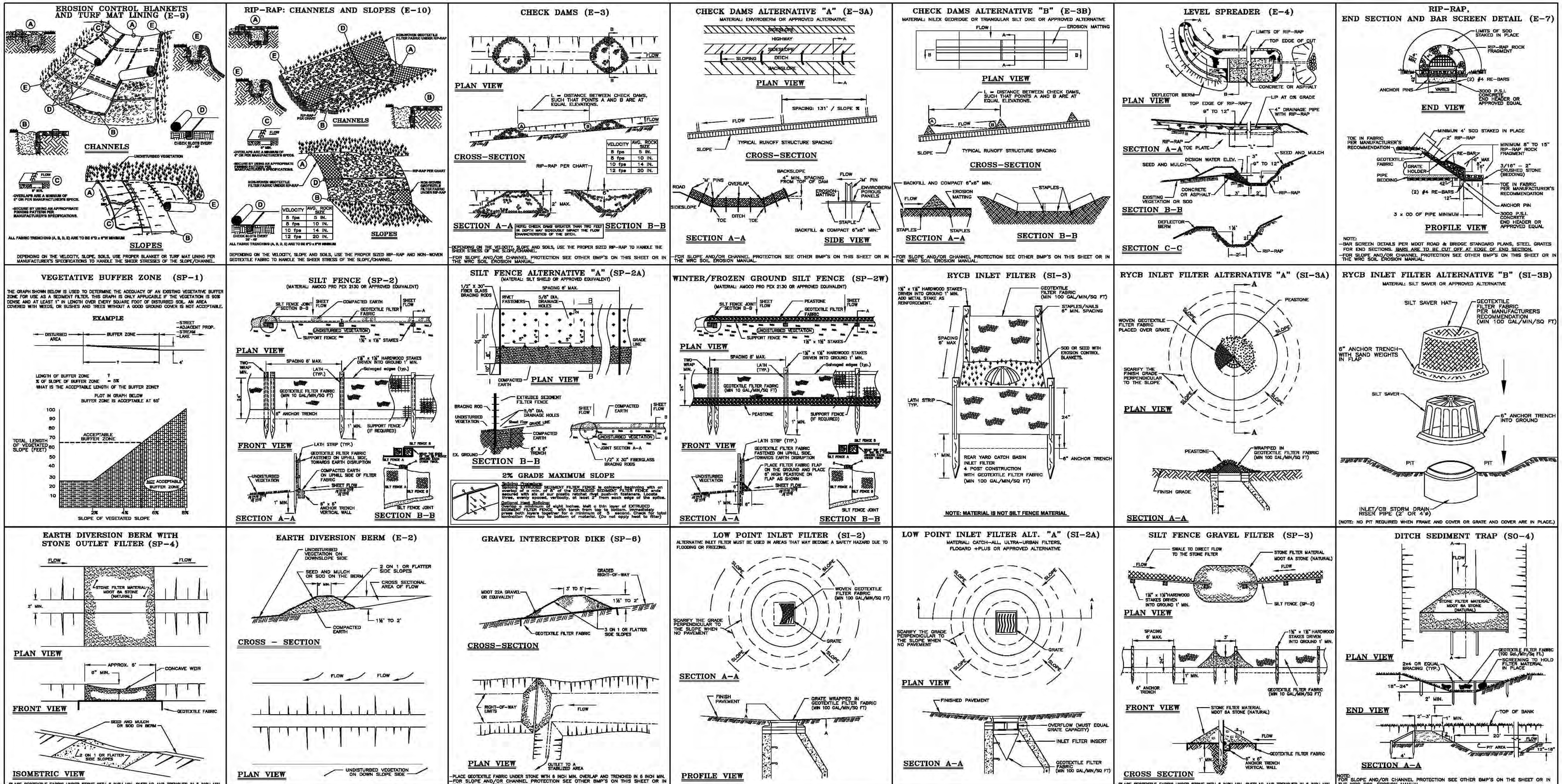


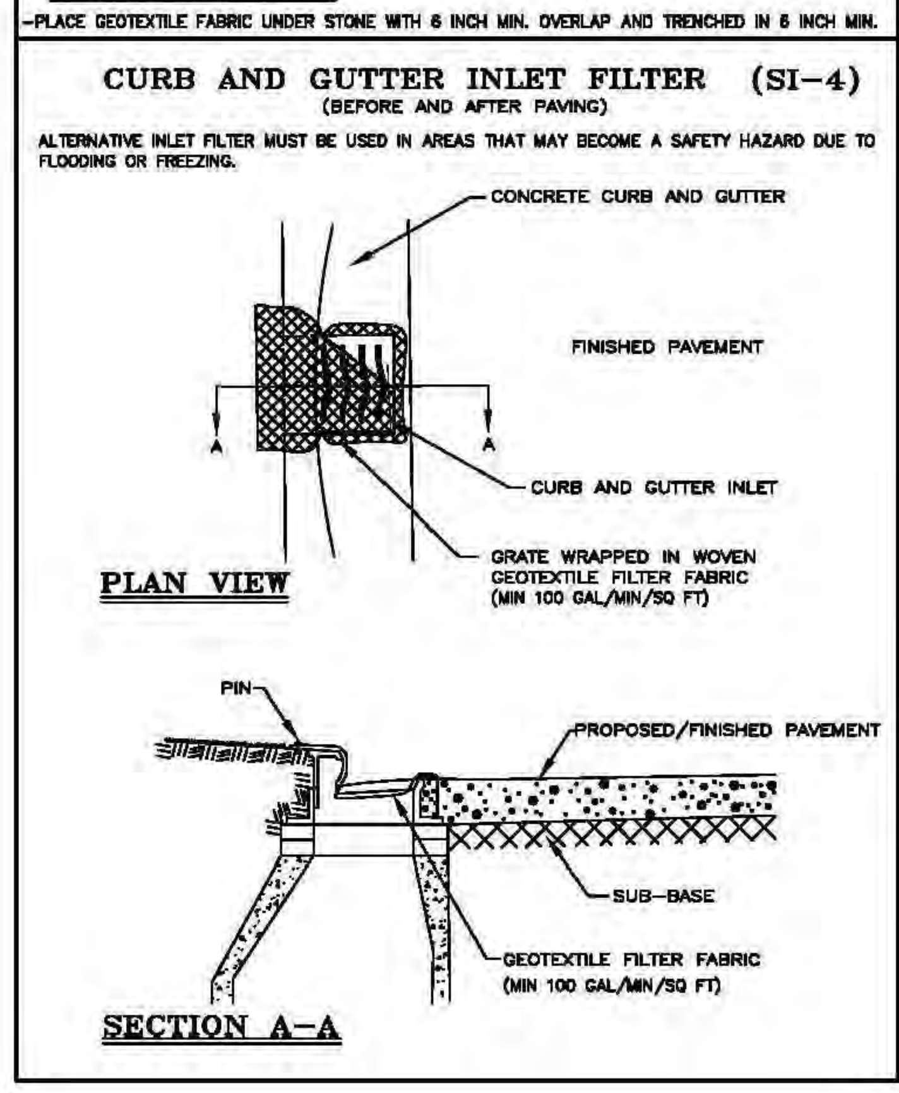
HIGHLAND TOWNSHIP

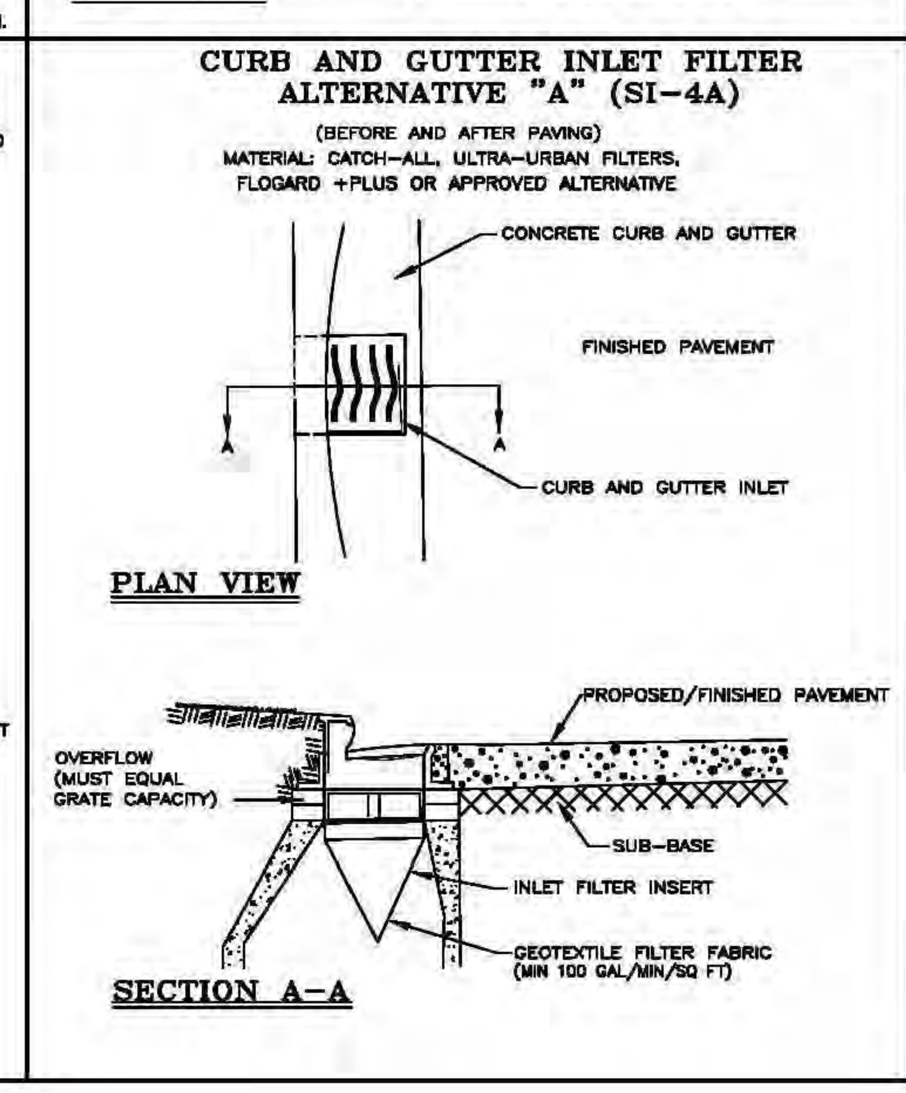
HIGHLAND TOWNSHIP
DESIGN STANDARDS

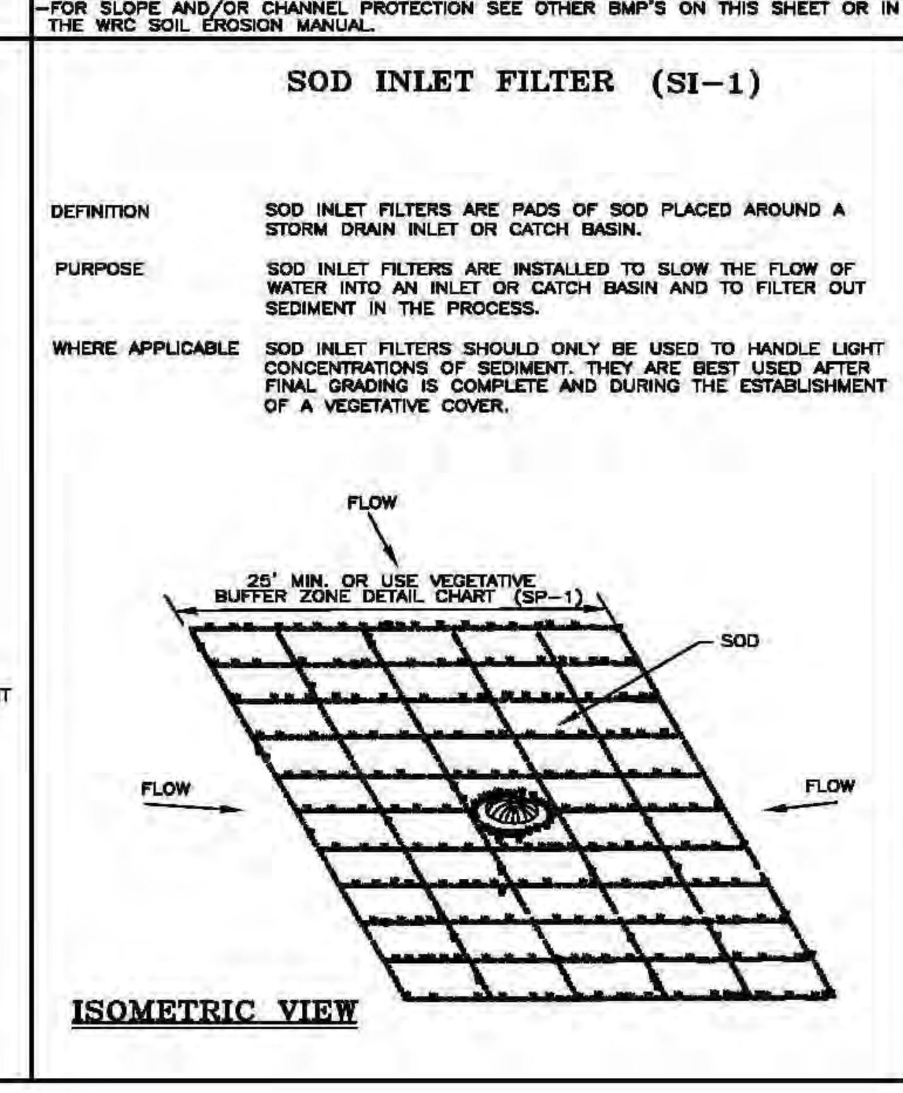
STORM SEWER DETAILS

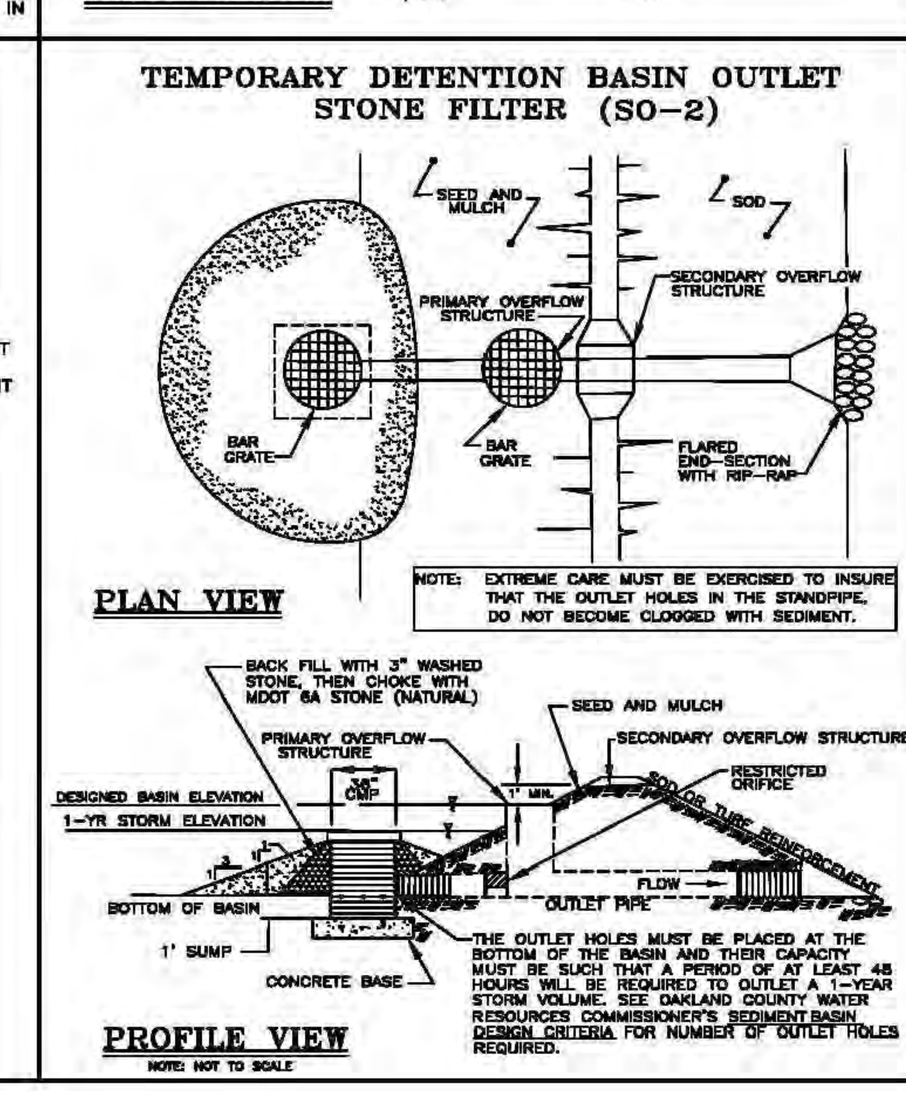
HRC JOB NO.	SCALE
20050368	NONE
DATE SEPTEMBER 2005	SHEET NO. 2 OF 2

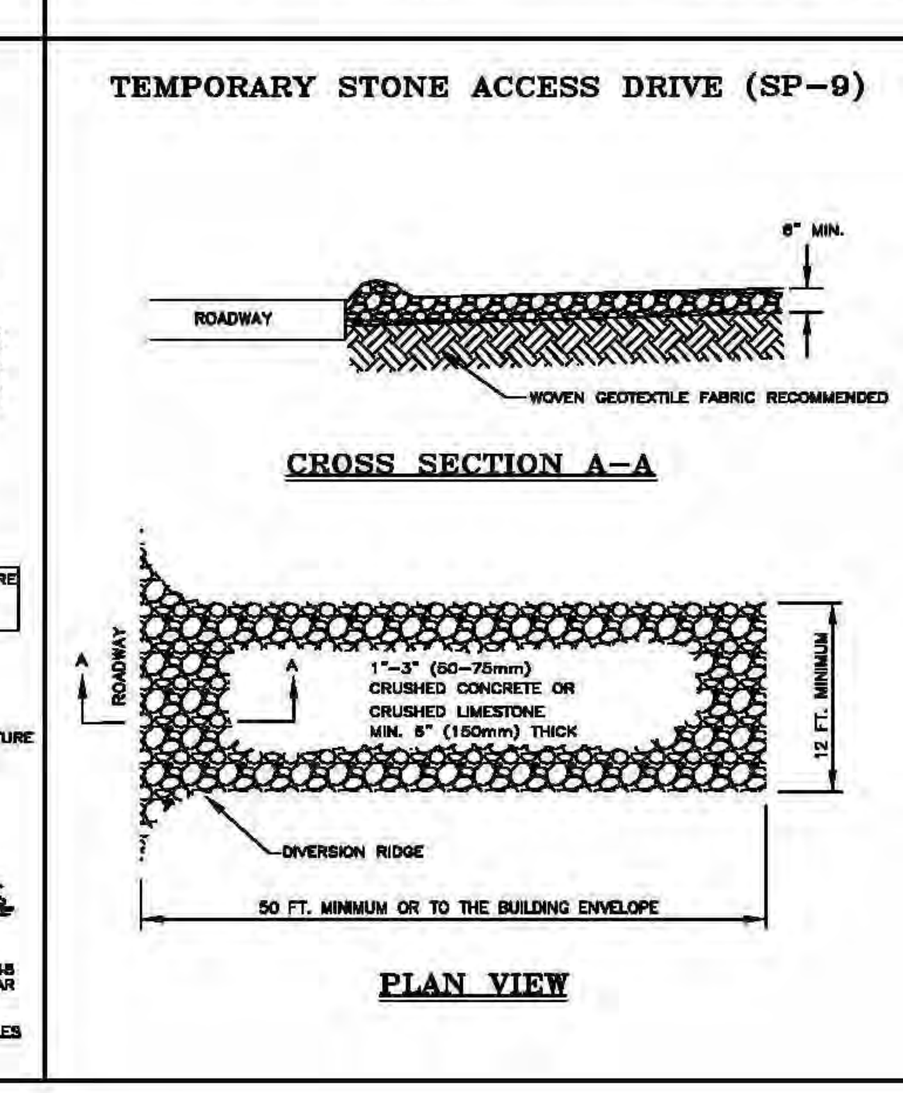

EROSION CONTROL BLANKETS AND TURF MAT LINING (E-9)
CHANNELS
SLOPES
DEPENDING ON THE VELOCITY, SLOPE, SOILS, USE PROPER BLANKET OR TURF MAT LINING PER MANUFACTURER'S SPECIFICATIONS TO HANDLE THE SHEER STRESS OF THE SLOPE/CHANNEL.
RIP-RAP: CHANNELS AND SLOPES (E-10)
CHANNELS
SLOPES
VELOCITY
AVG. ROCK SIZE
5 fps
5 IN.
8 fps
10 IN.
10 fps
14 IN.
12 fps
20 IN.
DEPENDING ON THE VELOCITY, SLOPE AND SOILS, USE THE PROPER SIZED RIP-RAP AND NON-WOVEN GEOTEXTILE FABRIC TO HANDLE THE SHEER STRESS OF THE SLOPE/CHANNEL.
CHECK DAMS (E-3)
PLAN VIEW
CROSS-SECTION
SECTION A-A
SECTION B-B
CHECK DAMS ALTERNATIVE "A" (E-3A)
MATERIAL: ENVIROBERM OR APPROVED ALTERNATIVE
PLAN VIEW
CROSS-SECTION
SECTION A-A
SIDE VIEW
CHECK DAMS ALTERNATIVE "B" (E-3B)
MATERIAL: NILEX GEORIDGE OR TRIANGULAR SILT DIKE OR APPROVED ALTERNATIVE
PLAN VIEW
CROSS-SECTION
SECTION A-A
SECTION B-B
FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.
LEVEL SPREADER (E-4)
PLAN VIEW
SECTION A-A
SECTION B-B
