



MEETING DATE: April 3, 2023

TOPIC: 494 S Broadway Site Plan Review

BACKGROUND BRIEF: A revised site plan package has been submitted by Stucky Vitale Architect (on behalf of the owner, BZ Lake Orion, LLC), for conformance to the provisions of the Lake Orion Marihuana Ordinance (Code of Ordinances: Chapter 114), the Zoning Ordinance, and sound planning and design principles. The proposed provisioning (retail marihuana) center is to be located in a new commercial building (±3,553 square feet) at the northwest corner of S. Broadway Street and Heights Road on approximately 0.67 acres of land.

McKenna's review letter and other supporting documents are included in the packet for your review and consideration.

ATTACHMENTS:

494 S. Broadway - Cloud Retail - Site Plan Review #3 - March 28, 2023

Site Plan Resubmittal

N038 LT-04 Site Plan Review 4



MCKENNA

March 28, 2023

Planning Commission
Village of Lake Orion
21 East Church Street
Lake Orion, Michigan 48362

Subject: 494 S. Broadway Street (M-24): Cloud Retail - Site Plan Review #3

Dear Commissioners,

We have reviewed the above revised site plan package submitted by Stucky Vitale Architect (on behalf of the owner, BZ Lake Orion, LLC), for conformance to the provisions of the Lake Orion Marihuana Ordinance (Code of Ordinances: Chapter 114), the Zoning Ordinance, and sound planning and design principles.

PROPOSAL SUMMARY

Site. The proposed provisioning (retail marihuana) center is to be located in a new commercial building (±3,553 square feet) at the northwest corner of S. Broadway Street and Heights Road on approximately 0.67 acres of land. The existing non-conforming, single-family homes that occupy the site today will be demolished as part of this project.

Zoning and Use. The entire parcel is zoned the MU, Mixed Use District and it is surrounded by other MU zoned parcels to the east and north. To the south is land located in Orion Township and to the west is Lake Orion. The proposed provisioning center is permitted as a retail business whose principal activity is the sale of merchandise within a completely enclosed building.

PROCESS

Per Section 114.07: Application Review of the Marihuana Ordinance, the Village Planner must review such applications and submit its recommendation to the Village Clerk, based on the standards set forth in Article 19 of the Zoning Ordinance. After reviewing the recommendation submitted by the Village Planner, the Village Clerk shall make the final decision concerning any application for a marihuana provisioning center.

We offer the enclosed site plan review for your consideration.

HEADQUARTERS
235 East Main Street
Suite 105
Northville, Michigan 48167

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F 248.596.0930
MCKA.COM

Communities for real life.

Attachment: 494 S. Broadway - Cloud Retail - Site Plan Review #3 - March 28, 2023 (5811 : 494 S Broadway Site Plan Review)



Site Plan Review

Standards for Site Plan Approval are set forth by [Article 19: Administrative Procedures and Standards](#). This project is reviewed against the Village's [Zoning Ordinance](#), Master Plan, existing site conditions, and sound planning and design principles. We offer the following comments for your consideration; underlined items require additional discussion and/or identify outstanding items to be addressed.

1. USE & HARMONIOUS DESIGN

Standards: *All elements of the site shall be harmoniously and efficiently designed in relation to the topography, size, and type of land, and the character of the adjacent properties and the proposed use. The site will be developed so as not to impede the normal and orderly development or improvement of surrounding properties for uses permitted on such property.*

Findings: The site is zoned the MU, Mixed Use District where the proposed provisioning center is considered a permitted retail business whose principal activity is the sale of merchandise within a completely enclosed building. No special land use or rezoning is required for this project.

The site occupies an area that contains 10 different parcels. The lot split and combination for the site's reconfiguration has been conditionally approved by the Village Administration and was approved by the Village Council on March 13, 2023; the final site plan is reflective of that proposed parcel reconfiguration.

2. DIMENSIONAL STANDARDS

Standards: *The site plan shall comply with the district requirements for minimum floor area, height of building, lot size, yard space, density and all other requirements as set forth in the Schedule of Regulations.*

Findings: The subject building complies with the dimensional standards of the MU, Mixed Use District, as detailed in the table on the following page. Several discrepancies from previous submittals have been corrected in this revised plan, however, the cover page still notes a discrepancy in the total square footage of the building area and must be corrected.

Dimensional Measurement	Required	Proposed	Comments
Min. Lot Area	n/a	0.671 acres	In compliance
Min. Lot Frontage (S. Broadway St.)	60'	126'	In compliance
Front Yard Setback	10' min. / 25' max.	Between 16' and 18'	In compliance
Min. Side Yard Street Setback (Heights Rd.)	10'	10'	In compliance
Min. Side Yard (north)	0'	>70'	In compliance
Min. Rear Yard Setback	25'	>80'	In compliance
Max. 1 st Floor Area	12,500 sq. ft.	3,553 sq. ft.	<u>Discrepancy in plan set</u>
Max. Building Height	36'	16'-8"	In compliance
Max. Lot Coverage	50%	12.14%	In compliance

3. NATURAL FEATURES & LANDSCAPING

Standards: *The existing natural landscape shall be preserved in its natural state as much as possible, by minimizing tree and soil removal and by topographic modifications that result in maximum harmony with adjacent properties. There shall be reasonable visual and sound privacy. Fences, walks, barriers, and landscaping shall be used, as appropriate, for the protection and enhancement of property and the safety and privacy of occupants and users.*

Findings: The subject site (with its current mix of residential homes) is approximately 25% impervious surface; the resulting development will increase the impervious surface coverage to approximately 66%. Additionally, while a tree survey was not produced (as is not required per Ordinance), there are several existing mature trees on site and their removal will alter the character of this corner and gateway into the Village.

Our comments regarding landscaping are as follows:

- **General Site Landscaping and Plant Materials.** In total, the Landscape Plan (L1) details the addition of 15 deciduous trees, 144 shrubs, and 276 ornamental grasses which are to be installed along the S. Broadway, Heights Street, and interior property lines, and throughout the interior of the subject site.

Per section 15.02, no single tree species can account for more than 20% of the plant material provided (in order to create more diversity than currently present at the site today). The applicant has since revised their plans to account for greater diversity, satisfying this requirement.

Underground irrigation will be installed for all lawn areas and planting beds.

- **Parking Lot Screening and Frontage Landscaping.** A landscape buffer, a minimum of 10-feet-wide, is required along the street frontages as the parking lots directly abut the rights-of-way.

With a total of 361-feet of street frontage, a minimum of 9 street trees and 144 shrubs are required; 9 trees and 144 shrubs are provided. A 30-inch-tall knee wall of block with a limestone cap is also proposed



between the parking lots and Heights Road and Broadway to create a uniform, year-round screen. We find that the additional grasses and knee wall will provide a complementary screen to the parking lots. A note must be added that the knee-wall will match the material and color of the building.

- **Interior Parking Lot Islands.** With a parking lot greater than 20 spaces, 5% of the total vehicular area must be devoted to landscaped areas.

For the subject site, a total of 685 square feet of interior landscaped area (with 5 trees) is required. The project complies; a total of 6,689 interior square feet of landscaping is provided via trees, flowering shrubs, and ornamental grasses.

- **Screening to the North and West Residential Areas.** The abutting property to the north and west of the subject site is functionally a residential use (the approved Mystic Cove development) and as such, requires additional screening. The approved site plan for the Mystic Cove residential project to the west and north includes a 6-foot vinyl fence across the entire common property line of the two developments, which will provide some screening already.

For this project, the Landscape Plan (L1) details a 6-foot-wide greenbelt with a mix of shrubs along the north and west property lines. Most of the greenbelt is comprised of an evergreen hedge using 50 5-foot Ketleri Juniper shrubs. Additional plantings of Virginia Sweetspire shrubs have been incorporated within the parking lot islands.

- **Common Areas.** Per section 9.03(C.5), a minimum of 10% of the site must be reserved for open space and amenities, greater than what is required by Ordinance; this includes pocket parks, green areas, pedestrian walkways and expanded landscape areas and buffers.

The Site Data on Sheet C-1 details a common area calculation of approximately 33%; however, this calculation does not distinguish between the required sidewalks/landscaping and additional open space/amenities; this distinction must be provided.

- **Environmentally Sensitive Design.** Per section 9.03(D), the incorporation of environmentally sensitive design treatments is necessary to enhance water quality and environmental health for the Village; this includes the reduction of impervious surfaces, shared parking, use of permeable pavers, use of native species, and more.

Five rain gardens are included, and the internal 6-foot sidewalk is proposed as permeable concrete (as detailed on Sheet C-1). The rain gardens are still smaller in size and the steepness of the grades surrounding them will likely decrease their effectiveness. Creating a larger garden would be more beneficial to the site; it is recommended that the gardens are enlarged to maximize effectiveness (see diagram under Item 5).

4. ACCESS & CIRCULATION

Standards: *All buildings or groups of buildings shall be so arranged as to permit convenient and direct emergency vehicle access. The arrangement of public or common ways for vehicular and pedestrian circulation shall respect the pattern of existing or planned streets or pedestrian or bicycle pathways in the vicinity of the site. Streets and drives that are a part of an existing or planned street system serving adjacent developments shall be of an appropriate width to the volume of traffic they are planned to carry and shall have a dedicated right-of-way equal to that specified in a recognized source of reference. There shall be a pedestrian circulation system that is insulated as completely as possible from the vehicular circulation system.*

Where the Planning Commission determines, after expert consultation, that public safety would be substantially promoted in a particular location by reducing the number of points of ingress and egress between private property and an adjoining highway, cross-access may be required. Shared drive approaches between adjoining parcels may also be permitted under this Section.

Findings:

- **Access Points.** Access to the site is limited to a single, two-way curb cut off S. Broadway and two adjacent one-way curbs cut off Heights. A traffic study has been completed by the applicant and reviewed by the Village Engineer, please find these reports under separate cover. Final MDOT and Road Commission approval are necessary for access improvements.
- **Cross Access.** All developments in the MU district must permit pedestrian and vehicle cross access for adjacent MU sites.

No cross-access points are shown between the subject property and the adjacent development site; however, as a condition of site plan approval, the Planning Commission may waive this requirement if the proposed lot configuration and adjacent uses preclude harmonious and efficient connectivity. We find that cross access between the proposed marijuana retailer and a future housing development, in addition to the traffic flow and parking configuration on the site, is neither practical nor suitable for this project. Pedestrian activity will still be permitted via the public sidewalk network.
- **Pedestrian Connectivity.** Per section 9.03(C.8), sidewalks are required both within and between other sites in the MU District.

This standard is now met: 5-foot-wide sidewalks are provided along both S. Broadway and Heights Road.

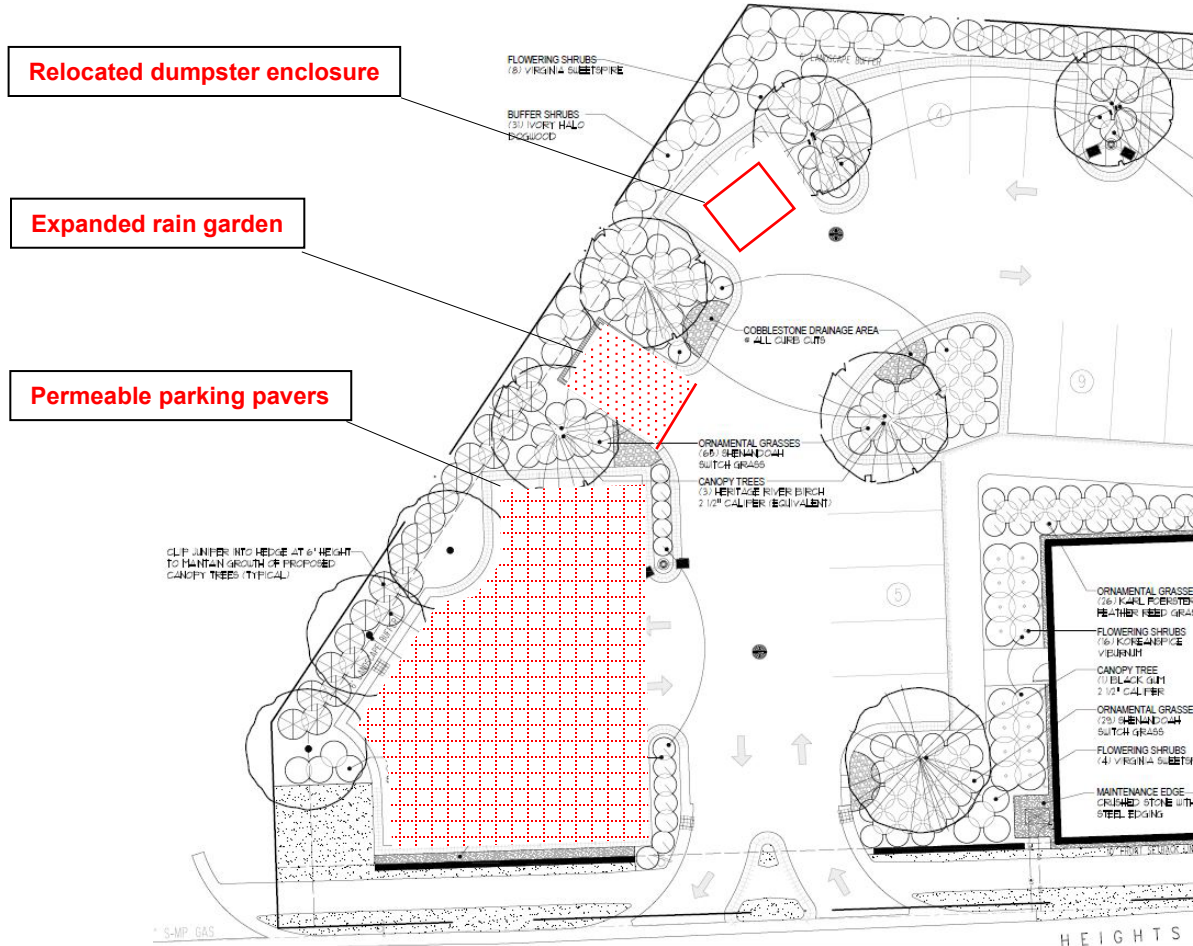
5. PARKING & LOADING

Standards: *Off-street parking, loading, and unloading areas and outside refuse storage areas, or other storage areas that face or are visible from adjacent homes, or from public thoroughfares, shall be screened by walls, fencing or landscaping of effective height.*

Findings: In compliance with section 9.03(C.2), parking is proposed to the rear of the proposed building, however some parking areas directly abut S. Broadway and Heights Road.

- **Parking.** Per section 14.02, a 3,553 square foot retail building requires a total of 15 parking spaces. The applicant proposes 36 parking spaces, exceeding this requirement by 21 parking spaces, more than double the requirement.

Per section 14.02(B.2), the maximum parking permitted cannot exceed the minimum required plus 20% to minimize excessive areas of pavement, unless otherwise approved by the Planning Commission. Applying this deviation would result in a maximum of 18 parking spaces. It is recommended that at least 10 parking spaces are removed to accommodate additional landscaping and soften the appearance of the overall site, especially since the total impervious surface coverage for the site is 70%. Please reference the diagram on the following page, illustrated that with just two parking spaces removed, a portion of the lot converted to permeable parking pavers, and an expanded rain garden, we could support the additional parking spaces in this scenario.



- **Loading.** A 10' x 50' loading space is located to the rear (west) of the building and will permit access to the building for deliveries via a rear doorway.
- **Dumpster Enclosure.** A 7-foot-high dumpster enclosure is proposed in the northwest corner of the site, shown to be clad in brick to match the building. A truck turning diagram radii has been provided illustrating sufficient space to access the site and remove rubbish.



6. BUILDING DESIGN & ARCHITECTURE

Standards: *Building design and architecture shall relate to and be harmonious with the surrounding neighborhood in terms of texture, scale, mass, proportion, materials, and color. Buildings should be designed with stylistic harmony and aim to serve people of all ages and abilities.*

Findings:

- Building Design.** Per section 9.03(C.3.a), all buildings along the street frontage must have a pedestrian-accessible primary entrance facing the street and architecturally highlighted by features such as awnings, porticos or raised cornice parapets.

The entryway is shown at the northeast corner of the building, closer to S. Broadway and the public sidewalks. The entryway has been enhanced in this submission, showing a raised parapet, expanded canopy, additional glazing, and decorative lighting. We find the overall design in compliance with the Ordinance.
- Building Materials.** Per section 9.03(C.3.b), preferred building materials in the Ordinance include brick, stone, and integrally colored architectural block.

The applicant proposes a building clad largely in brick veneer with limestone banding, fiber cement panel accents, and a metal canopy. Additional glazing is proposed for the north and east elevations. Material samples have been provided to the Planning Commission, approving the applicant's selection.
- Signage.** The location of a proposed monument sign is also detailed along S. Broadway; this sign will also be reviewed and permitted under separate application; no signage is approved as part of this site plan.

7. ENGINEERING / STORMWATER MANAGEMENT

Standards: *Appropriate measures shall be taken to ensure that the removal of stormwater will not adversely affect adjoining properties or the capacity of the public storm drainage system and shall comply with State and Federal standards. Provisions shall be made for the construction of stormwater facilities, and the prevention of erosion and dust. Surface water on all paved areas shall be collected at intervals so that it will not obstruct the flow of vehicles or pedestrian traffic and will not create nuisance ponding in paved areas. Adequate services and utilities and improvements shall be available or provided, located and constructed with sufficient capacity and durability to properly serve the development. All utilities shall be located underground. Where possible and practical, drainage design shall recognize existing natural drainage patterns.*

Findings: Stormwater pre-treatment infrastructure is proposed to capture water runoff before it is discharged into the Lake. All stormwater and utility requirements must be addressed to the satisfaction of the Village Engineer.

