

CHAHAL SEMI TRUCK/TRAILER REPAIR FACILITY

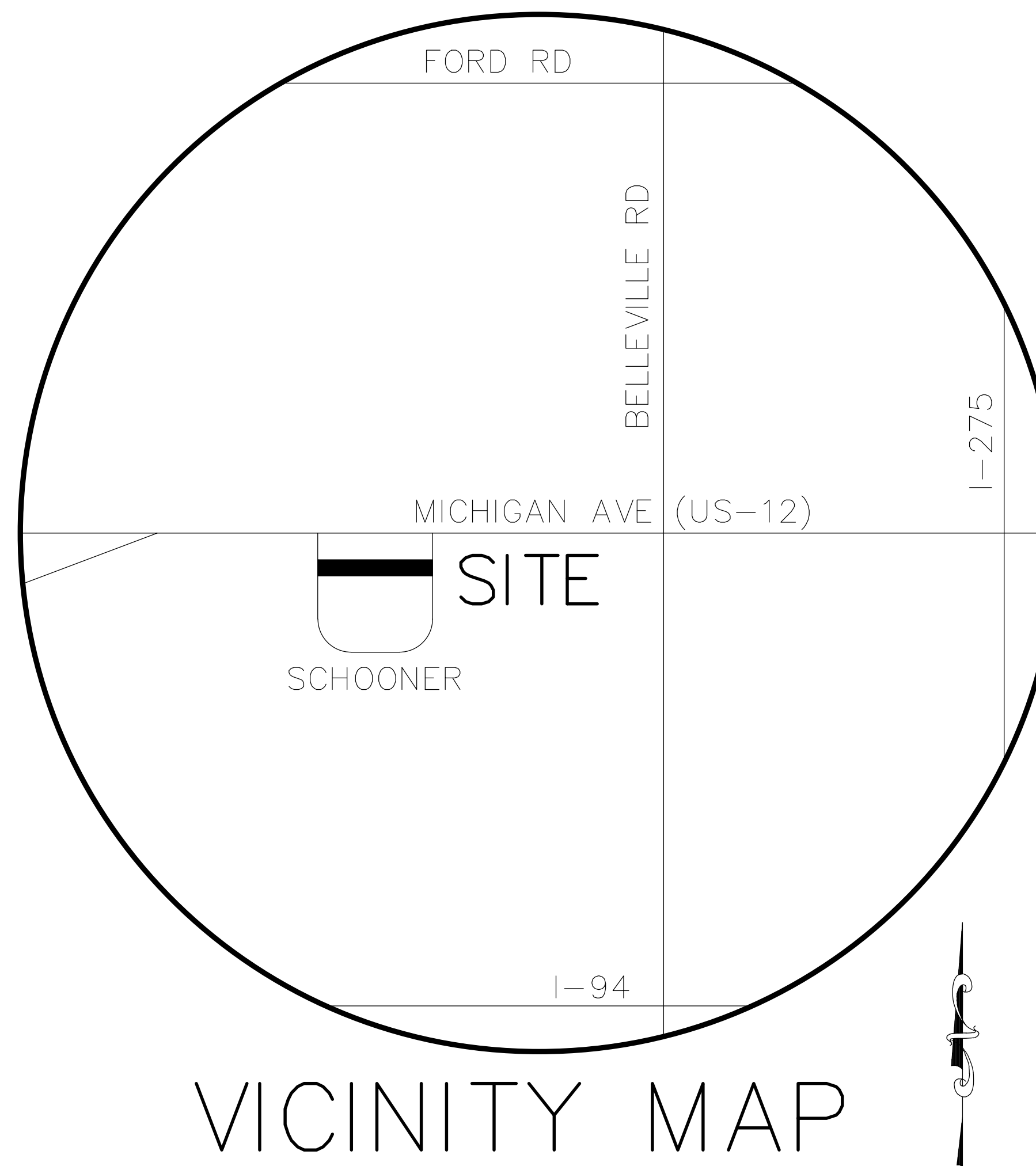
6100 SCHOONER DRIVE
VAN BUREN TOWNSHIP, WAYNE COUNTY, MICHIGAN

DESIGN ENGINEERS

HARDY CIVIL DESIGN SERVICES LLC
4996 MOORE
WAYNE MI 48184
Ph. (734) 756-2196
E-MAIL: kbhardy1964@hotmail.com
CONTACT: KEVIN HARDY

GENERAL CONTRACTOR

JOE DAVENPORT
(DAVENPORT BROTHERS CONST.)
301 INDUSTRIAL PARK DRIVE
BELLEVILLE, MI 48111
Ph. (313) 350-0369
E-MAIL: joe@davenportbrothers.com



VICINITY MAP

PROPERTY OWNER

SUKHDEV SINGH
8385 OPAL
WESTLAND, MI 48185
Ph. (734) 419-3060
E-MAIL: suksingh363@gmail.com



REQUIRED PERMITS

WAYNE COUNTY (STORM WATER PERMIT)
VAN BUREN TOWNSHIP (SITE DEVELOPMENT PERMIT)

PROPOSED USE

THE PROPOSED USE OF THE FACILITY IS FOR MAJOR TRUCK REPAIR.
VEHICLES AND THEIR TRAILERS MAY REQUIRE AND RECEIVE REPLACEMENT OR REPAIR TO ANY COMPONENT, SUCH AS ENGINES, EXHAUST SYSTEMS, TRANSMISSIONS, AND OR SUSPENSIONS.
NEW AND USED VEHICLES AND TRAILER COMPONENTS WILL BE REMOVED WITHIN THE PROPOSED BUILDING AND ALL NEW AND USED COMPONENTS WILL BE STORED WITHIN THE PROPOSED BUILDING.

LEGAL DESCRIPTION

COMMENCING AT THE SOUTH 1/4 CORNER OF SECTION 32, TOWN 2 SOUTH, RANGE 8 EAST, VAN BUREN TOWNSHIP, WAYNE COUNTY, MICHIGAN; THENCE S.87°37'34"W., 61.08 FEET ALONG THE SOUTH LINE OF SAID SECTION 32, ALSO BEING THE NORTH LINE OF SECTION 5, TOWN 3 SOUTH, RANGE 8 EAST, VAN BUREN TOWNSHIP, WAYNE COUNTY, MICHIGAN; THENCE ALONG THE WESTERLY LINE OF SCHOONER DRIVE (60' RIGHT OF WAY) THE FOLLOWING TWO COURSES: (1) SOUTHERLY 27.29 FEET ALONG THE ARC OF A 370 FOOT RADIUS CURVE TO THE RIGHT, THROUGH A CENTRAL ANGLE OF 04°13'31" AND HAVING A CHORD BEARING S.07°20'55"E., 27.28 FEET AND (2) S.05°14'10"E., 476.68 FEET TO THE POINT OF BEGINNING; THENCE CONTINUING S.05°14'10"E., 274.00 FEET; THENCE S.85°10'54"W., 1010.75 FEET; THENCE N.04°49'18"W., 216.33 FEET ALONG THE EASTERLY LINE OF SAID SCHOONER DRIVE; THENCE N.88°17'04"E., 217.19 FEET; THENCE N.05°42'41"W., 69.43 FEET; THENCE N.85°10'54"E., 792.98 FEET TO THE POINT OF BEGINNING. BEING A PART OF THE NORTH 1/2 OF SECTION 5, TOWN 3 SOUTH, RANGE 8 EAST, VAN BUREN TOWNSHIP, WAYNE COUNTY, MICHIGAN.

TAX ID #83-017-99-0014-714

SHEET INDEX

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2. TOPOGRAPHIC SURVEY & REMOVALS PLAN
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- A2.0 BUILDING ELEVATIONS
- LP-1 LANDSCAPING PLAN
- LP-2 LANDSCAPING DETAILS
- PH-1 PHOTOMETRICS PLAN
- PH-2 PHOTOMETRICS BUILDING

ZONING & SETBACKS

SUBJECT PROPERTY ZONED M2 (GENERAL INDUSTRIAL)
PROPOSED USE: SEMI TRUCK/TRAILER REPAIR

ADJACENT PROPERTY ZONING:
NORTH M1 & M2
EAST M2
SOUTH M2
WEST M1

SCHEDULE OF REGULATIONS FOR M2 ZONING

LOT SIZE NONE
BUILDING HEIGHT 4 - STORY
LOT COVERAGE 35%

SETBACKS

FRONT 60'(o)
REAR 50'
SIDES 50'(p), TOTAL 100'

SETBACK FOOTNOTES

(o) OFF-STREET PARKING FOR VISITORS, OVER AND ABOVE THE NUMBER OF SPACES REQUIRED UNDER SECTION 9.102 MAY BE PERMITTED WITHIN THE REQUIRED FRONT YARD PROVIDED THAT SUCH OFF-STREET PARKING IS NOT LOCATED WITHIN TWENTY (20) FEET OF THE FRONT LINE.
(p) OFF-STREET PARKING SHALL BE PERMITTED IN A REQUIRED SIDE YARD SETBACK.

LEGAL DESCRIPTION

COMMENCING AT THE SOUTH 1/4 CORNER OF SECTION 32, TOWN 2 SOUTH, RANGE 8 EAST, VAN BUREN TOWNSHIP, WAYNE COUNTY, MICHIGAN; THENCE S.87°37'34"W., 61.08 FEET ALONG THE SOUTH LINE OF SAID SECTION 32, ALSO BEING THE NORTH LINE OF SECTION 5, TOWN 3 SOUTH, RANGE 8 EAST, VAN BUREN TOWNSHIP, M WAYNE COUNTY, MICHIGAN; THENCE ALONG THE WESTERLY LINE OF SCHOONER DRIVE (60' RIGHT OF WAY) THE FOLLOWING TWO COURSES: (1) SOUTHERLY 27.29 FEET ALONG THE ARC OF A 370 FOOT RADIUS CURVE TO THE RIGHT, THROUGH A CENTRAL ANGLE OF 041°3'31" AND HAVING A CHORD BEARING S.07°20'55"E., 27.28 FEET AND (2) S.05°14'10"E., 476.68 FEET TO THE POINT OF BEGINNING; THENCE CONTINUING S.05°14'10"E., 274.00 FEET; THENCE S.85°10'54"W., 1010.75 FEET; THENCE N.04°49'18"W., 216.33 FEET ALONG THE EASTERLY LINE OF SAID SCHOONER DRIVE; THENCE N.88°17'04"E., 217.19 FEET; THENCE N.05°42'41"W., 69.43 FEET; THENCE N.85°10'54"E., 792.98 FEET TO THE POINT OF BEGINNING, BEING A PART OF THE NORTH 1/2 OF SECTION 5, TOWN 3 SOUTH, RANGE 8 EAST, VAN BUREN TOWNSHIP, WAYNE COUNTY, MICHIGAN.

6100 SCHOONER DRIVE
TAX ID #83-017-99-0014-714

GENERAL NOTES

- PICK UP DEBRIS WITHIN PROPERTY LIMITS WEEKLY OR AS NEEDED.
- PHASING OF THE PROJECT IS NOT PROPOSED.
- THERE ARE NO WETLANDS LOCATED ON SUBJECT PROPERTY.
- PAVED SURFACES, WALKWAYS, SIGNS, LIGHTING AND OTHER STRUCTURES AND SURFACES SHALL BE MAINTAINED IN A SAFE, ATTRACTIVE CONDITION AS ORIGINALLY MAINTAINED IN A CLEARLY VISIBLE CONDITION.

SITE SPECIFIC NOTES

- PROPOSED SEMI TRUCK REPAIR FACILITY. THERE WILL BE NO LONG TERM PARKING WITHIN THE SUBJECT PROPERTY.
- TRUCKS PARKED ON THIS PROPERTY ARE FUNCTIONAL AND AWAITING REPAIR I.E., NO JUNK TRUCKS FOR PARTS SALVAGE.
- THERE WILL BE NO HAZARDOUS WASTE GENERATED FROM THE SITE.
- OILS, SOLVENTS AND OTHER CHEMICALS WILL BE REMOVED FROM THE SITE BY APPROVED HAULING METHODS.
- ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS, SPECIFICATIONS, AND GENERAL CONDITIONS OF THE TOWNSHIP.
- THE APPLICANT IS RESPONSIBLE FOR RESOLVING ANY DRAINAGE PROBLEMS ON ADJACENT PROPERTIES WHICH ARE THE RESULT OF THE APPLICANT'S ACTIONS.
- PROPOSED GATE TO BE SUPPLIED A FIRE DEPARTMENT LOCK.
- SITE FENCING IS NOT PROPOSED AS PART OF THIS PLAN.
- THERE IS NO PROPOSED SIGNAGE FOR THE SITE.

REQUIRED PARKING

PER TOWNSHIP ORDINANCE:

5 SPACES + EITHER 1 SPACE PER 550 S.F. GROSS FLOOR AREA OR 1 SPACE PER EACH EMPLOYEE AT PEAK SHIFT, WHICHEVER IS GREATER.

= 5+(MAX EMPLOYEE "5") = 10 REQUIRED SPACES OR
= 5+(8320sf/550) = 20 REQUIRED SPACES

TOTAL SPACES REQUIRED = 20
PROVIDED REGULAR SPACES 21
PROVIDED BARRIER FREE SPACES 01
TOTAL SPACES 22

PROPOSED USE

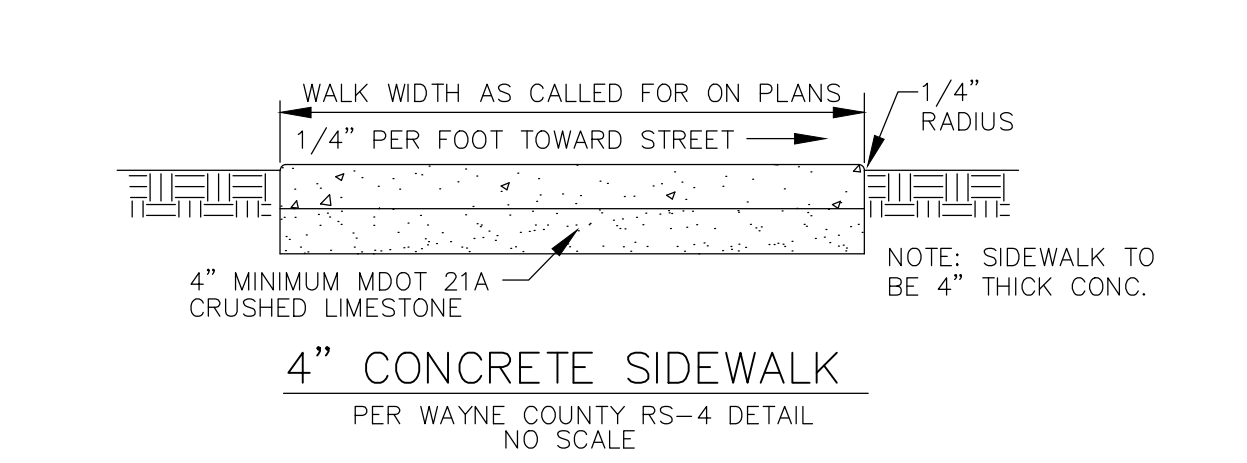
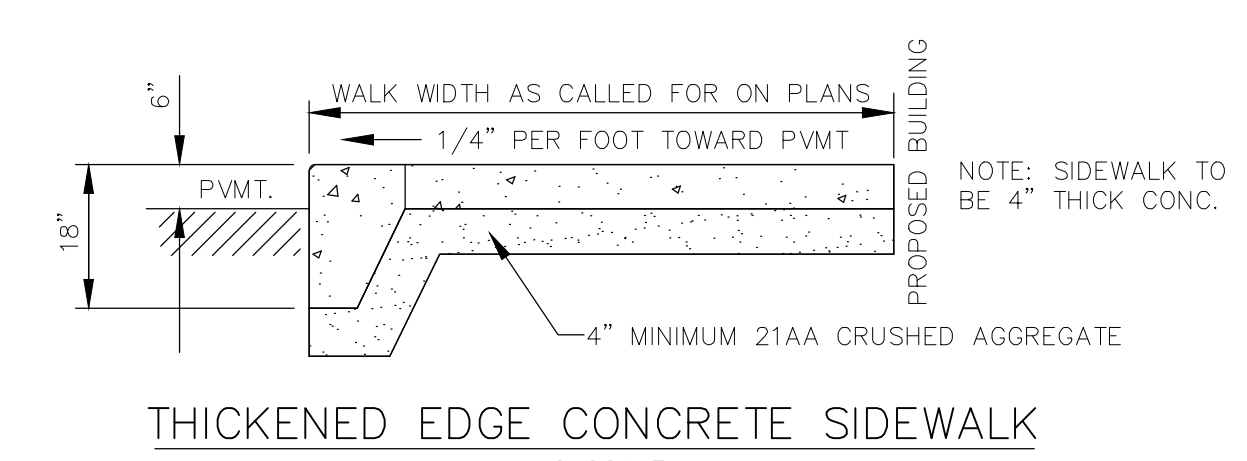
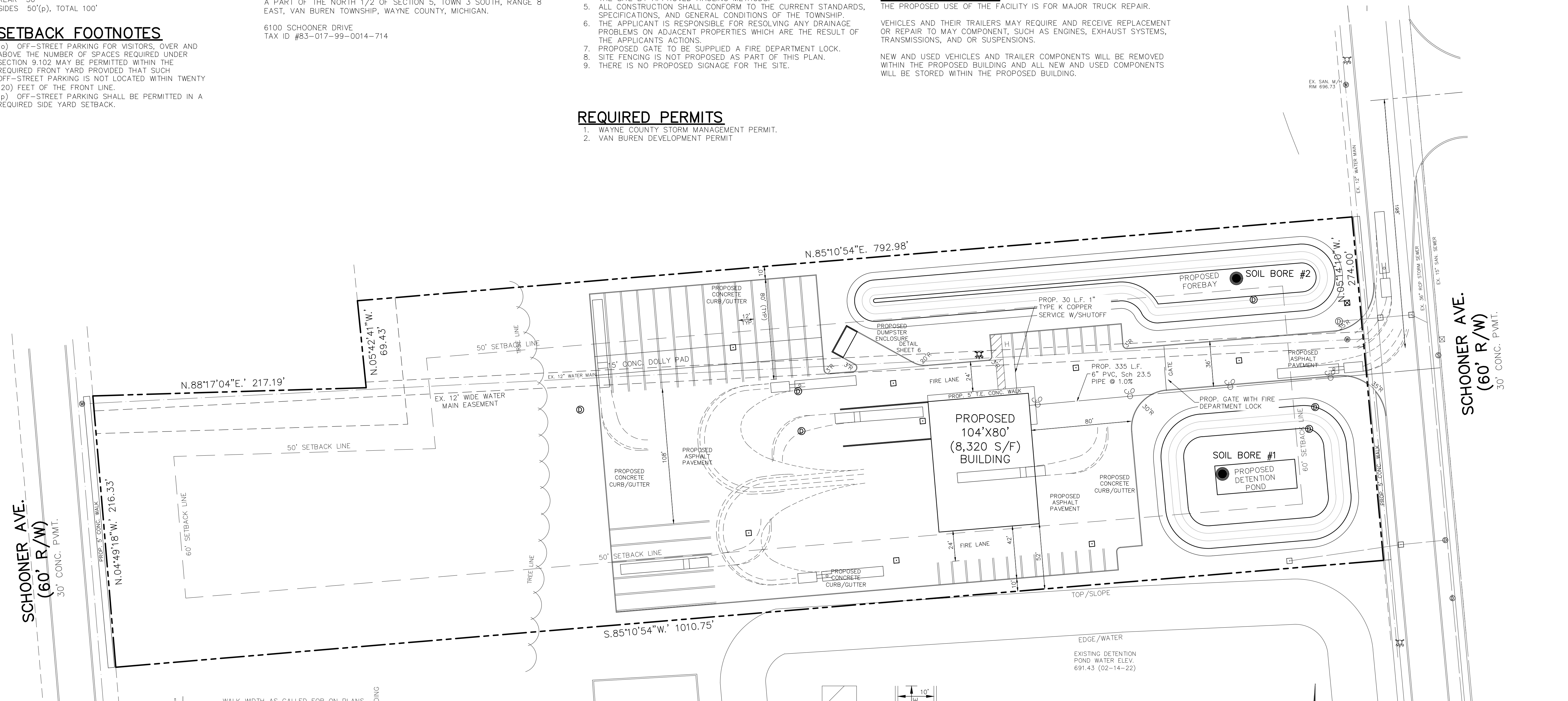
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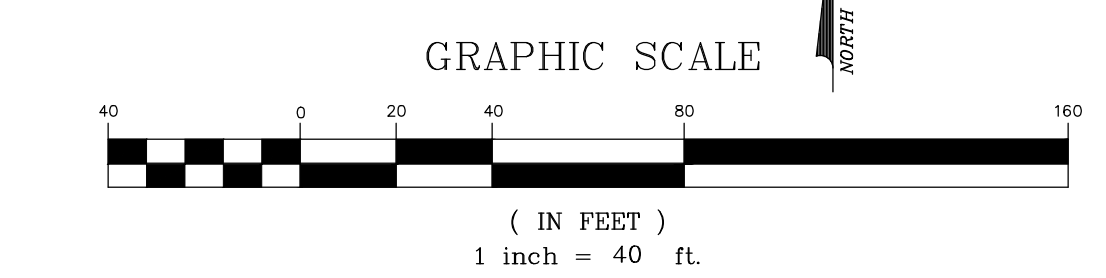
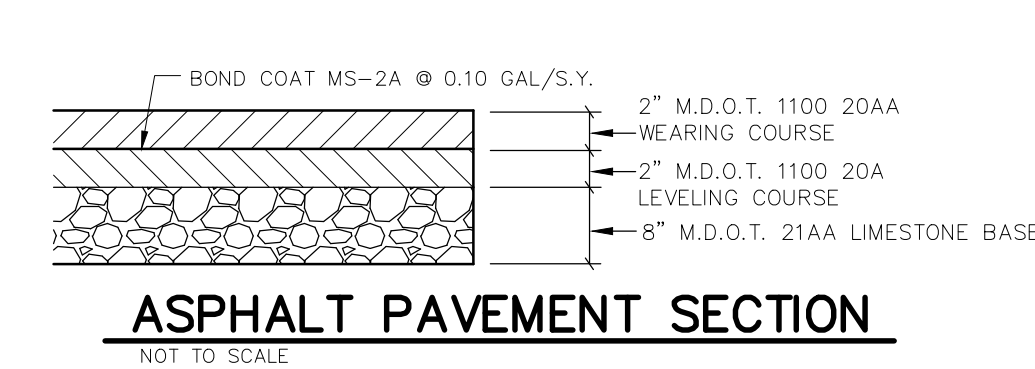
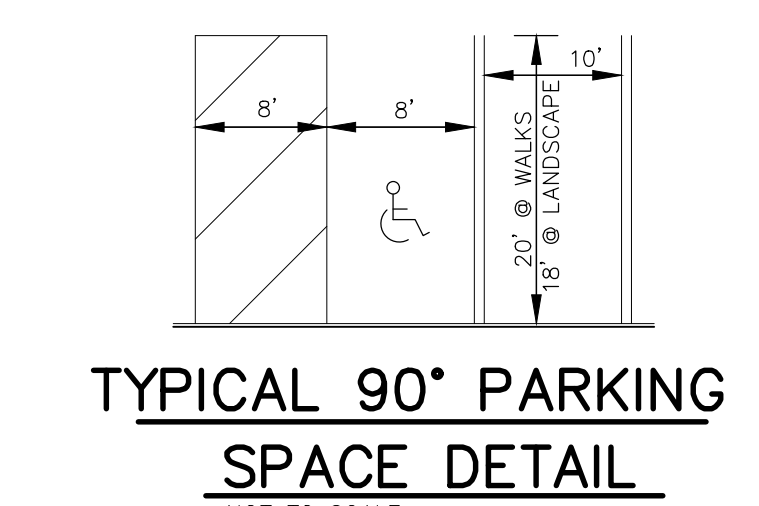
REQUIRED PERMITS

- WAYNE COUNTY STORM MANAGEMENT PERMIT.
- VAN BUREN DEVELOPMENT PERMIT



CURB & GUTTER DETAIL
USE CURB DETAIL "F2"

DETAIL	DIMENSIONS	LANE TIES	CONCRETE CU. YD. / LIN. FT.
F1	1'-6" x 7/8"	AS SHOWN	0.0424
F2	1'-6" x 7/8"	OMITTED	0.0424
F3	2'-0" x 1 3/8"	AS SHOWN	0.0550
F4	2'-0" x 1 3/8"	OMITTED	0.0550
F5	2'-6" x 1 7/8"	AS SHOWN	0.0677
F6	2'-6" x 1 7/8"	OMITTED	0.0677



PROPERTY OWNER
SDUKHDEV SINGH
8385 OPAL DRIVE
WESTLAND, MI 48185

LEGEND

- EX. CATCH BASIN
- EX. SANITARY MANHOLE
- EX. STORM MANHOLE
- EX. HYDRANT
- EX. UTILITY POLE
- EX. VALVE WELL
- EX. FENCE
- EX. STREET SIGN
- EX. LIGHT POLE

HARDY CIVIL DESIGN SERVICES LLC
4996 MOORE ST. WAYNE, MI 48184
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E-mail: kbhardy1964@hotmail.com

SITE PLAN

SEMI-TRUCK REPAIR FACILITY
6100 SCHOONER ROAD
VAN BUREN TWP, MI

REVISIONS

NO.	DATE	REVISIONS
02-18-22		
05-06-22		
06-02-22		
06-21-22		

DRAWING No. A- **DATE 01-10-22** **CHECKED BY:**

JOB No. 2022-01 **DRAWN BY:**

SHEET No. 1 OF 1

ZONING & SETBACKS

SUBJECT PROPERTY ZONED M2 (GENERAL INDUSTRIAL)

ADJACENT PROPERTY ZONING:
 NORTH M1 & M2
 EAST M2
 SOUTH M2
 WEST M1

SCHEDULE OF REGULATIONS FOR M2 ZONING

LOT SIZE NONE
 BUILDING HEIGHT 4 - STORY
 LOT COVERAGE 35%

SETBACKS

FRONT 60'(o)
 REAR 50'
 SIDES 50'(p), TOTAL 100'

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FLOODZONE

THE SUBJECT PROPERTY IS LOCATED IN ZONE "C" (AREAS OF MINIMAL FLOODING) AS SHOWN ON FLOOD INSURANCE RATE MAP PANEL 26163C0195E, DATED FEBRUARY 02, 2012.