SECTION C-C
RIP-RAP, END SECTION AND BAR SCREEN DETAIL (E-7)
END VIEW
PROFILE VIEW
VEGETATIVE BUFFER ZONE (SP-1)
EXAMPLE
SLOPE OF VEGETATED SLOPE
SILT FENCE (SP-2)
(MATERIAL: AMOCO PRO PEX 2130 OR APPROVED EQUIVALENT)
PLAN VIEW
FRONT VIEW
SECTION A-A
SECTION B-B
SILT FENCE ALTERNATIVE "A" (SP-2A)
(MATERIAL: SILT SHIELD OR APPROVED EQUIVALENT)
PLAN VIEW
SECTION B-B
2% GRADE MAXIMUM SLOPE
WINTER/FROZEN GROUND SILT FENCE (SP-2W)
(MATERIAL: AMOCO PRO PEX 2130 OR APPROVED EQUIVALENT)
PLAN VIEW
FRONT VIEW
SECTION A-A
SECTION B-B
RYCB INLET FILTER (SI-3)
NOTE: MATERIAL IS NOT SILT FENCE MATERIAL
RYCB INLET FILTER ALTERNATIVE "A" (SI-3A)
PLAN VIEW
SECTION A-A
RYCB INLET FILTER ALTERNATIVE "B" (SI-3B)
MATERIAL: SILT SAVER OR APPROVED ALTERNATIVE
EARTH DIVERSION BERM WITH STONE OUTLET FILTER (SP-4)
PLAN VIEW
FRONT VIEW
ISOMETRIC VIEW
EARTH DIVERSION BERM (E-2)
CROSS - SECTION
PLAN VIEW
GRAVEL INTERCEPTOR DIKE (SP-6)
CROSS-SECTION
PLAN VIEW
LOW POINT INLET FILTER (SI-2)
SECTION A-A
PROFILE VIEW
LOW POINT INLET FILTER ALT. "A" (SI-2A)
MATERIAL: CATCH-ALL, ULTRA-URBAN FILTERS, FLOGARD +PLUS OR APPROVED ALTERNATIVE
PLAN VIEW
SECTION A-A
SILT FENCE GRAVEL FILTER (SP-3)
PLAN VIEW
FRONT VIEW
CROSS SECTION
DITCH SEDIMENT TRAP (SO-4)
PLAN VIEW
END VIEW
SECTION A-A
NOTE:
FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THE SHEET OR IN THE WRC SOIL EROSION MANUAL.