8. LIGHTING

Standards: *Exterior lighting shall be so arranged so that it is deflected away from adjoining properties and so that it does not impede vision of drivers along adjacent streets.*

Findings: Overall, the proposed lighting complies with ordinance requirements. Both building mounted and freestanding pole lighting are proposed for the development and detailed on Sheet C-11; this now includes

decorative sconce lighting for the north and east elevations, as seen on Sheet A3.1. A cut sheet for the sconces must be provided and these fixtures must be reflected on the photometric plan, which still shows the previous wall packs and incorrect fixture locations and mounting heights.

Lighting Category	Standard (footcandles = fc.)	Proposed	Comments
Max. Height of Light Fixtures	22' or the height of the building, whichever is less	16'-8" (freestanding poles) 7-10' (building mounted)	Complies
Max. Illumination at Any Given Point	10 fc.	9.9 fc.	Complies
Max. Illumination at the Property Line	0.5 fc.	0.5 fc.	Complies

Recommendation

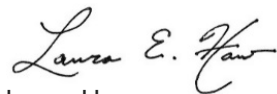
The revised site plan is largely in compliance with the standards of the Zoning Ordinance, and we applaud the applicant for being diligent in their modifications.

Outstanding items and inconsistencies remain to be addressed (including items listed in the engineering report); however, these do not materially impact the site plan and may be reviewed administratively. We recommend that the Planning Commission approve the proposed site plan, conditioned upon all outstanding items being addressed in a revised set of plans for administrative review by the Village, prior to final site plan approval.

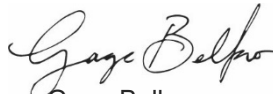
If you have any questions, please do not hesitate to contact us. Thank you.

Respectfully submitted,

McKENNA



Laura Haw
Senior Principal Planner



Gage Belko
Associate Planner

CC: Ms. Susan Galeczka, Village Clerk – 21 E. Church Street, Lake Orion, MI 48362 (galeczkas@lakeorion.org)

LAKE ORION RETAIL DEVELOPMENT

494 S. BROADWAY ST. (M-24)
LAKE ORION, MI 48362



CONCEPTUAL RENDERING
FOR CURRENT DESIGN INFORMATION
REFER TO ELEVATIONS - SHEET A3.1

OWNER:
BZ LAKE ORION, LLC
1822 ARROWHEAD TRAIL
OXFORD, MICHIGAN 48371

ARCHITECT:
STUCKY VITALE ARCHITECTS
27172 WOODWARD AVENUE
ROYAL OAK, MICHIGAN 48067
(248) 546-6700

CIVIL ENGINEER:
FENTON LAND SURVEYING & ENGINEERING, INC
14165 N. FENTON RD. SUITE 101A
FENTON, MI 48430
(810) 354-8115

PROJECT DATA:
BUILDING CODE AUTHORITY:
VILLAGE OF LAKE ORION

TYPE OF CONSTRUCTION:
II-B

USE GROUP:

M - MERCANTILE

PROJECT INFO:
PROVISIONING CENTER AND MARIHUANA RETAILER
BUILDING SQUARE FOOTAGE
TOTAL = 4,435 SF

EMPLOYEE COUNT PEAK USAGE
TOTAL = 10

PROJECT DESCRIPTION:
THE PROPOSED SITE DEVELOPMENT WILL CONSIST OF A NEW 4,435 SQUARE FOOT RETAIL BUILDING WITH NEW DRIVEWAY APPROACHES, ALONG WITH CONCRETE SIDEWALKS, AN ASPHALT PARKING LOT, SUSTAINABLE RAIN GARDEN AND PERMEABLE PAVER FEATURES, A NEW SANITARY SEWER AND WATER LEAD TO THE BUILDING, AND WE WILL BE DETAINING THE STORM WATER RUNOFF IN PROPOSED 48 INCH PIPES AND THE OUTLET WILL GO TO MDOT'S STORM SEWER SYSTEM ALONG M-24. ALL VILLAGE OF LAKE ORION ZONING AND SPECIFICATIONS WILL BE MET.

PROJECT NARRATIVE:
IT IS NOT ANTICIPATED THAT THERE WILL BE ANY SUBSTANTIAL INCREASE IN DUST, ODOR, SMOKE, FUMES, NOISE, OR LIGHTS. THE CONTRACTOR WILL BE REQUIRED TO COMPLY WITH ANY APPLICABLE ZONING ORDINANCE REQUIREMENTS REGARDING THESE ITEMS. THE MAJORITY OF THE CONSTRUCTION ACTIVITIES ARE DONE ON-SITE. THE EQUIPMENT USED ON THE SUBJECT SITE WILL CONSIST OF A EXCAVATOR, BACK HOE, TRUCK, CONCRETE MIXER, GENERATOR, COMPRESSORS, POWER SAWS, AND ELECTRIC DRILLS. THE AVERAGE SOUND LEVEL WILL BE WILL BE LESS THAN THE OSHA (AT WORKERS EAR) LEVEL OF 90.

APPLICABLE CODES: (COMMERCIAL):
BUILDING CODE:
2015 MICHIGAN BUILDING CODE

MECHANICAL CODE:
2015 MICHIGAN MECHANICAL CODE AS AMENDED

PLUMBING CODE:
2015 MICHIGAN PLUMBING CODE AS AMENDED

ELECTRICAL CODE:
2017 NATIONAL ELECTRIC CODE (NEC) AS AMENDED & MICHIGAN AMENDMENTS PART 8.

FIRE CODE:
2015 INTERNATIONAL FIRE CODE REFERENCED IN 2015 MICHIGAN BUILDING CODE

BARRIER FREE REQUIREMENTS:
2010 ADA STANDARDS FOR ACCESSIBLE DESIGN (DOJ)
MBC-2012 (CHAPTER 11)
ICC / ANSI 117.1 - 2009, EXCEPT SECTION 611 & 707

LIFE SAFETY CODES:
2015 NFPA 101 LIFE SAFETY CODE
2013 NFPA 72 NATIONAL FIRE ALARM CODE



SHEET INDEX		ISSUED FOR				
DRAWING INDEX KEY:		02.12.21	VILLAGE SUBMITTAL	04.14.22	VILLAGE SUBMITTAL	10.13.22
<input type="checkbox"/> NOT ISSUED		01.30.23	VILLAGE SUBMITTAL	02.20.23	VILLAGE SUBMITTAL	03.17.23
<input type="checkbox"/> PREVIOUSLY ISSUED						
<input checked="" type="checkbox"/> ISSUED						
<input checked="" type="checkbox"/> REFERENCE						
GENERAL						
TS1.1	TITLE SHEET AND SHEET INDEX AND LOCATOR PLAN					
SITE						
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C-7	COUNTY STANDARD WATERMAIN DETAILS & NOTES					
C-8	COUNTY STANDARD WATERMAIN DETAILS & NOTES					
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C-10	COUNTY STANDARD STORMDRAIN DETAILS & NOTES					
C-11	SITE LIGHTING PLAN & NOTES					
C-12	TRUCK CIRCULATION PLAN					
SP1.1	ARCHITECTURAL SITE PLAN					
SP1.2	SITE TRAFFIC FLOW DIAGRAM					
L1.1	CONCEPTUAL LANDSCAPE PLAN					
ARCHITECTURAL						
A1.1	ARCHITECTURAL FLOOR PLAN PROVISIONING/ RETAILER					
A1.2	LIFE SAFETY PLAN					
A1.3	SECURITY PLAN PLAN					
A3.1	EXTERIOR ELEVATIONS PROVISIONING/ RETAILER					
A3.2	EXTERIOR RENDERINGS					



2020.058

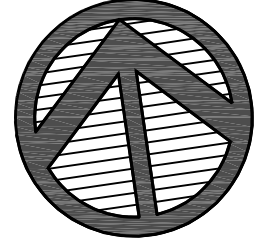
LAKE ORION RETAIL DEVELOPMENT
494 S. BROADWAY ST. (M-24)
LAKE ORION MI 48362
DRAWN BY: ZAP/MAT/JPM

CONCEPTUAL DESIGN PACKAGE

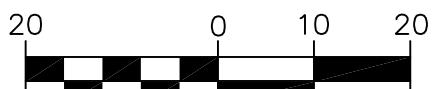
MARCH 17, 2023

TS1.1

NORTH



GRAPHIC SCALE



(1 IN FEET)
1 inch = 20 ft.

PROPERTY DESCRIPTION:

PARCEL "B", 494 S BROADWAY STREET (PER FLSE PARCEL SPLIT DRAWINGS)
PART OF THE NORTHEAST 1/4 OF SECTION 11 AND PART OF THE SOUTHEAST 1/4 OF SECTION 2, T4N-R10E,
VILLAGE OF LAKE ORION, OAKLAND COUNTY, MICHIGAN AND BEING PART OF LOT 52 AND LOT 54 THRU LOT 56
OF THE "ASSESSOR'S REPLAT OF DECKER'S ADDITION TO THE VILLAGE OF ORION AND PART OF CANANDAIGUA
CITY" AS RECORDED IN LIBER 52, PAGES 17 AND 17A OF OAKLAND COUNTY PLAT RECORDS, MORE
PARTICULARLY DESCRIBED AS: BEGINNING AT THE SOUTHEAST CORNER OF LOT 54, BEING ALSO THE SOUTHWEST
CORNER OF LOT 56 OF SAID PLAT, FROM WHICH THE EAST 1/4 CORNER OF SECTION 11, T4N-R10E, LIES
S80°07'47"W, 281.28 FEET, AND S03°11'40"E, 24.16 FEET, AND N80°07'47"E, 1,177.00 FEET; THENCE
S80°07'47"W, 170.00 FEET; THENCE N09°50'46"W, 33.98 FEET; THENCE N25°38'00"E, 142.86 FEET; THENCE
N85°49'40"E, 163.97 TO A POINT ON THE WEST RIGHT OF WAY LINE OF M-24 AS WIDENED (89.00 FEET WIDE);
THENCE S04°10'20"E, 126.84 FEET ALONG SAID WEST LINE OF M-24, BEING A LINE 31.00 FEET WEST OF AND
PARALLEL TO THE EAST LINE OF LOTS 52, 55 AND 56; THENCE CONTINUING ALONG SAID WESTERLY RIGHT OF
WAY LINE OF SAID M-24 AS WIDENED THE FOLLOWING TWO (2) COURSES: S85°47'13"W, 63.48 FEET, AND
S08°20'19"E, 14.05 FEET TO THE POINT OF BEGINNING, CONTAINING 0.671 ACRES OF LAND, MORE OR LESS.
SUBJECT TO ANY AND ALL EASEMENTS OR RESTRICTIONS OF RECORD

EXISTING IMPERVIOUS ON-SITE AREA:

THERE IS A TOTAL OF 7,288 SFT OF IMPERVIOUS AREA
COMBINING THE EXISTING PAVEMENT AREAS, BUILDINGS,
WALKS, AND DECKS/PATIOS.

THEREFORE 7,288/29,255 = 0.2491 or 25% IMPERVIOUS

PROPOSED IMPERVIOUS ON-SITE AREA:

THERE IS A TOTAL OF 19,347 SFT OF IMPERVIOUS AREA
COMBINING THE PROPOSED ASPHALT AND CONCRETE
PAVEMENT AREAS, BUILDINGS, AND WALKS.

THEREFORE 19,347/29,255 = 0.6613 or 66% IMPERVIOUS

SITE PLAN LAYOUT & COVER SHEET

SHEET INDEX

SITE PLAN LAYOUT & COVER SHEET	C-1
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COUNTY STANDARD SANITARY SEWER DETAILS	C-9
COUNTY STANDARD STORM DRAIN DETAILS & NOTES	C-10
SITE LIGHTING PLAN & NOTES	C-11
TRUCK CIRCULATION PLAN	C-12

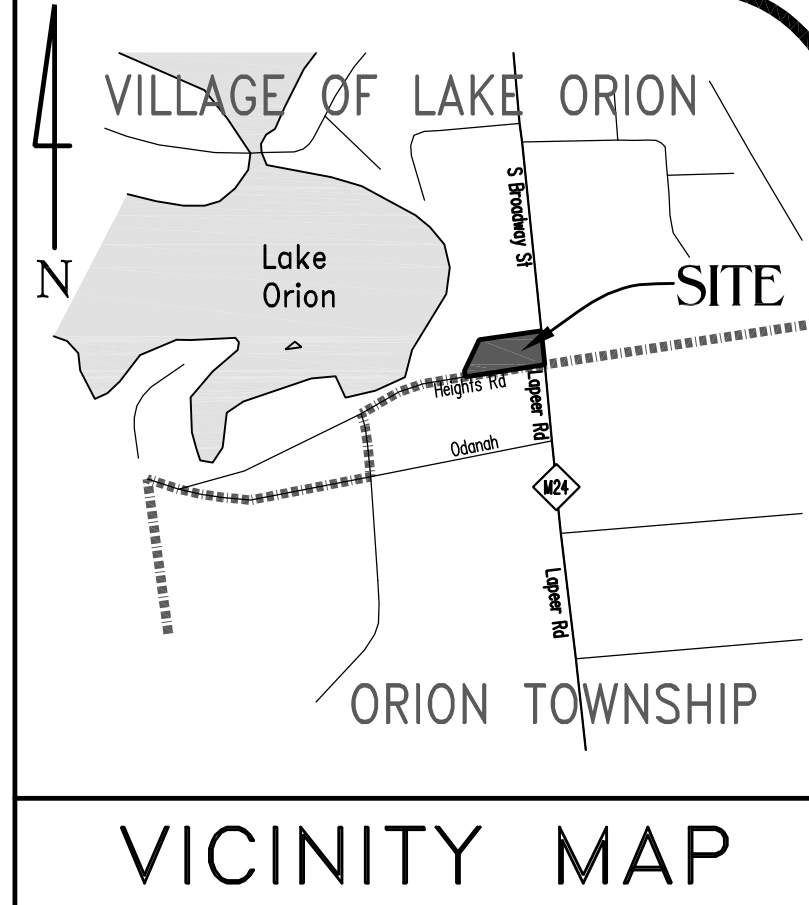
NOTE:
ANY WORK WITHIN THE OAKLAND COUNTY ROAD COMMISSION (RCOC) AND/OR
MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) RIGHT-OF-WAY
REQUIRES A ROAD RIGHT-OF-WAY PERMIT APPLICATION ISSUED. THE
CONTRACTOR MUST CONTACT THE GENESSEE COUNTY ROAD COMMISSION
PERMITS DEPARTMENT, AND SECURE THE REQUIRED PERMIT AND BOND PRIOR
TO BEGINNING CONSTRUCTION. CONTRACTOR MUST FOLLOW ALL REQUIREMENTS
IN THE PERMIT, INCLUDING THE PROPER CONSTRUCTION TRAFFIC SIGNAGE.

CONTRACTOR ALERT STATEMENT

THIS PROJECT HAS BEEN DESIGNED IMPLEMENTING THE LATEST VILLAGE
OF LAKE ORION & OAKLAND COUNTY DESIGN SPECIFICATIONS. CAREFULLY
REVIEW THE NOTES, DETAILS, AND DESIGN PRIOR TO SUBMITTING A BID.
FULL COMPLIANCE WITH THE LATEST STANDARDS WILL BE REQUIRED.

SITE DATA:

- 1) SITE ZONING = MU (MIXED USE DISTRICT)
- 2) ADJACENT ZONING = MU (WEST & NORTH)
- 3) TOTAL GROSS OVERALL AREA = 29,255 SFT or 0.671 ACRES
- 4) TOTAL GROSS BUILDING AREA:
TOTAL GROSS FLOOR AREA = 3,553 SFT
- 5) MAXIMUM BUILDING HEIGHT ALLOWED = 36 FEET (42' WITH SLU)
PROPOSED BUILDING HEIGHT = 18'-6"
- 6) MAXIMUM BUILDING COVERAGE ALLOWED = 50%
TOTAL BUILDING SITE COVERAGE = 3,553/29,255 = 12.14%
- 7) COMMON AREA CALCULATION (SECTION 9.03 (C.5)) =
TOTAL COMMON AREA COVERAGE = 9,908/29,255 = 33.77%
(INCLUDES POCKET PARKS, GREEN & LANDSCAPED AREAS, & WALKWAYS)
- 8) MAXIMUM SITE IMPERVIOUS ALLOWED = NONE SPECIFIED
PROPOSED IMPERVIOUS COVERAGE = 19,347/29,255 = 66.13%
(INCLUDES ALL PAVEMENT AREAS, ROOF, & WALKWAYS)
- 9) PARKING SPACE & LANE SIZE REQUIREMENTS
a) REGULAR PARKING SPACE = 9' x 19'
b) BARRIER FREE SPACE = 9' x 19' W/8' AISLE (VAN ACCESSIBLE)
c) DRIVE AISLE = 22' MIN (TWO WAY)
- 10) PARKING REQUIRED (OTHER RETAIL):
1 SPACE PER 250 SFT OF GROSS BUILDING AREA =
3,553 SFT / 250 = 14.21 or 15 SPACES
TOTAL SPACES REQUIRED = 15 SPACES
- 11) SITE PARKING PROVIDED:
TOTAL PARKING PROVIDED = 36 SPACES
- 12) BARRIER FREE PARKING REQUIRED:
BARRIER FREE PARKING REQUIRED = 2, PROVIDED = 2
- 13) LOADING SPACES REQUIRED = 0; PROVIDED = 1
- 14) EXISTING LAND USE = CABIN RENTALS & RESIDENTIAL HOMES
- 15) PROPOSED LAND USE = RETAIL CENTER
- 16) EXISTING ADDRESS = 468, 486, & 494 S BROADWAY
ALSO 16, 20, 24, 32, & 46 HEIGHTS ROAD
- 17) PROPOSED ADDRESS = JUST 494 S BROADWAY AVENUE



VICINITY MAP

STANDARD NOTES FOR SITE PLANS:

*A. EXTENSION OF PUBLIC UTILITIES: ALL PUBLIC SANITARY SEWER AND/OR WATERMAIN SHALL BE EXTENDED TO THE FURTHEST LIMITS OF THE PROPERTY, INCLUDING CORNER
LOTS, WITH THE PIPE SIZE AND MATERIAL APPROVED BY VILLAGE OF LAKE ORION. THIS IS NECESSARY FOR PLAN APPROVAL. FOR WATER SERVICE OF 1" OR LESS OR A
BUILDING ON A CORNER LOT, THE REQUIREMENTS TO EXTEND THE PUBLIC WATERMAIN AND/OR SANITARY SEWER ALONG BOTH PROPERTY LINES WILL BE REVIEWED.