PARCEL SOILS TYPE

Ba BELLEVILLE LOAMY FINE SAND
 T1A TEDROW LOAMY FINE SAND, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES
 PER USDA SOIL SURVEY OF SOUTHEAST MICHIGAN.

LAND AREA

THE SUBJECT PROPERTY CONTAINS 262,924 S/F - 6.02 AC.

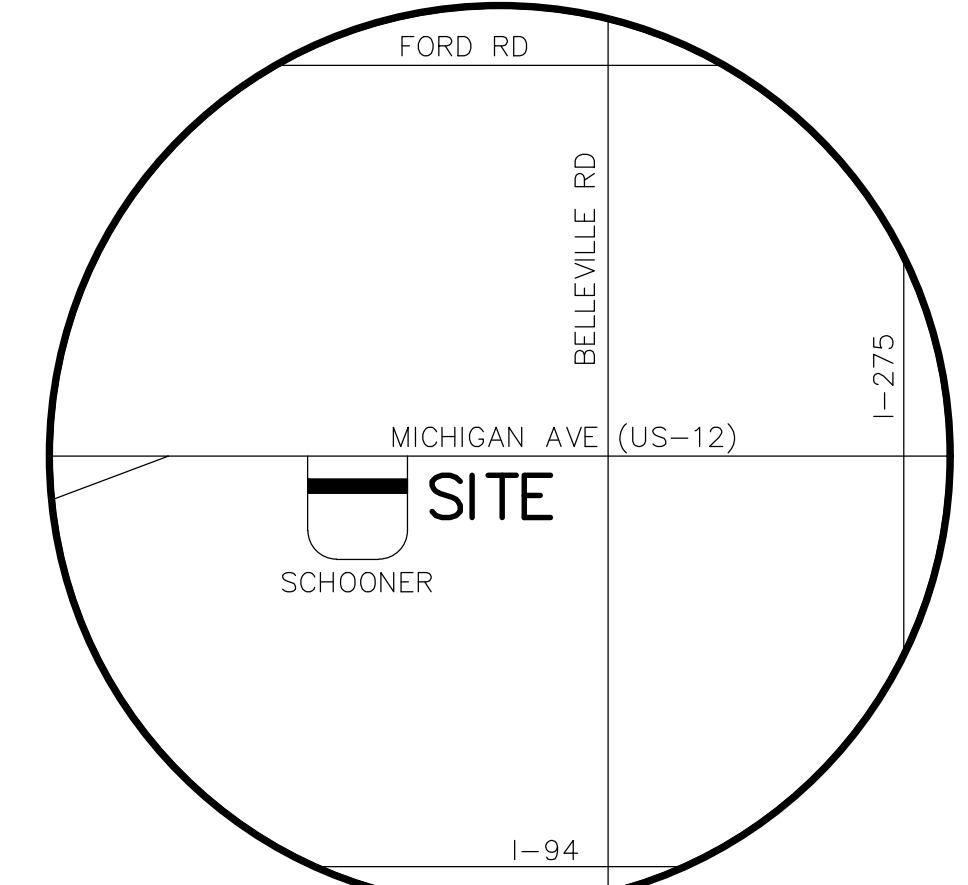
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- CONTRACTOR MUST PICK UP ANY FLOW FROM OFFSITE THAT CONTRIBUTES TO THE SITE.

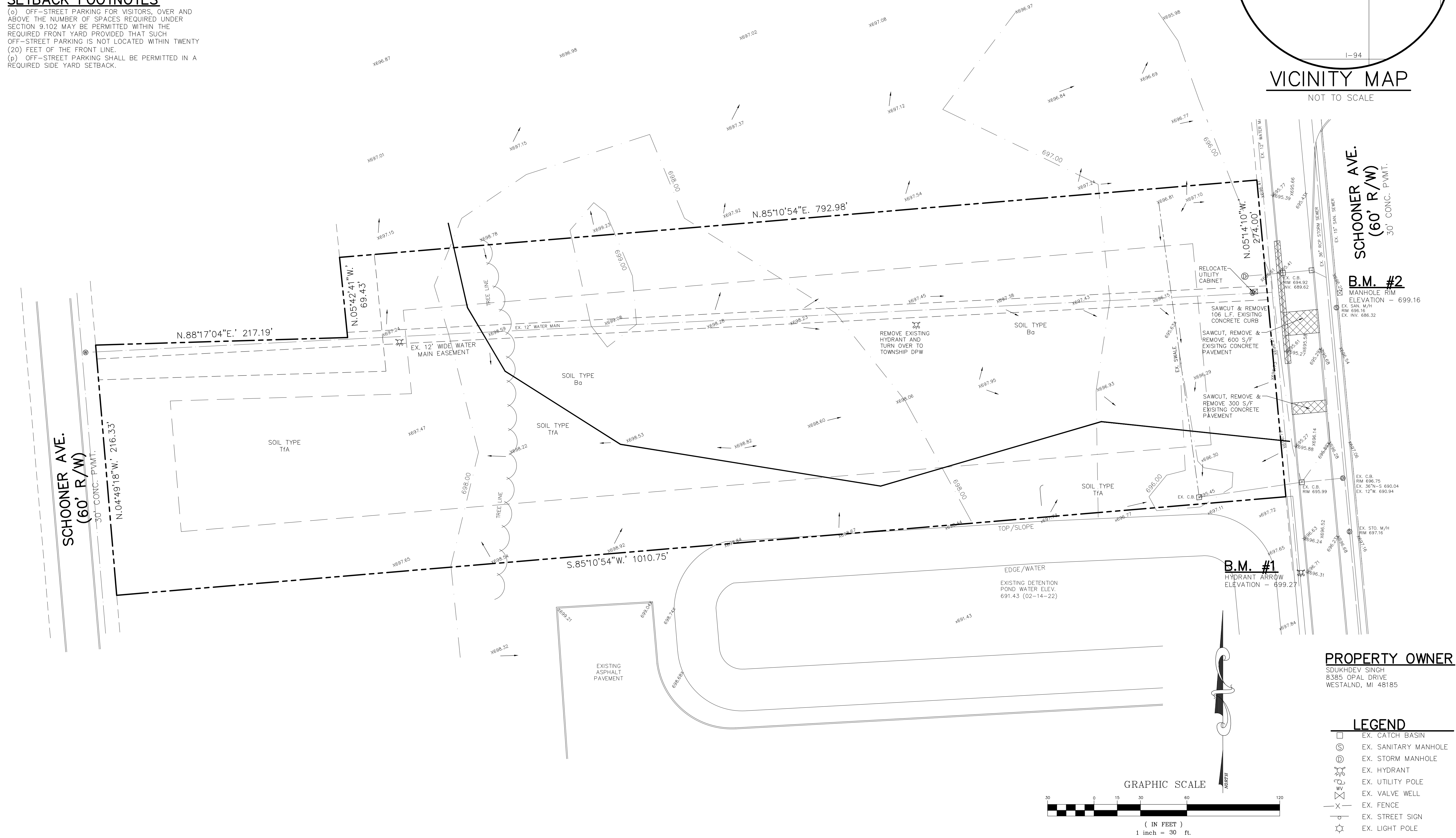
BENCHMARKS (USGS NAVD29)

RIM ON EXISTING MANHOLE LOCATED ON THE EAST SIDE OF SCHOONER DRIVE 115' SOUTH OF NORTHERLY PROPERTY LINE OF SUBJECT PARCEL ELEVATION - 699.16

ARROW ON HYDRANT LOCATED ON THE WEST SIDE OF SCHOONER DRIVE 65' SOUTH OF SOUTHERLY PROPERTY LINE OF SUBJECT PARCEL ELEVATION - 699.27



VICINITY MAP
 NOT TO SCALE



**SCHOONER AVE.
 (60' R/W)
 30' CONC. PAVMT.**

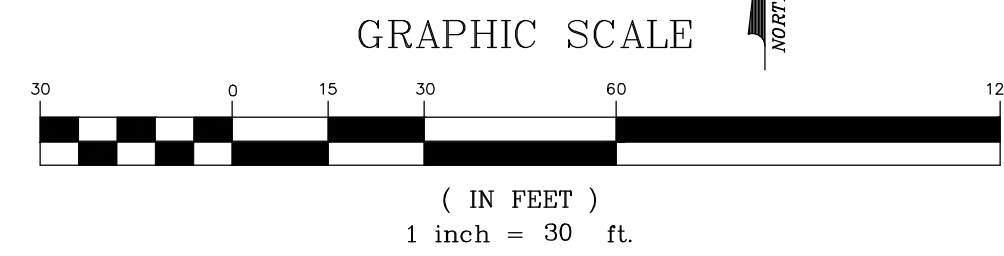
B.M. #2
 MANHOLE RIM
 ELEVATION - 699.16
 EX. SAN. W/H
 RIM 698.16
 EX. INV. 686.32

B.M. #1
 HYDRANT ARROW
 ELEVATION - 699.27

PROPERTY OWNER
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 8385 OPAL DRIVE
 WESTLAND, MI 48185

LEGEND

- EX. CATCH BASIN
- ⊙ EX. SANITARY MANHOLE
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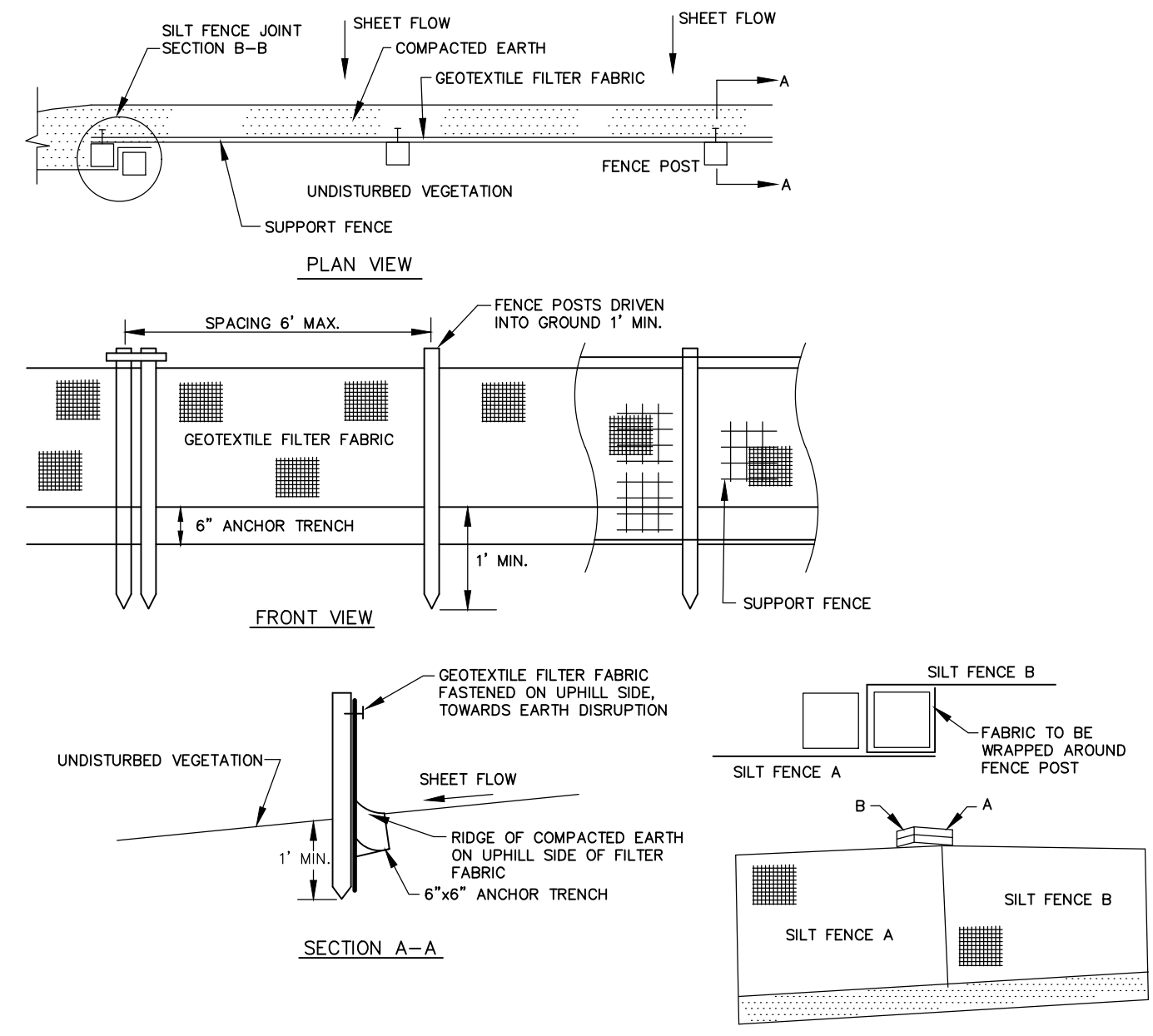
HARDY

TOPOGRAPHIC SURVEY

SEMI-TRUCK REPAIR FACILITY
6100 SCHOONER ROAD
VAN BUREN TWP, MI

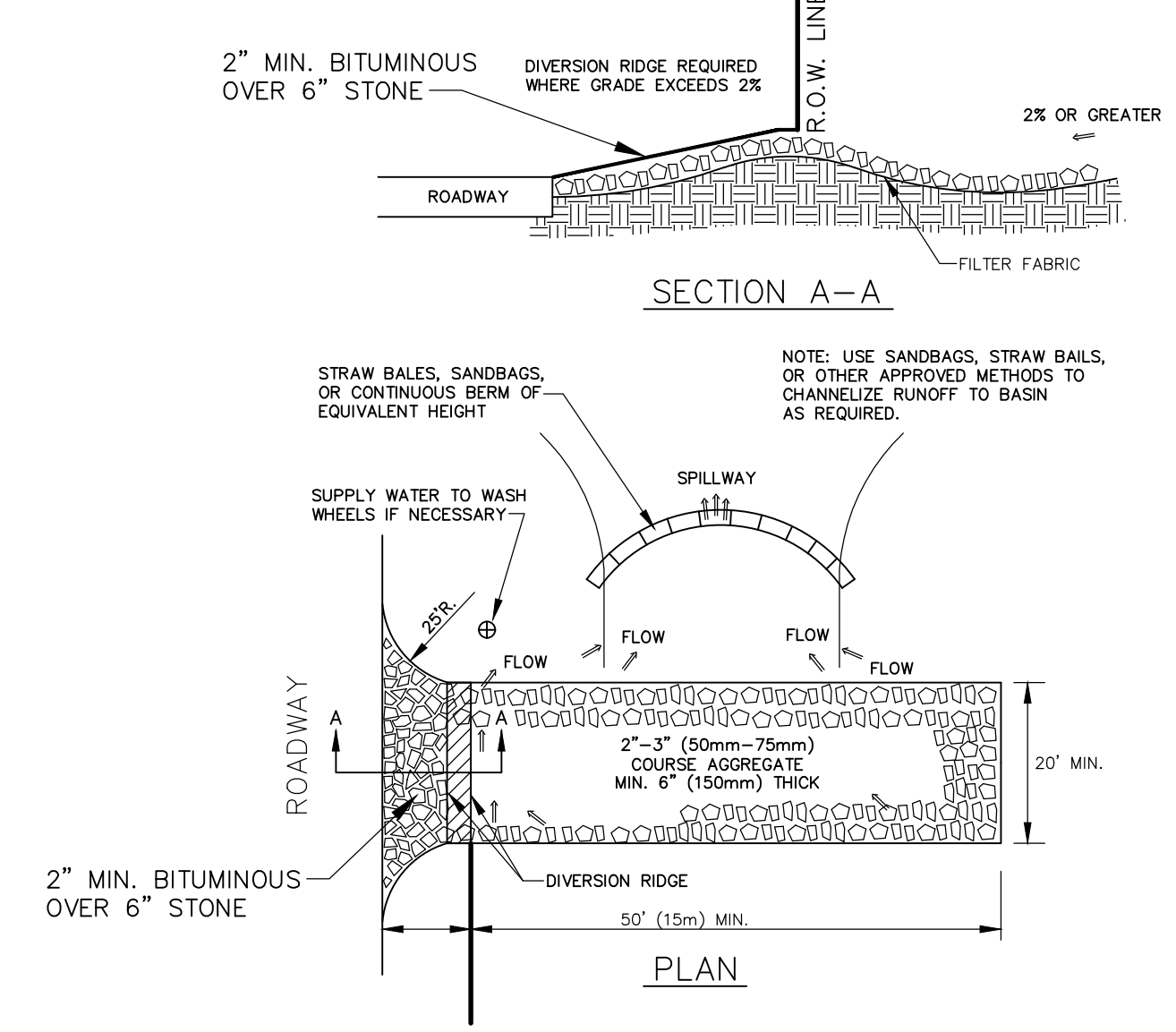
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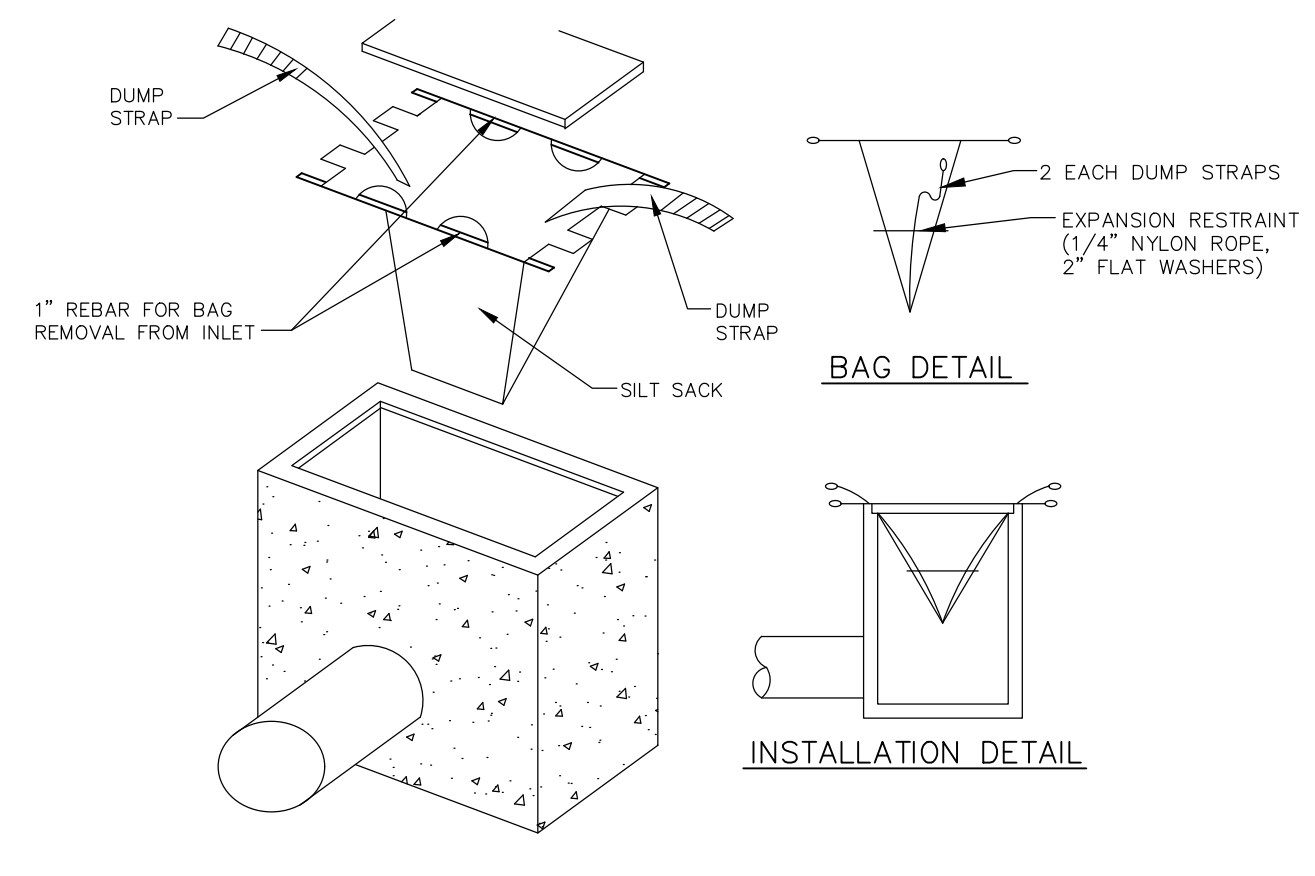


SILT FENCE

THE PROPOSED SILT FENCE REPRESENTS THE LIMITS OF CONSTRUCTION



1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.