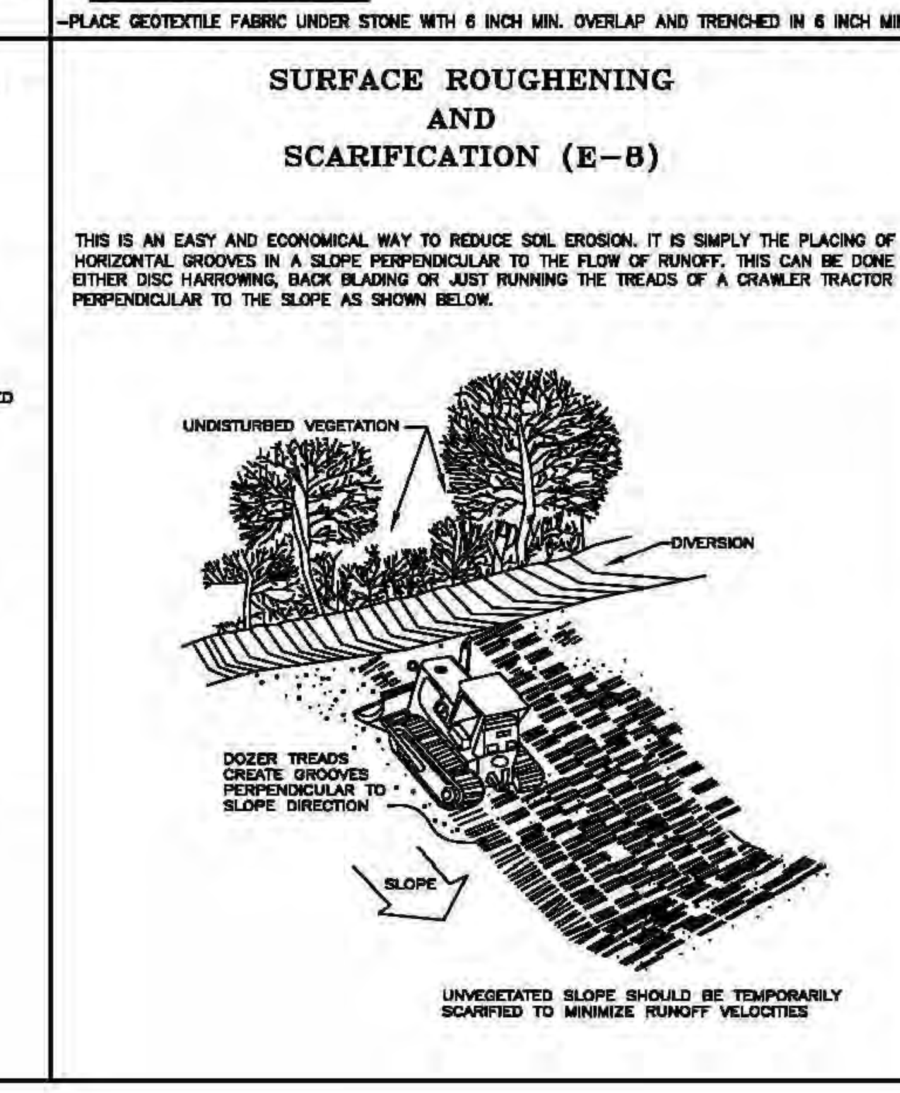





SOD INLET FILTER (SI-1)
DEFINITION
SOD INLET FILTERS ARE PADS OF SOD PLACED AROUND A STORM DRAIN INLET OR CATCH BASIN.
PURPOSE
SOD INLET FILTERS ARE INSTALLED TO SLOW THE FLOW OF WATER INTO AN INLET OR CATCH BASIN AND TO FILTER OUT SEDIMENT IN THE PROCESS.
WHERE APPLICABLE
SOD INLET FILTERS SHOULD ONLY 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.
ISOMETRIC VIEW







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

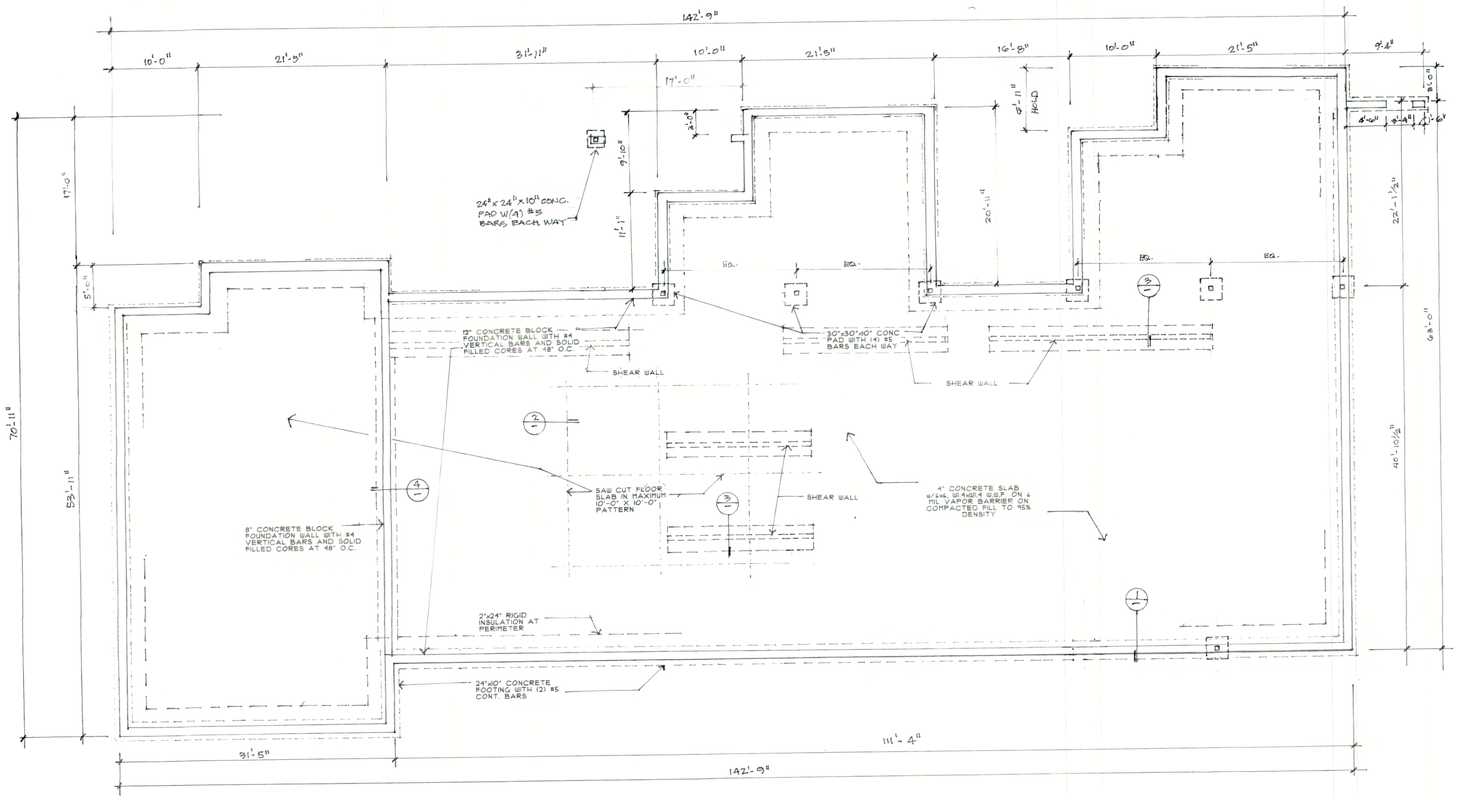
Rev. No.:	Rev. By:	Rev. Date:	Description:
1	lz	3-22-07	PROPOSED DETAIL EDITS
2	lz	2-28-09	STANDARDS COMMITTEE APPROVAL / NAME CHANGES
3	DS	3-28-11	SILT FENCE ALTERNATIVE "A" DETAIL (SP-2A) ADDED
4	DS	4-16-13	STANDARDS COMMITTEE APPROVAL / NOTE CHANGES

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
WATERFORD, MICHIGAN
48328-1907

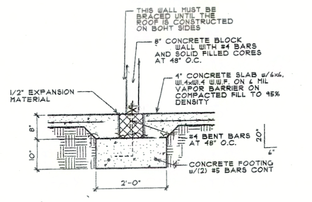
SHEET NO.: 1 of 1



FOUNDATION PLAN

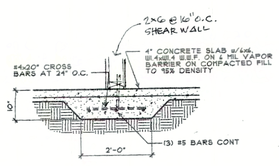
SCALE: 1/8" = 1'-0"

NORTH



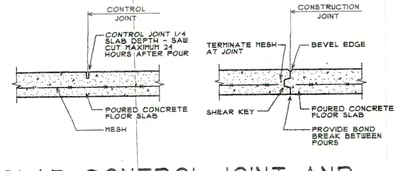
FOUNDATION DETAIL 4

SCALE: 1/2" = 1'-0"



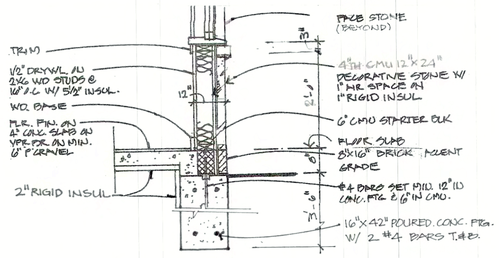
FOUNDATION DETAIL 3

SCALE: 1/2" = 1'-0"



SLAB CONTROL JOINT AND CONSTRUCTION JOINT DETAIL 2

SCALE: NONE



DET. @ ALT. TRENCH FTG. 1

SCALE: 1/2" = 1'-0"

CONCRETE NOTES:

1. ALL READY MIX CONCRETE SHALL CONFORM TO A.S.T.M. C 94.
2. MEASURING, MIXING, TRANSPORTING, AND PLACING OF ALL CONCRETE SHALL COMPLY W/ ACI 304R-00
3. ALL REINFORCING BARS, DOWELS, ANCHOR BOLTS AND ANY INSERTS SHALL BE SECURED IN POSITION PRIOR TO PLACING OF CONCRETE.
4. AIR ENTRAINED CONCRETE SHALL BE USED FOR ALL SIDEWALKS, PAVING, STAIRTREADS, CURBS, AND ALL CONCRETE ELEMENTS EXPOSED TO THE WEATHER.
5. ALL CONCRETE SHALL DEVELOP THE FOLLOWING COMPRESSIVE STRENGTHS AT 28 DAYS (U.N.O.)

INTERIOR CONCRETE SLABS	= 4000 PSI
EXTERIOR CONCRETE SLABS	= 4000 PSI
FOOTINGS AND FOUNDATION WALLS	= 3000 PSI

6. LOCATE ALL SLEEVES, OPENINGS, EMBEDDED ITEMS, ETC., WHICH ARE INDICATED ON ALL DESIGN DRAWINGS. CHECK WITH ALL TRADES TO VERIFY THAT ALL SLEEVES, OPENINGS, AND EMBEDDED ITEMS ARE IN PLACE AND LOCATED CORRECTLY PRIOR TO PLACING THE ADJACENT CONCRETE.
7. THE SURFACE OF ALL CONSTRUCTION JOINTS SHALL BE CLEANED TO REMOVE ALL DUST, CHIPS, OR OTHER FOREIGN MATTER PRIOR TO PLACING THE ADJACENT CONCRETE
8. ALL SLABS SHALL BE CURED AND SEALED TO MINIMIZE SHRINKAGE CRACKING.
9. REFER TO ARCHITECTURAL DRAWINGS FOR MOLDS, GROOVES, ORNAMENTS, OR ACCESSORIES REQUIRED TO BE CAST IN CONCRETE AND FOR LOCATIONS OF FLOOR FINISHES AND SLAB DEPRESSIONS
10. PIPE MAY PASS THROUGH STRUCTURAL CONCRETE IN SLEEVES, BUT SHALL NOT BE EMBEDDED THEREIN. SLEEVES SHALL BE WRAPPED WITH EXPANSION JOINT FILLER MATERIAL TO ALLOW CONCRETE TO CURE WITHOUT RESTRAINT. PIPES OR CONDUITS EXCEEDING ONE THIRD THE SLAB OR WALL THICKNESS SHALL NOT BE IN STRUCTURAL CONCRETE UNLESS SPECIFICALLY DETAILED. SEE MECHANICAL AND/OR ELECTRICAL DRAWINGS FOR LOCATIONS OF SLEEVES, ACCESSORIES, ETC.
11. SLAB SURFACES SHALL BE SMOOTH AND LEVEL, OR SHALL HAVE SMOOTH EVEN SLOPE. CONCRETE FINISH SHALL BE SMOOTH FOR INTERIOR FLOOR SLABS AND BROOMED FOR EXTERIOR WALKS.
12. DURING COLD WEATHER MONTHS, ALL CONCRETE SHALL COMPLY W/ ACI COLD WEATHER CONCRETING, ACI 306R-88. PER ACI, COLD WEATHER IS DEFINED AS A PERIOD WHEN, FOR MORE THAN (3) CONSECUTIVE DAYS, THE FOLLOWING CONDITIONS MUST EXIST:
   1) THE AVERAGE DAILY AIR TEMP IS LESS THAN 40 F, AND
   2) THE AIR TEMP. IS NOT GREATER THAN 50 F FOR MORE THAN 50 F THAN ONE-HALF OF ANY (24)-HR PERIOD.
13. DURING WARM WEATHER MONTHS, ALL CONCRETE SHALL COMPLY W/ ACI COLD WEATHER CONCRETING, ACI 305R-99

GENERAL NOTES:

1. FASTENERS AND CONNECTORS, INCLUDING NUTS AND WASHERS, IN CONTACT WITH PRESSERVATIVE TREATED WOOD SHALL BE OF HOT-DIPPED, ZINC COATED GLAVANIZED STEEL
2. CONTINUOUS HORIZONTAL REROD LAP TO BE A MINIMUM OF 24"

SOIL BEARING CAPACITY: 1000 PSF (VERIFY)

AS INDICATED IN THE SOILS REPORT, ALL INTERIOR AND EXTERIOR LOAD-BEARING FOOTINGS SHALL EXTEND THROUGH NON-ENGINEERED FILL SOILS, SOILS CONTAINING A SIGNIFICANT AMOUNT OF ORGANIC SUBSTANCES, OR EXCESSIVELY SOFT SOILS DUE TO GROUND WATER DEWATERING OR OTHER TECHNIQUES THAT BE REQUIRED TO PLACE FOUNDATIONS AT SOME LOCATIONS. ALL ENGINEERED FILL SHALL BE AS INDICATED IN THE SOILS REPORT. IT IS RECOMMENDED THAT A GEOTECHNICAL ENGINEER BE RETAINED TO OBSERVE THE BOTTOMS OF ALL FOOTING EXCAVATIONS PRIOR TO ORDERING THE CONCRETE FOR PLACEMENT SO THEY CAN TEST THE SOILS FOR THE REQUIRED BEARING CAPACITY.