*B. WATERMAIN LOOPING: ALL PUBLIC WATERMANS SHALL BE LOOPED WHENEVER POSSIBLE. THE PIPE SIZE REQUIREMENTS SHALL BE APPROVED BY VILLAGE OF LAKE ORION.

C. INDUSTRIAL PRETREATMENT PROGRAM (IPP): THIS PERMIT IS REQUIRED FOR ALL COMMERCIAL (NON-RESIDENTIAL) AND INDUSTRIAL DISCHARGES. THE OWNER SHALL OBTAIN AN
INDUSTRIAL PRETREATMENT DISCHARGE PERMIT PRIOR TO THE ISSUANCE OF A SEWER CONNECTION PERMIT. INDUSTRIAL DISCHARGE PERMITS ARE NONTRANSFERABLE. CHANGES IN
FACILITY USE WILL REQUIRE A NEW INDUSTRIAL DISCHARGE PERMIT.

D. SOIL EROSION: THE DEVELOPER SHALL SUBMIT A DETAILED SOIL EROSION AND SEDIMENTATION CONTROL PLAN AND OBTAIN AN ACT 451 PART 91, SOIL EROSION AND
SEDIMENTATION CONTROL PERMIT. THIS INCLUDES THE PAYMENT OF FEES AND THE PROVIDING OF NECESSARY BONDS. NO EARTH CHANGES OR EXCAVATION SHALL BE STARTED
PRIOR TO THE ISSUANCE OF THIS PERMIT. THE DEVELOPER SHALL PROTECT ALL EXISTING AND PROPOSED STORM SEWER FACILITIES ON AND ADJACENT TO THE SITE DURING
EXCAVATION AND CONSTRUCTION. ALL SEDIMENT SHALL BE CONTAINED ON SITE. ANY SILT IN COUNTY DRAINS, STORM SEWER, CULVERTS, ETC. AS A RESULT OF THIS PROJECT,
SHALL BE REMOVED BY THE DEVELOPER AT THE COST OF THE DEVELOPER.

*E. FLOOD PLAIN OR WETLAND CONSTRUCTION: THE DEVELOPER SHALL APPLY TO THE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKE, & ENERGY (EGLE) FOR A PERMIT FOR
THE ALTERATION AND/OR OCCUPATION OF A FLOOD PLAIN OR FLOODWAY, AS REQUIRED UNDER PA 451. EVIDENCE OF THIS PERMIT MAY BE REQUIRED PRIOR TO PLAN APPROVAL
BY VILLAGE OF LAKE ORION.

*F. NPDES STORM WATER DISCHARGE PERMIT: THE OWNER OF THE PROPERTY SHALL OBTAIN A NPDES STORM WATER DISCHARGE PERMIT FOR CONSTRUCTION ACTIVITIES FROM MDEQ
AS REQUIRED UNDER PUBLIC ACT 451. THE NOTICE OF COVERAGE FORM SHALL BE SUBMITTED THROUGH OAKLAND COUNTY WRC WITH THE SOIL EROSION CONTROL PERMIT
APPLICATION. ALL MDEQ FEES SHALL ACCOMPANY THE NOTICE OF COVERAGE. EVIDENCE OF THIS PERMIT MAY BE REQUIRED PRIOR TO PLAN APPROVAL. LESS THAN 1 ACRE WILL
BE DISTURBED IN CONSTRUCTION OF THIS PROJECT, THEREFORE A NPDES STORM WATER DISCHARGE PERMIT WILL NOT BE REQUIRED.

*G. VILLAGE OF LAKE ORION PERMIT TO CONSTRUCT A PUBLIC UTILITY: AFTER THE APPROVAL OF THIS PRELIMINARY PLAT OR SITE PLAN, THE DEVELOPER SHALL SUBMIT A
DETAILED PLAN FOR CONSTRUCTION OF ALL PUBLIC SANITARY SEWER AND WATERMAIN. THE PLANS MUST HAVE VILLAGE OF LAKE ORION APPROVAL, A S-PERMIT ISSUED, AND
APPROVAL FROM EGLE PRIOR TO BEGINNING CONSTRUCTION.

H. MDOT ROAD RIGHT-OF-WAY PERMIT: THE DEVELOPER SHALL OBTAIN A PERMIT FROM THE MDOT AND/OR OAKLAND COUNTY ROAD COMMISSION (RCOC) TO PERFORM WORK WITHIN
THE MDOT AND/OR RCOC RIGHT-OF-WAY. ALL FEES FOR THE PERMIT, BONDS AND INSURANCES ARE THE RESPONSIBILITY OF THE DEVELOPER.

I. MUNICIPALITY SANITARY SEWER AND WATER PERMIT: PRIOR TO THE ISSUANCE OF A BUILDING PERMIT BY THE LOCAL MUNICIPALITY, THE DEVELOPER SHALL BE REQUIRED TO
OBTAIN A SANITARY SEWER AND/OR WATER TAP-IN PERMIT FROM THE LOCAL MUNICIPALITY, IF AUTHORIZED, OR VILLAGE OF LAKE ORION PUBLIC SERVICES DEPARTMENT.

*J. STATE CONSTRUCTION PERMITS: THE SANITARY SEWER AND WATERMAIN CONSTRUCTION PERMITS SHALL BE SUBMITTED TO ELGE AFTER APPROVAL OF VILLAGE OF LAKE ORION.
CONSTRUCTION SHALL NOT BEGIN UNTIL THESE STATE PERMITS ARE ISSUED.
*NOT APPLICABLE TO THIS PROJECT

LEGEND

- EX ROAD SIGNS
- EX UTILITY AND/OR LIGHT POLE
- EX OVERHEAD POWERLINES
- EX STREET LIGHT POLE
- EX PEDESTAL
- EX BUILDING LINE
- EX GAS LINE
- EX GAS/ELEC METER
- EX STORM SEWER
- EX STORM MANHOLE
- EX STORM CATCHBASIN
- EX SANITARY SEWER
- EX SANITARY MANHOLE
- EX WATERMAIN
- EX FIRE HYDRANT
- EX WATER MANHOLE
- EX GATEVALVE
- EX CENTERLINE DITCH
- EX TOP OF BANK
- EX WOODS AREA
- EX TREES
- FOUND MONUMENTATION
- BACK TO BACK
- EXISTING
- EX BUILDING AREA
- EX PAVEMENT AREAS
- PROP PARKING SPACE COUNT
- PROP BARRIER FREE (ADA) PARKING
- PROP PAINTED TRAFFIC FLOW ARROW
- PROP CONCRETE AREAS
- PROP MDOT ROADWAY PAVEMENT
- PROP COUNTY ROAD PAVEMENT
- PROP ASPHALT PARKING PAVEMENT
- PROP BUILDING AREA
- PROP RAIN GARDEN AREAS
- PROP SIGN
- PROP 16'-8" HIGH LIGHT POLE
- PROP BUILDING WALL PACK LIGHT (12' A.F.G.)

EXISTING ZONING INFORMATION:

ACCORDING TO THE CURRENT VILLAGE OF LAKE ORION
ZONING ORDINANCE THIS PROPERTY IS CURRENTLY ZONED
MU (MIXED USE DISTRICT), AND IS SUBJECT TO THE
FOLLOWING CONDITIONS:

- 1) MINIMUM LOT SIZE = NONE SPECIFIED
- 2) MINIMUM LOT WIDTH = 60 FEET
- 3) FRONT SETBACK = 10 FEET (MIN), 25 FEET (MAX)
- 4) SIDE SETBACK = 0 FEET
- 5) SIDE SETBACK = 10 FEET (HEIGHTS ROAD)
- 6) REAR SETBACK = 25 FEET
- 7) MAXIMUM BUILDING HEIGHT = 36 FEET (42' WITH SLU)
- 8) MAXIMUM LOT COVERAGE = 50%

SANITARY SEWER & WATER NOTE:

THE PROPOSED BUILDING HAS ACCESS TO AN EXISTING PUBLIC
WATERMAIN, AND AN EXISTING PUBLIC SANITARY SEWER.

FLOOD PLAIN NOTE:

THIS PROPERTY LIES IN ZONE "X" (AREAS OUTSIDE THE 0.2%
ANNUAL CHANCE FLOODPLAIN) OF THE FLOOD INSURANCE RATE
MAP COMMUNITY PANEL NO. 26125C0238F WHICH BEARS AN
EFFECTIVE DATE OF SEPTEMBER 29, 2006 AND IS NOT IN A
SPECIAL FLOOD HAZARD AREA.

WETLAND NOTE:

ACCORDING TO THE FINAL WETLAND INVENTORY MAPS OF
MICHIGAN, THERE ARE NO WETLAND AREAS ON THIS PROPERTY.

REVISED PLANS 10.13.2022:

THE SITE HAS BEEN REVISED/UPDATED PER
COMMENTS FROM THE MICHIGAN DEPARTMENT OF
TRANSPORTATION AS TO THE NEW DRIVEWAY SHALL
LINE UP WITH THE BANK ENTRANCE DRIVEWAY
APPROACH ACROSS THE STREET FROM THE NEW
PROPOSED COMMERCIAL DRIVEWAY OPENING



UTILITY STATEMENT

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND
EXISTING DRAWINGS, IF AVAILABLE. THE SURVEYOR AND/OR ENGINEER MAKES NO GUARANTEES
THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN
SERVICE OR ABANDONED. THE SURVEYOR AND/OR ENGINEER FURTHER DOES NOT WARRANT THAT
THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES
CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE.
THE SURVEYOR AND/OR ENGINEER HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

SITE PLAN LAYOUT & COVER SHEET FOR:

**LAKE ORION RETAIL
DEVELOPMENT CENTER**
494 S BROADWAY ST (M-24), LAKE ORION, MI 48362

REVISIONS

03.14.2023

DRN. BY:

J.R.B.

J.R.B.

02.17.2023

SHEET NO:

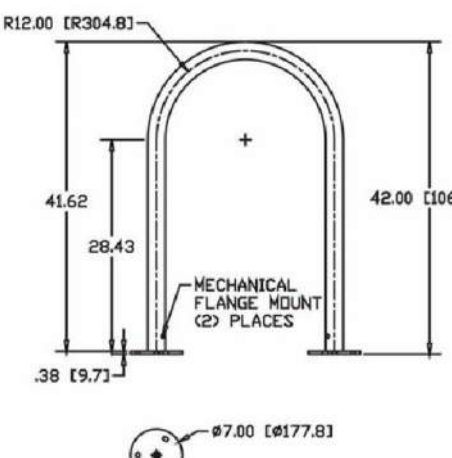
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BENCHMARK NO. 1

NORTH EDGE OF EXISTING WATER MANHOLE
LOCATED AT THE SOUTHWEST CORNER OF
HEIGHTS ROAD AND SOUTH BROADWAY
AVENUE, IN PARKING LOT, AS SHOWN
ELEVATION-995.52 (NAVD88)

BENCHMARK NO. 2

NORTH EDGE OF EXISTING SANITARY SEWER
MANHOLE LOCATED AT THE NORTH EDGE OF
SUBJECT SITE (NORTHEAST CORNER OF
PROPERTY), AS SHOWN
ELEVATION-991.66 (NAVD88)



BIKE RACK DETAIL

ZONED MU

LOT 52
09-11-277-028
BZ LAKE ORION, LLC

09-11-277-019
BZ LAKE ORION, LLC

09-11-277-018
BZ LAKE ORION, LLC

09-11-277-023
BZ LAKE ORION, LLC

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BZ LAKE ORION, LLC

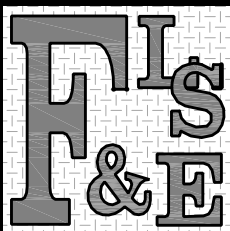
09-11-277-023
BZ LAKE ORION, LLC

OWNER/DEVELOPER:

BZ LAKE ORION, LLC
1822 ARROWHEAD TRAIL
OXFORD, MI 48371
ATTN: STUCKY VITALE ARCHITECTS PHONE 248.546.6700

PART OF THE NORTHEAST 1/4,

SECTION 11, T4N-R10E
VILLAGE OF LAKE ORION, OAKLAND CO, MI



Fenton Land Surveying & Engineering, Inc

14165 N. FENTON ROAD, SUITE 101A, FENTON, MI 48430
PHONE: 810.354.8115 EMAIL: INFO@FENTONLSE.COM

SITE PLAN LAYOUT & COVER SHEET FOR:

**LAKE ORION RETAIL
DEVELOPMENT CENTER**
494 S BROADWAY ST (M-24), LAKE ORION, MI 48362

REVISIONS

03.14.2023

DRN. BY:

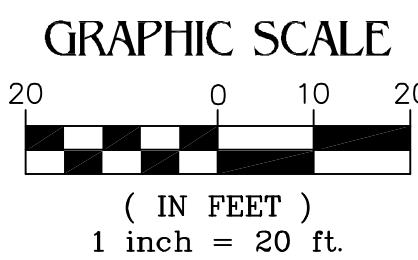
J.R.B.

J.R.B.

02.17.2023

SHEET NO:

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PARCEL 'B', 494 S BROADWAY STREET (PER FLSE PARCEL SPLIT DRAWINGS)
PART OF THE NORTHEAST 1/4 OF SECTION 11 AND PART OF THE SOUTHEAST 1/4 OF SECTION 2, T4N-R10E, VILLAGE OF LAKE ORION, OAKLAND COUNTY, MICHIGAN AND BEING PART OF LOT 52 AND LOT 54 THRU LOT 56 OF THE "ASSESSOR'S REPLAT OF DECKER'S ADDITION TO THE VILLAGE OF ORION AND PART OF CANANDAIGUA CITY" AS RECORDED IN LIBER 52, PAGES 17 AND 17A OF OAKLAND COUNTY PLAT RECORDS, MORE PARTICULARLY DESCRIBED AS: BEGINNING AT THE SOUTHEAST CORNER OF LOT 54, BEING ALSO THE SOUTHWEST CORNER OF LOT 56 OF SAID PLAT, FROM WHICH THE EAST 1/4 CORNER OF SECTION 11, T4N-R10E, LIES S80°07'47"W, 281.28 FEET, AND S03°11'40"E, 24.16 FEET, AND N80°07'47"E, 1,177.00 FEET; THENCE S80°07'47"W, 170.00 FEET; THENCE N09°50'46"W, 33.98 FEET; THENCE N25°38'00"E, 142.86 FEET; THENCE N85°49'40"E, 163.97 TO A POINT ON THE WEST RIGHT OF WAY LINE OF M-24 AS WIDENED (89.00 FEET WIDE); THENCE S04°10'20"E, 126.84 FEET ALONG SAID WEST LINE OF M-24, BEING A LINE 31.00 FEET WEST OF AND PARALLEL TO THE EAST LINE OF LOTS 52, 55 AND 56; THENCE CONTINUING ALONG SAID WESTERLY RIGHT OF WAY LINE OF SAID M-24 AS WIDENED THE FOLLOWING TWO (2) COURSES: S85°47'13"W, 63.48 FEET, AND S08°20'19"E, 14.05 FEET TO THE POINT OF BEGINNING, CONTAINING 0.671 ACRES OF LAND, MORE OR LESS, SUBJECT TO ANY AND ALL EASEMENTS OR RESTRICTIONS OF RECORD

NORTH EDGE OF EXISTING WATER MANHOLE
LOCATED AT THE SOUTHWEST CORNER OF
HEIGHTS ROAD AND SOUTH BROADWAY
AVENUE, IN PARKING LOT, AS SHOWN
ELEVATION-995.52 (NAVD88)

NORTH EDGE OF EXISTING SANITARY SEWER
MANHOLE LOCATED AT THE NORTH EDGE OF
SUBJECT SITE (NORTHEAST CORNER OF
PROPERTY), AS SHOWN
ELEVATION-991.66 (NAVD88)