SOIL EROSION SEQUENCE OF CONSTRUCTION

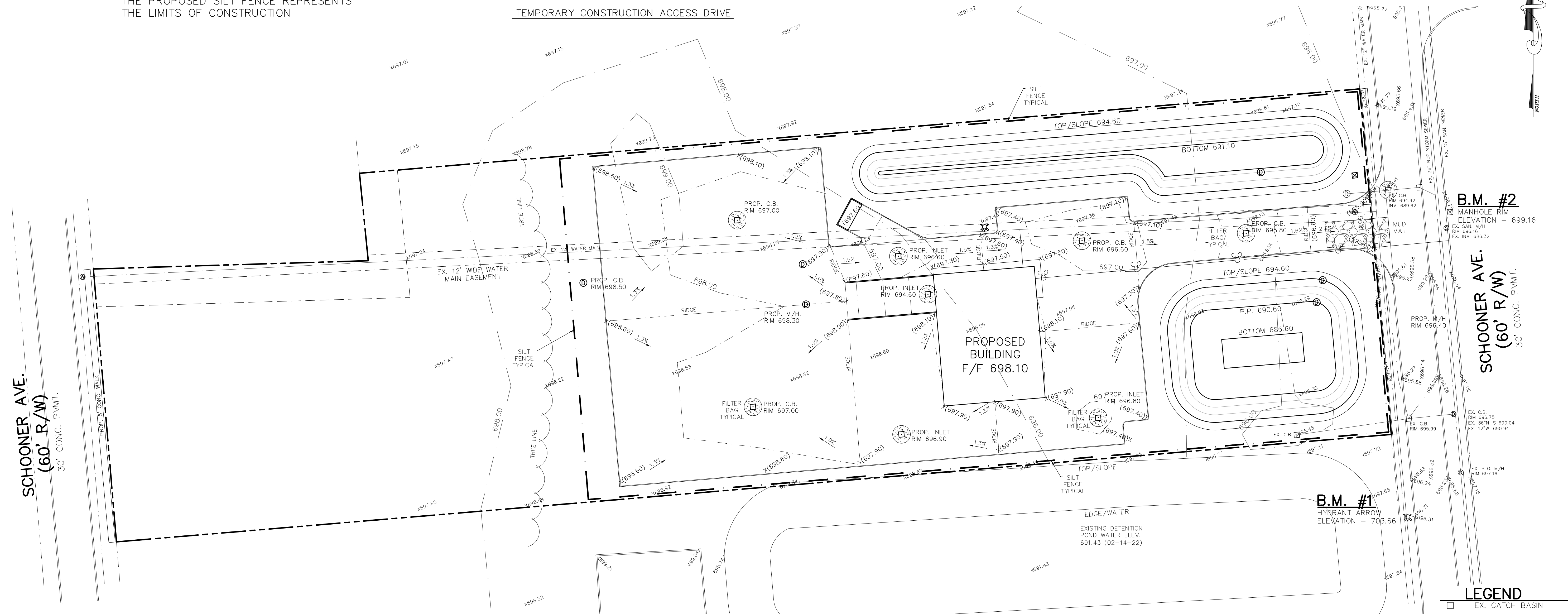
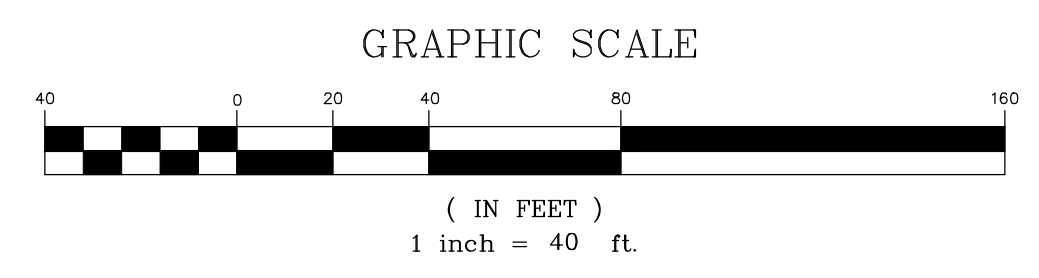
- (1) INSTALL SILT FENCE AS SHOWN HERE ON.
- (2) COMPLETE MASS GRADING AND UNDERGROUND UTILITIES.
- (3) COMPLETE BIOSWALE INSTALLATION
- (4) CONSTRUCT PARKING AREA.
- (5) RESTORE ALL DISTURBED AREAS WITH SOD OR TOPSOIL, SEED AND MULCH.
- (6) REMOVE SILT FROM FROM BEHIND SILT FENCE AND REMOVE SILT FENCE.

SOIL EROSION SEQUENCE OF CONSTRUCTION

START DAY	END DAY
8-14	11-30
8-14	11-30
8-14	8-18
8-14	9-02
8-21	9-02
9-05	9-16
8-01	11-30
9-19	10-06
10-09	10-13
10-16	
11-01	
11-30	

1. STONE TRACKING PAD ATOP GEOTEXTILE LINER (MUD-MAT).
2. INSTALL SILT FENCING AND PROTECTIVE FENCING.
3. STRIP AND STOCKPILE TOPSOIL.
4. GRADE AND BALANCE AS REQUIRED. STABILIZE DITCHES, SWALES, COMMON AREAS AND SLOPES PER PLAN WITHIN 5 DAYS OF GRADE.
5. EXCAVATE DETENTION BASIN. INSTALL APPROVED OUTLET. STABILIZE BEFORE PAVING IS STARTED.
6. INSTALL UNDERGROUND UTILITIES (I.E. SANITARY, STORM AND WATER MAIN).
7. PLACE INLET FILTERS.
8. INSTALL PAVEMENT COMPLETE.
9. INSTALL ALL PUBLIC UTILITIES COMPLETE (ELECTRIC, TELEPHONE, AND CABLE T.V.).
10. ESTABLISH VEGETATION FOR ALL DISTURBED AREAS AND ROAD / R.O.W.s.
11. CLEAN OUT STORM SEWERS SYSTEM.
12. CLEAN OUT AND RESTORE SEDIMENT FOREBAY AND DETENTION POND TO DESIGN SPECIFICATIONS.
13. REMOVE SILT FENCE FOLLOWING W.C.D.O.E. APPROVAL.

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
SCRAPE STREETS		X	X	X	X	X	X
SWEEP STREETS				X			



SOIL EROSION QUANTITIES:

- 1800 L.F. SILT FENCING
- 1 EA. MUD MAT
- 10 EA. SEDIMENTATION FILTER

SOIL EROSION LEGEND

- SILT FENCING
- SEDIMENTATION FILTER

BENCHMARKS (USGS NAVD29)

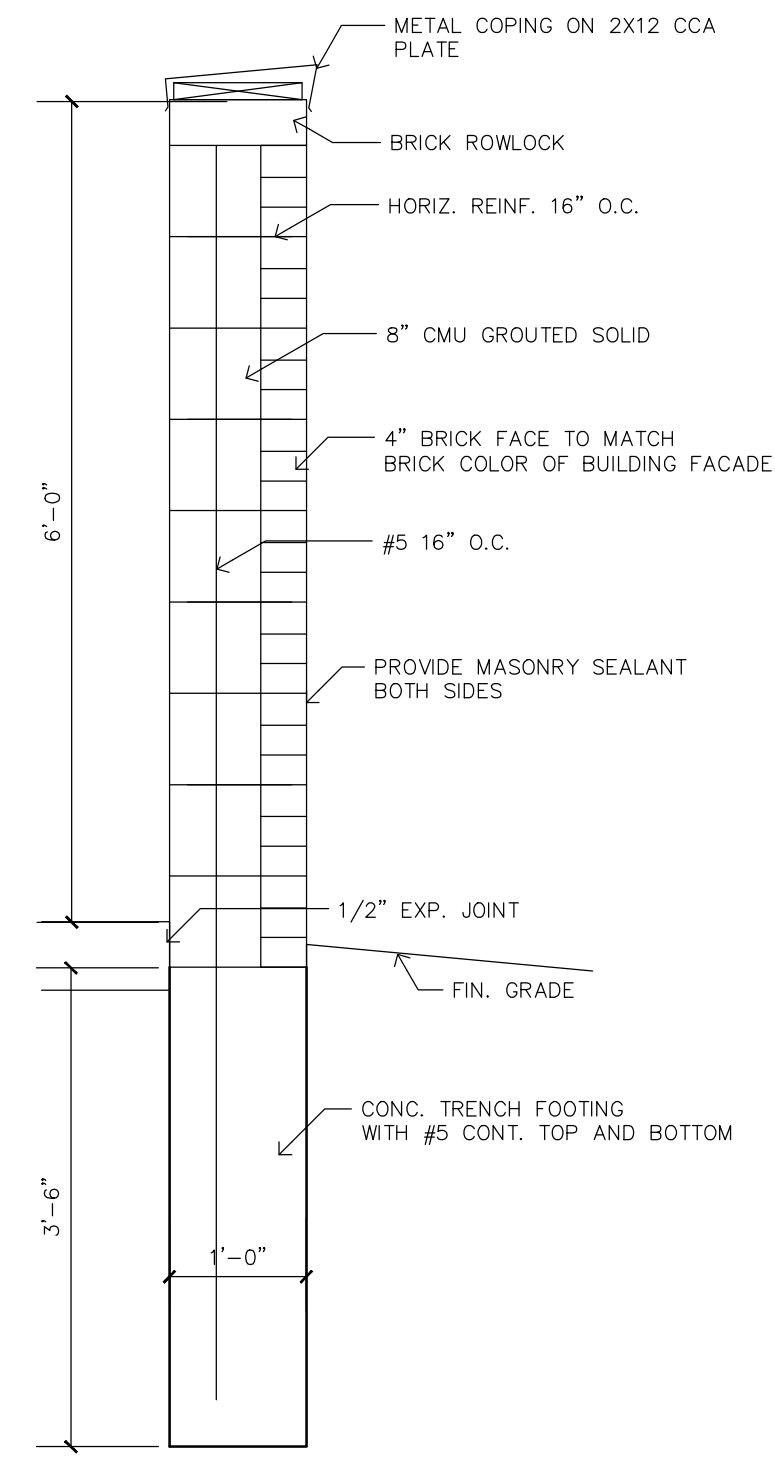
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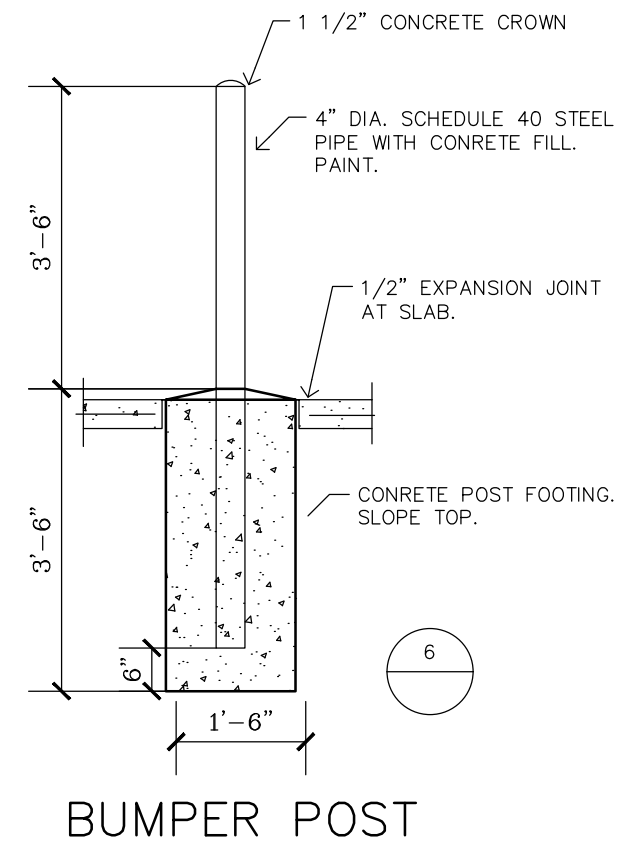
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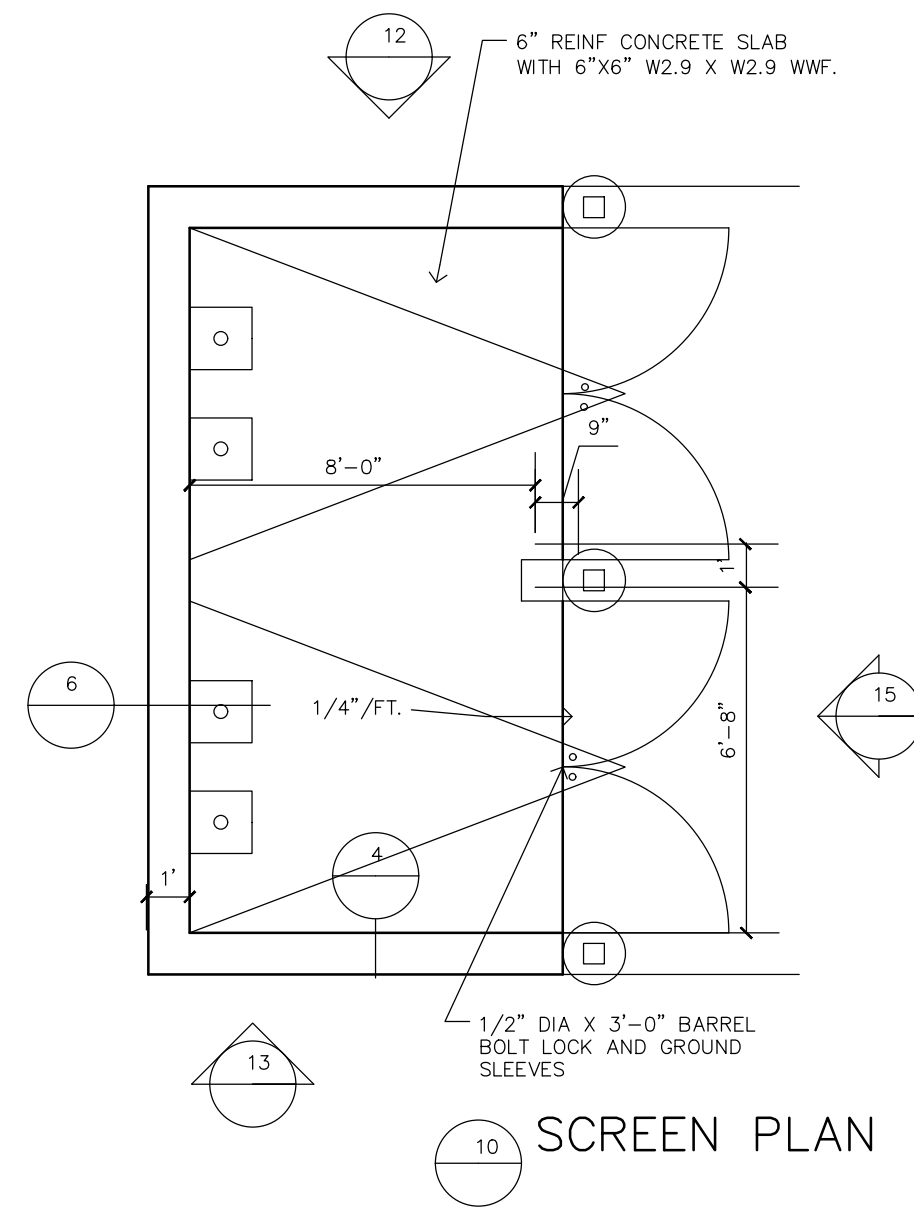
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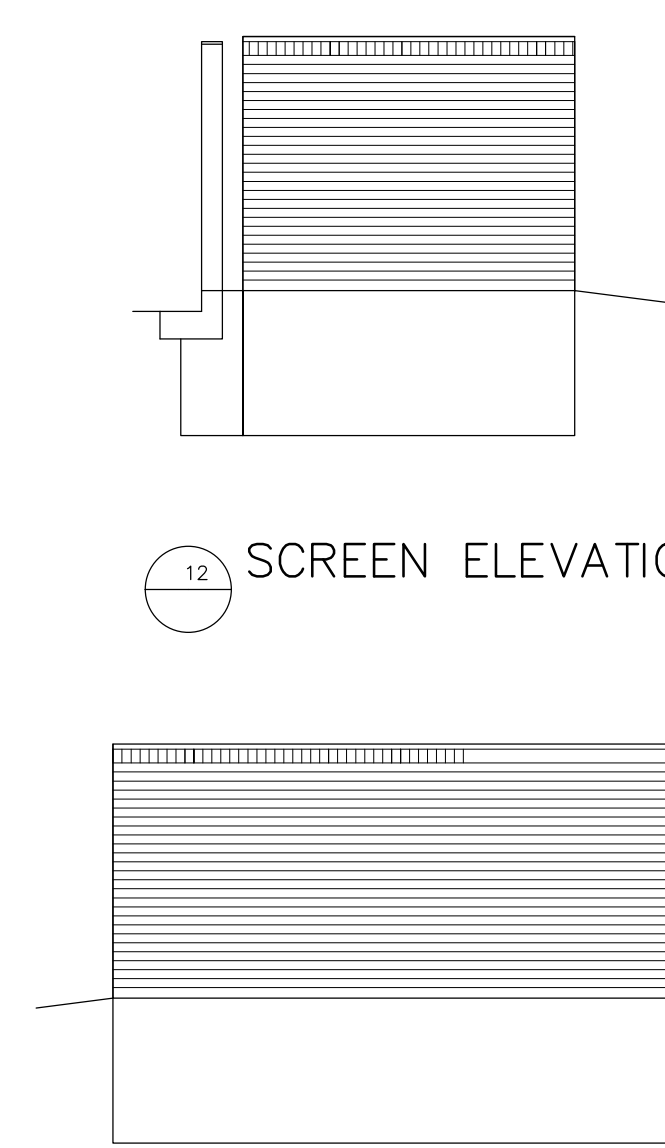
4 SCREEN SECTION



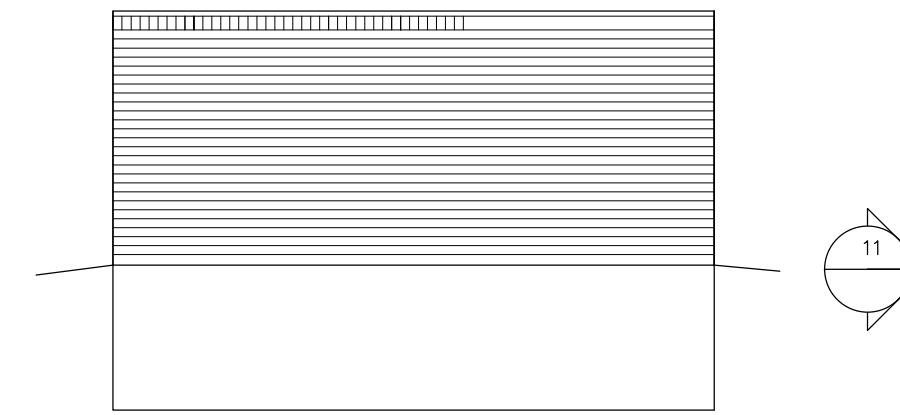
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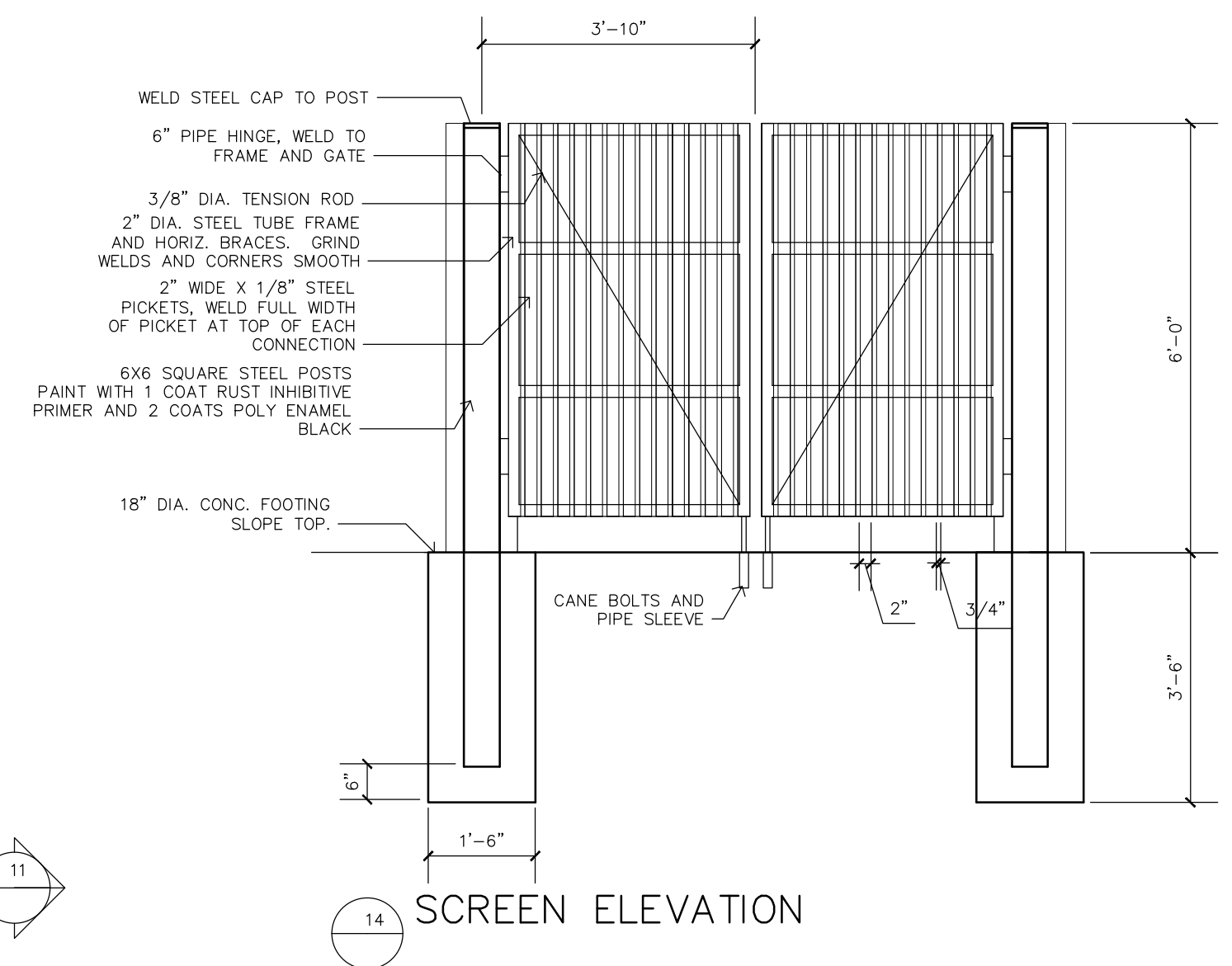
10 SCREEN PLAN



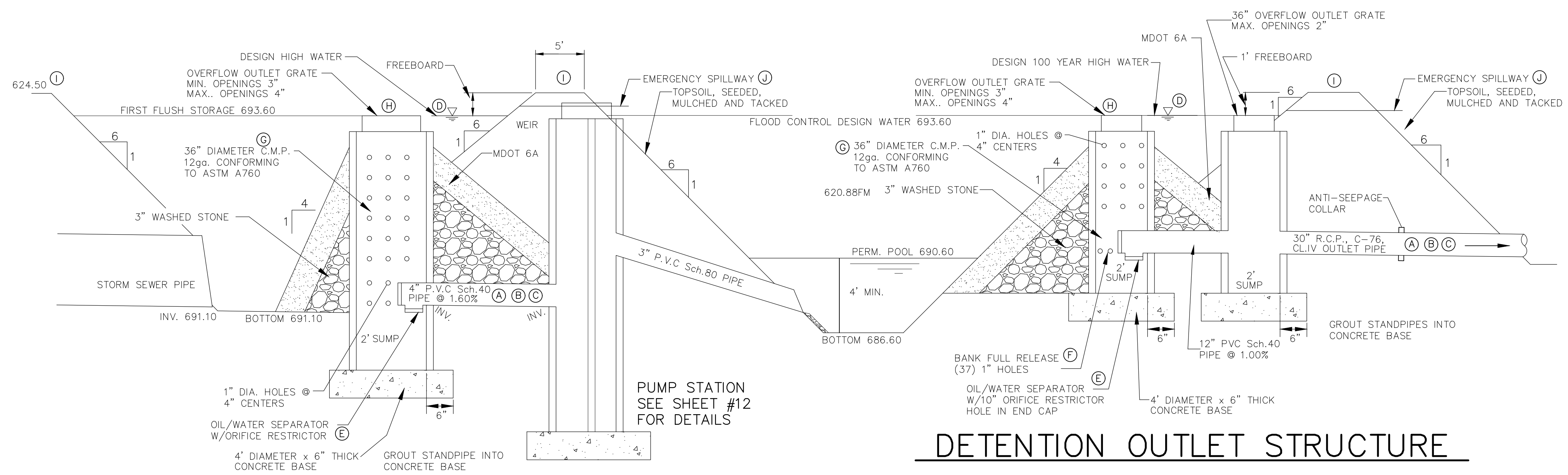
12 SCREEN ELEVATION



11 SCREEN ELEVATION



14 SCREEN ELEVATION



FOREBAY OUTLET STRUCTURE

DETENTION OUTLET STRUCTURE

FOREBAY OUTLET SCHEDULE								
OUTLET PIPE LENGTH (A)	OUTLET PIPE SLOPE (B)	OUTLET PIPE SIZE (C)	10-YEAR STORAGE (D)	FIRST FLUSH DISCHARGE ORIFICE SIZE (E)	STANDPIPE DIAMETER (G)	TOP OF STANDPIPE ELEVATION (H)	FOREBAY CREST ELEVATION (I)	EMERGENCY SPILLWAY ELEVATION (J)
100'	0.50%	24" @ 691.10	693.60	(1) 2-3/16" IN CAP	36"	693.60	694.60	694.60