Petkoski Architects

form | space | order

41 Shoreham
Grosse Pointe Shores, MI 48236
tel: 313-930-2030

project

SCHOOL BELL
CHILDCARE
4501 W.
HIGHLAND ROAD
MILFORD, MI 48380

owner

SCHOOL
IN THE PINES INC.

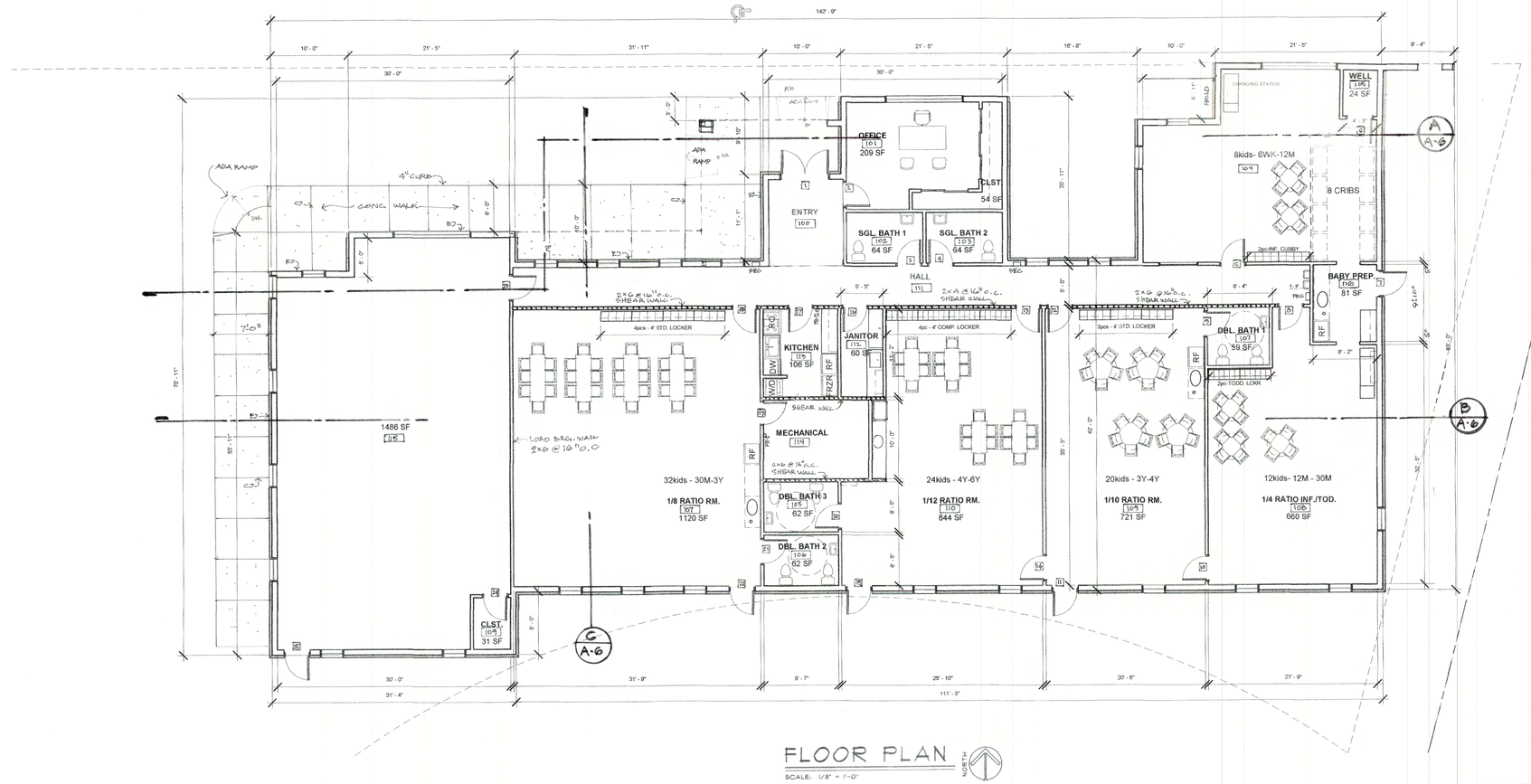
sheet

FOUNDATION
PLAN

issue / revision

Drawn by	JN/BG
Checked by	GP
Date	5-18-2024
Scale	AS NOTED
Project No.	24-010
Sheet No.	A-1

STATE OF MICHIGAN
GEORGE PETKOSKI
ARCHITECT
No. 35174
LICENSED ARCHITECT



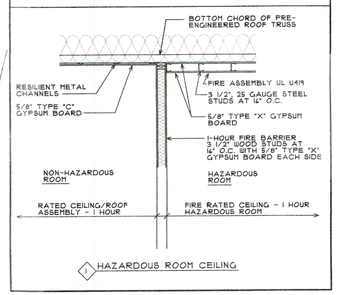
FLOOR PLAN

SCALE: 1/8" = 1'-0"

NORTH

FIRE RATING NOTES:

1. INTERIOR DOORS TO BE RATED PER DOOR SCHEDULE, INTERIOR WINDOWS TO BE RATED PER WINDOW SCHEDULE
2. ALL UL ASSEMBLIES SPECIFIC CONSTRUCTION CRITERIA CAN BE OBTAINED AND PRINTED FROM UL'S WEB SITE.
3. ALL PENETRATIONS SHALL BE SEALED TIGHT WITH AN APPROVED FIRE CAULKING.
4. PROVIDE FIRE DAMPERS AND SMOKE DAMPERS PER MECHANICAL PLAN WHERE INDICATED
5. ALL FIRE RATED AND SMOKE BARRIER WALLS WILL BE MARKED AND LABELED ABOVE THE CEILING AND OR ATTIC, SPACING 30'-0" FOOT INTERVALS AND 15± FEET FROM EACH END OF THE WALL. LETTERING HEIGHT TO BE 3 MINIMUM AND WIDTH OF 3/8 MIN. SUGGESTED WORDING FIRE AND/OR SMOKE BARRIER 4 PROTECT ALL OPENINGS



FIRE EXTINGUISHER LEGEND

- FEC 10# ABC FIRE EXTINGUISHER IN RECESSED CABINET
- FE-1 5# ABC FIRE EXTINGUISHER (MECHANICAL ROOM ONLY)
- FE-2 'K' STYLE FIRE EXTINGUISHER (KITCHEN)

Petkoski Architects

form | space | order

41 Shoreham
Grosse Pointe Shores, MI 48236
tel: 313-930-2030

project

SCHOOL BELL CHILDCARE
4501 W. HIGHLAND ROAD
MILFORD, MI 48380

owner

SCHOOL IN THE PINES INC.

sheet

FLOOR PLAN

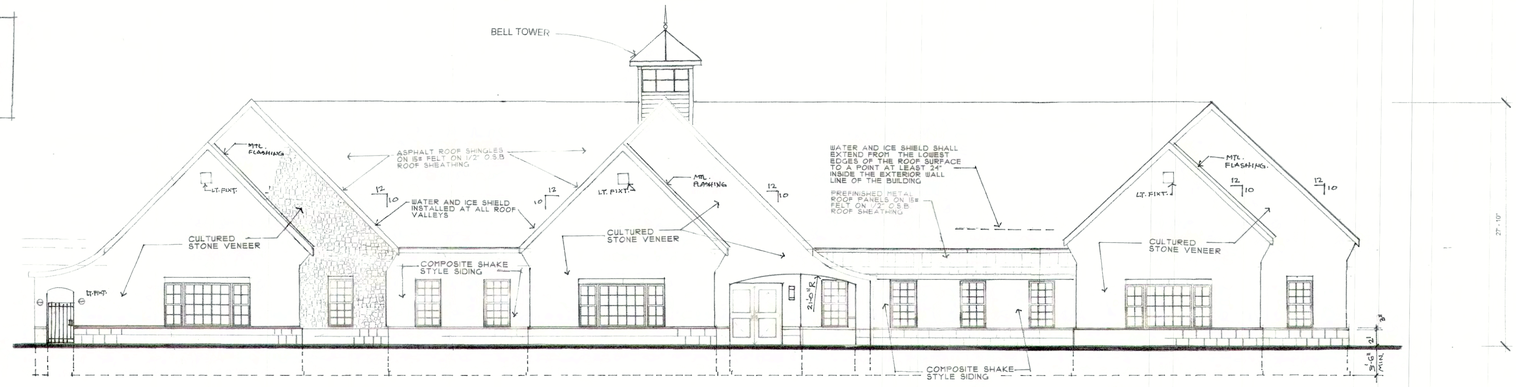
issue / revision

Drawn by	JN/BG
Checked by	GP
Date	5-18-2024
Scale	AS NOTED
Project No.	24-010
Sheet No.	A-2

STATE OF MICHIGAN
GEORGE PETKOSKI
ARCHITECT
No. 35174
LICENSED ARCHITECT

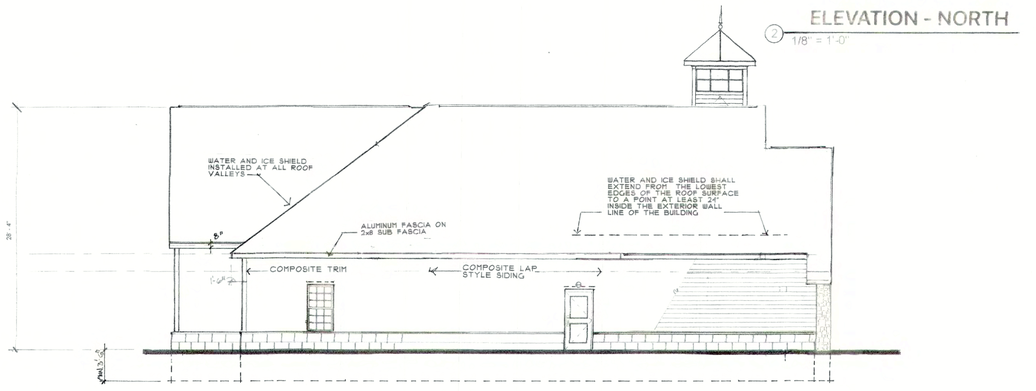
NOTE:

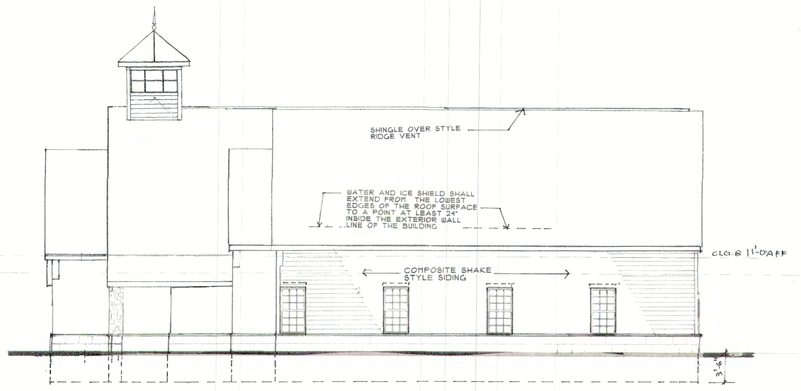
PLUMBING AND HVAC VENTS SHALL BE GROUPED IN ATTIC TO LIMIT THE NUMBER OF ROOF PENETRATIONS. ALL ROOF PENETRATIONS SHALL OCCUR TO THE REAR