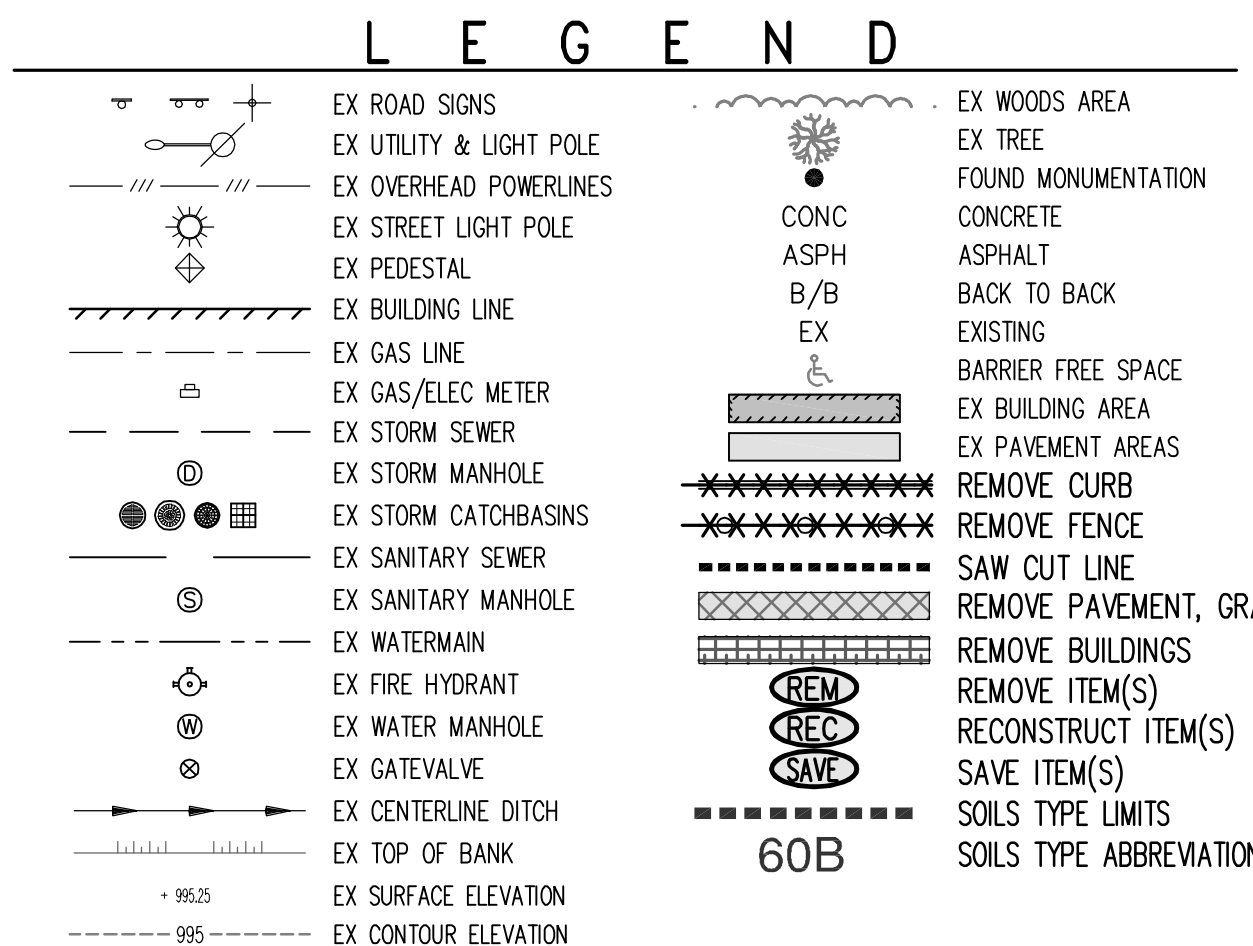
THERE IS A TOTAL OF 7,288 SFT OF IMPERVIOUS AREA COMBINING THE EXISTING PAVEMENT AREAS, BUILDINGS, WALKS, AND DECKS/PATIOS.

THEREFORE $7,288/29,255 = 0.2491$ or 25% IMPERVIOUS

ACCORDING TO THE CURRENT VILLAGE OF LAKE ORION ZONING ORDINANCE THIS PROPERTY IS CURRENTLY ZONED MU (MIXED USE DISTRICT), AND IS SUBJECT TO THE FOLLOWING CONDITIONS:

- 1) MINIMUM LOT SIZE = NONE SPECIFIED
- 2) MINIMUM LOT WIDTH = 60 FEET
- 3) FRONT SETBACK = 10 FEET
- 4) SIDE SETBACK = 0 FEET
- 5) SIDE SETBACK = 10 FEET (HEIGHTS ROAD)
- 6) REAR SETBACK = 25 FEET
- 7) MAXIMUM BUILDING HEIGHT = 42 FEET
- 8) MAXIMUM LOT COVERAGE = 50%

PER USDA SOILS MAPS, THE FOLLOWING SOILS ARE FOUND ON-SITE:
 59 - Urban land
 60B - Urban land-Marlette complex, 0 to 8 percent slopes
 60C - Urban land-Marlette complex, 8 to 15 percent slopes



1. ALL DEMOLITION/REMOVAL WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES. ALL DEMOLITION OPERATIONS SHALL COMPLY WITH MIOSHA REGULATIONS INsofar AS THEY APPLY TO THE REQUIRED WORK. A SOIL EROSION CONTROL PERMIT MUST BE OBTAINED FROM THE OAKLAND COUNTY WATER RESOURCE COMMISSION PRIOR TO BEGINNING ANY DEMOLITION/REMOVAL WORK.

2. THE DEMOLITION/REMOVAL CONTRACTOR SHALL FOLLOW DEMOLITION & REMOVAL POLICY IN VILLAGE OF LAKE ORION AND IN OAKLAND COUNTY.
3. THE DEMOLITION/REMOVAL CONTRACTOR SHALL INSTALL SOIL EROSION CONTROL ITEMS PRIOR TO ANY REMOVALS OR EARTHWORK, AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
4. ALL DEMOLITION/REMOVAL MATERIAL SHALL BE PROPERLY REMOVED FROM THE SITE AND DISPOSED OF IN A LEGAL DESIGNATED DISPOSAL AREA. NO ON-SITE BURNING WILL BE PERMITTED. PERMITS AND FEES FOR DISPOSAL OF DEMOLITION MATERIAL SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL DEMOLISH AND REMOVE ANY ITEMS AS SHOWN ON THESE PLANS. UTILITY LEAD WORK SHALL BE COORDINATED WITH THE APPROPRIATE UTILITY COMPANIES, IF APPLICABLE.
6. BACKFILL EXCAVATED AREAS WITH CLEAN CLASS II GRANULAR FILL COMPACTED TO 95% DENSITY PER MODIFIED PROCTOR IN MAXIMUM 9" LIFTS.
7. AT THE CONCLUSION OF THE DEMOLITION/REMOVAL OPERATIONS, THE ENTIRE WORK AREA SHALL BE LEFT IN A CLEAN CONDITION WITH ANY PROTECTIVE DEVICES AND BARRIERS REMOVED. ALL EXPOSED AREAS SHALL BE SUITABLY TOP SOILED, SEEDDED AND/OR MULCHED.
8. DEMOLISH AND REMOVE ALL EXISTING ITEMS AS SHOWN. VISIT THE SITE TO DETERMINE THE EXTENT OF DEMOLITION WORK WHICH MAY OR MAY NOT BE SHOWN ON THE PLANS.
9. CONTRACTOR SHALL INSTALL INFI-SHIELD OR AN APPROVED ALTERNATE FOR MANHOLES IN DRIVE, IF APPLICABLE.
10. CONTRACTOR SHALL OBTAIN A MANHOLE CASTING ADJUSTING PERMIT FROM THE VILLAGE OF LAKE ORION WATER & WASTEWATER UTILITIES DEPARTMENT FOR ANY CITY SANITARY SEWER OR WATER MANHOLES WITHIN CONSTRUCTION.
11. CONTRACTOR SHALL SAW-CUT ALL EXISTING CONCRETE AND ASPHALT PAVEMENT AND CONCRETE CURBS, PRIOR TO REMOVAL. REPLACE PAVEMENT IN KIND OR AS SHOWN ON THE ACCOMPANYING CONSTRUCTION PLANS.

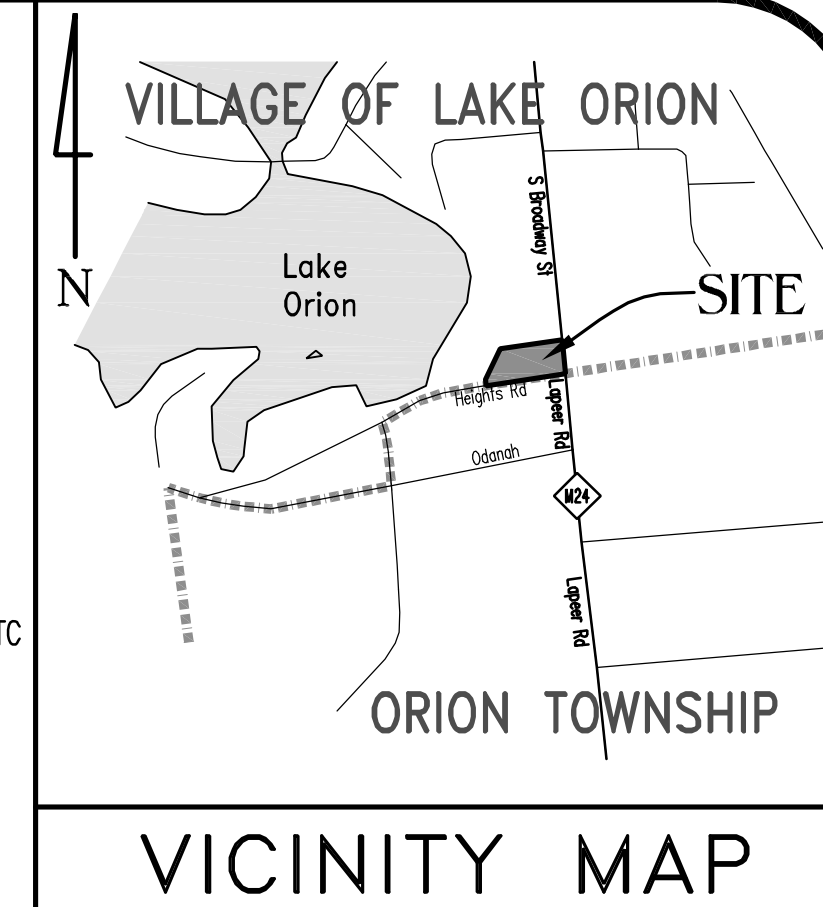
PER OBSERVATION, THIS SITE IS EITHER CURRENTLY SUPPLIED BY OR HAS ACCESS TO THE FOLLOWING PUBLIC UTILITIES: PUBLIC WATER, PUBLIC SANITARY SEWER, STORM SEWER, GAS, ELECTRIC, AND TELEPHONE, EITHER LOCATED ADJACENT TO THE SUBJECT SITE OR WITHIN PUBLIC ROAD RIGHT-OF-WAY.

THIS PROPERTY LIES IN ZONE "X" (AREAS OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) OF THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL NO. 26125C0238F WHICH BEARS AN EFFECTIVE DATE OF SEPTEMBER 29, 2006 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.

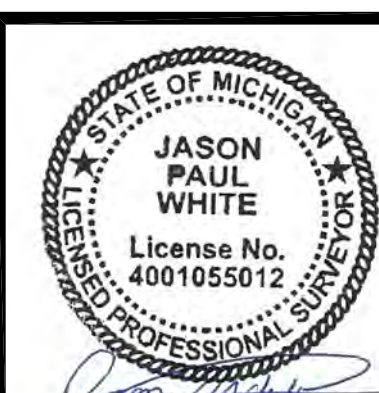
1. LIBER 215, PAGE 31, O.C.R. – BUILDING RESTRICTION – NO LIQUOR SOLD OR KEPT ON PROPERTY, PRIVATE RESIDENCE ERECTED, AND ANNUAL \$15 FEE FOR RESORT ADMISSION FOR EACH LOT (ACROSS OVERALL ORIGINAL PARCEL)
2. LIBER 525, PAGE 124, O.C.R. – BUILDING RESTRICTION – PROPERTY TO BE USED AS PRIVATE RESIDENCE ONLY, NO BUILDINGS ERECTED WITH A COST OF LESS THAN \$5,000. (ACROSS OVERALL ORIGINAL PARCEL)
3. LIBER 3205, PAGE 665, O.C.R. – DRIVEWAY EASEMENT – 3.5 FEET WIDE BY 45 FEET DEEP FROM RIGHT-OF-WAY LINE OF HEIGHTS ROAD, WESTERLY 35 FEET OF LOT 54 OF ASSESSORS REPLAT OF DECKERS ADD TO THE VILLAGE OF LAKE ORION AND PART OF CANANDAIGUA CITY SUBDIVISION RECORDED IN LIBER 52 OF PLATS, PAGE 17 AND 17A, O.C.R.
4. LIBER 14944, PAGE 527-528, O.C.R. – MDOY HIGHWAY AND PUBLIC UTILITY EASEMENT – ACROSS LOTS 55 & 56 OF ASSESSORS REPLAT OF DECKERS ADD TO THE VILLAGE OF LAKE ORION AND PART OF CANANDAIGUA CITY SUBDIVISION RECORDED IN LIBER 52 OF PLATS, PAGE 17 AND 17A, O.C.R.
5. LIBER 21596, PAGE 471-472, O.C.R. – HIGHWAY AND PUBLIC UTILITY EASEMENT – ACROSS LOTS 55 & 56 OF ASSESSORS REPLAT OF DECKERS ADD TO THE VILLAGE OF LAKE ORION AND PART OF CANANDAIGUA CITY SUBDIVISION RECORDED IN LIBER 52 OF PLATS, PAGE 17 AND 17A, O.C.R.
6. NO RECORDED EASEMENT FOR THE PUBLIC SANITARY SEWER RUNNING EAST AND WEST WITH LOT 52 DESCRIBED AS THE SOUTH 20 FEET OF THE SOUTH 50 FEET OF LOT 52 OF ASSESSORS REPLAT OF DECKERS ADD TO THE VILLAGE OF LAKE ORION AND PART OF CANANDAIGUA CITY SUBDIVISION RECORDED IN LIBER 52 OF PLATS, PAGE 17 AND 17A, O.C.R.

1. DATE OF LAST FIELD WORK 11/21/2022.
2. PER THE LATEST LAKE ORION CITY ZONING MAP, THE OVERALL PARCEL AND ADJACENT PARCELS IS ZONED MU (MIXED USE) AND IS SUBJECT TO THE VILLAGE OF LAKE ORION STANDARDS AND ORDINANCES.
3. THE BASIS OF BEARINGS ARE PER AN ALTA-NPS LAND TITLE SURVEY, PROVIDED BY STUCKY VITALE ARCHITECTS, JOB NO. 2020.058.
4. REFERENCE PLANS DONE BY FENTON LAND SURVEYING & ENGINEERING, INC, JOB NO. 21-130, CIVIL SITE CONSTRUCTION PLANS, DATED 02.12.2021.
5. THE TITLE WORK WAS PROVIDED BY THE CLIENT, FIRST AMERICAN TITLE INSURANCE COMPANY, AGENT IS VANGUARD INSURANCE AGENCY, LLC, FILE NO V6A401966
6. SEE THIS SHEET FOR THE LIST OF EASEMENTS AND RESTRICTIONS THAT ENCUMBER THE PROPERTY.
7. THERE IS A TOTAL OF 29,255 SFT OR 0.671 ACRES OF LAND, MORE OR LESS

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS, IF AVAILABLE. THE SURVEYOR AND/OR ENGINEER MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR AND/OR ENGINEER FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR AND/OR ENGINEER HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.



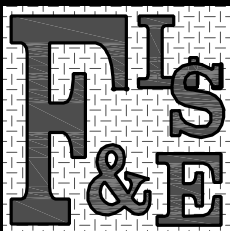
Know what's **below**.
Call before you dig.



JOB NO. 22-317

OWNER/DEVELOPER:
BZ LAKE ORION, LLC
1822 ARROWHEAD TRAIL
OXFORD, MI 48371
ATTN: STUCKY VITALE ARCHITECTS PHONE 248.546.6700

PART OF THE NORTHEAST 1/4,
SECTION 11, T4N-R10E
VILLAGE OF LAKE ORION, OAKLAND CO, MI

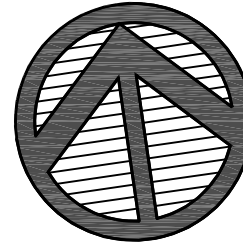


Fenton Land Surveying & Engineering, Inc
14165 N. FENTON ROAD, SUITE 101A, FENTON, MI 48430
PHONE: 810.354.8115 EMAIL: INFO@FENTONLSE.COM

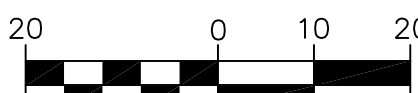
EXISTING CONDITIONS SURVEY & REMOVAL PLAN FOR:
LAKE ORION RETAIL
DEVELOPMENT CENTER
494 S BROADWAY ST (M-24), LAKE ORION, MI 48362

REVISIONS	DRN. BY:	J.R.B.	02.13.2023	SHEET NO: <div style="font-size: 2em; font-weight: bold; text-align: center;">C-2</div>
	DSN BY:	J.R.B.	"	
	CHK'D BY:	D.J.K.	"	
	APPR BY:	J.P.W.	"	

NORTH



GRAPHIC SCALE



(IN FEET)
1 inch = 20 ft.

EXISTING IMPERVIOUS ON-SITE AREA:

THERE IS A TOTAL OF 7,288 SFT OF IMPERVIOUS AREA COMBINING THE EXISTING PAVEMENT AREAS, BUILDINGS, WALKS, AND DECKS/PATIOS.

THEREFORE 7,288/29,255 = 0.2491 or 25% IMPERVIOUS

PROPOSED IMPERVIOUS ON-SITE AREA:

THERE IS A TOTAL OF 19,347 SFT OF IMPERVIOUS AREA COMBINING THE PROPOSED ASPHALT AND CONCRETE PAVEMENT AREAS, BUILDINGS, AND WALKS.