DETENTION OUTLET SCHEDULE								
OUTLET PIPE LENGTH (A)	OUTLET PIPE SLOPE (B)	OUTLET PIPE SIZE (C)	100 YEAR STORAGE (D)	100 YEAR STORM RELEASE INV./ORIFICE SIZE (E)	STANDPIPE DIAMETER (G)	TOP OF STANDPIPE ELEVATION (H)	POND CREST ELEVATION (I)	EMERGENCY SPILLWAY ELEVATION (J)
75'	0.50%	36"	693.60	(1) 10" HOLE @ 690.60	36"	693.60	694.60	694.60

LANDSCAPE PLANTING NOTES:

PLANTING

- Installation of all plant material shall be in accordance with the latest edition of the *American Association of Nurserymen Standards for Nursery Stock* and with the specifications set forth by Van Buren Township, Michigan.
- The plant materials shall conform to the type stated on the plant list. Sizes shall be the minimum stated on the plant list or larger. All measurements shall be in accordance with the latest edition of the *American Association of Nurserymen Standards for Nursery Stock*.
- The plant material shall be nursery grown and inspected by the Owner's representative before planting. The Owner's representative reserves the right to reject any plant material at any time.
- Plants designated "B&B" shall be balled and burlapped with firm balls of earth.
- Dig shrub pits one foot (1') larger than the shrub rootball, tree pits three (3) times the width of the tree rootball and backfill with one (1) part topsoil and one (1) part soil from excavated pit. Plant trees and shrubs at the same grade level at which they were planted at the nursery. If wet, clay soils are evident, plant trees and shrubs slightly higher.
- The Contractor is responsible for planting the materials at the correct grades and spacing. The plants shall be oriented to give the best appearance.
- When the plant has been properly set, the pit shall be backfilled with the topsoil mixture, gradually filling, patting, and settling with water.
- Trees in lawn areas to have a four foot (4') circle of mulch, four inches (4") deep, and three inches (3") away from the trunk. Shrub beds are to be mulched with shredded bark mulch to a minimum depth of three inches (3"). Perennial beds are to be mulched with shredded bark mulch to a minimum depth of two inches (2"). Only natural color, finely shredded hardwood bark mulch will be accepted.
- Remove all twine, wire, and burlap from the top one third (1/3) of tree and shrub root balls and from tree trunks. Remove all non-biodegradable material such as plastic or nylon completely from branches and stems. All tree wrap, stakes, and guys are to be removed after one (1) winter season.
- All plant materials shall be pruned and injuries repaired. The amount of pruning shall be limited to the removal of dead or injured limbs and to compensate for the loss of roots from transplanting. Cuts should be flush, leaving no stubs. Cuts over three quarters of an inch (3/4") shall be painted with tree paint. Shrubs along the site perimeter shall be allowed to grow together in a natural form.
- Organic, friable topsoil shall be evenly distributed and fine graded over all areas to receive lawns at uniform depth of four inches (4") after settlement.
- All lawn areas shall be sodded with a Grade A Kentucky Blue Grass blend over the topsoil.
- All plantings shall be completed within three (3) months, and no later than November 30, from the date of issuance of a certificate of occupancy if such certificate is issued during the April 1 thru September 30 period; if the certificate is issued during the October 1 thru March 31 period, the planting shall be completed no later than the ensuing May 31. If the Owner is to pursue a Certificate of Occupancy prior to landscaping requirements being fulfilled, a performance guarantee must be provided.
- Backfill directly behind all curbs and along sidewalks and compact to the top of curbs or walk to support vehicle and pedestrian weight without settling.
- Conversion of all asphalt and gravel areas to landscape planting beds shall be done in the following manner:
 - Remove all asphalt, gravel, and compacted earth to a depth of six inches to eighteen inches (6"-18") depending on the depth of the sub base and dispose of off site;
 - Call the Township for an inspection prior to backfilling;
 - Replace excavated material with good, medium-textured planting soil (loam or light yellow clay loam) to a minimum of two inches (2") above the top of the curb and sidewalk, add four inches to six inches (4"-6") of topsoil and crown to a minimum of six inches (6") above the adjacent curb and walk after earth settling, unless otherwise noted on the landscape plan.
 If conversion from asphalt to landscape occurs in or between an existing landscape area(s), replace excavated material from four inches to six inches (4"-6") below adjacent existing grade with good, medium-textured planting soil (loam or light yellow clay loam) and add four inches to six inches (4"-6") of topsoil to meet existing grades after earth settling.

MATERIALS

- Required landscape material shall satisfy the criteria of the American Association of Nurserymen Standards for Nursery Stock and be:
 - Northern nursery grown;
 - State Department of Agriculture inspected;
 - No. 1 grade material with a straight, unscarred trunk, and well-developed uniform crown (park grade trees will not be accepted);
 - Staked, wrapped, watered, and mulched according to the details provided;
 - Guaranteed for one (1) year.
- Topsoil shall be friable, fertile soil of clayloam character containing at least five percent (5%) but not more than twenty percent (20%) by weight of organic matter with a pH range between 6.0 and 7.0. The topsoil shall be free from clay lumps, coarse sand, plant roots, sticks, and other foreign materials.
- The seed mixture for the seeded lawn areas as indicated on the plan shall consist of a Kentucky Blue Grass blend and mulched with clean straw free of noxious weed seeds. Maintenance of the right-of-way lawn area shall consist of a regular cuttings as needed. Weed content of the seed mixture shall not exceed one percent (1%). The mix shall be applied at a rate of 200 pounds per acre.
- Sod, if specified, shall be two (2) year old "Baron/Sheri/Adelphi" Kentucky Blue Grass blend grown in a sod nursery on loam soil.
- Proposed perennials shall be full, well-rooted plants.
- Cobblestone mulch shall consist of two inch to four inch (2" - 4") cobbles six inches (6") deep with geotextile fabric beneath.
- Callery Pear (*Pyrus calleryana*) and Norway Maple (*Acer platanoides*) shall not be substituted for any tree species in the plant list. Contact the Landscape Architect for acceptable plant substitutions.

GENERAL

- Do not plant deciduous or evergreen trees directly over utility lines or under overhead wires. Maintain a six foot (6') distance from the centerline of utilities and twenty feet (20') from the centerline of overhead wires for planting holes. Call MISS DIG forty-eight (48) hours prior to landscape construction for field location of utility lines.
- The Contractor agrees to guarantee all plant material for a period of one (1) year. At that time, the Owner's representative reserves the right for a final inspection. Plant material with twenty-five percent (25%) die back, as determined by the Owner's representative shall be replaced. This guarantee includes the furnishing of new plants, labor, and materials. These new plants shall also be guaranteed for a period of one (1) year.
- The work shall consist of providing all necessary materials, labor, equipment, tools, and supervision required for the completion as indicated on the drawings.
- Landscape areas shall be irrigated by an automatic underground irrigation system. Lawns and shrub/landscape areas shall be watered by separate zones to minimize overwatering.
- All written dimensions override scale dimensions on the plans.
- All substitutions or deviations from the landscape plan must be approved by Van Buren Township prior to installation.
- All bidders must inspect the site and report any discrepancies to the Owner's representative.
- All specifications are subject to change due to existing conditions.
- The Owner's representative reserves the right to approve all plant material.

MAINTENANCE

- The Owner of the landscaping shall perpetually maintain such landscaping in good condition so as to present a healthy, neat, and orderly appearance, free from refuse and debris.
- The Owner shall conduct a seasonal landscape maintenance program including regular lawn cutting (at least once per week during the growing season), pruning at appropriate times, watering, and snow removal during winter.
- The Contractor is responsible for watering and maintenance of all seed areas until a minimum of ninety percent (90%) coverage, as determined by the Owner's representative.
- All diseased and/or dead material shall be removed within sixty (60) days following notification and shall be replaced within the next appropriate planting season or within one (1) year, whichever comes first.
- Any debris such as lawn clippings, fallen leaves, fallen limbs, and litter shall be removed from the site on a weekly basis at the appropriate season.
- All planting beds shall be maintained by removing weeds, fertilizing, and replenishing mulch as needed.

DETENTION POND LANDSCAPE DEVELOPMENT NOTES:

PLANTING:

- Follow the Supplier's recommended procedures for bed preparation, installation, and soil erosion control measures of the proposed seeded areas. After the plants germinate and begin to grow follow the maintenance guidelines included on this sheet.
- Rototill four inches (4") of compost or topsoil into the top six inches (6") of the surface of the basin. (Compost may be obtained from the municipal facility at Six Mile and Ridge Roads. Call Onyx Environmental at 248 305-8377 or 248 349-7230 for hours of operation and general information.)
- Provide a cover crop of annual rye at a rate of ten pounds (10#) per acre and seed oats at a rate of thirty pounds (30#) per acre over the entire area to be seeded.

MAINTENANCE OF THE DETENTION AREA

- ESTABLISHMENT:** During the first growing season, the native seed areas should be mowed two (2) to four (4) times to a height of four inches to six inches (4"-6") when the plants reach a height of ten inches to twelve inches (10"-12"). Hand pulling may be needed to control unwanted weed populations. If a mower cannot be set high enough, a string trimmer can be used. During the second growing season, the native seed areas should be mowed a few times to a height of about eight inches (8"), when the plants reach a height of ten inches to eighteen inches (10"-18"). Hand pulling may be needed to control unwanted weed populations. By the second growing season it should be apparent if some areas need reseeding. Long term management includes mowing and hand pulling of weeds. The native planting may be mowed to a short height and the clippings removed in the early Spring before birds begin nesting.
- WATERING:** Watering should be performed as needed. During the establishment period after the initial planting, watering is very important and should be conducted every two to three (2-3) days. The initial planting should be checked regularly for appropriate moisture availability. Two (2) methods for determining adequate moisture levels include the following:
 - if the plants wilt during the day when the temperature is at its highest, but revive during the night, then watering is not necessary, and
 - by testing the soil moisture at a depth of four inches (4") by inserting a small rod into the soil. If the rod is wet, then the soil is moist at a depth of four inches (4") and watering is not necessary.
- EROSION CONTROL:** Provide an erosion control blanket on the side slopes of the seeded areas detention area. The erosion control blanket shall be pegged in place.
- EDGING:** The edge of the detention area should be maintained to avoid grass growing into the detention area. The edge can be maintained with a V-notch cut edge. The channel should be maintained at four inches (4") or greater and renewed every six to eight (6-8) weeks.
- CUTTING BACK:** Tall wildflowers should be cut back by one-third. Early flowering plants can be cut back in late June or early July and late flowering plants in late October.
- THINNING:** After the detention area has become established and thriving, it may be necessary to thin perennials by dividing individual plants in Spring or Fall.
- REPLACEMENT:** Any plants that die or become diseased should be replaced. Plant health should be checked regularly with replanted material occurring in the Spring or Fall.
- REMOVAL OF LITTER AND DEBRIS:** Litter, trash, and debris should be removed on a regular basis to insure that inlets remain free flowing and to keep the area in a neat and attractive appearance.
- INORGANIC APPLICATIONS:** In general, detention areas do not need fertilization as nutrients from surrounding areas is usually at an elevated level. If soil fertility appears to be an issue, the soil should be tested and appropriate actions taken based on the results. Insecticides, herbicides, fungicides, and rodenticides should not be used in the detention area. If a plant is diseased or infested with insects, it should simply be removed and replaced.

SEED MIX COMPOSITIONS

WETLAND SEED MIX

MICHIGAN WILDFLOWER FARM
A composition of wildflowers, sedges, and grasses.
Application rate: 3 oz. per 1000 sq. ft. or 7 lbs. per acre

BOTANICAL NAME	COMMON NAME
Wildflowers	
<i>Asclepias incarnata</i>	Swamp Milkweed
<i>Aster novae-anglae</i>	New England Aster
<i>Aster puniceus</i>	Swamp Aster
<i>Aster umbellatus</i>	Flat-Top Aster
<i>Eupatorium maculatum</i>	Joe-Pye Weed
<i>Eupatorium perfoliatum</i>	Boneset
<i>Euthamia graminifolia</i>	Grassleaved Goldenrod
<i>Liatris spicata</i>	Marsh Blazing Star
<i>Pedicularis lanceolata</i>	Swamp Betony
<i>Rudbeckia subtomentosa</i>	Black-Eyed Susan
<i>Silphium perfoliatum</i>	Cupplant
<i>Silphium terebinthinaceum</i>	Prairie Dock
<i>Solidago patula</i>	Swamp Goldenrod
<i>Solidago riddellii</i>	Ridell's Goldenrod
<i>Verbena hastata</i>	Blue Vervain
<i>Vernonia missurica</i>	Ironweed
<i>Veronicastrum virginicum</i>	Culver's Root
Sedges/Grasses	
<i>Andropogon scoparius</i>	Little Bluestem
<i>Carex crinita</i>	Fringed Sedge
<i>Carex stricta</i>	Tussock Sedge
<i>Scirpus cyperinus</i>	Wool Grass



WETLAND SEED MIX

CUSTOM SHORT GRASS SEED MIX

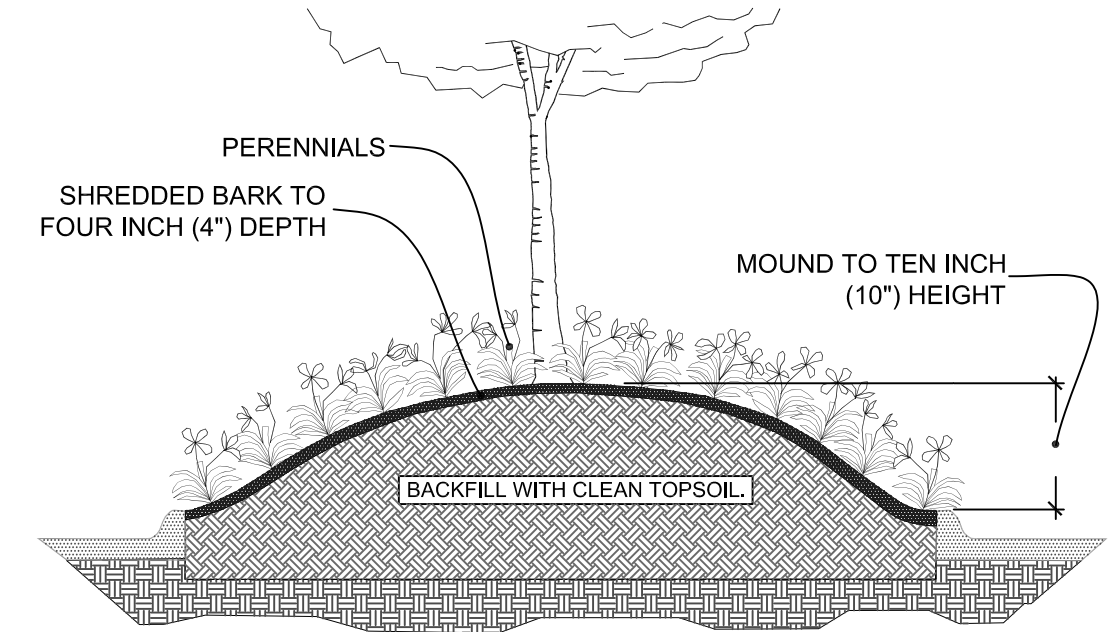
Fifty percent (50%) Forbs/Fifty percent (50%) Grass.
Application rate: 5 oz. per 1000 sq. ft. or 10 lbs. per acre

BOTANICAL NAME	COMMON NAME
Wildflowers	
<i>Achillea millefolium</i>	Yarrow
<i>Aquilegia canadensis</i>	Wild Columbine
<i>Asclepias tuberosa</i>	Butterflyweed
<i>Aster laevis</i>	Smooth Aster
<i>Coreopsis lanceolata</i>	Sand Tickseed
<i>Echinacea purpurea</i>	Purple Coneflower
<i>Kuhnia eupatorioides</i>	False Boneset
<i>Monarda fistulosa</i>	Bergamot
<i>Penstemon digitalis</i>	Fogklove Beardstongue
<i>Rudbeckia hirta</i>	Black-Eyed Susan
<i>Solidago speciosa</i>	Shaw's Goldenrod
Sedges/Grasses	
<i>Schizachyrium scoparius</i>	Little Bluestem
<i>Bouteloua curtipendula</i>	Side Oats Grama
<i>Koeleria pyramidata</i>	June Grass*
<i>Sporobolus heterolepis</i>	Prairie Dropseed*
* Supplier to add these species to the mix.	

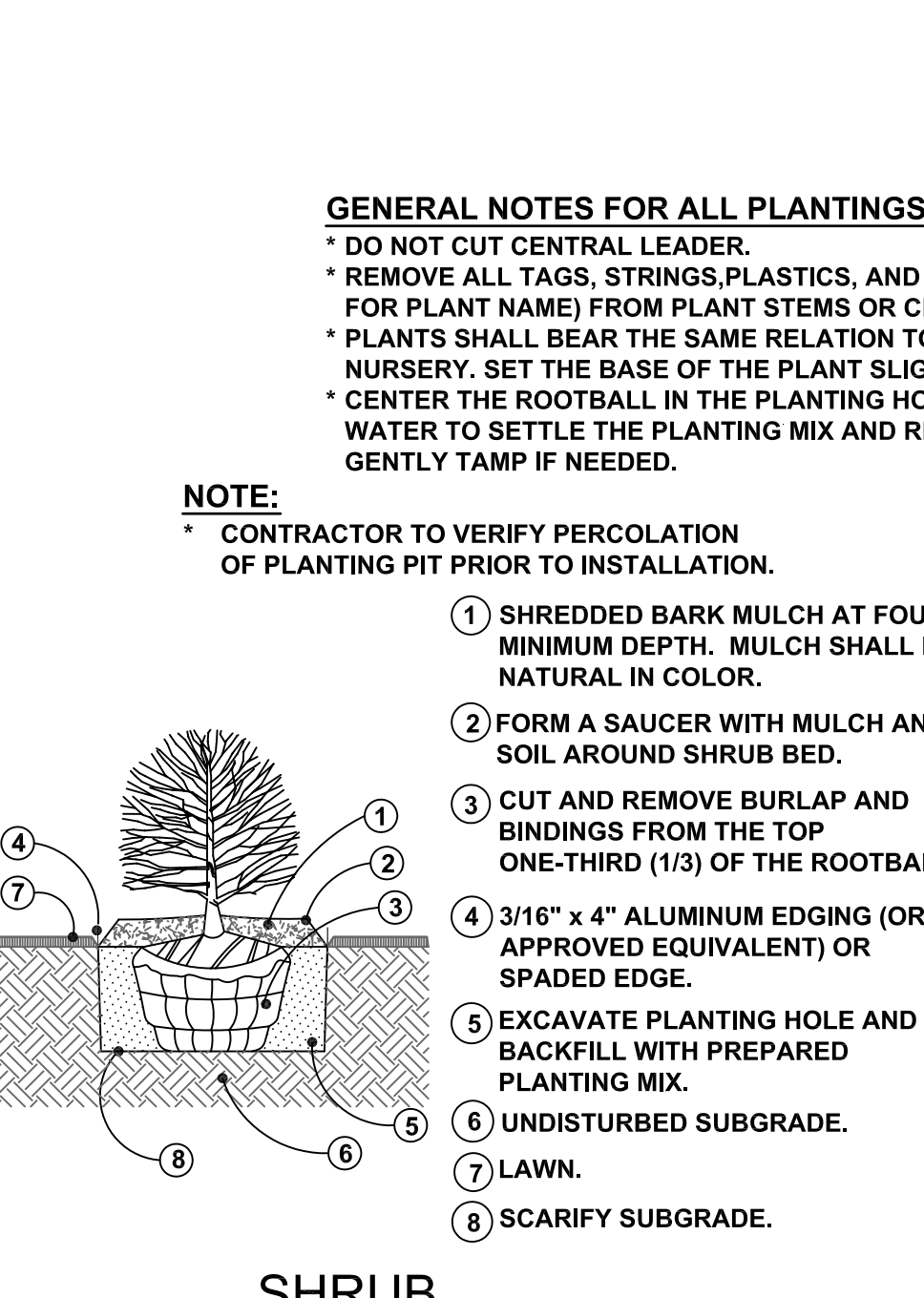
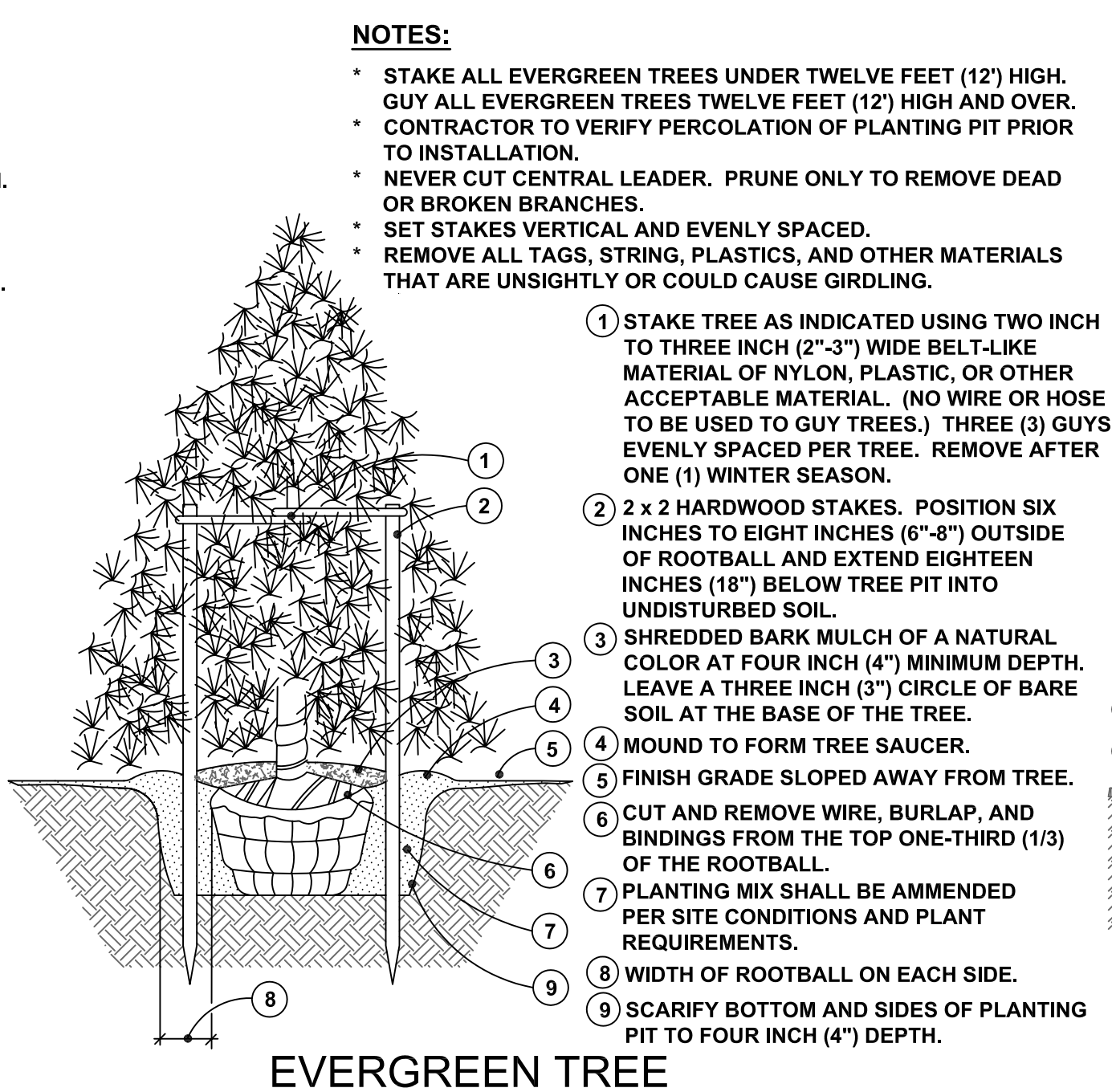
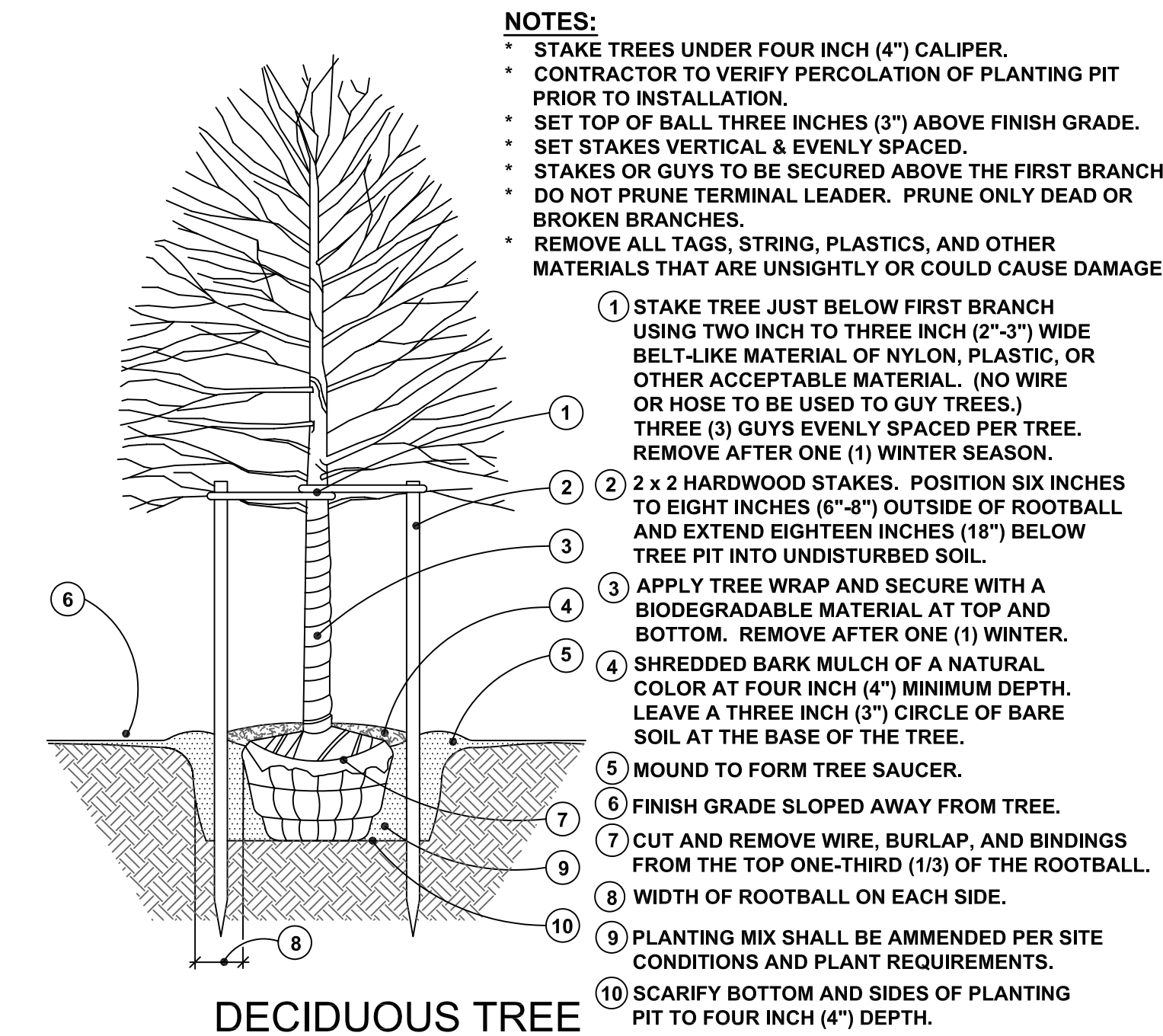
BOTANICAL NAME	COMMON NAME
Sedges/Grasses	
<i>Schizachyrium scoparius</i>	Little Bluestem
<i>Bouteloua curtipendula</i>	Side Oats Grama
<i>Koeleria pyramidata</i>	June Grass*
<i>Sporobolus heterolepis</i>	Prairie Dropseed*
* Supplier to add these species to the mix.	