ELEVATION - NORTH

2 1/8" = 1'-0"



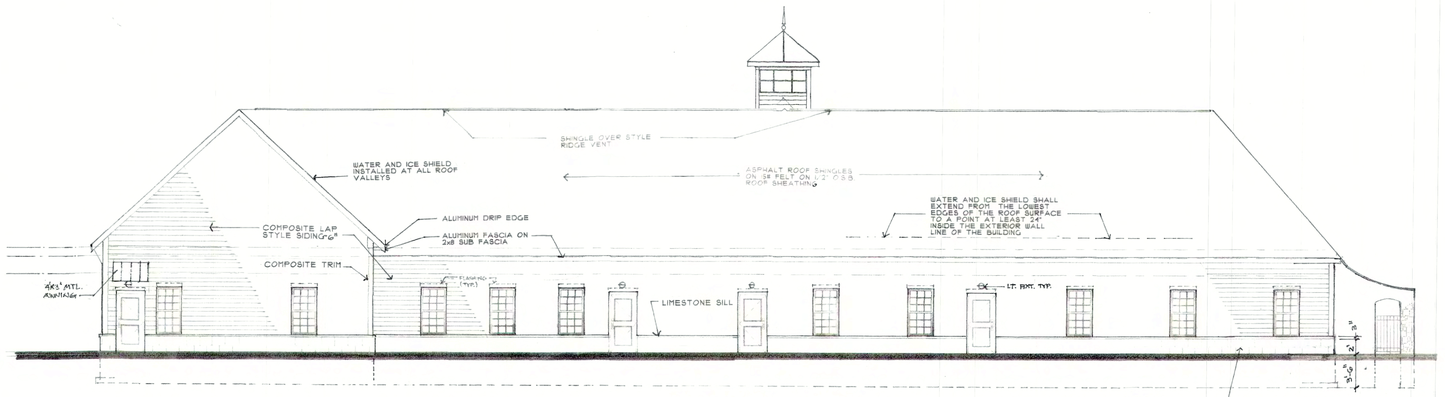


ELEVATION - EAST

1 1/8" = 1'-0"

ELEVATION - WEST

4 1/8" = 1'-0"



ELEVATION - SOUTH

3 1/8" = 1'-0"

Petkoski Architects

form | space | order

41 Shoreham
Grosse Pointe Shores, MI 48236
tel: 313-930-2030

project

SCHOOL BELL
CHILDCARE
4501 W.
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MILFORD, MI 48380

owner

SCHOOL
IN THE PINES INC.

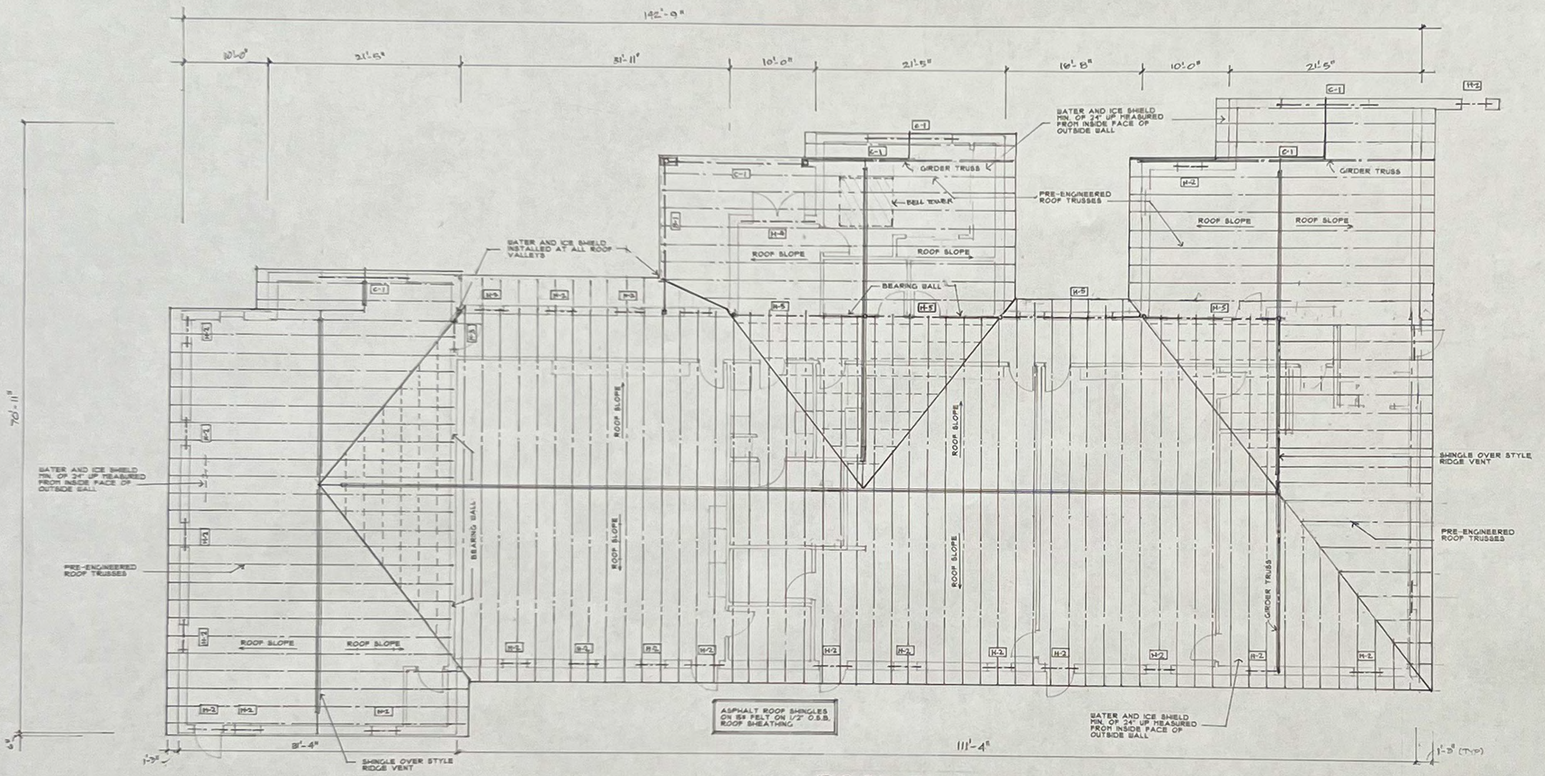
sheet

ELEVATIONS

issue / revision

Drawn by	JN/BG
Checked by	GP
Date	5-18-2024
Scale	AS NOTED
Project No.	24-010
Sheet No.	A-3

STATE OF MICHIGAN
GEORGE PETKOSKI
ARCHITECT
No. 35174
LICENSED ARCHITECT



ROOF PLAN

SCALE: 1/8" = 1'-0"

(ROOF/FRAMING PLAN)

ROOF STRUCTURE NOTES

1. REFER TO COVER SHEET FOR MINIMUM GROUND SNOW LOADING FOR ROOF TRUSSES
2. ROOF TRUSS DESIGN SHALL BE PERFORMED BY A REGISTERED ENGINEER IN THE STATE OF MICHIGAN
3. CONTRACTOR SHALL PROVIDE FINAL TRUSS SHOP DRAWING TO THE ARCHITECT AND THE BUILDING DEPARTMENT FOR REVIEW AND COMMENT. PLAN COPIES SUBMITTED TO BUILDING DEPARTMENT SHALL BE SEALED BY A REGISTERED ENGINEER IN THE STATE OF MICHIGAN
4. CONTRACTOR SHALL PROVIDE ANCHORING AND BRACING FOR ALL ROOF TRUSSES AS REQUIRED BY ROOF TRUSS SHOP DRAWINGS
5. ARCHITECT WILL PROVIDE REQUIRED ADDITIONAL TRUSS BRACING PLAN TO GENERAL CONTRACTOR AFTER SEALED TRUSS SHOP DRAWINGS ARE SUBMITTED TO ARCHITECT
6. CONTRACTOR SHALL VERIFY WEIGHT AND LOCATION OF ALL ROOFTOP EQUIPMENT AND SUBMIT TO TRUSS ENGINEER FOR ADEQUATE REINFORCEMENT
7. ALL ROOF TRUSSES SHALL BE CONNECTED TO WALL PLATES USING "SIMPSON" H2.5 BEHIND HURRICANE CLIPS AT EACH TRUSS CONNECTION. COORDINATE APPROPRIATE TRUSS CONNECTOR WITH TRUSS MANUFACTURER'S SHOP DRAWINGS
8. CONTRACTOR TO VERIFY ALL LOADING WITH TRUSS MANUFACTURER AND ARCHITECT PRIOR TO CONSTRUCTION
9. STRUCTURAL LUMBER SUPPLIER SHALL SUBMIT SHOP DRAWING ON ALL STRUCTURAL LUMBER PRODUCTS INDICATING SIZE, GRADE AND DESIGN STRENGTH TO MEET CONDITIONS INDICATED IN HEADER AND BEAM SCHEDULE. SHOP DRAWING SHALL BE REVIEWED AND APPROVED BY ARCHITECT PRIOR TO CONSTRUCTION
10. NO DRAFT STOPPING REQUIRED DUE TO SPRINKLER SYSTEM THROUGHOUT BUILDING (INCLUDING ATTIC) PER DRAFTSTOPPING EXCEPTION IN MICHIGAN BUILDING CODE IF FIRE SUPPRESSION IS NOT SUPPLIED IN ATTIC, THEN DRAFTSTOPPING IS REQUIRED
11. WATER AND ICE SHIELD SHALL BE APPLIED A MINIMUM OF 24" PREASURED HORIZ. FROM INSIDE FACE OF OUTSIDE WALLS AT ALL ROOF OVERHANGS AND AT ALL ROOF VALLEYS
12. PROVIDE INSULATED FIRE RATED ATTIC ACCESS DOORS WHEN IN FIRE RATED CEILING- SEE FLOOR PLAN FOR ATTIC ACCESS LOCATIONS. DOORS AND HARDWARE (HINGES, HOOK AND EYE) TO BE PROVIDE BY FRAMING CONTRACTOR
13. COORDINATE DOUBLE AND TRIPLE STUD FRAMING WITH PRE-ENGINEERED GIRDER TRUSS LOCATIONS. REVISE FINAL TRUSS PLANS FOR THESE LOCATIONS AND ANY OTHER ADDITIONAL LOCATIONS AS A RESULT OF TRUSS REVIEW

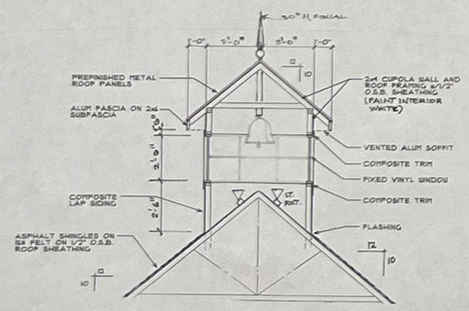
WOOD HEADERS AND BEAM SCHEDULE

H-1	5-1/4"x9-1/2" LSSE LSL OR (2) 1-3/4"x9-1/2" LSSE LSL BEAR ON ONE (1) STUD.
H-2	5-1/4"x9-1/2" 2.0E LVL OR (2) 1-3/4"x9-1/2" 2.0E LVL BEAR ON TWO (2) STUDS.
H-3	5-1/4"x11-7/8" 2.0E LVL OR (3) 1-3/4"x11-7/8" 2.0E LVL BEAR ON TWO (2) STUDS.
H-4	5-1/4"x11-7/8" 2.0E LVL BEAR ON TWO (2) STUDS.
H-5	5-1/4"x11-7/8" 2.0E LVL BEAR ON THREE (3) STUDS.
B-1	W8x21 STEEL BEAM
C-1	5 x 3½ x 5/16 LINTEL, SEE DETAIL

NOTE:
ALL HEADERS TO BE VERIFIED AFTER FINAL TRUSS SHOP DRAWINGS ARE AVAILABLE AND SUBMITTED TO ARCHITECT.