THEREFORE 19,347/29,255 = 0.6613 or 66% IMPERVIOUS

NOTE:

ANY WORK WITHIN THE OAKLAND COUNTY ROAD COMMISSION (RCOC) AND/OR MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) RIGHT-OF-WAY REQUIRES A ROAD RIGHT-OF-WAY PERMIT APPLICATION ISSUED. THE CONTRACTOR MUST CONTACT THE OAKLAND COUNTY ROAD COMMISSION, PERMITS DEPARTMENT, AND SECURE THE REQUIRED PERMIT AND BOND PRIOR TO BEGINNING CONSTRUCTION. CONTRACTOR MUST FOLLOW ALL REQUIREMENTS IN THE PERMIT, INCLUDING THE PROPER CONSTRUCTION TRAFFIC SIGNAGE.

GRADING, DRAINAGE, PAVING & UTILITY PLAN

GENERAL NOTES:

- FOR PROTECTION OF UNDERGROUND UTILITIES AND IN CONFORMANCE WITH PUBLIC ACT 53, 1974, THE CONTRACTOR SHALL DIAL 1-800-482-7171 A MINIMUM OF THREE FULL WORKING DAYS, EXCLUDING SATURDAYS, SUNDAYS, AND HOLIDAYS, PRIOR TO BEGINNING EACH EXCAVATION IN AREAS WHERE PUBLIC UTILITIES HAVE NOT BEEN PREVIOUSLY LOCATED. MEMBERS WILL THUS BE ROUTINELY NOTIFIED. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF NOTIFYING UTILITY OWNERS WHO MAY NOT BE A PART OF THE "MISS DIG" ALERT SYSTEM.
- THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO BEGINNING CONSTRUCTION, AND WILL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES DURING CONSTRUCTION.
- THE CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL REGULATIONS FOR WORK AT THE SITE. THIS SHALL INCLUDE ALL M.I.O.S.H.A. REGULATIONS.
- THE CONTRACTOR SHALL CONTROL NOISE, CARRY OUT A PROGRAM OF DUST CONTROL AND SHALL ALLOW NO ON-SITE BURNING, WITHOUT APPROVAL FROM LOCAL FIRE DEPARTMENT(S).
- ALL WORK NECESSARY TO COMPLETE THIS PROJECT SHALL CONFORM TO ALL RELATED VILLAGE OF LAKE ORION & OAKLAND COUNTY CODES AND ORDINANCES, ALONG WITH ALL MDOT STANDARDS & SPECIFICATIONS FOR CONSTRUCTION.
- IF ANY UTILITY POLES ARE IMPACTED BY CONSTRUCTION THEY SHALL BE PROTECTED AND SUPPORTED BY THE CONTRACTOR AT THE CONTRACTORS EXPENSE.
- THE CONTRACTOR SHALL FURNISH, PLACE AND MAINTAIN PLASTIC DRUM BARRICADES AS REQUIRED TO PROTECT THE TRAVELING PUBLIC DURING CONSTRUCTION OPERATIONS ON THIS PROJECT.
- ALL LAWN OR TURF AREAS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED WITH 4" TOPSOIL SURFACE, SEED, FERTILIZER, MULCH, AND MULCH BLANKET IN ACCORDANCE WITH THE M.D.O.T. 2012 STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- PUBLIC UTILITIES WHERE SHOWN ARE BASED ON INFORMATION PROVIDED BY THE UTILITY OWNERS, NEITHER THE OWNER OR THE ENGINEER ARE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES, PRIOR TO CONSTRUCTION.
- ALL PUBLIC UTILITIES WHICH ARE NOT TO BE MOVED SHALL BE PROTECTED AND SUPPORTED BY THE CONTRACTOR AT THEIR OWN EXPENSE.
- ALL SAW CUTTING REQUIRED FOR THE REMOVAL OF PAVEMENT AREAS SHALL BE DONE AS SHOWN ON THE PLANS, OR AS DIRECTED BY THE OWNER AND/OR ENGINEER.

CONSTRUCTION NOTES:

- PROPOSED SPOT ELEVATIONS ARE TO TOP OF PAVEMENT UNLESS NOTED OTHERWISE. SEE SHEET C-4 FOR MISCELLANEOUS CONSTRUCTION DETAILS TO CALCULATE THE TOP OF WALK OR TOP OF CURB ELEVATIONS.
- ALL PROPOSED 48" AND 36" STORM SEWER PIPE SHALL BE ADS N-12 WATERIGHT HIGH-DENSITY POLYETHYLENE PIPE (HDPE), OR APPROVED EQUAL. ALL ROOF DRAIN PIPE SHALL BE 6" SCH-40 PVC PIPE, BENDS, AND WYES, OR APPROVED EQUAL. THE OUTLET PIPE TO S BROADWAY AVE (MDOT SYSTEM) SHALL BE SCH-40 PVC PIPE. ALL FRAMES AND COVERS FOR THE ROOF DRAIN CLEANOUTS SHALL BE EAST JORDAN IRON WORKS FRAME NO. 363921, PRODUCT NO. 003639125, AND COVER TYPE 3639A1 (STORM), PRODUCT NO. 00363927, OR APPROVED EQUAL.
- ALL NEW UTILITIES PIPES UNDER PROPOSED PAVEMENT SHALL BE BACKFILLED WITH CLASS II SAND COMPACTED TO A MINIMUM 95% OF MAXIMUM UNIT WEIGHT BY MODIFIED PROCTOR FOR THE FULL DEPTH OF THE TRENCH.
- SEE SHEET C-4 FOR SIDEWALK CONSTRUCTION DETAILS AND NOTES.
- A PERMIT FROM MICHIGAN DEPARTMENT OF TRANSPORTATION WILL BE REQUIRED FOR THE PLACEMENT OF THE DRIVEWAY ALONG S BROADWAY (M-24) AND VILLAGE OF LAKE ORION AND/OR THE OAKLAND COUNTY ROAD COMMISSION FOR THE DRIVEWAY APPROACH OFF HEIGHTS ROAD.

LEGEND

	EX ROAD SIGNS		PROP CONCRETE AREAS
	EX UTILITY POLE		PROP ASPHALT PARKING PAVEMENT
	EX LIGHT POLE		PROP MDOT ROADWAY PAVEMENT
	EX OVERHEAD POWERLINES		PROP COUNTY ROAD PAVEMENT
	EX GAS, ELECTRIC & TELE		PROP BUILDING AREA
	EX STORM SEWER		PROP DRAINAGE STRUCTURE (DS)
	EX STORM MANHOLE		PROP STORM SEWER PIPE
	EX STORM CATCHBASINS		PROP UG DETENTION STORAGE PIPE
	EX SANITARY SEWER		PROP 6" ROOF DRAIN
	EX SANITARY MANHOLE		PROP 6" ROOF DRAIN CLEANOUT
	EX WATERMAIN		PROP DRAINAGE HIGH POINT
	EX FIRE HYDRANT		PROP DRAINAGE FLOW ARROW
	EX WATER MANHOLE		PROP CURB & GUTTER (NORMAL GUTTER)
	EX GATEVALVE		PROP CURB & GUTTER (REVERSE GUTTER)
	EX CHAIN LINK FENCE		PROP 6" SANITARY CLEANOUT
	EX SURFACE ELEVATION		PROP 6" SANITARY SEWER LEAD
	EX MAJOR CONTOUR ELEVATION		PROP WATER SHUT-OFF VALVE
	EX MINOR CONTOUR ELEVATION		PROP 2" WATER LEAD LINE
			PROP BURIED UG GAS LINE
			PROP BURIED UG ELECTRIC LINE

ADDITIONAL NOTES FOR SITE PLANS:

- SAND FILL UNDER ANY FLOOR SLAB, WALKS, PAVED AREAS, ETC. SHALL BE MINIMUM MDOT CLASS II SAND BACKFILL (A5). FILL SAND SHALL NOT HAVE MOISTURE CONTENT GREATER THAN 15%. THE SAND SHALL BE COMPACTED TO 95% OF MATERIAL THE UNIT WEIGHT BY MODIFIED PROCTOR.
- ALL EXISTING UTILITIES SERVING THE PROPERTY SHALL BE PROPERLY TERMINATED IN COMPLIANCE WITH LOCAL AND/OR COUNTY REGULATIONS. REMOVE ALL TREES, INCLUDING ROOT STRUCTURES, EXCEPT THOSE SPECIFICALLY NOTED TO REMAIN, AND THOSE ON PROPERTY LINES. DO NOT CLEAR SITE PRIOR TO COORDINATING WITH THE OWNER AND THE LANDSCAPING PLAN TO DETERMINE ALL TREES TO REMAIN.
- FOR ANY DEMOLITION WORK, PLEASE SEE DEMOLITION NOTES ATTACHED HERewith ON SHEET C-2.
- VERIFY EXACT LOCATION OF UNDERGROUND UTILITIES PRIOR TO BEGINNING CONSTRUCTION.
- CONTRACTOR IS TO ADJUST ANY UTILITY ELEMENT MEANT TO BE FLUSH WITH GRADE (CLEAN OUT, VALVE BOXES, MANHOLES, CATCH BASINS, INLETS, ETC.) THAT IS AFFECTED BY SITE WORK OR GRADE CHANGES, WHETHER SPECIFICALLY NOTED ON PLANS OR NOT. THE CONTRACTOR SHALL OBTAIN ANY NECESSARY PERMITS FOR ADJUSTMENT AT THE CONTRACTOR'S EXPENSE.
- THE WATER SUPPLY FOR ALL COMMERCIAL AND INDUSTRIAL BUILDINGS SHALL BE EQUIPPED WITH A BACKFLOW PREVENTION DEVICE IN ACCORDANCE WITH BUILDING CODES. AN APPROVAL OF METHODS MUST BE ACQUIRED FROM VILLAGE OF LAKE ORION AND/OR OAKLAND COUNTY DRAIN COMMISSIONER.
- WATER SERVICE CONNECTION AND CURB BOX SHALL BE INSTALLED IN ACCORDANCE WITH VILLAGE OF LAKE ORION AND/OR OAKLAND COUNTY DRAIN COMMISSIONER STANDARD DETAILS AND SPECIFICATIONS.
- ALL COMMERCIAL WATER SERVICE LEADS SHALL BE "K" COPPER. THE MINIMUM SIZE SHALL BE 2".
- THE CONTRACTOR SHALL NOTIFY MISS DIG (811) THREE (3) WORKING DAYS PRIOR TO STARTING ANY EXCAVATION WITH POWER EQUIPMENT.
- THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL, COUNTY, STATE, AND LOCAL REGULATIONS FOR ALL WORK THAT TAKES PLACE ON THE SITE.
- THE CONTRACTOR/DEVELOPER SHALL PAY FOR AND OBTAIN ALL PERMITS REQUIRED BY FEDERAL, STATE, LOCAL, OR PRIVATE AGENCIES AND PAY ALL CHARGES FOR INSPECTION AND TESTING.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING UP THE PREMISES, AND UPON COMPLETION OF THE PROJECT, LEAVE THE SITE IN AN ACCEPTABLE CONDITION AS DETERMINED BY THE ENGINEER OR OWNER.
- COMMERCIAL BUILDINGS SHALL USE A 6" SANITARY RISER FROM THE MAIN TO THE STRUCTURE. THE SERVICE RISER SHALL CONNECT TO THE MAINLINE AND NOT AT A MANHOLE.
- FOR COMMERCIAL ESTABLISHMENTS THAT GENERATE GRIT OR GREASE, AN EXTERNAL GREASE INTERCEPTOR SHALL BE PROVIDED. SHOW THE DETAIL ON THE PLANS WITH APPROPRIATE NOTES. THE DOMESTIC SEWAGE SHALL BE DESIGNED TO BYPASS THE GREASE/GRIT TRAP. (NOT REQUIRED FOR THIS PROJECT)
- THE MINIMUM SLOPE FOR A COMMERCIAL LEAD IS 1' OF FALL PER 100 FEET OF PIPE. SHOW THE INVERT AT THE STRUCTURE AND THE SLOPE TO THE PROPERTY LINE.
- ALL SANITARY SEWER LEADS/LATERALS SHALL BE SDR-23.5 PVC WITH CLEANOUTS SPACED EVERY 90 FEET.

BZ LAKE ORION, LLC - 494 S BROADWAY AVE - STATE HIGHWAY M-24 100 YEAR STORM EVENT STORAGE VOLUMES REQUIRED/PROVIDED

Site Drainage Area =	28,830	Sft	0.660	Acres
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Weighted Runoff Coefficient				
On-site Type of Surfaces	Total Sft	Multiply	Runoff Coeff	Value
Lawn Area	8,452	X	0.25	2,113
Impervious Sidewalk Pavers	1,410	x	0.35	494
Pavement Area	15,415	x	0.90	13,874
Roof Area	3,553	x	0.90	3,198
Totals	28,830			19,678

Weighted "C" Formula = 19,678 / 28,830 = 0.6825

Site "C" Factor Utilized =	0.700
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Q Allowable (Per Oakland County Drain Commissioner)			
Q Allowable (Qa)	=	0.20	cfs/acre
Total Site Qa =	0.66 x 0.20 =	0.132	cfs

Total Site Allowable Outflow (Qo)			
Qo = Qa/(AxC) = 0.132/(0.66 x 0.70) =	Qo =	0.29	Cfs/Acre imperv

Storage Time (T) (In Minutes that Maximum Storage will Occur)			
T = -25+SQRT(10312.5/Qo) = -25+SQRT(10312.5/0.29) =	T =	164.98	Minutes

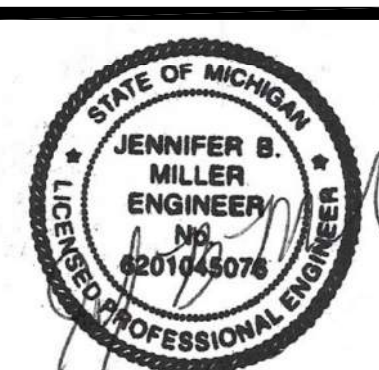
Maximum Volume of Storage per acre of Imperviousness (Vs)			
Vs = 16500xT/(T+25)+(40xQoxt)			
= 16500x164.98/(164.98+25)+40x0.29x164.98 =	Vs =	12443.23	Cft/Acre imperv

Total Volume of Storage Required (Vt)			
Vt = Vs x A x C = 12443.23x0.66x0.70 = Required Volume =	Vt =	5,749	Cft
100 Year Highwater Elevation =	Elevation =	988.89	Use 989.00
Storage Volume Provided at Elevation =	Elevation =	989.00	5,773 Cft
Detention Basin Outlet Invert Elevation =	Elevation =	985.00	

Bankfull Flood Storage Volume (2.3" of Rain Event)			
Bankfull Volume = 8349xAc = 8349 x 0.66 x 0.700 =	Volume =	3,773	Cft
Bankfull Flood Elevation =	Elevation =	987.47	

First Flush Storage Volume (First 1" of Rain Event)			
First Flush Volume = 3630xAc = 3630 x 0.66 x 0.70 =	Volume =	1,676	Cft
First Flush Elevation =	Elevation =	986.32	

Outlet Pipe Flow Design (Restrictor Pipe)			
Qtotat Formula = 0.62A x (2gh) ^{0.5}			
Acceleration due to Gravity	g =	32.2	feet/s ²
Head on Pipe	H =	3.93	Ft
Diameter of Pipe	D =	1.57	Inch
Cross-section area of pipe	A =	0.013	Sft
Discharge	Q =	0.133	cfs
Total Site Q Allowable	Qa =	0.132	cfs



FILE: 0085/22-317/SV-M/494 S BROADWAY-M24/GRU PLAN - C-3



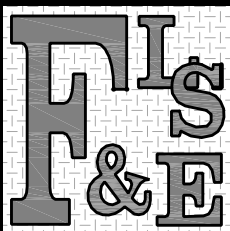
UTILITY STATEMENT

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS, IF AVAILABLE. THE SURVEYOR AND/OR ENGINEER MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR AND/OR ENGINEER FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR AND/OR ENGINEER HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

SCALE: 1"=20'
JOB NO. 22-317

OWNER/DEVELOPER:
BZ LAKE ORION, LLC
1822 ARROWHEAD TRAIL
OXFORD, MI 48371
ATTN: STUCKY VITALE ARCHITECTS PHONE 248.546.6700