MICHIGAN WILDFLOWER FARM
11770 Cutler Road
Portland, Michigan 48875-9452
Phone: (517) 647 6010
Fax: (517) 647 6072

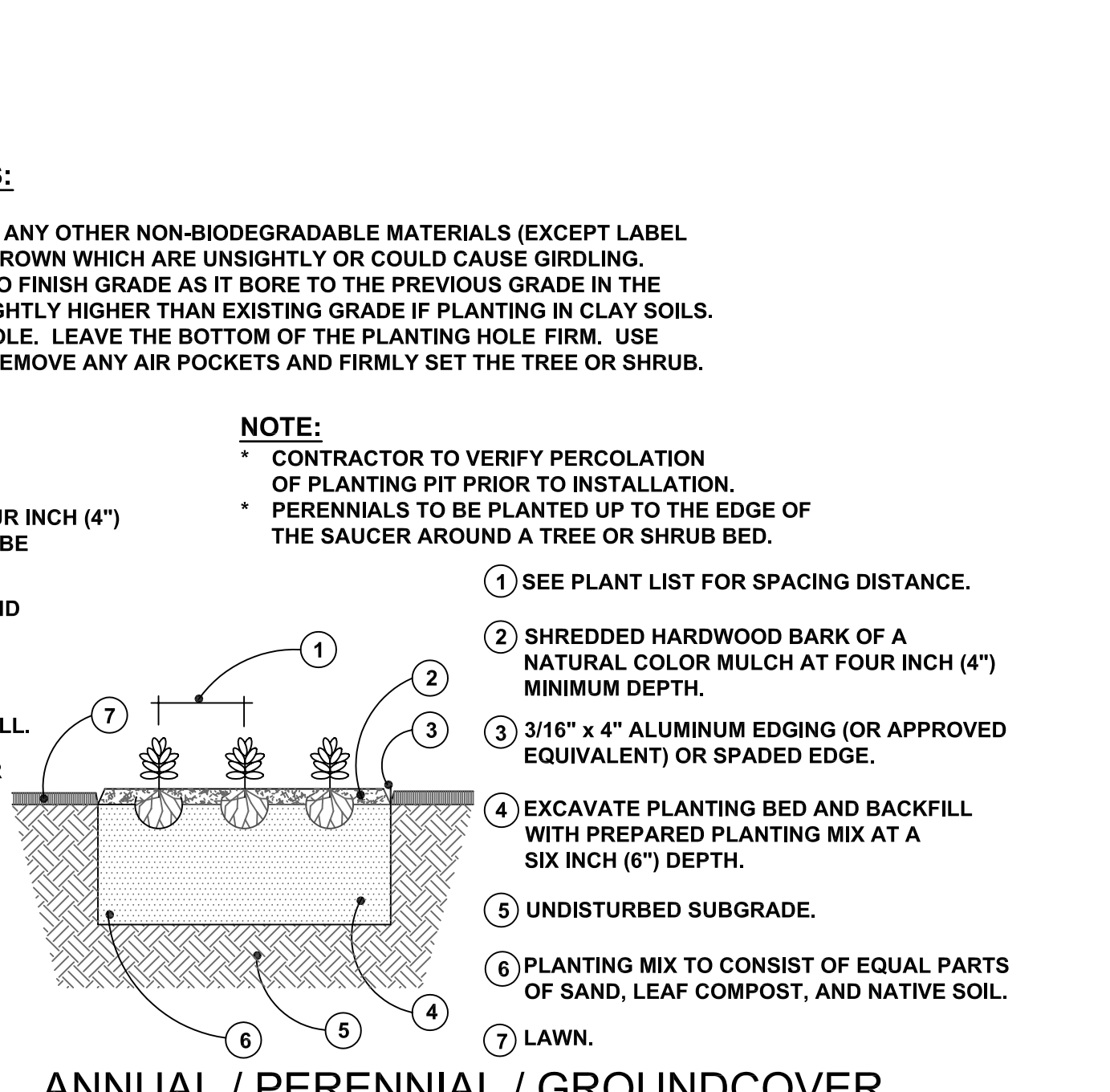
CUSTOM SHORT GRASS SEED MIX



PARKING LOT ISLAND DETAIL not to scale



SHRUB



ANNUAL / PERENNIAL / GROUNDCOVER

not to scale

PLANTING DETAILS

not to scale

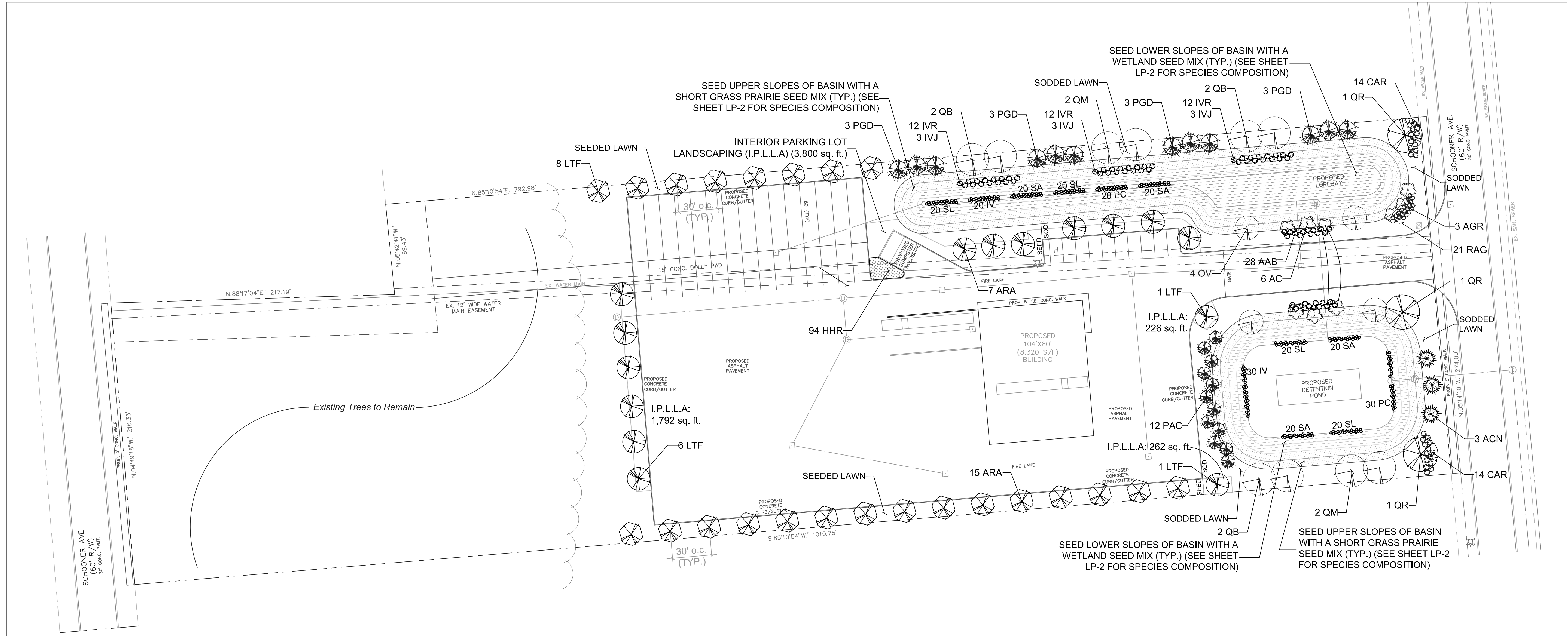
date: March 2, 2022
revised:
05-16-2022 Revise for Township review ltr.
dated April 14, 2022.

LANDSCAPE PLAN FOR:
Davenport Brothers Construction
301 Industrial Park Drive
Belleville, Michigan 48111
(734) 697-2994

PROJECT LOCATION:
Proposed Trucking Facility
Schooner Avenue
Van Buren Township
Michigan

LANDSCAPE PLAN BY:
Nagy Devlin Land Design, L.L.C.
31736 West Chicago Ave.
Livonia, Michigan 48150
(734) 634-9208

LP - 2: LANDSCAPE NOTES & DETAILS



LANDSCAPE PLANTING PLAN

scale: 1" = 40'

PLANT LIST

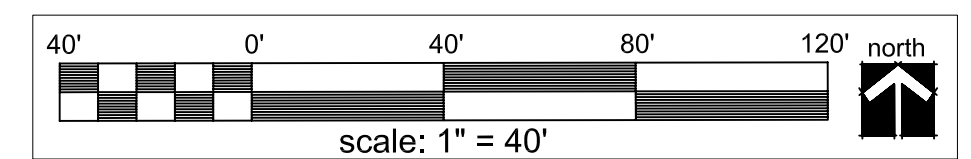
KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE
FRONTAGE LANDSCAPING - Schooner Avenue				
ACN	3	<i>Abies concolor</i>	Concolor Fir	8' ht. B&B
AGR	3	<i>Amelanchier x grandiflora</i> 'Robin Hill'	Robin Hill Apple Serviceberry	2" cal. B&B
CAR	28	<i>Clethra alnifolia</i> 'Ruby Spice'	Ruby Spice Summersweet	30" ht., 5 gal. pot
QR	3	<i>Quercus rubra</i>	Red Oak	3" cal. B&B
RAG	21	<i>Rhus aromatica</i> 'Gro-Low'	Gro-Low Fragrant Sumac	24" ht., 3 gal. pot
INTERIOR PARKING LOT LANDSCAPING				
ARA	7	<i>Acer rubrum</i> 'Armstrong Gold'	Armstrong Gold Red Maple	3" cal. B&B
LTF	8	<i>Liriodendron tulipifera</i> 'Fastigiata'	Fastigate Tuliptree	3" cal. B&B
HHR	94	<i>Hemerocallis</i> sp. 'Happy Returns'	Happy Returns Daylily	1 gal. pot, 36" o.c.
LOADING AREA LANDSCAPING				
PAC	12	<i>Picea abies</i> 'Cupressina'	Cupressina Norway Spruce	8' ht. B&B
OPEN SPACE LANDSCAPING				
PGD	12	<i>Picea glauca</i> 'Black Hills'	Black Hills White Spruce	8' ht. B&B
STORMWATER BASIN LANDSCAPING				
AAB	28	<i>Aronia arbutifolia</i> 'Brilliantissima'	Brilliantissima Red Chokeberry	36" ht., 5 gal. pot
AC	6	<i>Amelanchier canadensis</i>	Clump Serviceberry	8' - 10' ht. B&B
IVJ	9	<i>Ilex verticillata</i> 'Jim Dandy'	Jim Dandy Michigan Holly	30" ht., 5 gal. pot
IVR	36	<i>Ilex verticillata</i> 'Red Sprite'	Red Sprite Michigan Holly	30" ht., 5 gal. pot
OV	4	<i>Ostrya virginiana</i>	American Hophornbeam	2" cal. B&B
QB	4	<i>Quercus bicolor</i>	Swamp White Oak	3" cal. B&B
QM	2	<i>Quercus macrocarpa</i>	Bur Oak	3" cal. B&B
Emergent Plantings				
IV	50	<i>Iris virginica</i>	Blue Flag Iris	Bare Root
PC	50	<i>Pontederia cordata</i>	Pickeral Weed	Bare Root
SA	80	<i>Scirpus acutus</i>	Hard-Stemmed Bulrush	Bare Root
SL	70	<i>Sagittaria latifolia</i>	Broad-Leaf Arrowhead	Bare Root
GREENBELT BUFFER LANDSCAPING				
ARA	15	<i>Acer rubrum</i> 'Armstrong Gold'	Armstrong Gold Red Maple	3" cal. B&B
LTF	8	<i>Liriodendron tulipifera</i> 'Fastigiata'	Fastigate Tuliptree	3" cal. B&B

LANDSCAPE CALCULATIONS

FRONTAGE LANDSCAPING - Schooner Avenue (240 l.f.)
 * One (1) deciduous or evergreen tree / 40 l.f. = 6 trees
 * One (1) ornamental tree / 100 l.f. = 2.4 trees = 3 trees
 * Eight (8) shrubs / 40 l.f. = 48 shrubs
 PARKING LOT LANDSCAPING (88,352 sq. ft. of parking area)
 * Interior landscaping shall account for a minimum of five percent of all paved parking areas
 * 88,352 times .05 equals 4,418 sq. ft.
 * One (1) deciduous tree shall be planted for each three hundred (300) sq. ft. or fraction thereof of interior landscaped area
 * 4,418 divided by 300 = 14.73 trees = 15 trees
 * Interior parking lot landscape provided equals 6,014 sq. ft.
 LOADING AREA LANDSCAPING
 * Loading areas shall be screened from a perpendicular view from any public street rights-of-way
 * Evergreen trees at least eight feet (8') in height and planted in staggered double row spaced fifteen feet (15') on center
 OPEN SPACE LANDSCAPING (20,644 sq. ft.)
 * One (1) deciduous or evergreen tree shall be planted per 3,000 sq. ft. of open area
 * 20,644 divided by 3,000 equals 6.88 trees = 7 trees
 STORMWATER BASIN LANDSCAPING
 * The landscape treatment for the side slopes and bottom of the basin shall be planted with native plants consisting of a native seed mix and plugs
 * Trees and shrubs shall be planted around the perimeter of the basin
 GREENBELT BUFFER LANDSCAPING
 * One (1) deciduous or evergreen tree shall be planted per 30 in. ft. of required buffer

NOTE:

* See Sheet LP-2 for landscape planting details, landscape development notes, parking lot island detail, detention pond planting notes, and seed mix compositions.



date: March 2, 2022
 revised:
 05-16-2022 Revise for Township review ltr.
 dated April 14, 2022.

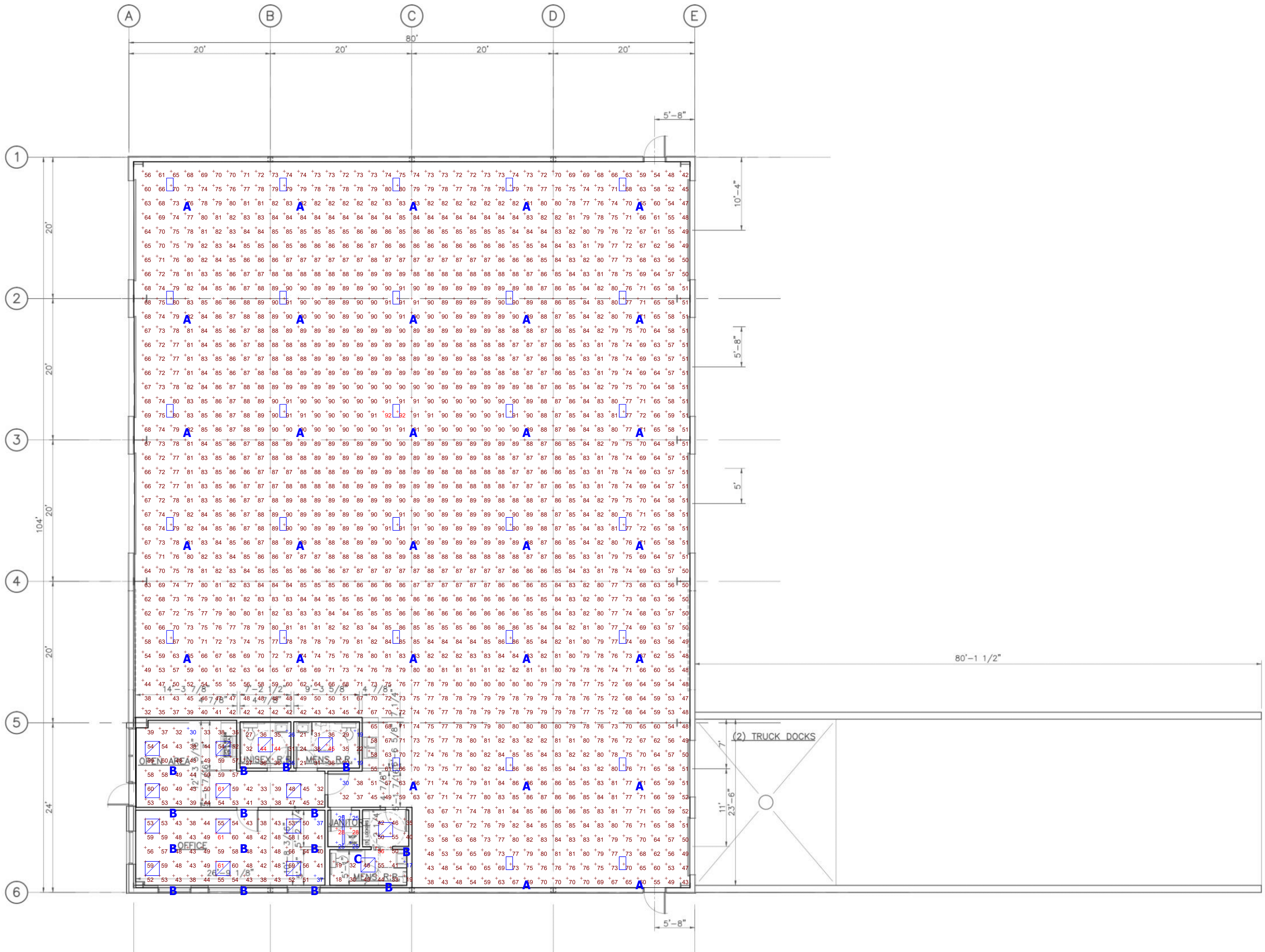


LANDSCAPE PLAN FOR:
 Davenport Brothers Construction
 301 Industrial Park Drive
 Belleville, Michigan 48111
 (734) 697-2994

PROJECT LOCATION:
 Proposed Trucking Facility
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 Van Buren Township,
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 Nagy Devlin Land Design, L.L.C.
 31736 West Chicago Ave.
 Livonia, Michigan 48150
 (734) 634-9208





Plan View
Scale - 1/8" = 1ft

- General Note**
- SEE SCHEDULE FOR LUMINAIRE MOUNTING HEIGHT.
 - SEE LUMINAIRE SCHEDULE FOR LIGHT LOSS FACTOR.
 - CALCULATIONS ARE SHOWN IN FOOTCANDLES AT: 2' - 6".
 - SHOP AREA REFLECTANCE IS: 60 / 40 / 10.
 - OFFICE AREA REFLECTANCES ARE: 70 / 40 / 10.

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

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

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

Ordering Note
FOR INQUIRIES CONTACT GASSER BUSH AT QUOTES@GASSERBUSH.COM OR 734-266-6705.

Drawing Note
THIS DRAWING WAS GENERATED FROM AN ELECTRONIC IMAGE FOR ESTIMATION PURPOSE ONLY. LAYOUT TO BE VERIFIED IN FIELD BY OTHERS.