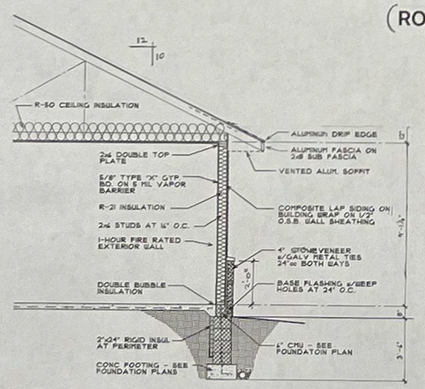
NOTE:

TRUSS FABRICATOR TO VERIFY ALL ROOF SLOPE AS INDICATED ON PLANS. NOTIFY ARCHITECT OF ANY ADJUSTMENTS TO THE PROPOSED ROOF SLOPES.



DETAIL SECTION @ BELL TOWER

SCALE 1/4" = 1'-0" (5)

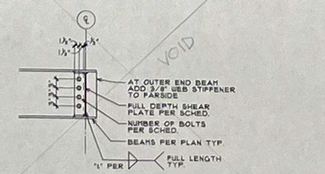


DETAIL WALL SECTION

SCALE 1/4" = 1'-0" (4)

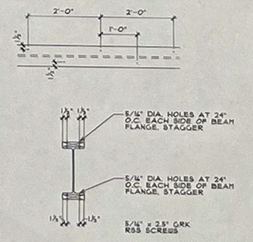
BEAM CONNECTION SCHEDULE

BEAM SIZE	NUMBER OF BOLTS AND SIZE	BOLT TYPE	BOLT BEARING TYPE	FILLET WELD "t" THICKNESS	SHEAR PLATE THICKNESS
W8x21	(4) 3/4" DIA.	A325	TYPE 'N'	1/4"	3/8"



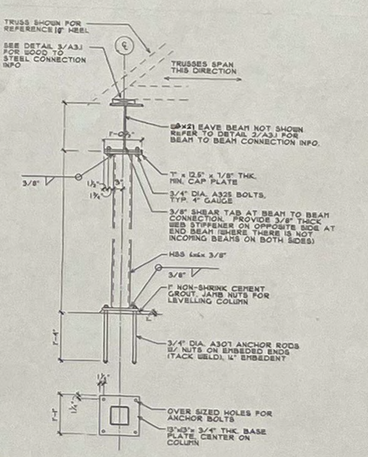
BEAM CONNECTION SINGLE PLATE

SCALE: 1/2" = 1'-0" (2 A)



WOOD PLATES TO STEEL BEAM

SCALE: 1/2" = 1'-0" (3 A)



COLUMN & BEAM DETAIL

SCALE: 1/2" = 1'-0" (1 A3)

Petkoski Architects

form | space | orde

41 Shoreham
Grosse Pointe Shores, MI 482
tel: 313-930-2030

project

SCHOOL BELL CHILDCARE
4501 W. HIGHLAND ROAD
MILFORD, MI 4838

owner

SCHOOL IN THE PINES INC

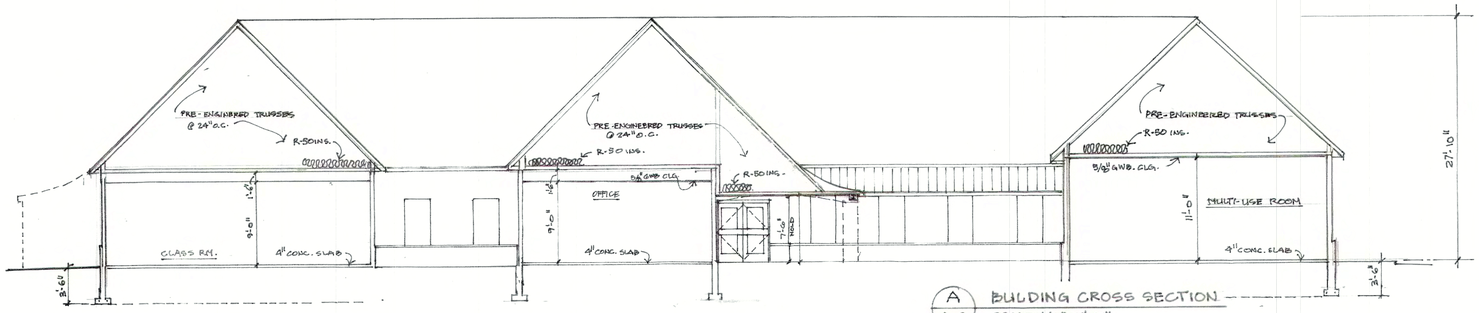
sheet

ROOF/FRAMING PLAN

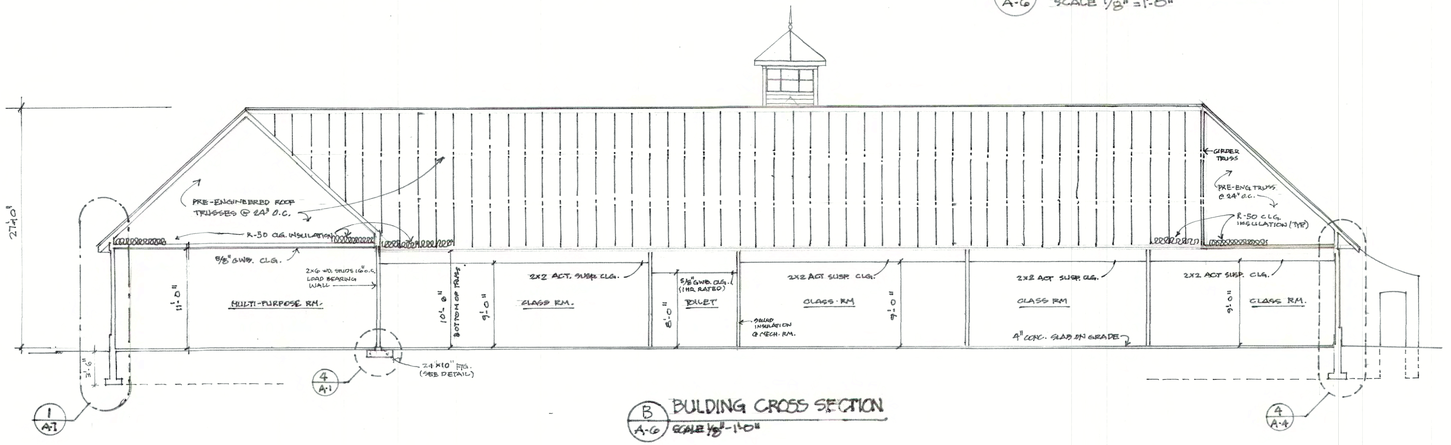
issue / revision

Drawn by	JN/BC
Checked by	GP
Date	8-18-2024
Scale	AS NOTED
Project No.	24-010
Sheet No.	A-4

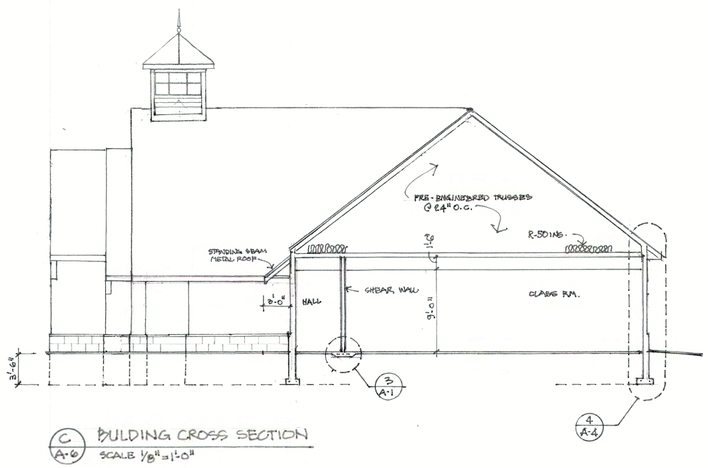
STATE OF MICHIGAN
GEORGE PETKOSKI
ARCHITECT
No. 36174
LICENSED ARCHITECT



A A-6 BUILDING CROSS SECTION
SCALE 1/8" = 1'-0"



B A-6 BULDING CROSS SECTION
SCALE 1/8" = 1'-0"



C A-6 BULDING CROSS SECTION
SCALE 1/8" = 1'-0"

Petkoski Architects
form | space | order
41 Shoreham
Grosse Pointe Shores, MI 48236
tel: 313-930-2030

project

SCHOOL BELL
CHILDCARE
4501 W.
HIGHLAND ROAD
MILFORD, MI 48380

owner

SCHOOL
IN THE PINES INC.

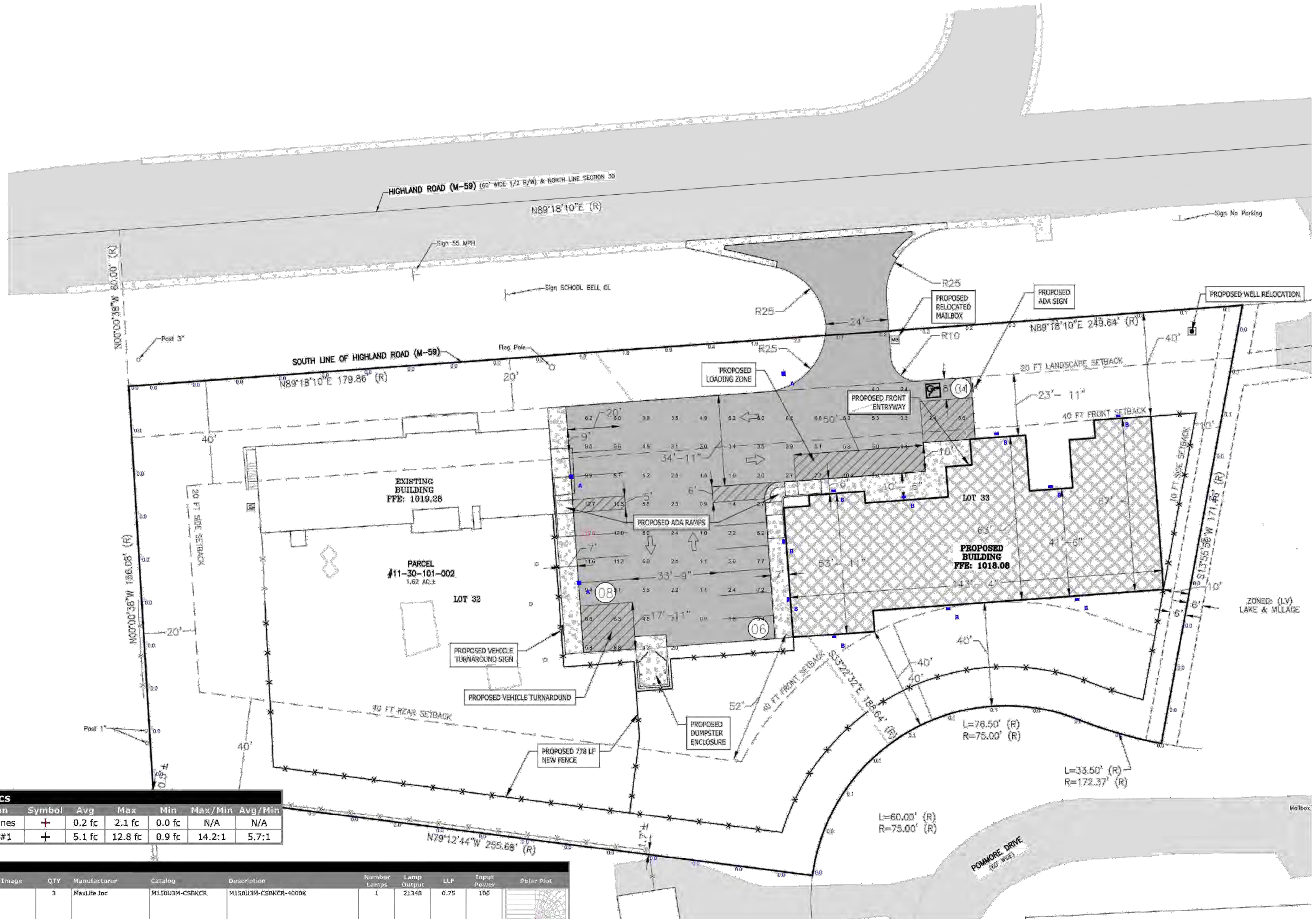
sheet

BUILDING
CROSS SECTIONS

issue / revision

Drawn by	JN/BG
Checked by	GP
Date	5-18-2024
Scale	AS NOTED
Project No.	24-010
Sheet No.	A-6

STATE OF MICHIGAN
GEORGE PETKOSKI
ARCHITECT
No. 36174
LICENSED ARCHITECT



Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Property Lines	+	0.2 fc	2.1 fc	0.0 fc	N/A	N/A
Calc Zone #1	+	5.1 fc	12.8 fc	0.9 fc	14.2:1	5.7:1

Schedule

Symbol	Label	Image	QTY	Manufacturer	Catalog	Description	Number Lamps	Lamp Output	LLF	Input Power	Polar Plot
	A		3	MaxLite Inc	M150U3M-CSBKCR	M150U3M-CSBKCR-4000K	1	21348	0.75	100	Max: 19255cd
	B		10	Above All Lighitng Inc	GRA-SP401-FT	Outdoor Full-Cutoff Wall-Mounted Area Luminaires	1	8134	0.71	66.52	Max: 4001cd

Note

1. POLES ARE MOUNTED AT 17'-0" AFF, 15' POLES ATOP A 2FT TALL BASE.

2. WALL PACKS ARE MOUNTED AT 15'-0" AFF.

3. FOOT-CANDLES ARE MEASURED AT LOT LEVEL, 0'-0" AFF.

SITE PHOTOMETRY

SCALE: 1"=20'-0"

NOTE:
PHOTOMETRIC STUDY ON THIS SHEET SIMULATED TO CALCULATE LIGHT LEVELS ONLY. REFER TO SHEET E-01 FOR ALL FIXTURE LOCATIONS, SPECIFICATIONS, AND OTHER LIGHTING SYSTEM INFORMATION.