PART OF THE NORTHEAST 1/4,
SECTION 11, T4N-R10E
VILLAGE OF LAKE ORION, OAKLAND CO, MI

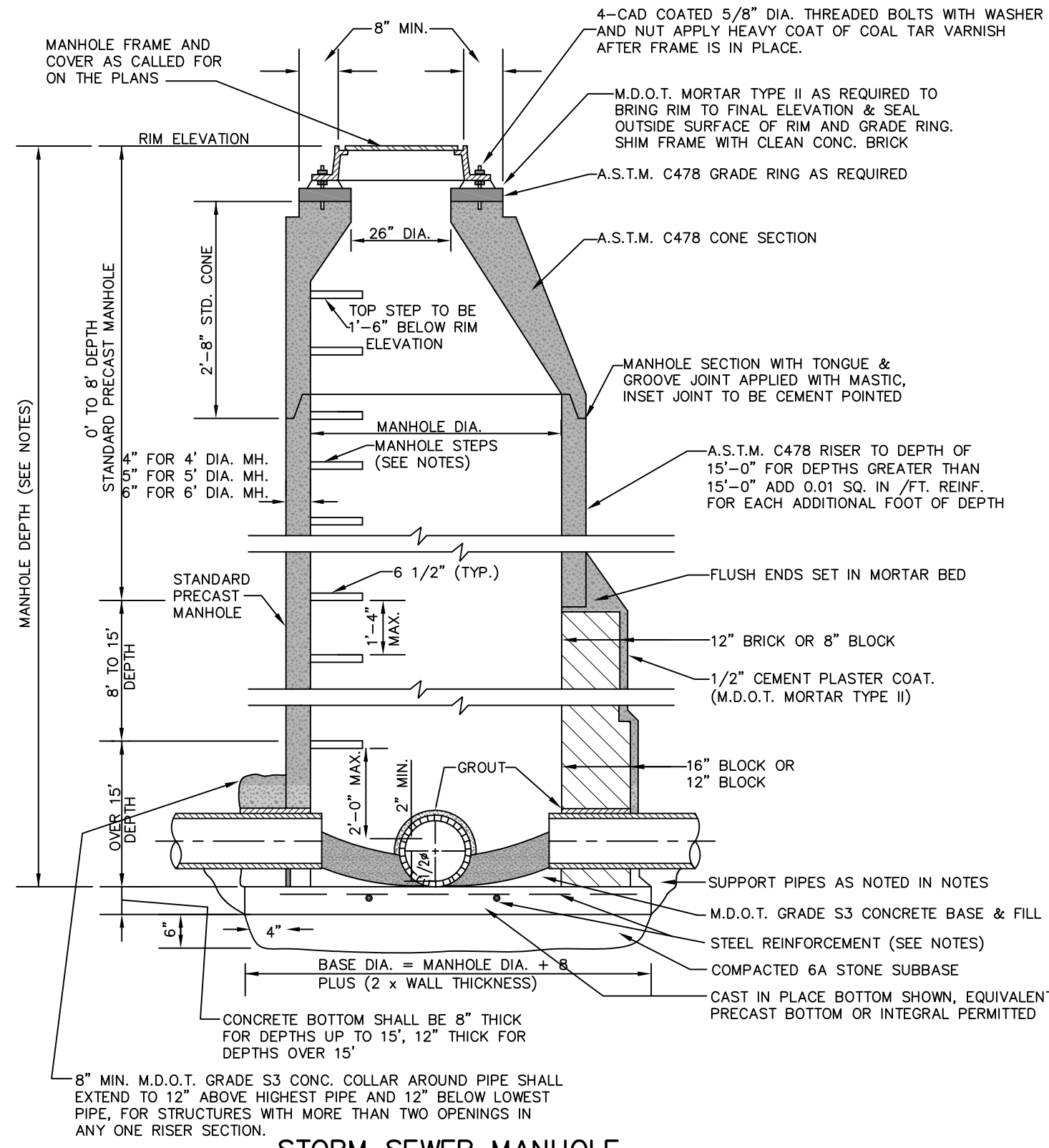


Fenton Land Surveying & Engineering, Inc
14165 N. FENTON ROAD, SUITE 101A, FENTON, MI 48430
PHONE: 810.354.8115 EMAIL: INFO@FENTONLSE.COM

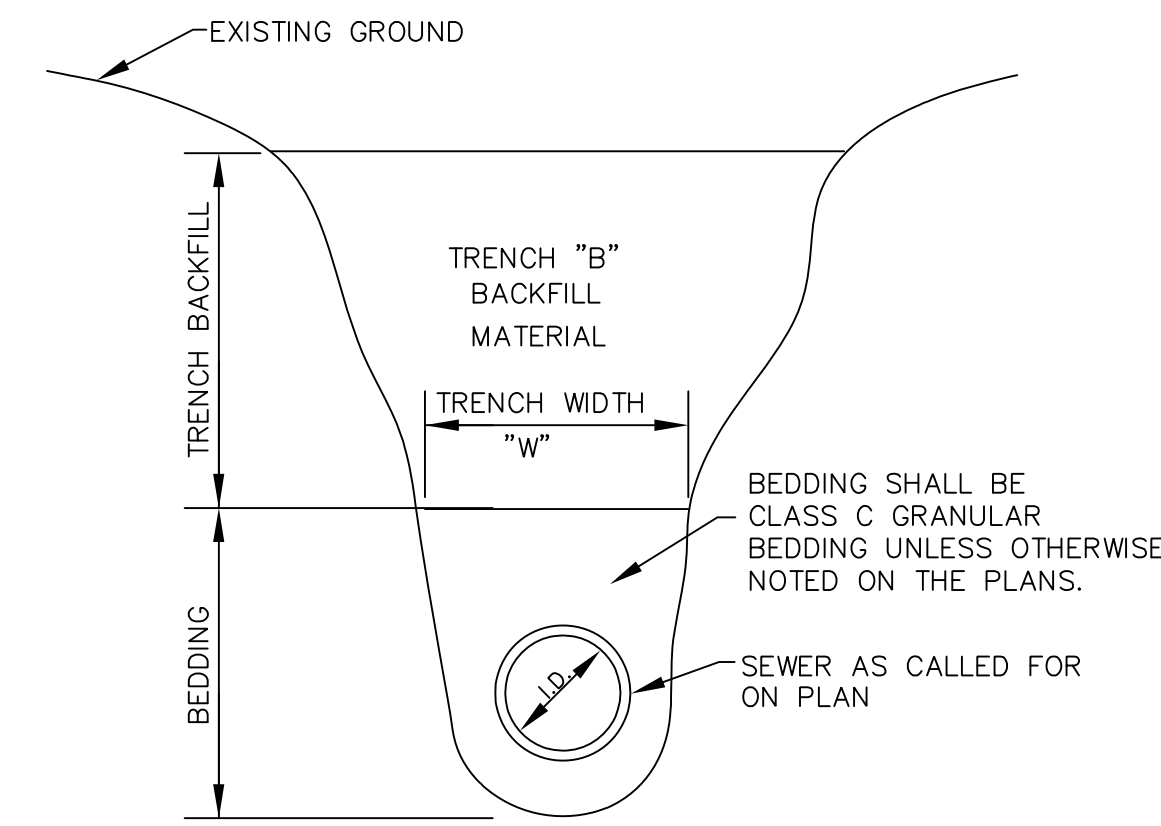
GRADING, DRAINAGE, PAVING & UTILITY PLAN FOR:
**LAKE ORION RETAIL
DEVELOPMENT CENTER**
494 S BROADWAY ST (M-24), LAKE ORION, MI 48362

REVISIONS 03.14.2023	DRN. BY: DSN BY:	J.R.B.	02.17.2023	SHEET NO: C-3
	CHK'D BY:	D.J.K.		
	APPR BY:	J.B.M.		

ELSE: JOBS/22-317/SV-M/494 S BROADWAY-M24/DRAINAGE & MISC. DETAILS - C-5



STORM SEWER MANHOLE
(NOT TO SCALE)
MDOT STANDARD PLAN NO. R-1-G

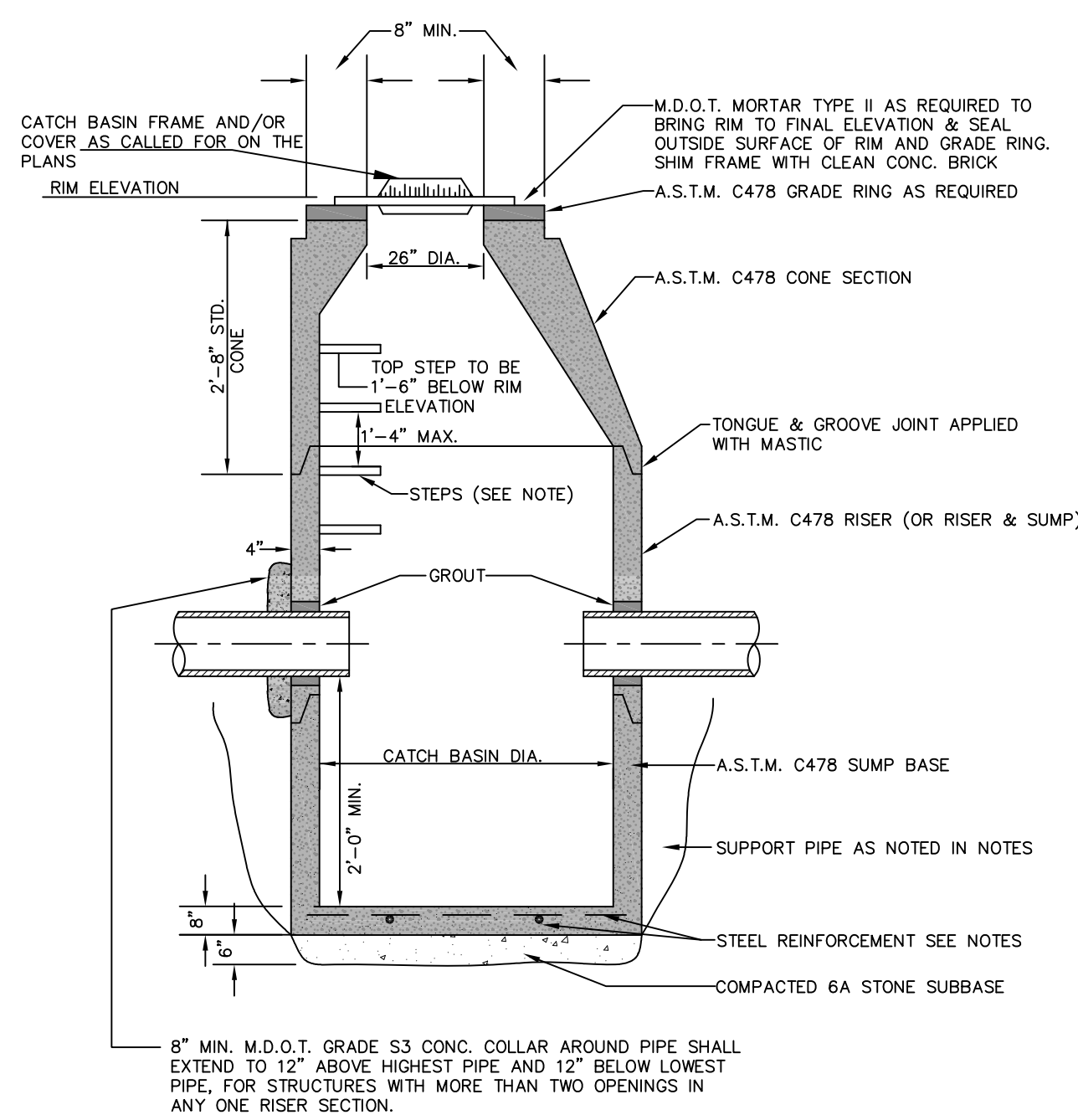


**SEWER NOT UNDER TRAFFIC AREA
TRENCH DETAIL I (TD-1)**
NO SCALE

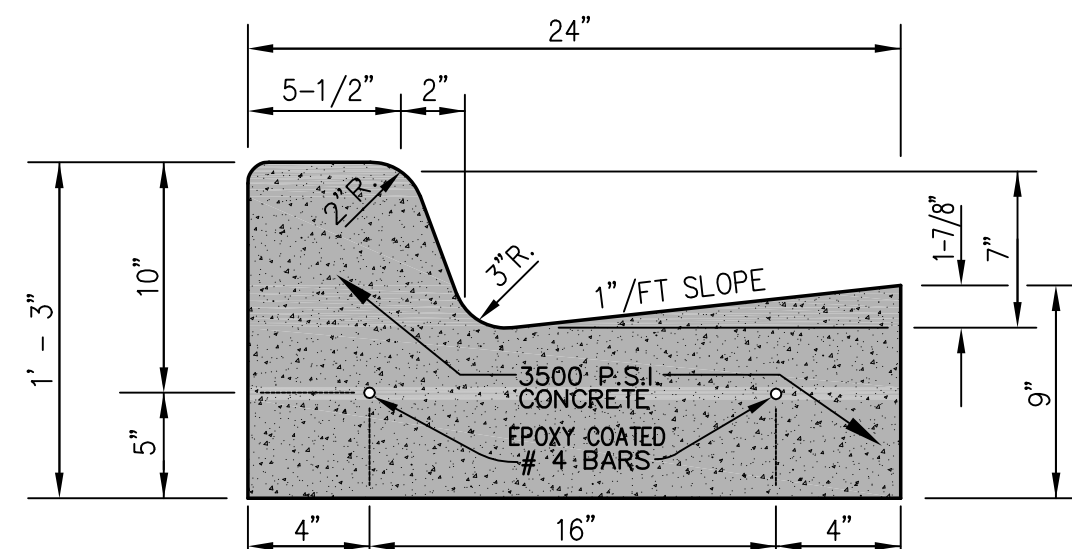
- NOTE**
1. TRAFFIC AREAS INCLUDES ROAD AND SHOULDER SURFACES OF ANY TYPE, DRIVE WAY AND PARKING LOT SURFACES OF ANY TYPE, AND SIDEWALKS, WHETHER EXISTING OR PROPOSED FOR FUTURE CONSTRUCTION.
 2. WHERE TRENCH WIDTH EXCEEDS THE MAXIMUM VALUES IN THE TABLE THE OWNER MAY AT HIS DISCRETION REQUIRE CONSTRUCTION OF A CONC. CRADLE AT THE CONTRACTOR'S EXPENSE.
 3. BELOW A POINT 12" ABOVE THE TOP OF THE PIPE, THE TRENCH WIDTH SHALL PROVIDE A CLEARANCE OF NOT LESS THAN 6" BETWEEN THE PIPE AND TRENCH AND THE TRENCH WIDTH SHALL NOT EXCEED THOSE SHOWN IN MAXIMUM TRENCH WIDTH TABLE.
 4. BACKFILL MATERIAL FALLING WITHIN THE ZONE OF INFLUENCE OF TRAFFIC SURFACES (PAVED OR GRAVEL) OR STRUCTURES IN TRENCH DETAIL 1 (TD-1) SHALL BE GRANULAR MATERIAL CLASS II COMPACTED TO 95% OF MAXIMUM UNIT WEIGHT AS SHOWN IN TRENCH DETAIL 2 (TD-2).
 5. SANITARY SEWER TRENCH WIDTH REQUIREMENTS DIFFER FROM STORM SEWERS. SEE SPECIFICATIONS FOR PROVISIONS.