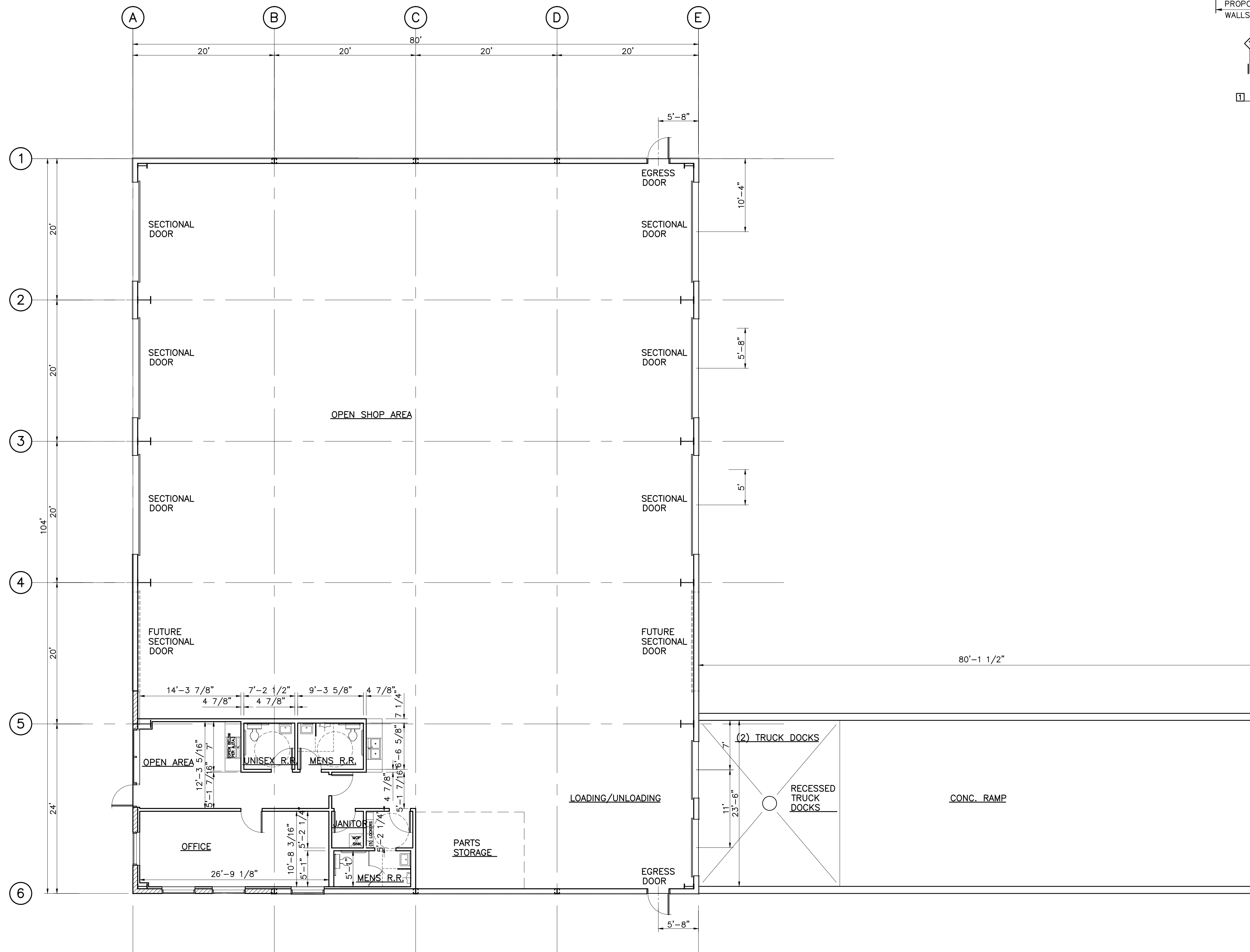
Statistics							
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
JANITOR	+	26 fc	28 fc	25 fc	1.1:1	1.0:1	0.9:1
MENS R.R.	+	39 fc	56 fc	17 fc	3.3:1	2.3:1	0.7:1
MENS R.R.	+	29 fc	45 fc	19 fc	2.4:1	1.5:1	0.6:1
OFFICE	+	49 fc	61 fc	37 fc	1.6:1	1.3:1	0.8:1
OPEN AREA	+	47 fc	61 fc	30 fc	2.0:1	1.6:1	0.8:1
SHOP AREA	+	78 fc	92 fc	30 fc	3.1:1	2.6:1	0.8:1
UNISEX R.R.	+	33 fc	44 fc	26 fc	1.7:1	1.3:1	0.8:1

Schedule											
Symbol	Label	Quantity	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Lumens Per Lamp	Light Loss Factor	Wattage	Mounting Height
□	A	30	Lithonia Lighting	CPHB 24000LM SEF GCL MD 40K 80CRI	Compact Pro Highway, 24000 lumens, Standard efficiency, Glare control lens, Medium distribution, 40 K, 80CRI.	LED	1	24872	0.9	174.41	19'-0"
□	B	15	Lithonia Lighting	2BLT2 40L ADP LP840	BLT 2X2, 4000 Nominal Lumens, Curved Linear Prismatic lens, 4000K CCT	LED	1	4105	0.9	31.1	8'-0"
	C	1	Lithonia Lighting	CLX L48 4000LM SEF FDL MVOLT GZ10 40K 80CRI	CLX LED Linear 48", 4,000 lumens, Standard Efficiency, Less louver, Flat diffuse lens, General distribution, MVOLT, 0-10V dimming, 4000 CCT, 80 CRI	LED	1	3758	0.9	27.58	8'-0"

Small Car
PERFORMANCE

1403





PLAN LEGEND

- ROOM NAME (A1-2) ROOM NAME AND NUMBER; SEE ROOM FINISH SCHEDULE ON SHEET A5.0.
- (#) FENESTRATION NUMBER, BOTH NEW AND EXISTING; SEE DOOR SCHEDULE ON SHEET A5.0.
- PROPOSED WALLS PROPOSED WALLS; SEE THE WALL TYPES DESCRIPTIONS ON THIS SHEET.
- WALL PARTITION TYPE; SEE THE WALL TYPES DESCRIPTIONS ON THIS SHEET.
- CONSTRUCTION NOTE; SEE THE CONSTRUCTION NOTES KEY ON THIS SHEET.

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

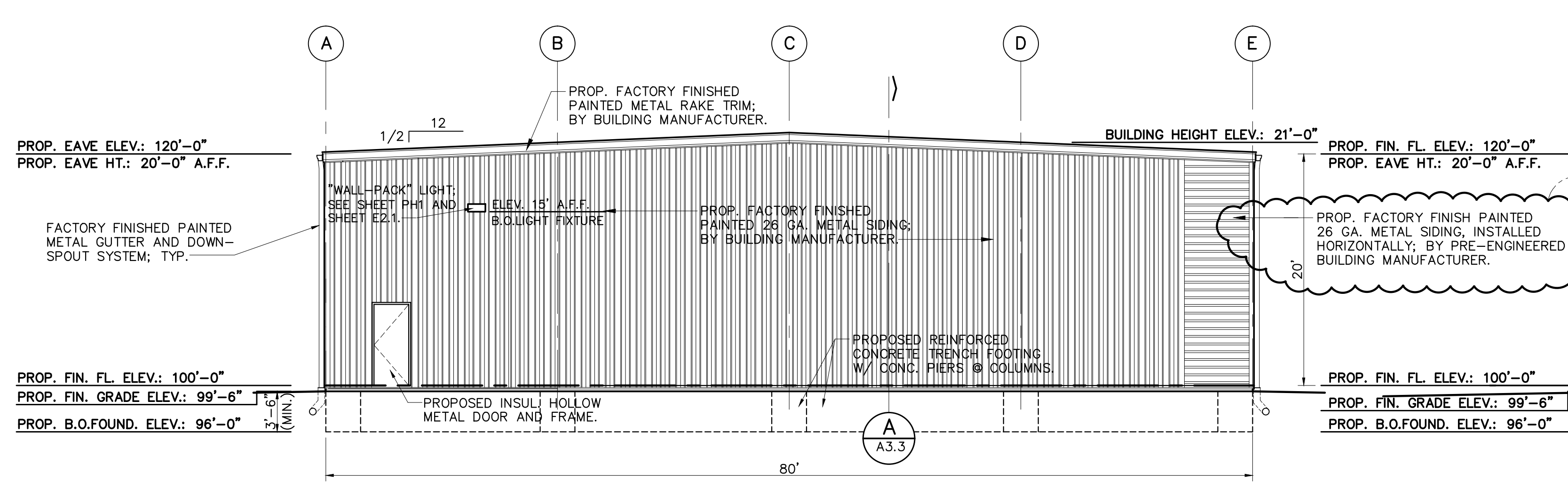
FACILITY USE STATEMENT
THE PROPOSED USE OF THE FACILITY IS FOR MAJOR TRUCK REPAIR. VEHICLES AND THEIR TRAILERS MAY REQUIRE AND RECEIVE REPLACEMENT OR REPAIR TO MANY COMPONENTS, SUCH AS ENGINES, EXHAUST SYSTEMS, TRANSMISSIONS, AND OR SUSPENSIONS.
NEW AND USED VEHICLE AND TRAILER COMPONENTS WILL BE REMOVED WITHIN THE PROPOSED BUILDING, AND ALL NEW AND USED COMPONENTS WILL BE STORED WITHIN THE PROPOSED BUILDING.

L. WARDEN, DESIGNER
LANCE WARDEN, BUILDING SPECIALIST L.L.C.
3819 PINEVIEW DRIVE EAST
DEXTER, MICHIGAN 48130
PHONE NO.: (734) 276-8672

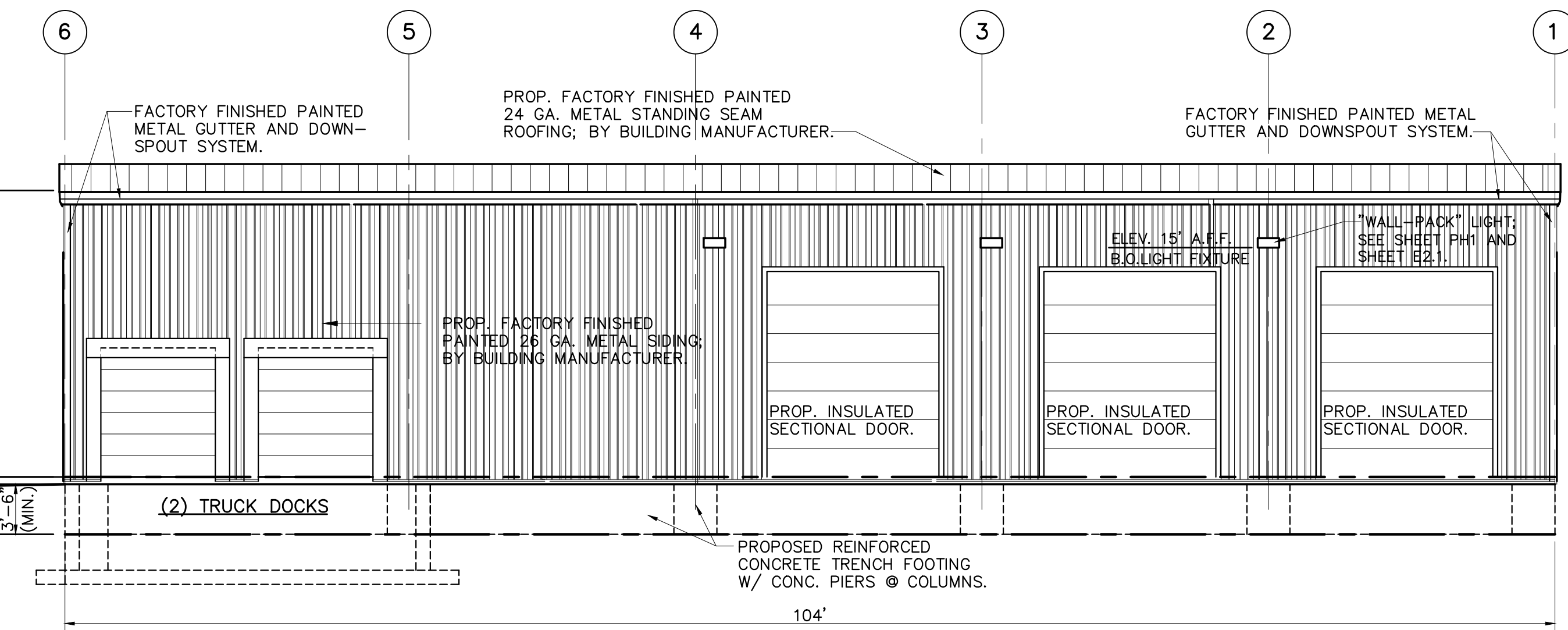
NO.	DATE	BY	REVISIONS
1	12/21/21	LDW	ISSUED FOR PERMITS
2	12/21/21	LDW	REVISED PER MICHIGNA 5/21/22 REVIEW LETTER COMMENTS
3			
4			

SEMI-TRUCK REPAIR FACILITY
VAN BUREN TWP., MICHIGAN
FLOOR PLAN

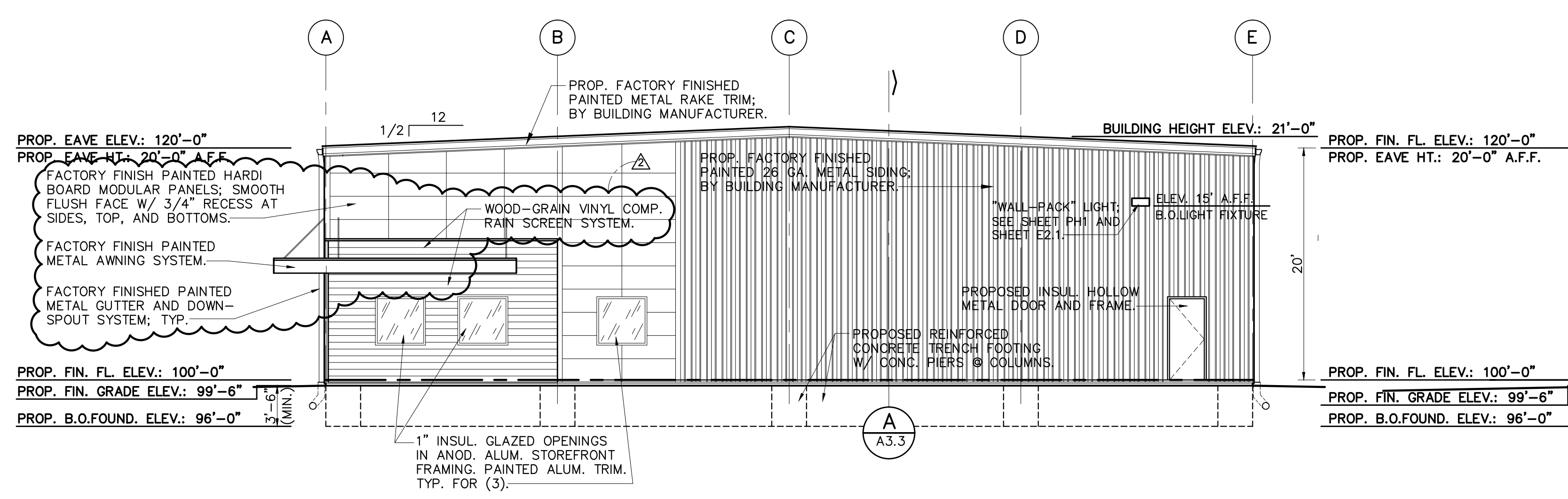
DESIGNED BY LDW	DATE DEC. 2021
DRAWN BY LDW	DATE DEC. 2021
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EDIT	FILE
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PROJECT	211220
A1.0	
SHEET NO.	



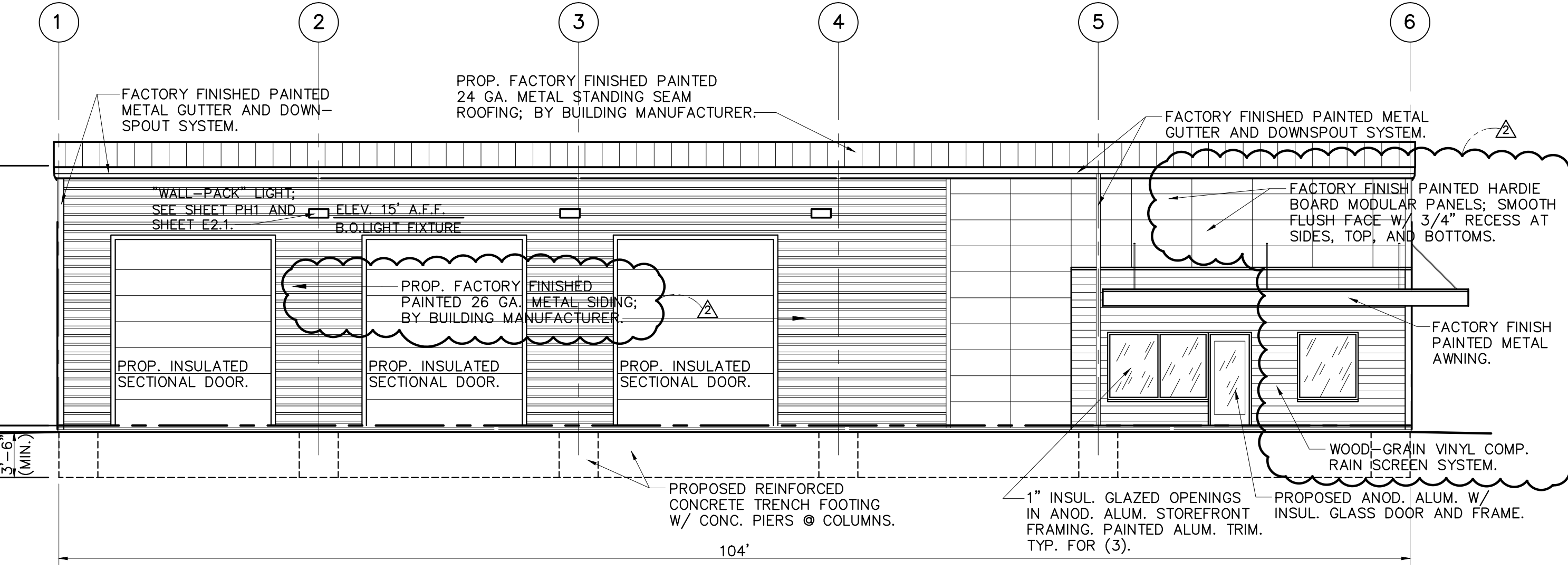
SOUTH EXTERIOR ELEVATION
 SCALE 1/8" = 1'-0"



WEST EXTERIOR ELEVATION
 SCALE 1/8" = 1'-0"



NORTH EXTERIOR ELEVATION
 SCALE 1/8" = 1'-0"



EAST EXTERIOR ELEVATION
 SCALE 1/8" = 1'-0"

NO.	DATE	BY	REVISIONS
1	12/22/20	LDW	REVIEW ONLY
2	12/22/20	LDW	REVISED PER MICHIGAN 5/21/20 REVIEW COMMENT LETTER
3			
4			

REVISED IN ACCORDANCE WITH CONSTRUCTION RECORDS

SEMI-TRUCK REPAIR FACILITY
 VAN BUREN TWP., MICHIGAN
 BUILDING ELEVATIONS

DESIGNED BY	LDW	DATE	DEC. 2021
DRAWN BY	LDW	DATE	DEC. 2021
CHECKED BY	LDW	DATE	DEC. 2021
EDIT		FILE	
SCALE	VARIES		
DRAWING			
PROJECT	211220		
A2.0			
SHEET NO.			

A photograph of the Golden Gate Bridge in San Francisco, taken at sunset. The sun is low on the horizon, creating a bright orange and red glow. The bridge's towers and suspension cables are silhouetted against the sky. The water below is calm, reflecting the bridge and the sky.

**PROPOSED DETENTION POND & FOREBAY
CHAHAL TRUCK/TRAILER REPAIR FACILITY
SCHOONER AVENUE
VAN BUREN TOWNSHIP, MICHIGAN**

**Subsurface Soil Exploration and
Geotechnical Engineering Report**

**Mr. Mark Davenport
Davenport Brothers Construction
301 Industrial Park Drive
Belleville, Michigan 48111
734-697-2994
mark@davenportbrothers.com**

HAE Project No. H-22-2236-G

June 26, 2022

HAENGEL & ASSOCIATES ENGINEERING, INC.



**HAENGEL & ASSOCIATES
ENGINEERING, INC.**

*Geotechnical, Environmental, Structural, Civil,
Construction O&A/OC, Inspection and Testing*

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June 26, 2022

Mr. Mark Davenport
Davenport Brothers Construction
301 Industrial Park Drive
Belleville, Michigan 48111
Phone: 734-697-2994

RE: Soil Exploration & Geotechnical Engineering Services
Proposed Detention Pond & Forebay
Chahal Truck/Trailer Repair Facility
Schooner Avenue, Van Buren Township,
Wayne County, Michigan 48111
HAE Project No. H-22-2236-G

Dear Mr. Davenport:

We have completed the subsurface soil exploration and geotechnical engineering report for the above referenced project. The purpose of this study was to obtain general subsurface soil and groundwater information from the site, and to identify and evaluate the geotechnical characteristics of the soils encountered at the boring locations within the proposed detention pond and forebay locations. This report presents our understanding of the project, the results of the exploration including boring logs and boring location plan, our observations including site photos, geotechnical engineering analysis, and project related recommendations.

We appreciate the opportunity to assist you and the design team on the geotechnical aspects of this project. We have over 25 years of experience in geotechnical investigation/engineering, construction quality control field testing/inspection and construction materials laboratory testing/evaluation services for over 15,000 projects for many satisfied and repeat clients. HAE will be happy to provide you these services for your projects.

If you have any questions regarding this report, please do not hesitate to contact us. Thank you very much for your continued use of our services.

Respectfully,

HAENGEL & ASSOCIATES ENGINEERING, INC.

A. Asís Kander, PhD, PE
Senior Consultant

Gustavo N. Haendel
Principal

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1. THE PROJECT

1.1 Introduction

Mr. Mark Davenport of Davenport Brothers Construction has authorized Haengel & Associates Engineering, (HAE) Inc., to perform this site exploration and geotechnical engineering services for the above referenced project. Accordingly, HAE has completed the soil borings and geotechnical engineering report in accordance with the project requirements.

The purpose of this study was to obtain general subsurface soil and groundwater information from the site, and to identify and evaluate the geotechnical characteristics of the soils encountered at the boring locations within the proposed detention pond and forebay locations.

This report presents our understanding of the project, the results of the exploration including boring logs and boring location plan, our observations including site photos, geotechnical engineering analysis, our recommendations for design of storm water management systems as well as related construction considerations.

If our understanding of the project does not align with your intent, or if changes occur in the design, location, or concept of the project, the conclusions and recommendations contained in this report are not valid unless HAE is notified of the differences in writing. HAE will then review the changes and confirm the recommendations or make changes in writing.

1.2 Project Description

We understand the detention pond and forebay are included in the design and construction of the proposed "Chahal Semi Truck/Trailer Repair Facility Project" located at 6032 Schooner Avenue in Van Buren Township, Wayne County, Michigan. The proposed detention pond, approximately 150'x100' in area and about 10 feet maximum depth, will be located at the south-west corner of the site. The proposed forebay, approximately 300'x50' in area and about 8 feet maximum depth, will be located at the north-west corner of the site; both adjacent to the Schooner road.

1.3 Scope of Geotechnical Services

Our scope of services for this project included the following:

- A) Two soil borings were drilled to a depth of 20 feet each within the proposed detention pond and forebay area.
- B) Appropriate field and laboratory tests were performed, including standard penetration tests, visual engineering classification, natural moisture content density measurements, and hand penetrometer testing on representative split spoon samples.
- C) Geotechnical engineering analysis and preparation of this report including results of field and laboratory tests, site and boring location plan, boring logs, geotechnical assessment of the soil and groundwater conditions encountered, and our recommendations regarding the storm water management system.

D) Our scope of services does not include environmental sampling of the site.

1.4 Limitations of Geotechnical Services

HAE prepared this report according to generally accepted geotechnical engineering standards and procedures. The purpose of this report is to aid in the evaluation of this property and to help the design team of this project. If changes occur in the design, location, or concept of the project, the conclusions and recommendations contained in this report are not valid. The changes must be reviewed by HAE with the recommendations of this report modified or affirmed in writing by HAE.

We based the analyses and recommendations submitted in this report upon the data from the soil borings performed at the approximate location shown on the location diagram. This report does not reflect variations that may occur between the actual boring location and the actual structure location. The nature and extent of any such variations may not become clear until the time of construction. If significant variations then become evident, it may be necessary for us to re-evaluate our report recommendations.

2. PROCEDURES

The field operations, laboratory testing, and engineering report preparation are performed under the direction and supervision of a registered professional engineer. These services are performed according to generally accepted standards and procedures in the practice of geotechnical engineering.

2.1 Field Operations

The number, location and depth of the soil borings were proposed by the Client. The soil borings were located in the field based on physical features shown on a site plan, provided by the Client, and by using simple tape and wheel measurements. The borings may have been relocated to facilitate drill rig access. Actual locations are shown on the Boring Location Plan included in the Appendix.

A rotary drilling rig was used to perform the soil borings. Continuous flight solid-stem augers were used to advance the bore holes. Standard split spoon samplers were used to obtain the soil samples. The sampling was in general conformance with ASTM Standard D 1586. The number of blows required to drive the sampler 12 inches, after an initial seating of 6 inches, with a 140-pound hammer falling 30 inches is termed the Standard Penetration Resistance, N-value. A graphical representation of the N-values is given on the boring logs.

During the field operations, HAE Engineer maintained the log of the subsurface conditions, including changes in stratigraphy and observed groundwater levels. After completion of the drilling operations, the boreholes were backfilled with auger cuttings. The split spoon soil samples

were placed in standard glass jars with lids and brought to the laboratory for testing and classification.