C.I. Engineering Solutions
15 N. WALNUT STREET, SUITE 300
MOUNT CLEMENS, MI 48043
Telephone: (586) 741-6300 Cell (586) 489-5513
Fax: (586) 416-2699 Website: ciengsolutions.com

TITLE: SITE PHOTOMETRY

CLIENT: SCHOOL IN THE PINES INC.
4501 WEST HIGHLAND RD
MILFORD, MI 48380

PROJECT: SCHOOL BELL DAYCARE
4501 W HIGHLAND RD
MILFORD, MI 48380

SEAL:

SYM	DATE	ISSUED FOR: DESCRIPTION	BY	APP'D

PROJECT NO.: MK-003

E-04

(517) 546-6121
FAX (517) 546-1478

HASTINGS TESTING ENGINEERS
AND ENVIRONMENTAL INC.
"Testing to keep America on a firm foundation"
4841 GOLF CLUB ROAD • HOWELL, MI 48843

May 08, 2024

Boss Engineering
3121 East Grand River Avenue
Howell, MI 48843

Attention: Jared Prather

Reference: 4501 West Highland Road - Sub-Surface Exploration

Dear Mr. Prather,

Five (05) soil test borings designated as soil boring locations #1 through #5 were drilled in the influence of a planned new building located at 4501 West Highland Road in Highland Charter Township, Michigan. Soil test boring locations #1 and #5 were performed to determine the soil infiltration characteristics of the sub-surface sub-grade materials for a proposed underground detention system. Soil test borings #2 through #4 were performed in the influence of the proposed building to determine the structural integrity of the sub-surface sub-grade materials. Each of the test boring locations were advanced to a depth of twenty feet (20'-0") below the existing site grade. The soil boring locations can be identified on the enclosed diagram.

Soil descriptions and depths shown on the soil boring logs were approximate indications of changes from one soil to another and are not intended to represent an exact geological change or stratification.

Ground water was encountered in some of the test boring locations at the following depths:

Test boring #1 – None
Test boring #2 – None
Test boring #3 – 18'-6" below the existing site grade.
Test boring #4 – 19'-0" below the existing site grade.
Test boring #5 – 19'-0" below the existing site grade.

It should be noted that short-term ground water observations may not provide a reliable indication of the depth of the water table. In cohesive soils this is due to the slow rate of water infiltration into the bore hole as well as the potential for water to be trapped in overlying layers of granular soil in periods of heavy rain fall.

Information obtained from soil blow counts (standard penetration) indicate that the soils are variably compacted. The encountered granular soils were generally in a medium dense state, and the encountered cohesive soils generally had medium stiff to very stiff consistencies.

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Soil blow counts, profiles and the unconfined compressive strengths of the encountered sub-grade soils can be reviewed on the test boring logs.

Site Preparation

It is anticipated that there will be a minimal amount of fill material required for the site. Prior to the construction of footings or slabs all organic soils or unsuitable fill materials should be removed and it is recommended that the existing sub-grade be uniformly compacted to a minimum density of ninety-five percent of the materials maximum unit weight with a 20 ton vibratory roller. Engineered fill materials could then be placed in horizontal lifts not exceeding one foot in depth with each lift compacted uniformly to a minimum density of ninety-five percent of the materials maximum unit weight as determined by AASHTO T-180 or ASTM D1557. It is anticipated that the granular sub grade soils could be used as engineered fill materials in areas where an MDOT class III granular material is suitable. If any of the on-site cohesive material is re-used as an engineered fill material it is recommended that the material be compacted with a padfoot (sheepsfoot) roller. Hastings Testing Engineers and Environmental Inc. should be on site during excavating and filling operations to verify the suitability of the native sub-grade and proposed engineered fill materials. It is recommended that all existing sub-grade soils be proof rolled with a fully loaded tandem axle dump truck or other approved equipment to determine if there is any sub-grade instability. Any unstable sub-grade materials should be removed and replaced with engineered fill material as described above.

Site Utilities

Temporary excavations for site utilities shallower than twelve feet should be able to use typical benched excavations at a 1.5:1 slope. For site utilities deeper than twelve feet it is recommended that a protective system be utilized such as trench boxes or shoring. The excavating contractor should be prepared for the potential of encountering perched ground water. Any ground water encountered at depths less than nineteen feet should be able to be removed with typical 2" pumps. Special dewatering techniques may be required for utilities placed deeper than the anticipated ground water elevation of approximately nineteen feet (19'-0) below the existing site grade. All temporary excavations should be performed according to OSHA standards and specifications.

The existing granular sub-grade materials could be suitable for backfilling utility trenches where a MDOT Class III granular material is required. The excavating contractor should be prepared to import material for utility trenches requiring MDOT class II granular material.

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Foundation Recommendation

Based on the project information provided (one story building with slab on grade) and the results of field tests, it is believed that the proposed structure can be supported with conventional spread or strip footings. Prior to the construction of footings or floor slabs all organic soil and unsuitable fill materials should be removed and replaced with engineered fill materials as described in the site preparation portion of the report.

Footings could then be proportioned for a design soil pressure of two thousand pounds per square foot between one foot (1'-0") and ten feet (10'-0") below the existing site grade. Care should be taken to either remove or re-compact any loose granular or cohesive soils found in the bottom of the footing sub-grade locations. All exterior footings should be constructed at or below the maximum frost penetration of three feet six inches (3'-6") below finished grade. All footings and slabs should be constructed on naturally occurring sub-soils or engineered fill materials.

Floor Slab Recommendation

It is recommended that a minimum of six inches of clean coarse granular soil (MDOT class II granular material) be placed under all concrete slabs to provide a capillary break for any moisture migration. It is also recommended that a minimum 10 mil vapor barrier be installed directly under the concrete slab.

Expected Settlement

It is estimated that a properly configured shallow foundation constructed on the naturally occurring sub-grade soil or engineered fill material will have less than one inch of settlement and less than one-half inch of differential settlement.

Seismic Site Class

The known properties of the soils at the site are limited to the explored depths of the borings (20 feet) performed for this evaluation. Based on the conditions encountered in the borings, seismic site Class D applies to this site in accordance with the IBC and Michigan Building Code. The potential for liquefaction of the sub-grade soils should be considered low.

Detention Basin Infiltration

Test boring location #1 and #5 were drilled in the influence of the proposed underground detention system. Hastings Testing Engineers and Environmental Inc. was requested to perform permeability tests from soil sampled during drilling operations. The permeability tests were performed to determine the hydraulic conductivity of existing soils in the influence of the proposed detention pond.

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Hastings Testing Engineers and Environmental Inc. performed the constant head/falling head permeability tests on five samples (ASTM D2434). The results of the tests are as follows:

Test #1
Sample: Soil boring location #1.
Depth: Approximately four feet below the existing site grade.
Sub-Grade Material: Coarse Brown Sand with Fine Gravel and some Silt
K_{sat}= **3.8** $\frac{in}{hr}$

Test #2
Sample: Soil boring location #1.
Depth: Approximately nine feet below the existing site grade.
Sub-Grade Material: Silty Brown Clay
K_{sat}= **0.000088** $\frac{in}{hr}$

Test #3
Sample: Soil boring location #1.
Depth: Approximately nineteen feet below the existing site grade.
Sub-Grade Material: Coarse Brown Sand
K_{sat}= **8.6** $\frac{in}{hr}$

Test #4
Sample: Soil boring location #5.
Depth: Approximately five feet below the existing site grade.
Sub-Grade Material: Coarse Brown Sand with Fine Gravel and some Silt
K_{sat}= **2.0** $\frac{in}{hr}$

Test #5
Sample: Soil boring location #5.
Depth: Approximately seven feet below the existing site grade.
Sub-Grade Material: Silty Brown Clay
K_{sat}= **0.000031** $\frac{in}{hr}$

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Conclusion

Experience indicates that the actual subsoil conditions at the site could vary from those generalized on the basis of the test borings made at specific locations. It is therefore essential that Hastings Testing Engineers and Environmental Inc. be notified of any variation of the soil conditions to determine the effects on the recommendations in this report. The evaluations and recommendations contained in the report have been formulated on assumed data relating to the proposed project. Any significant change in this data in the final design plans should be brought to our attention for review and evaluation.

If you should have further questions, please contact our office.

Sincerely,

Marc A. W. Smith PE

STATE OF MICHIGAN
MARC ANDREW
WAYNE SMITH
ENGINEER
No.
6201068928
LICENSED PROFESSIONAL ENGINEER

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FAX (517) 546-1478

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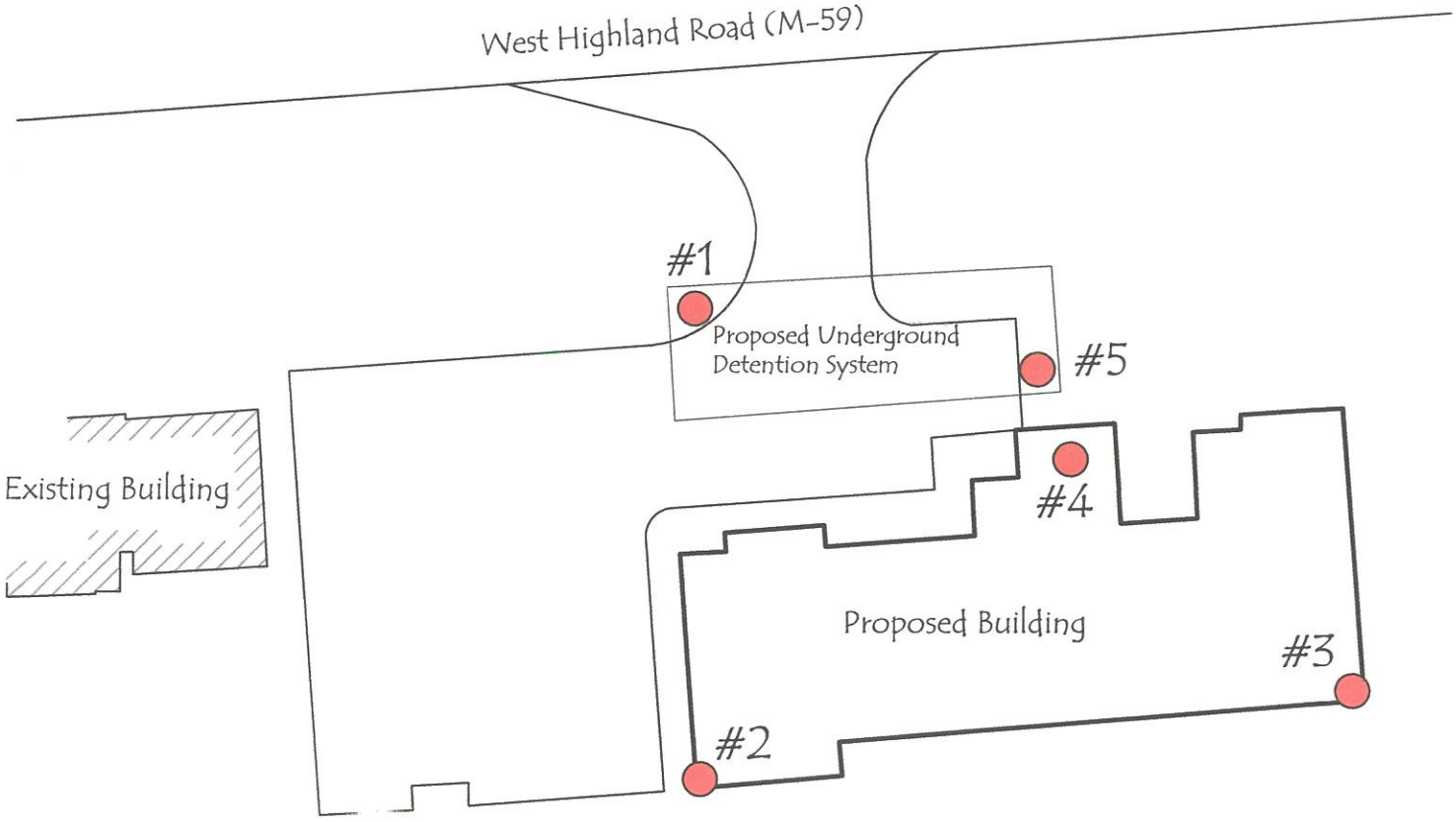
4501 West Highland Road