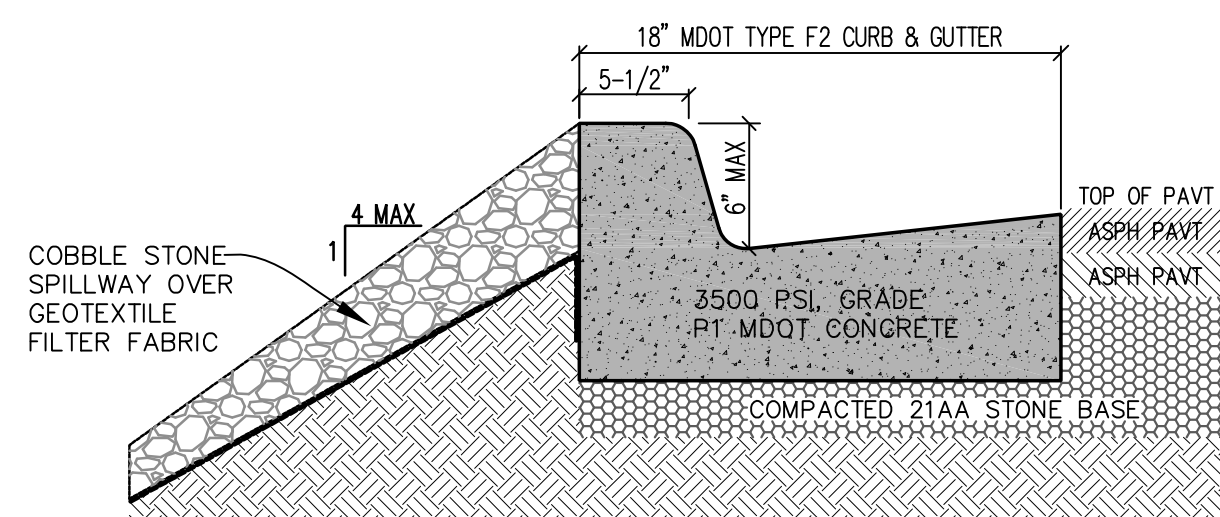
PROPOSED REGULATORY SIGNS



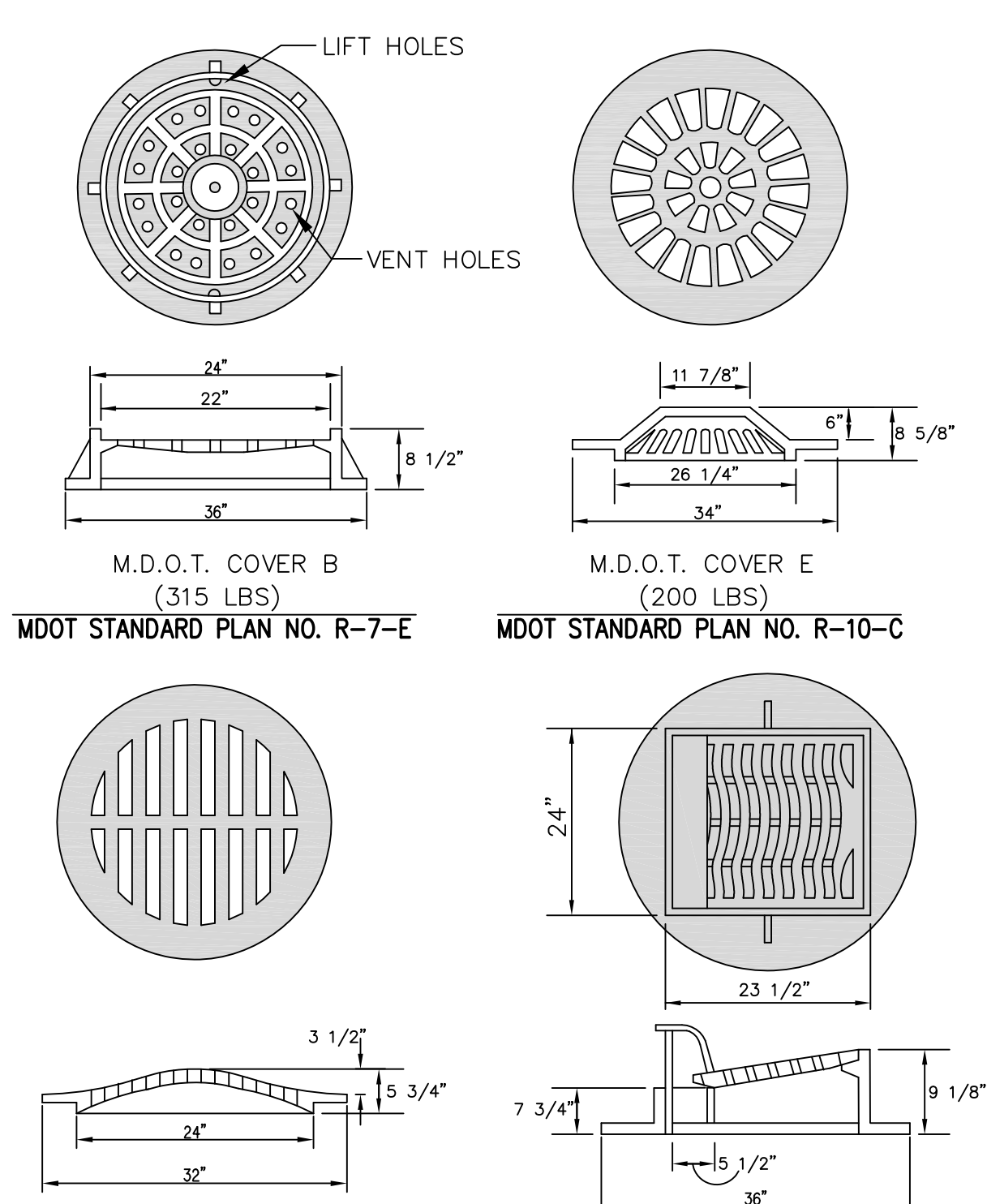
PRECAST CATCH BASIN
(NOT TO SCALE)
MDOT STANDARD PLAN NO. R-1-G



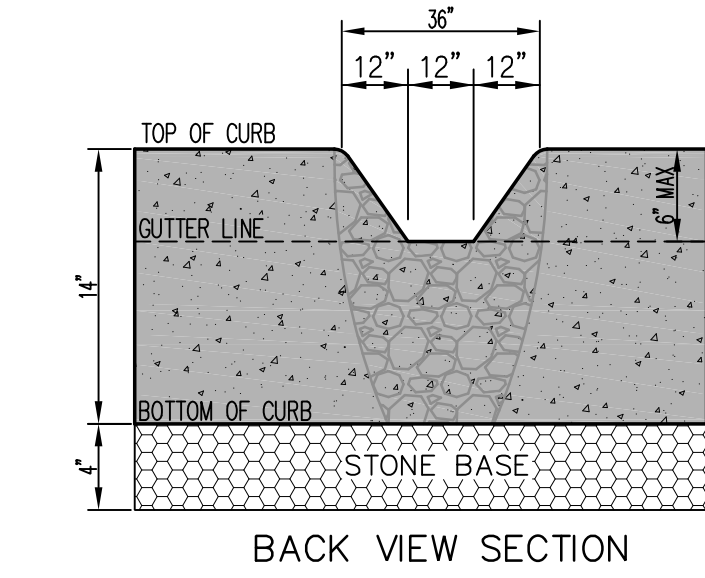
CONCRETE CURB & GUTTER DETAIL C6
(W/NORMAL GUTTER GRADE)
APPLIES TO M-24 (BROADWAY AVE)



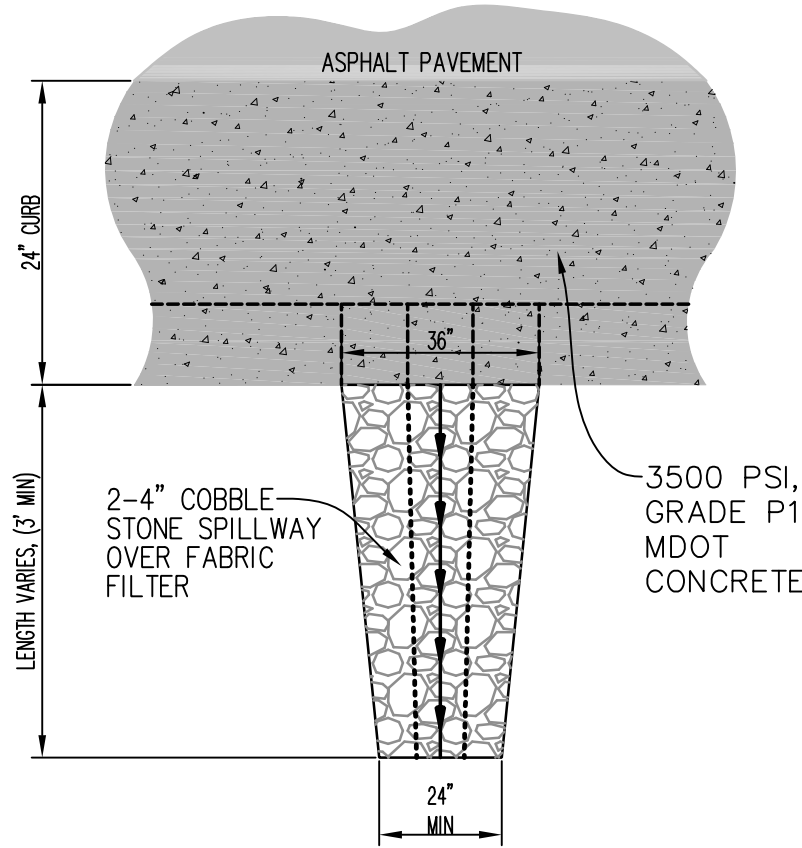
MDOT TYPE F2 CURB CUT DETAIL
(ADJACENT TO ASPHALT PAVEMENT)



MANHOLE AND CATCH BASIN COVERS



BACK VIEW SECTION

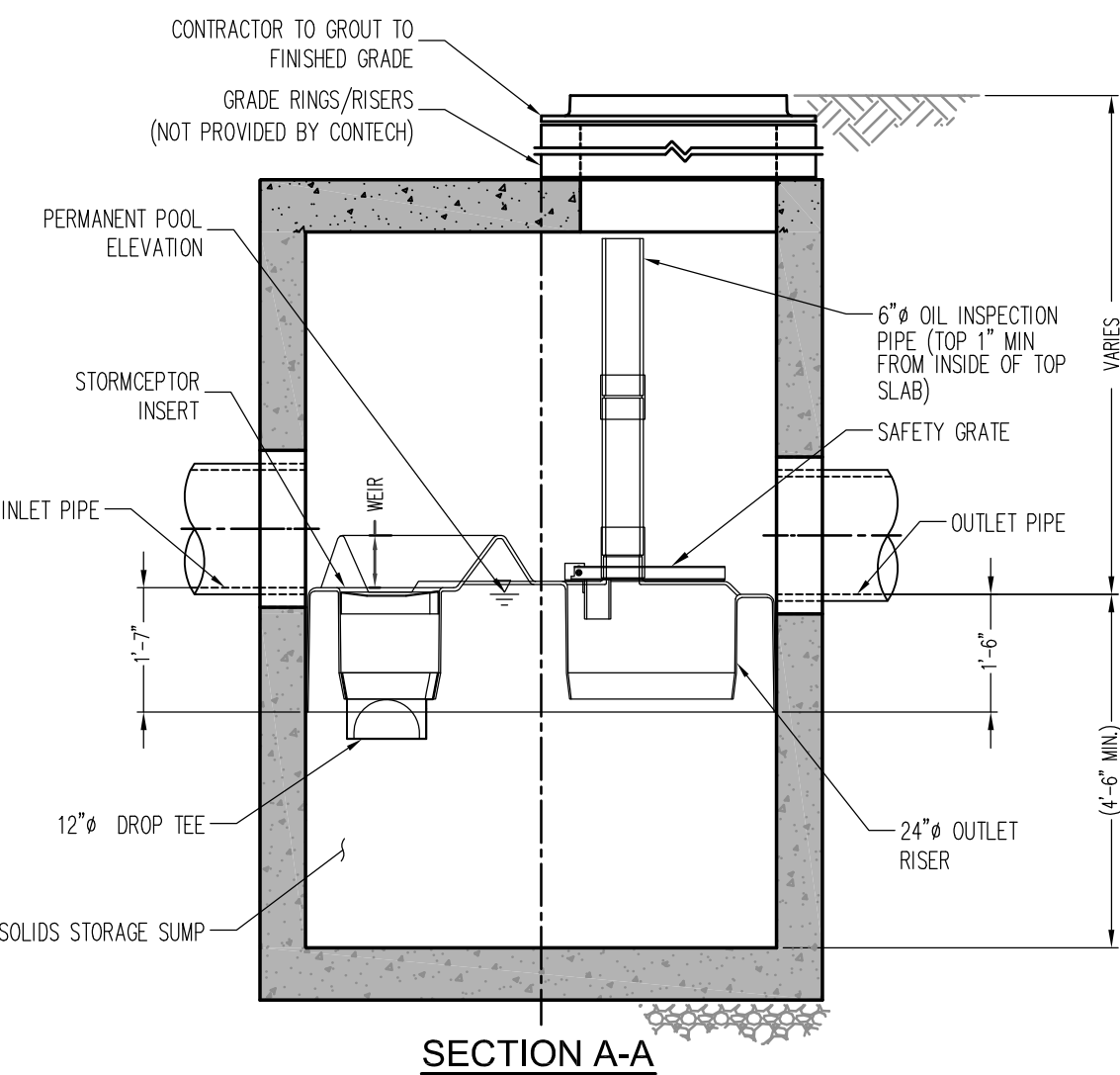


**TO VIEW SECTION
CONCRETE CURB SPILLWAY OPENING**

NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEASURING FOR THEM SELF THE HEIGHTS OF ALL STRUCTURES BASED UPON FINAL LOCATION IN THE FIELD THE CONTRACTOR IS CAUTIONED NOT TO ORDER THE STRUCTURE MATERIALS BASED ON PLAN INFORMATION.
2. ALL PRECAST MANHOLE AND CATCH BASIN COMPONENTS SHALL BE IN ACCORDANCE WITH A.S.T.M. C 478 CURRENT EDITION.
3. CONE SECTIONS SHALL BE ECCENTRIC CONE SECTIONS AS SHOWN. CONCENTRIC CONES AND FLAT SLAB TOPS MAY BE SUBSTITUTED ONLY UPON RECEIPT OF PRIOR WRITTEN APPROVAL FROM THE OWNER. STANDARD CONE HEIGHTS SHALL BE AS SHOWN. SHORTER CONES MAY BE SUBSTITUTED ONLY UPON PRIOR WRITTEN APPROVAL FROM THE OWNERS. SHORTER CONES SHALL BE FABRICATED IN ACCORDANCE WITH M.D.O.T. STANDARD PLANS, CURRENT EDITION. CONES SHALL BE FURNISHED WITH 4 5/8" DIA. THREADED INSERTS CAST INTEGRALLY WITH ALL FRAMES.
4. SPACING BETWEEN PIPE OPENINGS IN A RISER SHALL BE 6" MINIMUM. OPENINGS MAY BE CONSTRUCTED BY CASTING, REMOVING THE GREEN CONCRETE OR BY DRILLING THE OPENINGS IN CURED CONCRETE.
5. THE TOP OF MASONRY AND PRECAST STRUCTURES SHALL BE SUFFICIENTLY LOW TO PERMIT PROPER ADJUSTMENTS OF COVER TO GRADE WITH MORTAR.
6. M.D.O.T. GRANULAR MATERIAL CLASS II COMPACTED TO 95% DENSITY SHALL BE USED IN BACKFILLING AROUND ALL STRUCTURES THAT FALL WITHIN THE 1 ON 1 INFLUENCE LINES FROM THE EDGE OF PAVEMENT OR BACK OF CURB OR FROM STRUCTURE FOOTINGS.
7. CAST IN PLACE AND PRECAST CONCRETE BOTTOMS (FOOTINGS) SHALL BE REINFORCED WITH #4 STEEL BARS SPACED AT 1'-0" BOTH WAYS OR TWO LAYERS OF WELDED WIRE FABRIC OF EQUIVALENT CROSS SECTIONAL AREA LAID AT RIGHT ANGLES AND WIRED TOGETHER. REINFORCEMENT SHALL BE PLACED IN TOP OF FOOTING AND SHALL BE MARKED. PROVIDE 3" CLEARANCE FOR REINFORCING. FOOTINGS SHALL BE SUPPORTED BY A COMPACTED 6" GRANULAR SUBBASE.
8. PRECAST BOTTOMS SHALL BE SET LEVEL AND A MINIMUM OF 2" BELOW THE BOTTOM OF THE SEWER.
9. THE BELL SHALL BE REMOVED FOR THE FIRST LENGTH OF OUTLET PIPE PROJECTING THRU THE WALL OF THE MANHOLE.
10. POUR M.D.O.T. GRADE S3 (3000 PSI) CONCRETE UNDER SEWER PIPE FROM UNDISTURBED SOIL TO THE SPRING LINE. THE MINIMUM WIDTH OF CONCRETE SHALL BE O.D. + 12".
11. MORTAR FOR BRICK, BLOCK AND PARKING, POINTING AND BEDDING OF CASTING FRAMES SHALL BE IN ACCORDANCE WITH M.D.O.T. STANDARD SPECIFICATIONS FOR MORTAR TYPE II.
12. ALL LIFT PIN HOLES SHALL BE FILLED WITH MORTAR.
13. ALL BRICK AND BLOCK USED IN MANHOLE OR CATCH BASIN CONSTRUCTION SHALL BE SOLID.
14. MANHOLE AND CATCH BASIN DIAMETERS (EXCEPT WHERE OTHERWISE NOTED) SHALL BE AS FOLLOWS:

PIPE DIA.	REQUIRED MH & CB DIA.	MINIMUM PRECAST WALL THICKNESS
24" OR LESS	4"	4"
27" THRU 36"	5"	5"
42" & 48"	6"	6"
54" THRU 72"	8"	8"
15. STEPS SHALL BE INSTALLED IN ALL STRUCTURES MORE THAN 4' DEEP AND SHALL HAVE A MINIMUM 3" EMBEDMENT STEPS SHALL BE FABRICATED OF CAST IRON MEETING THE REQUIREMENTS OF A.A.S.H.T.O. M105 CLASS NO. 35, AND SHALL BE CAST INTEGRALLY WITH THE STRUCTURE. STEPS SHALL BE DESIGNED IN ACCORDANCE WITH CURRENT O.S.H.A. REGULATIONS AND SHALL NOT BE LESS THAN 10" CLEAR LENGTH. STEPS SHALL BE CAPABLE OF SUPPORTING 300 LBS AND COATED WITH COAL TAR PITCH VARNISH. STEPS SHALL NOT BE PLACED OVER ANY SEWER CHANNEL.
16. FRAME AND COVER CASTING SHOP DRAWINGS SHALL BE APPROVED BY THE OWNER BEFORE MANUFACTURING.
17. THE MANHOLE FRAME AND COVER SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATIONS FOR GRAY-IRON CASTINGS A.A.S.H.T.O. M105, AND SHALL HAVE A MINIMUM STRENGTH AS PROVIDED FOR CLASS NO. 30 GRAY IRON CASTINGS. THE MANHOLE FRAME SHALL BE BOLTED TO THE CONE WITH 4-5/8" DIA. BOLTS WITH 3/4" X 2" X 1/8" FLAT WASHERS AND NUTS, ALL CADMIUM COATED AND SUPPLIED BY THE FRAME SUPPLIER.