2.2 Laboratory Testing

An experienced geotechnical engineer classified the samples in general conformance with the Unified Soil Classification System. After visual classification of the soils received in the sample jars, routine laboratory testing includes the determinations of natural moisture content of all samples and in-situ density of intact samples.

For cohesive soils, unconfined compressive strength was measured using a calibrated hand penetrometer, to a maximum of 4-1/2 tons per square foot (tsf), by measuring the resistance of the soil sample to penetration of a small calibrated spring loaded cylinder.

The particle size distributions of three soil samples were also determined by sieve analysis. The gradation curve provides estimates of internal friction and permeability-related behavior of the granular soils.

The data obtained from the field and laboratory tests are indicated on the boring logs and laboratory result sheets included in the Appendix.

The laboratory tests apply to the samples tested and some results may not be representative of the soil mass because of variations in composition and texture as well as imperfect samples and presence of pebbles and/or other inclusions.

HAE will keep the soil samples for 60 days before we dispose of them. If you desire HAE to retain the samples longer than 60 days, please notify us within the above referenced time frame.

3. RESULTS

When obtaining and testing samples and preparing this report, we followed procedures that represent reasonable and accepted practice in the geotechnical engineering profession. The engineer preparing the report reviews the field log, laboratory classifications, and test data, and then prepares the final boring log. We base our recommendations on the contents of the final log.

3.1 Site Conditions

The topography of the rectangular site is characterized by a relatively flat terrain. The site area is vacant, partially wooded and sparsely vegetated.

3.2 Soil Conditions

Based on the 20 feet deep boring, B1 within the detention pond footprint, the pond area is covered with approximately 12 inches of topsoil. Below the topsoil, the upper native soils include medium dense fine sand with little silt to approximately 3.0 feet depth underlain by very stiff silty clay with trace of sand to approximately 5.5 feet depth, followed by a medium dense silt layer with little clay and trace of sand extending to approximately 8.0 feet depth. The lower native gray silty clay with trace of sand extended from approximately 8.0 feet to the end of boring at 20.0 feet depth.

The natural cohesive soils are stiff to very stiff with unconfined compressive strength ranging from 2.5 to 3.5 tons per square foot (tsf). Moisture contents ranged from 15.4 to 23.4. percent of the dry weight of the soil. Dry unit weight ranged from 113.4 to 128.0 pounds per cubic foot.

Based on the 20 feet deep boring, B2 within the forebay footprint, the forebay area is covered with approximately 12 inches of topsoil. Below the topsoil, the upper native soils include very stiff sandy clay with little silt and trace of gravel to approximately 5.5 feet depth. The native gray silty clay with trace of sand extended from approximately 5.5 feet to the end of boring at 20.0 feet depth with an interlayer of medium dense sandy silt from 12.0 to 17.0 feet

The natural cohesive soils are stiff to very stiff with unconfined compressive strength ranging from 2.5 to 4.5 tons per square foot (tsf). Moisture contents ranged from 8.8 to 19.2 percent of the dry weight of the soil. Dry unit weight ranged from 109.5 to 139.1 pounds per cubic foot.

The stratification depths shown on the soil boring logs represent the soil conditions at the boring locations. Variations may occur between the borings. Additionally, the stratigraphic lines represent the approximate boundary between soil types; the transition may be more gradual than what is shown. We have prepared the boring logs based on laboratory classification and testing as well as field logs of the soils encountered.

The soil boring logs and boring location diagram are presented in the Appendix. The soil profiles described above are generalized descriptions of the conditions encountered at the boring location. Please consult the boring logs for more specific information.

3.3 Groundwater Conditions

In Boring B1, the driller reported groundwater seepage at 7.0 feet depth during drilling and no seepage upon completion of the drilling. In Boring B, groundwater seepage was reported at 13.0 feet depth during drilling and at 15.0 feet depth upon completion of the drilling.

It should be noted that in cohesive soils, such as the natural clay material encountered at this site, the groundwater observations made during drilling of the test borings are not necessarily indicative of the static groundwater level. Change of soil color usually indicates long term static

ground water level which is approximately 12.0 feet depth at this site.

Groundwater or surface water can become trapped or confine within open excavations or shallow pockets of sand above the less pervious clay soils. Ground water levels can be temporarily elevated as a result of wet weather conditions. Typically, groundwater levels and volumes are expected to be higher in the winter and spring seasons as compared to the summer and fall months.

Predominantly cohesive soils require a long time for water to become stable in the bore hole. These soils have relative low permeability rates and the drilling operations have a tendency to seal off the paths of groundwater flow due to the slurry created during drilling of cohesive soils. Seams of water-bearing sand, not indicated on the test boring logs, are possible at various depths within the natural clay soils.

To make an accurate determination of the long term groundwater level it is necessary to install groundwater level monitoring wells (piezometer) in the boreholes and monitored for an extended time. Ground water levels can be temporarily elevated as a result of wet weather conditions. Typically, groundwater levels and volumes are expected to be higher in the winter and spring seasons as compared to the summer and fall months.

The long-term hydrostatic groundwater level and perched groundwater levels will vary due to changes in precipitation, evaporation, surface run-off, and other factors. The groundwater levels, discussed herein, represent the conditions at the time of the measurements.

4. ANALYSIS AND RECOMMENDATIONS

We have made our analysis based on the information developed during this exploration. The resulting recommendations are given in the following sections. If our assumptions or understandings are not correct or if conditions during construction are significantly different from those found in the site exploration, contact HAE immediately. HAE may need to re-evaluate the recommendations.

4.1 Stormwater Basins/Ponds

Stormwater runoff, if not controlled properly, may overwhelm city sewer systems and can damage nearby streams and rivers through erosion. Managing the stormwater at the source can save costly repairs for correcting erosion or controlling flood. State and local regulations require stormwater basins for best practice management of stormwater for new development projects.

Basins/ponds are used to collect the surface water runoff and release it at a rate that prevents

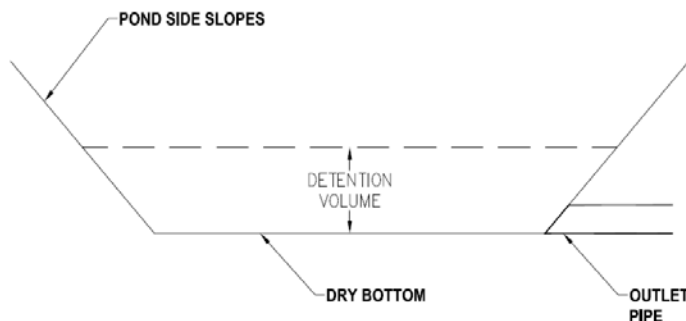
flooding or erosion. There are two main types of basins/ponds that can be designed and constructed; namely, detention basin/pond and retention basin/pond. In addition, sediment forebay can also be added to the stormwater management system to manage high rate of runoff and sedimentation.

The basins are important for storing and slowing stormwater runoff from nearby areas, especially areas with asphalt or concrete development. Stormwater runoff flows much faster from these surfaces than naturally occurring areas and needs to be diverted to ensure the runoff occurs at the desired rate. The amount of cleaning and treatment of the water is limited. Dry basins, or detention basins, only control flood flows. A retention pond can also provide some water quality benefits by reducing pollutants and sediments.

The main difference between a detention basin/pond and a retention basin/pond, is the absence or presence of a permanent pool of water, respectively. The water level in the pond is controlled by a low flow orifice. In most cases, the orifice is part of a metal or concrete structure called a riser. A detention, or dry, pond has an orifice level at the bottom of the basin and does not have a permanent pool of water. All the water runs out between storms and it usually remains dry. A retention basin or wet pond has a riser and orifice at a higher point and therefore retains a permanent pool of water. A retention pond looks like a regular pond, but plays an important role in controlling stormwater runoff.

Detention Basins/Ponds

Detention ponds are mostly dry between storm events and best used in areas where surface flow from ten or more acres of land needs to be managed. Dry detention ponds generally use a very small slope to divert water. The inlet needs to be not more than 15% higher than the outlet to ensure the correct amount of water flow through the system. The system works by allowing a large collection area, or basin, for the water. The water then slowly drains out through the outlet at the bottom of the structure.



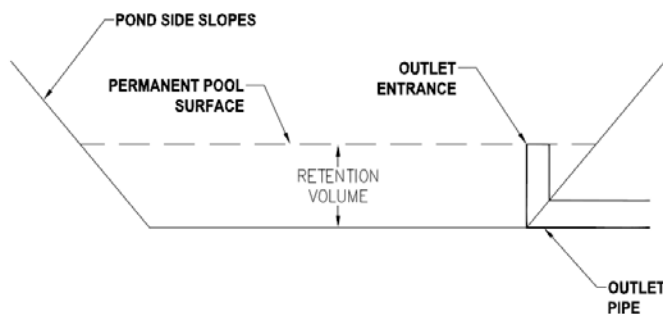
DETENTION POND DIAGRAM

Sometimes concrete blocks and other structures act as a deterrent to slow the water flow and collect extra debris. Surrounding areas usually have vegetative buffer that can withstand dry or wet conditions. Detention ponds may cost less to implement than a wet retention pond. Dry detention ponds usually require a large amount of space, does not improve water quality.

Retention Basins/Ponds

Wet retention ponds are a stormwater control structure that provides retention and treatment of contaminated stormwater runoff. Wet retention ponds control stormwater quantity and quality by capturing and retaining stormwater runoff. The pond's natural processes then work to remove pollutants. Retention ponds should be surrounded by natural vegetation to improve bank stability and improve aesthetic benefits.

Water is diverted to a wet retention pond by a network of underground pipes connecting storm drains to the pond. The system allows for large amounts of water to enter the pond, and the outlet lets out small amounts of water as needed to maintain the desired water level.



RETENTION POND DIAGRAM

Retention ponds are simple and naturally processes water without additional equipment if space is provided. Wet ponds collect and improve water quality and provides Improved stormwater collection and flood control. New habitats are created and can be used for recreational purposes.

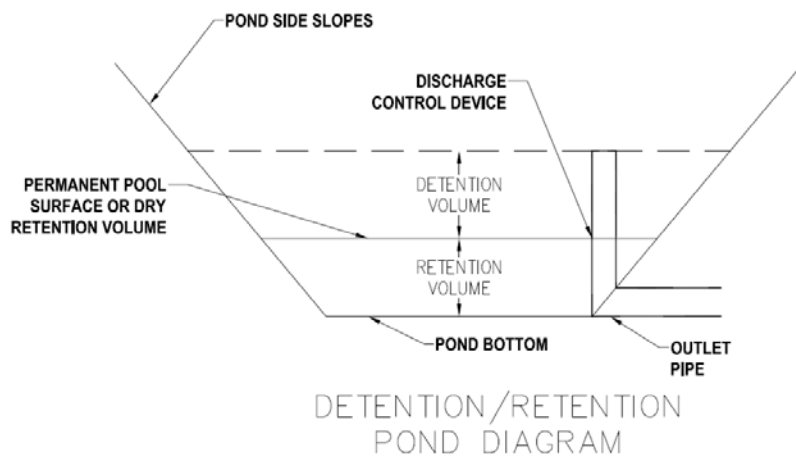
From a health standpoint, there is a concern with standing water, if not properly addressed during design. There can be a drowning hazard, particularly with children. Wet Ponds can also draw mosquitoes, which may contribute to the transmission of some diseases. Large areas of land are needed and negative water quality impacts may occur if not properly designed.

Combined Detention and Retention

Increasingly, stormwater ponds comprise elements of both retention and detention ponds. This is accomplished similarly to a retention pond where the outlet is elevated above the bottom of the pond at the desired retention elevation. At this elevation, a control device is placed to limit the rate of out-flow to the pre-development rate.

The difference in the maximum and retention elevations in the pond is the detention volume. With this method, the detention volume is stacked on the retention volume. Both wet and dry ponds can be configured in this way.

The retention volume in a dry pond is recovered using infiltration allowing soil microbes to consume pollutants. Functioning this way, a detention pond is sometimes known as dry retention. Similarly, the difference between the maximum elevation and the permanent pool is the detention volume. In this way, a wet pond may be known as a wet detention pond.



Stormwater facilities are a critical part of protecting rivers, lakes and streams from erosion and pollutants from construction and development activities. Dry detention ponds temporarily store a volume stormwater runoff and discharge it at controlled rate to prevent infrastructure and waterbodies from receiving too much water. Wet retention ponds store a permanent volume of water for treatment of runoff to remove pollutants and sediments prior to discharging. Combining the two principles in one facility results in a dry retention or wet detention pond that serves to provide the necessary treatment and flood control.

4.2 Sediment Forebay

A sediment forebay is a post-construction practice consisting of an excavated pit, bermed area, or cast structure combined with a weir, designed to slow incoming stormwater runoff and facilitating the gravity separation of suspended solids. Forebays provide dissipation of energy from incoming stormwater and a place for sediment to accumulate. The design of forebays include zones for each of these functions.

A properly designed forebay provides pretreatment of runoff before delivery to other basins. It slows velocities of incoming stormwater and can be easily accessed for sediment removal. Forebays are relatively inexpensive compared to other storm management systems and last longer with proper maintenance.

However, a forebay removes only coarse sediment fractions and does not remove soluble pollutants. Forebays provide no recharge to groundwater and the volume of runoff is not controlled. Frequent maintenance is essential for a forebay.

Forebay sizing criteria should include evaluation of the watershed size and the land use/cover of that watershed. The total forebay volume shall be approximately 20% of the total detention basin volume for the 2-year, 24- hour storm event for a single inlet. If multiple inlets are planned, the total forebay volume requirement shall be proportionally distributed to each inlet based on the tributary drainage area to each inlet. If there are numerous inlets with forebays, they shall be sized to provide effective protection at each inlet given the expected inflow velocities and volumes on a site-specific basis even if that total volume exceeds the 20%.

Any live storage provided by the forebays shall not be included toward the required volume of the associated basin, since at any given time a portion of that volume may be filled by accumulated sediments in the forebay. Forebays and their associated basin may be subject to local, county, state, or federal rules and regulations which may have more restrictive requirements.

4.3 Recommendations for Stormwater Basins or Ponds

We understand a stormwater basin will be constructed adjacent to road within the east end portion of the site in conjunction with the proposed development. The existing detention pond water level, to the south of proposed pond is at approximate elevation 698 feet on 3-19-21.

Soil boring B1 was performed within the area of the proposed pond. Soil conditions consisted of medium dense fine sand within the upper 3 feet of the boring, underlain by very stiff silty clay. Perched water seepage was encountered at an approximate depth of 7.0 feet during drilling operations. Based on the existing soil condition, groundwater conditions, proposed elevations, and existing elevations, we anticipate that very stiff silty clay will be present at the bottom of the proposed pond. We anticipate the silty clay will have a permeability rate on the order of 1×10^{-7} to 1×10^{-8} cm/sec.

The bottom level of the proposed detention pond is not known. We assume the bottom of the pond will be no more than 10 to 12 feet below the current grade. It is intended to provide a forebay to the north of the pond for additional storm water detention. The soils in these areas at 8 to 10 feet depth will be clays underlain by silts and are anticipated to provide little to no significant seepage.

The slopes in the upper clayey soils should be on the order of 4H to 1V to limit erosion and allow for maintenance. Suitable vegetation should be established as soon as possible on the sloping sides of the pond. We recommend a layer of topsoil be placed over any sand subgrade to protect the sand soils from erosion and allow for growth of vegetation. Erosion protection blankets may also be used to provide temporary protection until the vegetation becomes established.

4.4 Basin Maintenance Considerations

One of the most important maintenance consideration for either of these basins is to ensure that the orifice does not become blocked or clogged. Keeping the pipes clear of debris will ensure the ponds and basins are functioning properly. Keeping up with maintenance can reduce costly repairs in the future. Other maintenance includes:

- Identifying and repairing areas of erosion - A few times a year and after major storms, check for gullies and other disturbances on the bank.
- removing sediment and debris - Keeping pipes clear of debris and removing sediment ensures proper function. Remove debris around and in ponds before it reaches the outlets to prevent problems.
- Maintaining vegetation - The amount of maintenance depends on the type of vegetation surrounding the basin. Some grasses need weekly mowing, and others can be maintained a couple of times a year.

4.5 Earthwork and Excavations

We recommend that during site grading, all trees, trunks, large roots, organic soil and other debris and unsuitable materials, if encountered, must be removed completely. Earthwork operations should be performed under adequate specifications and properly monitored in the field.

All excavations should be performed in accordance with MIOSHA requirements to protect workmen and existing above grade and underground structures and utilities. Excavations should

be properly sloped and/or laterally braced. Existing structures, foundations, and utilities should be properly shored and/or underpinned if necessary. All excavations should be safely sheeted, shored, sloped, or braced in accordance with MI-OSHA requirements.

In general, we recommend that excavated materials not be stockpiled and equipment stored or operated near open excavations. The surcharge effect of these conditions could possibly cause unstable slope conditions to develop. Thus, a careful evaluation should be made if the contractor is contemplating placing materials and/or equipment near excavation slopes.

It may be necessary to excavate slopes flatter and/or design lateral bracing to resist the anticipated greater lateral pressures induced by the surcharge effect. Care should always be exercised when excavating near existing buildings, foundations, roadways, or utilities to avoid undermining. In no case should excavations extend below the level of adjacent existing foundations unless underpinning of the foundations is planned.

4.6 Utility Trench Excavations

Trench excavations for utility lines may proceed with either sloped banks, vertical banks with properly designed and installed lateral bracing, or a combination of both. Bracing systems for pipe trenches may include, where applicable, portable trench boxes, sliding trench shields or tight sheeting. In all cases, local, state, and federal regulations, including the current MI-OSHA requirements must be followed.

Groundwater seepage into the utility trench excavations may take place if the excavations are carried below the prevailing groundwater level. Depending on the utility invert elevation, it may be necessary to perform positive dewatering procedures, such as installing sump pumps closely spaced along both sides of the utility trench excavations. It may also be necessary to stabilize the excavation bottom with a layer of crushed aggregate, to maintain the integrity of the bearing material. All excavations should comply with applicable local, state and federal regulations, including current MI-OSHA regulations.

5. GENERAL COMMENTS

HAE prepared this report according to generally accepted geotechnical engineering standards and procedures. The purpose of this report is to aid in the evaluation of this property and to help the design team of this project. If changes occur in the design, location, or concept of the project, the conclusions and recommendations contained in this report are not valid. The changes must be reviewed by HAE and the recommendations either modified or affirmed in writing by HAE.

We base the analyses and recommendations submitted in this report upon the data from the soil

HAENGEL & ASSOCIATES ENGINEERING , INC.

Davenport Brothers Construction
Chahal Truck/Trailer Repair Facility
Van Buren Township, Michigan
HAE Project No.: H- 22-2236-G
Page No. 12

borings performed at the approximate location shown on the boring location diagram. This report does not reflect variations that may occur between the actual boring location and the actual structure location. The nature and extent of any such variations may not become clear until the time of construction. If significant variations then become evident, it may be necessary for us to re-evaluate our report recommendations.

The field log is prepared during the drilling and sampling operations to describe the field observations, sampling depths, and other information. We frequently subject the samples from the field to additional testing and reclassification in the laboratory. Differences may exist between the field log and the final log.

We recommend HAE be given the opportunity to review the final design plans and specifications as they relate to the recommendations presented in this report. The review is necessary to verify the report conclusions and recommendations have been interpreted according to our intent and are properly incorporated into the design. Further, the review will verify subsequent changes to the project have not affected our recommendations. Without this review, we can not be held responsible for misinterpretation of our data, analysis and/or our recommendations, nor how these are incorporated in the final design.

We also recommend HAE observe all geotechnical related work, including excavation, subgrade and slope preparation, and engineered fill placement. HAE will perform the appropriate testing to confirm the geotechnical conditions given in the report are found during construction.

We have enjoyed working with you and look forward to being of further assistance during the design and construction phases. If you have any questions, please do not hesitate to call us at (734) 455-9771.

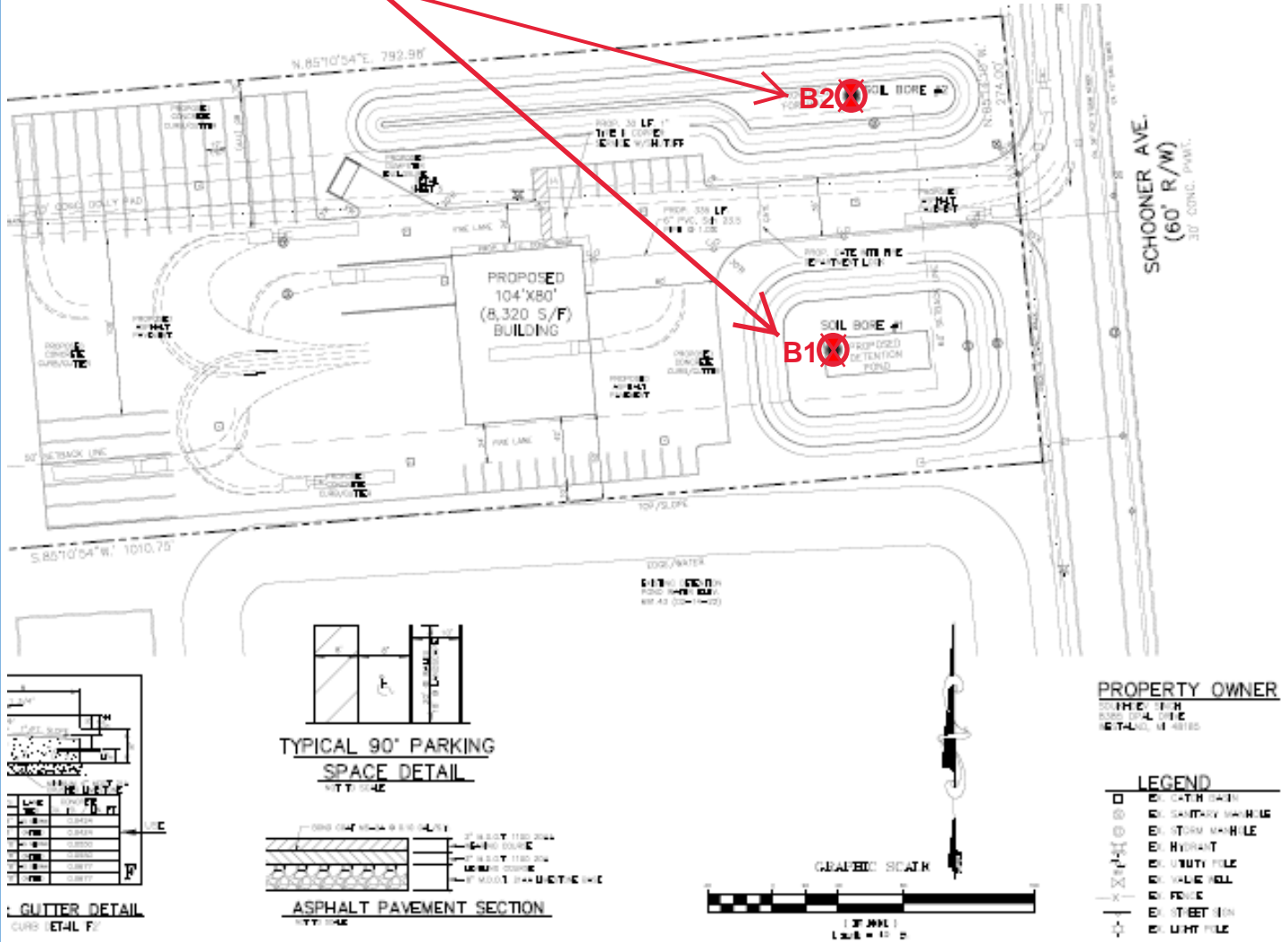
APPENDIX

1. BORING LOCATION SITE PLAN DIAGRAM
2. GENERAL NOTES
3. BORING LOGS
4. UNIFIED SOIL CLASSIFICATION SYSTEM
5. LAB
6. SITE PICTURES
7. IMPORTANT INFORMATION ABOUT THE
GEOTECHNICAL REPORT

1

BORING LOCATIONS DIAGRAM

**Approximate Location
of Soil Boring Holes**



LEGEND:



Approx. Soil Boring B1 - B2

6/24/2022 by HAE / GEOSERV DRILLING

N.T.S.