Soil Boring Testing Diagram

Date : 04/26/2024



● =Approximate Test Location

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REPORT OF SOIL BORING

TESTED FOR: Boss Engineering

3121 E. Grand River

Howell, MI 48843

REPORT # :7029
CLIENT # :4562
DATE :04/26/24
PAGE :1

LOCATION :Soil Boring #1 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength Str. PSF	Unconfined Strength Fail Strain
Organic Soil & Material	0.5							
Coarse Brown Sand with Fine	1.0							
Gravel and some Silt	1.5		4					
	2.0		6					
	2.5	SS1	6	12	4.6			
	3.0							
	3.5		6					
	4.0		7					
	4.5	SS2	6	13	5.1			
	5.0							
	5.5							
	6.0		5					
Silty Brown Clay	6.5		9					
	7.0	SS3	13	22	10.8		9000.	

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :None
GROUND WATER AFTER COMPLEATION:None
GROUND WATER AFTER :

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AND ENVIRONMENTAL INC.

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REPORT OF SOIL BORING

TESTED FOR: Boss Engineering

3121 E. Grand River

Howell, MI 48843

REPORT # :7029
CLIENT # :4562
DATE :04/26/24
PAGE :2

LOCATION :Soil Boring #1 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength	
							Str. PSF	Fail Strain
Silty Brown Clay	7.5							
	8.0							
	8.5		7					
	9.0		7					
	9.5	SS4	12	19	10.4		8000.	
	10.0							
	10.5							
	11.0							
	11.5							
	12.0							
	12.5							
	13.0							
	13.5		9					
	14.0		9					

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :None
GROUND WATER AFTER COMPLEATION:None
GROUND WATER AFTER :

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REPORT OF SOIL BORING

TESTED FOR: Boss Engineering

3121 E. Grand River

Howell, MI 48843

REPORT # :7029
CLIENT # :4562
DATE :04/26/24
PAGE :3

LOCATION :Soil Boring #1 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength Str. PSF	Unconfined Strength Fail Strain
Silty Brown Clay	14.5	SS5	10	19	11.3		7500.	
	15.0							
	15.5							
	16.0							
	16.5							
	17.0							
	17.5							
	18.0							
Coarse Brown Sand	18.5		6					
	19.0		9					
	19.5	SS6	12	21	5.0			
End Of Soil Boring #1	20.0							

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :None
GROUND WATER AFTER COMPLEATION:None
GROUND WATER AFTER :

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REPORT OF SOIL BORING

TESTED FOR: Boss Engineering

3121 E. Grand River

Howell, MI 48843

REPORT # :7030
CLIENT # :4562
DATE :04/26/24
PAGE :1

LOCATION :Soil Boring #2 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength	
							Str. PSF	Fail Strain
Organic Soil & Material	0.5							
Silty Brown Clay	1.0							
	1.5		4					
	2.0		6					
	2.5	SS1	7	13	14.6		2000.	
	3.0							
Coarse Brown Sand with Fine	3.5		3					
Gravel and some Silt	4.0		5					
	4.5	SS2	9	14	5.3			
	5.0							
	5.5							
	6.0		6					
	6.5		9					
Silty Brown Clay	7.0	SS3	9	18	15.5		2000.	

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :None
GROUND WATER AFTER COMPLEATION:None
GROUND WATER AFTER :

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"Testing to keep America on a firm foundation"

4841 GOLF CLUB ROAD • HOWELL, MI 48843

REPORT OF SOIL BORING

TESTED FOR: Boss Engineering

3121 E. Grand River

Howell, MI 48843

REPORT # :7030
CLIENT # :4562
DATE :04/26/24
PAGE :2

LOCATION :Soil Boring #2 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength	
							Str. PSF	Fail Strain
Silty Brown Clay	7.5							
	8.0							
Coarse Brown Sand	8.5		7					
	9.0		8					
	9.5	SS4	11	19	6.1			
	10.0							
	10.5							
	11.0							
	11.5							
	12.0							
	12.5							
	13.0							
	13.5		6					
	14.0		6					

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :None
GROUND WATER AFTER COMPLEATION:None
GROUND WATER AFTER :

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REPORT OF SOIL BORING

TESTED FOR: Boss Engineering

3121 E. Grand River

Howell, MI 48843

REPORT # :7030
CLIENT # :4562
DATE :04/26/24
PAGE :3

LOCATION :Soil Boring #2 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength Str. PSF	Unconfined Strength Fail Strain
Coarse Brown Sand	14.5	SS5	8	14	5.9			
	15.0							
	15.5							
	16.0							
	16.5							
	17.0							
	17.5							
	18.0							
	18.5		10					
	19.0		16					
	19.5	SS6	12	28	6.4			
End Of Soil Boring #2								

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :None
GROUND WATER AFTER COMPLEATION:None
GROUND WATER AFTER :

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REPORT OF SOIL BORING

TESTED FOR: Boss Engineering

3121 E. Grand River

Howell, MI 48843

REPORT # :7031
CLIENT # :4562
DATE :04/26/24
PAGE :1

LOCATION :Soil Boring #3 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength	
							Str. PSF	Fail Strain
Organic Soil & Material	0.5							
Coarse Brown Sand with Fine	1.0							
Gravel and some Silt	1.5		4					
	2.0		3					
	2.5	SS1	4	7	5.6			
	3.0							
	3.5		4					
	4.0		4					
	4.5	SS2	5	9	6.5			
	5.0							
	5.5							
Silty Brown Clay	6.0		3					
	6.5		8					
	7.0	SS3	6	14	9.9		9000.	

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :18' 6" BEG
GROUND WATER AFTER COMPLEATION:18' 6" BEG
GROUND WATER AFTER :1 Hour

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REPORT OF SOIL BORING

TESTED FOR: Boss Engineering

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Howell, MI 48843

REPORT # :7031
CLIENT # :4562
DATE :04/26/24
PAGE :2

LOCATION :Soil Boring #3 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength	
							Str. PSF	Fail Strain
Silty Brown Clay	7.5							
	8.0							
	8.5		8					
	9.0		8					
	9.5	SS4	12	20	10.1		9000.	
	10.0							
	10.5							
	11.0							
	11.5							
	12.0							
	12.5							
	13.0							
	13.5		5					
	14.0		4					

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :18' 6" BEG
GROUND WATER AFTER COMPLEATION:18' 6" BEG
GROUND WATER AFTER :1 Hour

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REPORT OF SOIL BORING

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Howell, MI 48843

REPORT # :7031
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PAGE :3

LOCATION :Soil Boring #3 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength	
							Str. PSF	Fail Strain
Silty Brown Clay	14.5	SS5	4	8	12.7		5000.	
	15.0							
	16.0							
	16.5							
	17.0							
	17.5							
	18.0							
Coarse Brown Sand	18.5		3					
	19.0		3					
	19.5	SS6	3	6	8.9			
End Of Soil Boring #3	20.0							

Type of Sample. SS Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :18' 6" BEG
GROUND WATER AFTER COMPLEATION:18' 6" BEG
GROUND WATER AFTER :1 Hour

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REPORT OF SOIL BORING

TESTED FOR: Boss Engineering

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Howell, MI 48843

REPORT # :7032
CLIENT # :4562
DATE :04/27/24
PAGE :1

LOCATION :Soil Boring #4 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength	
							Str. PSF	Fail Strain
Organic Soil & Material	0.5							
Coarse Brown Sand with Fine	1.0							
Gravel and some Silt	1.5		2					
	2.0		5					
	2.5	SS1	5	10	4.5			
	3.0							
	3.5		5					
	4.0		9					
	4.5	SS2	9	18	5.3			
	5.0							
	5.5							
Silty Brown Clay	6.0		8					
	6.5		13					
	7.0	SS3	14	27	8.8		9000.	

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :19' 0" BEG
GROUND WATER AFTER COMPLEATION:19' 0" BEG
GROUND WATER AFTER :1 Hour

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REPORT OF SOIL BORING

TESTED FOR: Boss Engineering
3121 E. Grand River
Howell, MI 48843

REPORT # :7032
CLIENT # :4562
DATE :04/27/24
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LOCATION :Soil Boring #4 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength	
							Str. PSF	Fail Strain
Silty Brown Clay	7.5							
	8.0							
	8.5		3					
	9.0		5					
	9.5	SS4	12	17	12.5		7000.	
	10.0							
	10.5							
	11.0							
	11.5							
	12.0							
	12.5							
	13.0							
	13.5		2					
	14.0		4					

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :19' 0" BEG
GROUND WATER AFTER COMPLEATION:19' 0" BEG
GROUND WATER AFTER :1 Hour

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LOCATION :Soil Boring #4 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength	
							Str. PSF	Fail Strain
Coarse Brown Sand	14.5	SS5	12	16	6.0			
	15.0							
	15.5							
	16.0							
	16.5							
	17.0							
	17.5							
	18.0							
	18.5		2					
	19.0		4					
	19.5	SS6	4	8	9.5			
End Of Soil Boring #4	20.0							

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :19' 0" BEG
GROUND WATER AFTER COMPLEATION:19' 0" BEG
GROUND WATER AFTER :1 Hour

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REPORT # :7033
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DATE :04/27/24
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LOCATION :Soil Boring #5 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength	
							Str. PSF	Fail Strain
Organic Soil & Material	0.5							
	1.0							
Coarse Brown Sand with Fine	1.5		2					
Gravel and some Silt	2.0		2					
	2.5	SS1	3	5	4.3			
	3.0							
	3.5		2					
	4.0		4					
	4.5	SS2	4	8	6.6			
	5.0							
	5.5							
Silty Brown Clay	6.0		3					
	6.5		4					
	7.0	SS3	6	10	14.9		3000.	

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :19' 0" BEG
GROUND WATER AFTER COMPLEATION:19' 0" BEG
GROUND WATER AFTER :1 Hour

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CLIENT # :4562
DATE :04/27/24
PAGE :2

LOCATION :Soil Boring #5 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength Str. PSF	Unconfined Strength Fail Strain
Silty Brown Clay	7.5							
	8.0							
	8.5		3					
	9.0		5					
	9.5	SS4	10	15	11.3		9000.	
	10.0							
	10.5							
	11.0							
	11.5							
	12.0							
	12.5							
	13.0							
	13.5		5					
	14.0		4					

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :19' 0" BEG
GROUND WATER AFTER COMPLEATION:19' 0" BEG
GROUND WATER AFTER :1 Hour

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LOCATION :Soil Boring #5 - See Enclosed Diagram

Soil Description	Depth in Feet	Sample & Type	Blow Count *	N Val	% Water	Natural WT. P C F	Unconfined Strength	
							Str. PSF	Fail Strain
Coarse Brown Sand	14.5	SS5	10	14	6.7			
	15.0							
	15.5							
	16.0							
	16.5							
	17.0							
	17.5							
	18.0							
	18.5		2					
	19.0		4					
	19.5	SS6	10	14	10.7			
End Of Soil Boring #5	20.0							

Type of Sample: SS - Split Spoon
SL - Split Spoon With Liner
ST - Shelby Tube

* Standard Penetration Test - Driving 2" OD Sampler 18" with 140 # Hammer, Falling 30" Count made at 6" intervals.

DRILLING METHOD :Track Mounted Auger
DRILLING FOREMAN :T. Dingman
BACKFILL MATERIAL:Existing Material

GROUND WATER ENCOUNTERED AT :19' 0" BEG
GROUND WATER AFTER COMPLEATION:19' 0" BEG
GROUND WATER AFTER :1 Hour