42040 KOPPERNICK ROAD, SUITE 407 CANTON, MICHIGAN 48187 (734) 455-9771 / Fax (734) 455-9774	
SOIL BORING LOCATION PLAN	
Proposed Schooner Ave. Detention Pond	
Project No.: H-22-2236-G	PLATE No.: 1A

2

GENERAL NOTES

GENERAL NOTES

TERMINOLOGY AND CLASSIFICATION

Unless otherwise noted, terms used refer to Standard Definitions in ASTM D 653. The major soil constituent is the principal noun (i.e. **CLAY, SILT, SAND, GRAVEL**). The 2nd major constituent and minor constituents are reported as follows:

<u>Particle Sizes</u>	<u>2nd Major Constituent (Percent by weight)</u>	<u>Minor Constituents (Percent by weight)</u>
Boulders - Greater than 12 inches (305 mm)		
Cobbles - 3 inches (76.2 mm) to 12 inches (305 mm)	trace: 1 – 12	trace: 1 – 12
Coarse Gravel - 3/4 inches (19.05 mm) to 3 inches (76.2 mm)	clayey, etc.: 13 – 35	little: 13 – 23
Fine Gravel - No. 4 sieve (4.75 mm) to 3/4 inches (19.02 mm)	and: > 35	some: 24 – 33
Coarse Sand - No. 10 sieve (2.0 mm) to No. 4 sieve (4.75 mm)	(e.g. CLAY AND SILT)	
Medium Sand - No. 40 sieve (0.425 mm) to No. 10 sieve (2.00 mm)		
Fine Sand - No. 200 sieve (0.074 mm) to No.40 sieve (0.425 mm)		
Silt - 0.005 mm to 0.074 mm		
Clay - Less than 0.005 mm		

COHESIVE SOILS

If clay content is sufficient so that cohesion dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier (i.e. **SILTY CLAY**). Other minor soil constituents may be included in accordance with the classification breakdown for cohesion less soils (i.e. **SILTY CLAY**, trace of sand, little gravel). Consistency of cohesive soils is based on an evaluation of the observed resistance to deformation under load and not upon the Penetration Test (**SPT**) Resistance (**N**). The **N-Values** shown below are general indicators of the relative soil consistency.

<u>Soil Consistency</u>	<u>Unconfined Compressive Strength (psf)</u>	<u>Undrained Shear Strength (psf)</u>	<u>Approximate Range of (N)</u>
Very Soft	< 500	< 250	0 – 2
Soft	501 – 1000	250 – 500	3 – 4
Medium	1001 – 2000	500 – 1000	5 – 8
Stiff	2001 – 4000	1000 – 2000	9 – 15
Very Stiff	4001 – 8000	2000 – 4000	16 – 30
Hard	8001 – 16000	4000 – 8000	31 – 50
Very Hard	> 16000	> 8000	> 50

COHESIONLESS SOILS

Relative Density of Cohesion less Soils is based on the **N-Values**, modified as required for depth effects, sampling effects, etc.

<u>Density Classification</u>	<u>Relative Density (Percent)</u>	<u>Approximate Range of (N)</u>
Very Loose	0 – 15	0 – 4
Loose	16 – 35	5 – 10
Medium Dense	36 – 65	11 – 30
Dense	66 – 85	31 – 50
Very Dense	86 – 100	> 50

SAMPLE DESIGNATIONS

AS -Auger Sample: Directly from auger flight.	ST -Shelby Tube Sample: 3-inch diameter unless noted.
BS -Miscellaneous Samples: Bottle or Bag.	PS -Piston Sample: 3-inch diameter unless noted.
S -Split Spoon Sample with Liner Insert: ASTM D 1586	RC -Rock Core: NX core unless otherwise noted.
LS -Liner Sample S with liner insert 3 inches in length	

STANDARD PENETRATION TEST (SPT) ASTM D 1586: A 2-in. OD, 1.375-in ID split spoon sampler is driven into undisturbed soil by means of a 140-lb. Weight falling freely a vertical distance of 30 inches. The sampler is normally driven three successive 6-in. increments. The number of bellows required for the final 12 inches of penetration is the **SPT Resistance (N)**.

3

BORING LOGS



Project: Truck Repair Facility - Proposed Detention Pond & Forebay **Project No.:** H-22-2236-G
Location: Schooner Avenue, Van Buren Township, MI **Prepared/Checked by:** AAK / GH

SUBSURFACE PROFILE				SOIL SAMPLE DATA							
ELEV. (FT)	STRATA PROFILE	MATERIAL DESCRIPTION	LAYER DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE TYPE-NO.	BLOWS PER 6-IN.	N-SPT BLOWS PER FT	MOIST. CONT. (%)	DRY UNIT WT (PCF)	UNCONF. COMP. STR. (TSF)	SPT N-VALUE Blows/Feet
100.0			0								10 20 30 40
		TOPSOIL									
99.0		Fine SAND (SP) little silt brown, moist, medium dense	1.0	1.0		4 6					
				2.5	S-1	5	11	20.3			
97.0			3.0	3.5							
		Silty CLAY (CL) trace sand gray, moist, very stiff		5.0	S-2	5	9	15.4	128.0	3.5	
94.5			5.5	6.0		3 4					
		SILT (ML) little clay, trace sand gray, moist, medium dense		7.5	S-3	10	19	18.6			
92.0			8.0	8.5		2 7					
		Silty CLAY (CL) trace sand gray, moist, very stiff		10.0	S-4	6	13	23.4	113.4	3.5	
88.0			12.0	13.5		7 9					
		Silty CLAY (CL) trace sand gray, moist, very stiff		15.0	S-5	17	26	16.4	124.6	3.5	
83.0			17.0	18.5		7 8					
		Silty CLAY (CL) trace sand gray, moist, stiff		20.0	S-6	10	18	16.3	127.5	2.5	
80.0			20.0	20.0							

End of Boring

* Indicates results from calibrated penetrometer

DRILLING INFORMATION

GROUNDWATER LEVEL OBSERVATIONS

Date Drilled: 6/23/2022 **Total Depth:** 20 feet
Driller: Steve - GeoServ **Inspector:** Tarun
Drilling Method: Track-mounted, solid-stem auger.
BH Backfill Procedure: Borings backfilled with soil cuttings.
Refusal:
Relocate:

During Drilling: 7 At Completion: none
... Hours after completion: Cave-in:
Notes:



Project: Truck Repair Facility - Proposed Detention Pond & Forebay **Project No.:** H-22-2236-G
Location: Schooner Avenue, Van Buren Township, MI **Prepared/Checked by:** AAK / GH

SUBSURFACE PROFILE				SOIL SAMPLE DATA							
ELEV. (FT)	STRATA PROFILE	MATERIAL DESCRIPTION	LAYER DEPTH (FT)	SAMPLE DEPTH (FT)	SAMPLE TYPE-NO.	BLOWS PER 6-IN.	N-SPT BLOWS PER FT	MOIST. CONT. (%)	DRY UNIT WT (PCF)	UNCONF. COMP. STR. (TSF)	SPT N-VALUE Blows/Feet
100.0			0								10 20 30 40
		TOPSOIL									
99.0		Sandy CLAY (CL) little silt, trace gravel gray/brown, moist, very stiff	1.0	1.0		3 4					
				2.5	S-1	5	9	19.2	109.5	4.5	
97.0			3.0	3.5							
		Sandy CLAY (CL) little silt, trace gravel gray/brown, moist, very stiff		5.0	S-2	9	14	17.7	114.5	4.5	
94.5			5.5	6.0		4 7					
		Silty CLAY (CL) trace sand gray, moist, very stiff		7.5	S-3	11	18	14.3	115.4	4.5	
92.0			8.0	8.5		7 9					
		Silty CLAY (CL) trace sand gray, moist, very stiff		10.0	S-4	14	23	10.5	122.3	4.5	
88.0			12.0	13.5		7 7					
		Sandy SILT (ML) trace sand brown, moist, medium dense		15.0	S-5	10	17	2.3			
83.0			17.0	18.5		8 15					
		Silty CLAY (CL) trace sand gray, moist, stiff		20.0	S-6	13	28	8.8	139.1	2.5	
80.0			20.0	20.0							

End of Boring

* Indicates results from calibrated penetrometer

DRILLING INFORMATION

GROUNDWATER LEVEL OBSERVATIONS

Date Drilled: 6/23/2022 **Total Depth:** 20 feet
Driller: Steve - GeoServ **Inspector:** Tarun
Drilling Method: Track-mounted, solid-stem auger.
BH Backfill Procedure: Borings backfilled with soil cuttings.
Refusal:
Relocate:

During Drilling: 13 At Completion: 15
... Hours after completion: Cave-in:
Notes:

4

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION

Major Division		Group Symbols	Typical Names	Laboratory Classification Criteria				
Coarse Grained Soils (More than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean Gravels (Little or no fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines	Determine percentage of sand and gravel from grain-size curve depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse grained soils are classified as follows: Less than 5% ----- GW, GP, SW, SP More than 5% ----- GM, GC, SM, SC More than 12% ----- Borderline cases requiring dual symbols	$C_u = D_{60}/D_{10}$ greater than 4; $C_c = (D_{30})^2 / (D_{10} \times D_{60})$ between 1 and 3		
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW		
		Gravels with fines (Appreciable amount of fines)	GM	d		Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols
				u			Atterberg limits above "A" line with PI greater than 7	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean Sands (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines		$C_u = D_{60}/D_{10}$ greater than 6; $C_c = (D_{30})^2 / (D_{10} \times D_{60})$ Between 1 and 3		
			SP	Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW		
		Sands with fines (Appreciable amount of fines)	SM	d		Silty sands, sand-silt mixtures	Atterberg limits below "A" line or PI less than 4	Limits plotting hatched zone with P1 between 4 and 7 are borderline cases requiring use of dual symbols
				u			Atterberg limits above "A" line or PI less than 7	
		SC	Clayey sands, sand-clay mixtures					

Major Division		Group Symbols	Typical Names	Laboratory Classification Criteria				
Fine Grained Soils (More than half of material is smaller than No. 200 sieve size)	Silt and Clays (Liquid limit less than 50)	ML	Inorganic silt with low plasticity	For Classification of fine-grained soils and fine fraction of coarse-grained soils. Atterberg Limits plotting in hatched area are borderline classifications requiring use of dual symbols. Equation of A-line: $PI = 0.73(LL - 20)$				
		CL	Inorganic clays of low to medium plasticity, sandy clays, silty clays, lean clays					
		OL	Organic silt, micaceous or diatomaceous fine sandy or silty soils, elastic silts					
	Silt and Clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			OH	And	MH
		CH	Inorganic clays of high plasticity, fat clays					
		OH	Organic clays of medium to high plasticity, organic silts					
	Highly Organic Soils	PT	Peat and other highly organic soils					

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LAB

SIEVE ANALYSIS OF SOILS

ASTM D - 422

Project:	Truck Repair Facility - Retention Pond	Project #:	H-22-2236
Location:	Schooner Avenue, Van Buren Township, MI	Source:	Boring B1
Sampled by:	ST	Tested By:	TM
Date Sampled:	06/23/22	Date Tested:	06/24/22
Soil Description:	Silt little clay, trace sand	Sample No.:	S3
		Soil Classification:	ML

		Wt soil+tare	Dry wt of soil
Tare No.:	5	Before Wash:	209.9
Wt of Tare (gm):	86.8	After Wash:	94.8
			123.1
			8

Washed Gradation

Sieve size (in. or #)	Sieve size (mm)	Cum. Weight Retained (g)	Percent (%) Retained	Percent % Passing	Specification
1.5"	37.5	0.0	0.0	100.0	
1"	25.4	0.0	0.0	100.0	
.75"	19.1	0.0	0.0	100.0	
.5"	12.5	0.0	0.0	100.0	
.375"	9.5	0.0	0.0	100.0	
#4	4.75	0.0	0.0	100.0	
#8	2.36	0.0	0.0	100.0	
#10	2.00	0.5	0.4	99.6	
#16	1.18	0.8	0.6	99.4	
#30	0.600	1.9	1.5	98.5	
#40	0.425	2.4	1.9	98.1	
#60	0.300	2.8	2.3	97.7	
#100	0.150	3.6	2.9	97.1	
#200	0.075	3.7	3.0	97.0	
Pan	0	8.0	6.5		
Total Dry Weight:		123.1	Loss by Wash:	97.0	

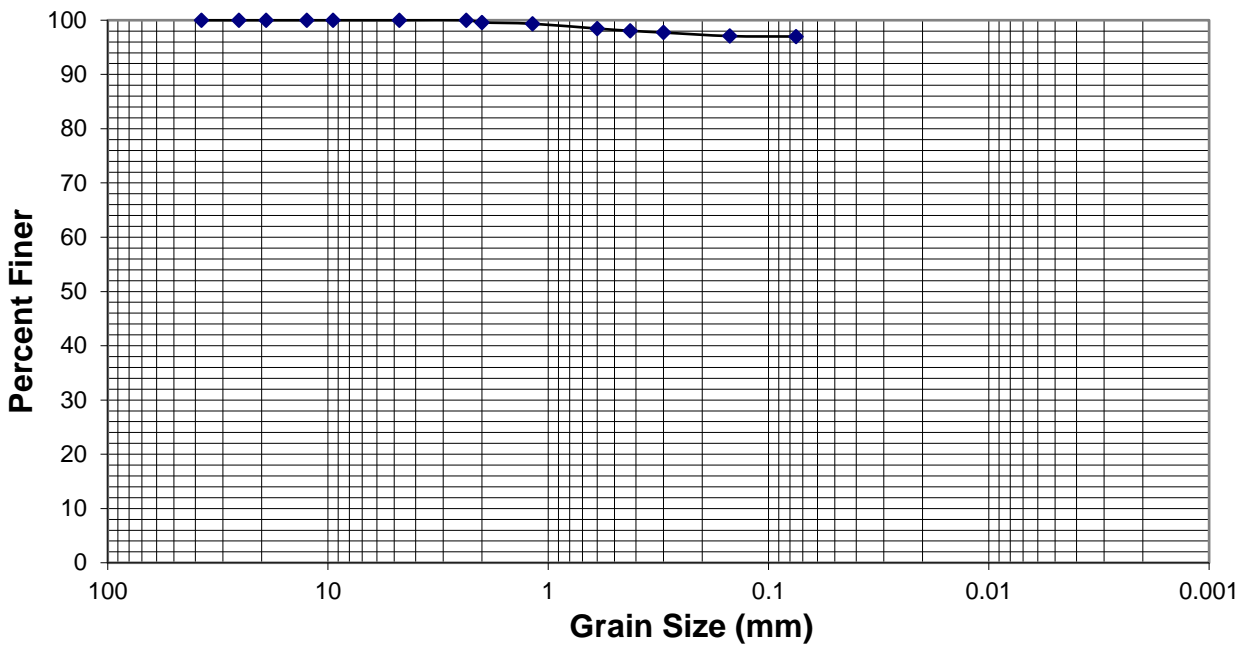
SIEVE ANALYSIS OF SOILS

ASTM D - 422

Project:	Truck Repair Facility - Retention Pond	Project #:	H-22-2236	
Location:	Schooner Avenue, Van Buren Township, MI	Source:	Boring B1	
Sampled by:	S	Tested By:	S	
		Sample No.:	S3	
Date Sampled:	06/23/22	Date Tested:	06/24/22	
		Sample Depth:	6-7.5	
Soil Description:	Silt	little clay, trace sand	Soil Classification:	ML

Soil Gradation Information				Soil Classification	
% >1.5 in.=	0.0		Plastic Limit, PL =	USCS:	ML
% Gravel=	0.0		Liquid Limit, LL=	Description:	Silt
% Sand=	3.0		Plasticity Index PI =	little clay, trace sand	
	Coarse	0.4%	D ₁₀ =	AASHTO:	
	Medium	1.5%	D ₃₀ =		
	Fine	1.1%	D ₆₀ =		
% Fines=	97.0	> 50%	Cu=	Description:	
	Silt		Cc=		
	Clay				

Grain Size Distribution Curve



SIEVE ANALYSIS OF SOILS

ASTM D - 422

Project:	Truck Repair Facility - Proposed Forebay	Project #:	H-22-2236
Location:	Schooner Avenue, Van Buren Township, MI	Source:	Boring B2
Sampled by:	ST	Tested By:	TM
Date Sampled:	06/23/22	Date Tested:	06/24/22
Soil Description:	Sandy Clay	Soil Classification:	CL
	little silt, trace gravel		

		Wt soil+tare	Dry wt of soil
Tare No.;	3	Before Wash:	215.7
Wt of Tare (gm):	86.3	After Wash:	129.4
			51

Washed Gradation

Sieve size (in. or #)	Sieve size (mm)	Cum. Weight Retained (g)	Percent (%) Retained	Percent % Passing	Specification
1.5"	37.5	0.0	0.0	100.0	
1"	25.4	0.0	0.0	100.0	
.75"	19.1	0.0	0.0	100.0	
.5"	12.5	3.9	3.0	97.0	
.375"	9.5	3.9	3.0	97.0	
#4	4.75	9.1	7.0	93.0	
#8	2.36	18.3	14.1	85.9	
#10	2.00	19.8	15.3	84.7	
#16	1.18	24.1	18.6	81.4	
#30	0.600	29.6	22.9	77.1	
#40	0.425	32.3	25.0	75.0	
#60	0.300	32.6	25.2	74.8	
#100	0.150	35.1	27.1	72.9	
#200	0.075	43.0	33.2	66.8	
Pan	0	50.5	39.0		
Total Dry Weight:		129.4	Loss by Wash:	66.8	

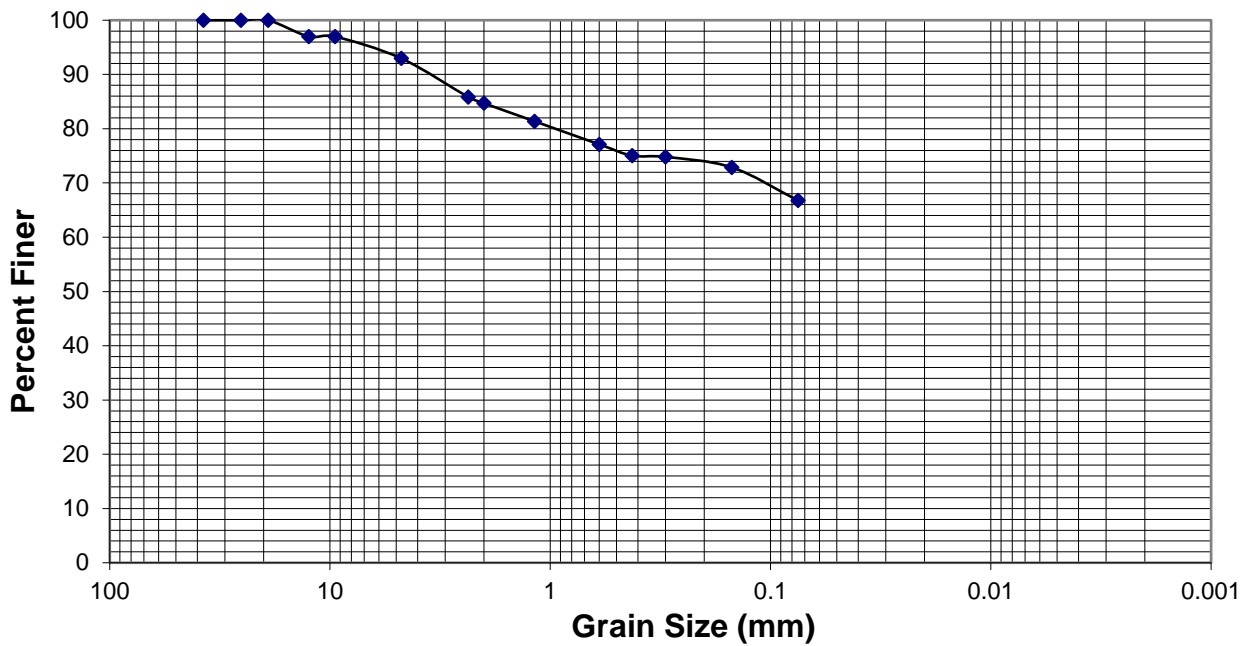
SIEVE ANALYSIS OF SOILS

ASTM D - 422

Project:	Truck Repair Facility - Proposed Forebay	Project #:	H-22-2236	
Location:	Schooner Avenue, Van Buren Township, MI	Source:	Boring B2	
Sampled by:	S	Tested By:	S	
		Sample No.:	S2	
Date Sampled:	06/23/22	Date Tested:	06/24/22	
		Sample Depth:	3.5-5.0	
Soil Description:	Sandy Clay	little silt, trace gravel	Soil Classification:	CL

Soil Gradation Information				Soil Classification	
% >1.5 in.=	0.0		Plastic Limit, PL =	USCS:	CL
% Gravel=	7.0		Liquid Limit, LL=	Description:	Sandy Clay
% Sand=	26.2		Plasticity Index PI =	little silt, trace gravel	
	Coarse	8.3%	D ₁₀ =	AASHTO:	
	Medium	9.7%	D ₃₀ =		
	Fine	8.3%	D ₆₀ =		
% Fines=	66.8	> 50%	Cu=	Description:	
	Silt		Cc=		
	Clay				

Grain Size Distribution Curve



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BORING LOG PHOTOS



Geotechnical

Environmental

Construction

42040 Koppernick Rd., Suite 407

Canton, Michigan 48187

Phone: 734-455-9771

Fax: 734-455-9774

Email: haei@earthlink.net

Project Name: Proposed Detention Pond & Forebay
Chahal TruckTrailer Repair

Van Buren Township, Michigan

Project No.: H-Job # H-22-2236-G





Geotechnical

Environmental

Construction

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Project Name: Proposed Detention Pond & Forebay
Chahal TruckTrailer Repair
Van Buren Township, Michigan

Project No.: H-Job # H-22-2236-G

B-2



06-23-2022

7

IMPORTANT INFORMATION ABOUT GEOTECHNICAL REPORT

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

More construction problems are caused by site subsurface conditions than any other factor. As troublesome as subsurface problems can be, their frequency and extent have been lessened considerably in recent years, due in large measure to programs and publications of ASFE/ The Association of Engineering Firms Practicing in the Geosciences.

The following suggestions and observations are offered to help you reduce the geotechnical-related delays, cost-overruns and other costly headaches that can occur during a construction project.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

A geotechnical engineering report is based on a subsurface exploration plan designed to incorporate a unique set of project-specific factors. These typically include: the general nature of the structure involved, its size and configuration; the location of the structure on the site and its orientation; physical concomitants such as access roads, parking lots, and underground utilities, and the level of additional risk which the client assumed by virtue of limitations imposed upon the exploratory program. To help avoid costly problems, consult the geotechnical engineer to determine how any factors which change subsequent to the date of the report may affect its recommendations.

Unless your consulting geotechnical engineer indicates otherwise, *your geotechnical engineering report should not be used:*

- When the nature of the proposed structure is changed, for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one;
- when the size or configuration of the proposed structure is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership, or
- for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems which may develop if they are not consulted after factors considered in their report's development have changed.

MOST GEOTECHNICAL "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site exploration identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are extrapolated by geo-

technical engineers who then render an opinion about overall subsurface conditions, their likely reaction to proposed construction activity, and appropriate foundation design. Even under optimal circumstances actual conditions may differ from those inferred to exist, because no geotechnical engineer, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. *Nothing can be done to prevent the unanticipated, but steps can be taken to help minimize their impact.* For this reason, *most experienced owners retain their geotechnical consultants through the construction stage*, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

SUBSURFACE CONDITIONS CAN CHANGE

Subsurface conditions may be modified by constantly-changing natural forces. Because a geotechnical engineering report is based on conditions which existed at the time of subsurface exploration, *construction decisions should not be based on a geotechnical engineering report whose adequacy may have been affected by time.* Speak with the geotechnical consultant to learn if additional tests are advisable before construction starts.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Geotechnical engineers' reports are prepared to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Unless indicated otherwise, this report was prepared expressly for the client involved and expressly for purposes indicated by the client. Use by any other persons for any purpose, or by the client for a different purpose, may result in problems. *No individual other than the client should apply this report for its intended purpose without first conferring with the geotechnical engineer. No person should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.*