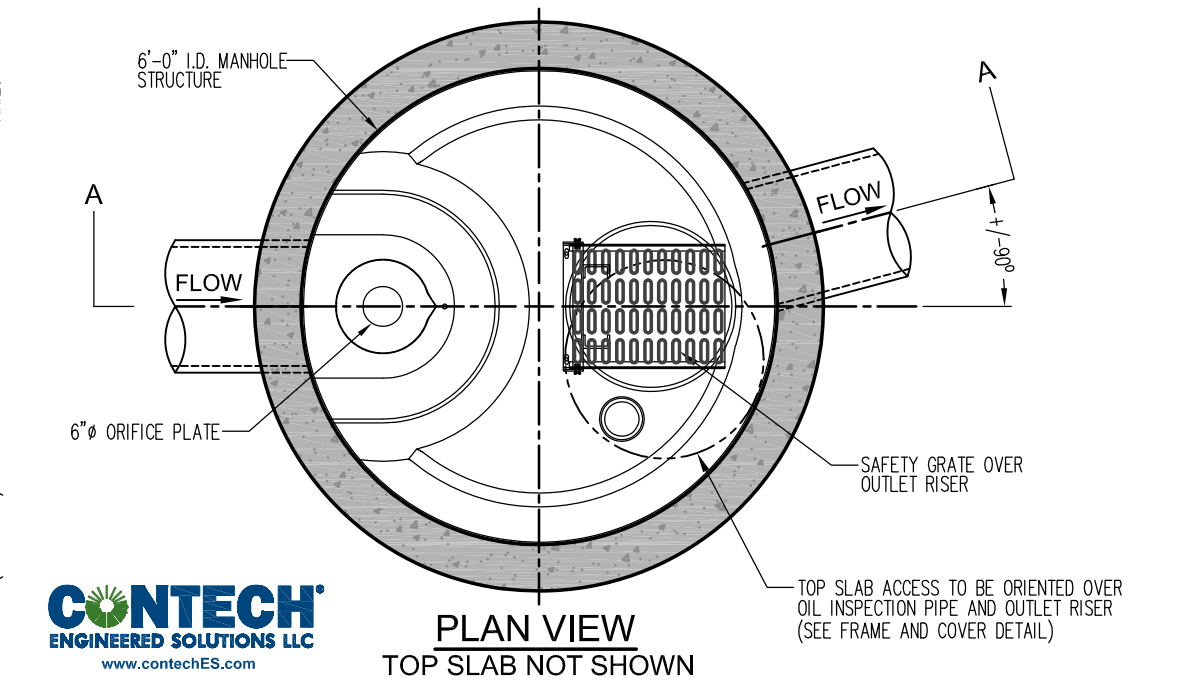
SECTION A-A

STORMCEPTOR GENERAL NOTES

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

STORMCEPTOR INSTALLATION NOTES

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

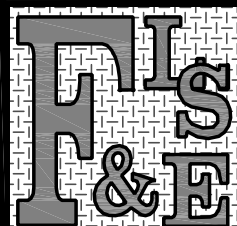


**PLAN VIEW
TOP SLAB NOT SHOWN**

SCALE:	NONE
JOB NO.	22-317

OWNER/DEVELOPER:
BZ LAKE ORION, LLC
1822 ARROWHEAD TRAIL
OXFORD, MI 48371
ATTN: STUCKY VITALE ARCHITECTS PHONE 248.546.6700

PART OF THE NORTHEAST 1/4,
SECTION 11, T4N-R10E
VILLAGE OF LAKE ORION, OAKLAND CO, MI



Fenton Land Surveying & Engineering, Inc
14165 N. FENTON ROAD, SUITE 101A, FENTON, MI 48430
PHONE: 810.354.8115 EMAIL: INFO@FENTONLSE.COM

DRAINAGE & MISCELLANEOUS DETAILS & NOTES FOR:
**LAKE ORION RETAIL
DEVELOPMENT CENTER**
494 S BROADWAY ST (M-24), LAKE ORION, MI 48362

REVISIONS	DRN. BY:	J.R.B.	02.13.2023
	DSN BY:	J.R.B.	"
	CHK'D BY:	D.J.K.	"
	APPR BY:	J.B.M.	"

GENERAL NOTES

- ALL CONSTRUCTION PROCEDURES AND MATERIALS SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE WATER RESOURCES COMMISSIONER'S OFFICE AND/OR THE LOCAL MUNICIPALITY.
- THE CONTRACTOR SHALL OBTAIN AN WATER RESOURCES COMMISSIONER'S OFFICE WATER INSPECTION PERMIT PRIOR TO THE START OF CONSTRUCTION. SEE CORRESPONDING WATER MAIN CONSTRUCTION PERMIT REQUEST LETTER FOR COST OF THE PERMIT.
- A PRE-CONSTRUCTION MEETING SHALL BE HELD PRIOR TO THE START OF CONSTRUCTION AND SHALL BE SCHEDULED BY THE LOCAL MUNICIPAL ENGINEER. THOSE IN ATTENDANCE SHALL INCLUDE 1) LOCAL MUNICIPAL ENGINEER, 2) DESIGN ENGINEER, 3) OWNER/DEVELOPER, 4) ROAD COMMISSION FOR OAKLAND COUNTY, 5) OAKLAND COUNTY WATER RESOURCES COMMISSIONER'S OFFICE (WATER, SEWER AND STORM DIVNSIONS) AND 6) ALL UTILITY COMPANIES. CONTRACTOR SHALL PROVIDE MATERIALS LISTING FOR APPROVAL BY MUNICIPAL ENGINEER AND OCWC.
- CONTRACTOR MUST CONTACT MISS DIG (1-800-482-7171) THREE WORKING DAYS BEFORE THE START OF CONSTRUCTION FOR UNDERGROUND UTILITY LOCATIONS. ALL UTILITIES SHALL BE STAKED BEFORE CONSTRUCTION STARTS.
- ALL NECESSARY EASEMENTS FOR WATER MAINS SHALL BE PROVIDED IN THE NAME OF THE OWNER OF THE WATER MAIN PRIOR TO CONSTRUCTION AND ACCEPTANCE OF THE WATER DISTRIBUTION SYSTEM FOR OPERATION.
- ALL WATER MAINS SHALL BE CONSTRUCTED WITH A MINIMUM COVER OF FIVE AND ONE-HALF (5-1/2) FEET BELOW FINISHED GRADES INCLUDING OPEN DRAINAGE COURSES.
- ALL TRENCHES UNDER OR WITHIN A 1:1 RATIO OF EXISTING OR PROPOSED PAVEMENT OR DRIVEWAYS SHALL BE BACKFILLED WITH THOROUGHLY COMPACTED CLASS II SAND TO GRADE AT NOT LESS THAN 95% OF THE MAXIMUM UNIT WEIGHT
- WHERE TWO UTILITIES CROSS, PROVIDE CLASS II BACKFILL MATERIAL IN TWELVE (12) INCH COMPACTED LAYERS TO THE UNDERSIDE OF THE HIGHER UTILITY.
- WHERE WATER MAINS MUST DIP TO PASS UNDER OTHER UTILITIES, THE SECTIONS WHICH ARE DEEPER THAN NORMAL SHALL BE KEPT TO A MINIMUM LENGTH AND SHALL BE CONSTRUCTED WITH ELEVEN AND ONE-QUARTER (11-1/4) DEGREE VERTICAL BENDS, PROPERLY ANCHORED. BENDS GREATER THAN 11-1/4° MUST HAVE ROD RESTRAINTS.
- ALL PRECAST CONCRETE GATE WELL SECTIONS SHALL BE MANUFACTURED TO CONFORM WITH A.S.T.M. C478, STANDARD SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS, EXCEPT WALL THICKNESS SHALL BE AS SHOWN ON THESE DETAILS. ALL JOINTS FOR PRECAST CONCRETE GATE WELL SECTIONS SHALL BE "MODIFIED GROOVE TONGUE" WITH GASKET MANUFACTURED TO CONFORM WITH A.S.T.M. C 443, STANDARD SPECIFICATION FOR JOINTS FOR CIRCULAR CONCRETE SEWER AND CULVERT PIPE USING RUBBER GASKETS.
- CONTRACTOR SHALL INSTALL VALVES, TAPPING SLEEVES AND GATE WELL STRUCTURES IN STRICT COMPLIANCE WITH MEASUREMENTS PROVIDED ON SHEET 2 (i.e. 2'-0" BETWEEN GATE WELL WALL & CENTERLINE OF OPERATING NUT) TO ALLOW PROPER OPERATION OF VALVE THROUGH GATEWELL OPENING. FAILURE TO DO SO WILL REQUIRE CONTRACTOR TO CORRECT AT HIS EXPENSE.
- ALL CROSS-CONNECTION CONTROL DEVICES SHALL BE INSTALLED AS REQUIRED BY THE LOCAL PLUMBING INSPECTOR AND IN ACCORDANCE WITH THE STANDARDS OF THE WATER RESOURCES COMMISSIONER'S OFFICE OPERATION AND MAINTENANCE DIVISION AND THE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES AND ENERGY, DIVISION OF DRINKING WATER AND ENVIRONMENTAL HEALTH DIVISION
- ALL WATER SERVICE CONNECTIONS TWO (2) INCHES AND SMALLER SHALL BE MADE BY THE WATER RESOURCES COMMISSIONER'S OFFICE, OPERATIONS AND MAINTENANCE DIVISION AFTER WATER MAIN ACCEPTANCE AND APPLICABLE TAP PERMITS ARE OBTAINED.
- ALL FITTINGS AND BENDS SHOULD BE BLOCKED IN ACCORDANCE WITH THRUST BLOCK DETAILS, UNLESS ALTERNATE THRUST RESTRAINT SYSTEM AS INDICATED IN PLANS AND SPECIFICATIONS, IS APPROVED BY WATER RESOURCES COMMISSIONER'S OFFICE AND THE LOCAL MUNICIPALITY.
- ALL STEEL AND IRON MATERIAL AND PRODUCTS FOR PERMANENT INCORPORATION INTO THE WORK SHELL MEET BUY AMERICA REQUIREMENT, FEDERAL CODE OF REGULATIONS SECTION 635.410

WATER MAIN MATERIALS NOTES

- WATER SUPPLY SYSTEM PIPING (3-INCH & LARGER) SHALL BE DUCTILE IRON OR HIGH DENSITY POLYETHYLENE (HDPE) UNLESS OTHERWISE APPROVED BY THE LOCAL COMMUNITY.
- DUCTILE IRON PIPE SHALL BE CLASS 54 FOR SIZES THREE (3) INCH THROUGH EIGHTEEN (18) INCH, CLASS 55 FOR TWENTY (20) INCH, AND CLASS 56 FOR TWENTY-FOUR (24) INCH AND LARGER. (ABBREVIATED "D.I." IN DETAILS AND ON THIS SHEET).
- PIPES OF SIZES LARGER THAN TWENTY-FOUR (24) INCHES IN NOMINAL DIAMETER SHALL MEET ALL THE REQUIREMENTS OF THE CURRENT AWWA C100 FOR DUCTILE IRON WATER PIPE.
- THE DUCTILE IRON PIPE TO BE FURNISHED AND DELIVERED UNDER THIS SPECIFICATION SHALL MEET ALL THE REQUIREMENTS OF THE CURRENT AWWA C151 (ANSI A21.5), EXCEPT AS OTHERWISE SPECIFIED HEREIN. PIPE SHALL BE DOUBLE CEMENT-LINED AND SEAL COATED WITH AN APPROVED BITUMINOUS SEAL COAT IN ACCORDANCE WITH AWWA C104 (ANSI A21.4).
- REFER TO SHEET 5 FOR HDPE MATERIAL REQUIREMENTS.
- MECHANICAL AND SLIP-ON JOINTS FOR DUCTILE IRON WATER MAIN SHALL BE IN ACCORDANCE WITH AWWA C111 (ANSI A21.11).
- FLANGE JOINTS FOR DUCTILE IRON WATER MAIN SHALL BE IN ACCORDANCE WITH AWWA C110 (ANSI A21.10).
- FITTINGS FOR DUCTILE IRON PIPE SHALL BE DUCTILE IRON OR CAST IRON AND SHALL MEET REQUIREMENTS OF AWWA C110 (ANSI A21.10) OR AWWA C153 (ANSI A21.53). DUCTILE IRON FITTINGS SHALL BE RATED FOR 350 PSI, PIPE SIZES TWENTY-FOUR (24) INCH DIAMETER AND LESS AND 250 PSI FOR PIPE SIZES OVER TWENTY-FOUR (24) INCH DIAMETER. DUCTILE IRON FLANGE FITTINGS SHALL BE RATED FOR 250 PSI FOR ALL PIPE DIAMETERS.
- INSTALL BRASS WEDGES AT ALL PUSH ON JOINTS IN DUCTILE IRON PIPE INSTALLATIONS. TWO (2) WEDGES PER JOINT FOR PIPES 12 INCH IN DIAMETER AND LESS, FOUR WEDGES PER JOINT FOR PIPES GREATER THAN 12 INCHES IN DIAMETER.
- ALL WATER MAINS SHALL BE DESIGNED FOR 150 PSI MINIMUM WORKING PRESSURE.
- ALL BURIED BOLTS, NUTS, AND WASHERS SHALL BE AWWA C111 LOW ALLOY STEEL COATED WITH A MINIMUM OF TWO (2) COATS OF FLUOROPOLYMER EPOXY COATING AND HEAT CURED (COR-BLUE OR APPROVED EQUAL) AND POLY-WRAPPED WHEN SPECIFIED.
- ALL BURIED BOLTS, NUTS, AND WASHERS FOR ALL FLANGED CONNECTIONS SHALL BE STAINLESS STEEL (ASTM A320, GRADE B8M) AND HAVE A NEVER SEIZE TYPE COMPOUND APPLIED TO THE THREADS PRIOR TO INSTALLATION.
- CORPORATION STOPS USED FOR INSERTION INTO MAINS SHALL BE MUELLER TYPE H-15000, FORD METER BOX FB-1000-X-Q-NL OR FORD METER BOX FB1000-4-Q-NL. ALL STOPS SHALL HAVE BRONZE CAST BODIES, KEYS, STEM WASHERS AND NUTS. INLET THREADS SHALL CONFORM TO THE LATEST VERSION OF AWWA C800.
- TEMPORARY CONNECTIONS, WHICH MAY BE MADE FOR CHLORINATING AND FLUSHING PURPOSES, SHALL INCLUDE A TESTABLE REDUCE PRESSURE ZONE (RPZ) VALVE WITH CURRENT CERTIFICATION.

VALVE AND SLEEVE NOTES

- GATE VALVES, SIZES THREE (3) INCH THROUGH SIXTEEN (16) INCH AND TAPPING VALVES SHALL BE LOCAL MUNICIPAL STANDARD AS DETAILED WITH NON-RISING STEM.
- ALL IN LINE GATE VALVES THREE (3) INCH AND LARGER SHALL BE IN WELLS AS DETAILED. SPECIFICATIONS SHALL INCLUDE THE DIRECTION OF OPERATION OF ALL VALVES.
- ALL GATE WELL COVERS SHALL BE LOCAL MUNICIPAL STANDARD AS DETAILED.
- ALL GATE VALVES WITH OPERATING NUTS AT A DISTANCE GREATER THAN FIVE (5) FEET BELOW GROUND SURFACE SHALL BE PROVIDED WITH A STAINLESS STEEL EXTENSION STEM. THE LENGTH OF THE EXTENSION STEM SHALL REACH WITHIN FIVE (5) FEET FROM THE GROUND SURFACE. WHEN AN EXTENSION STEM IS USED, IT SHALL BE HELD IN PLACE BY A STAINLESS STEEL EXTENSION STEM GUIDE SUITABLY FASTENED TO THE WALL OF THE GATE WELL. THE EXTENSION STEM SHALL BE MECHANICALLY ATTACHED TO THE OPERATING NUT. DETAILS OF THE EXTENSION SYSTEM AND THE METHOD OF INSTALLATION SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
- TAPPING VALVES SHALL BE AWWA C515 FL X MJ AS MANUFACTURED BY EJ WITH RESILIENT SEATED GATE VALVES AS APPROVED BY LOCAL MUNICIPALITY.
- TAPPING SLEEVES SHALL BE ALL STAINLESS STEEL (BODY, FLANGE AND HARDWARE), MANUFACTURED BY ROMAC INDUSTRIES SST; JCM 432; SMITH-BLAIR 663/665 OR APPROVED EQUAL BY THE WATER RESOURCES COMMISSIONER'S OFFICE.

HYDRANT REQUIREMENTS

- ALL HYDRANTS SHALL BE CONSTRUCTED WITH A SIX (6) INCH COMPANION GATE VALVE IN A THREE (3) PIECE, ADJUSTABLE DUCTILE IRON VALVE BOX, WHICH SHALL INCLUDE A FIVE AND ONE-QUARTER (5-1/4) INCH SCREW SHAFT. VALVE BOXES SHALL BE SERIES 8860 AS MANUFACTURED BY TYLER PIPE. EJ VALVE BOX NO. 8560 OR APPROVED EQUAL.
- ALL HYDRANTS SHALL BE EJ 5BR250 TRAFFIC MODEL, OR APPROVED EQUAL WITH A MINIMUM OF 6'-0" DEPTH OF BURY UNLESS OTHERWISE INDICATED. SELF-DRAINING HYDRANTS SHALL NOT BE USED. ALL HYDRANTS SHALL BE LOCAL MUNICIPAL STANDARD AS DETAILED. HYDRANTS SHALL HAVE BREAKAWAY FLANGE.
- ALL HYDRANTS SHALL BE PAINTED RED ABOVE GROUND AND BLACK BELOW GROUND WITH A FINISH COAT OF GLAMORTEX 501 ENAMEL, COLOR 314 VERMILION OR APPROVED EQUAL. HYDRANT CAP SHALL BE PAINTED SAME COLOR AS THE HYDRANT. FOR PONTIAC: YELLOW RUST-OLEUM #7543 SAFETY YELLOW.

ACCEPTANCE OF NEW WATER MAINS

- PRIOR TO WATER MAIN ACCEPTANCE THE FOLLOWING CONDITIONS MUST BE MET:
 - PRESSURE TESTING AND BACTERIA TESTING MUST BE COMPLETED IN ACCORDANCE WITH THE WATER RESOURCES COMMISSIONER'S OFFICE REQUIREMENTS
 - ALL EASEMENT AND RIGHT-OF-WAY ACQUISITION MUST BE ACCEPTED BY THE WATER RESOURCES COMMISSIONER'S OFFICE, RIGHT-OF-WAY DIVISION
 - THE LOCAL MUNICIPALITY MUST BE PROVIDED WITH THE BILL OF SALE
 - ALL "RECORD DRAWINGS" MUST BE ACCEPTED AND APPROVED BY THE WATER RESOURCES COMMISSIONER'S OFFICE, OPERATIONS AND MAINTENANCE DIVISION. THE WATER RESOURCES COMMISSIONER'S OFFICE AND LOCAL ENGINEER MUST WITNESS THE CONNECTION OF THE WATER MAIN TO THE EXISTING WATER MAIN, AFTER WHICH RESIDENTIAL AND COMMERCIAL TAPS WILL BE ALLOWED.
- THE CONTRACTOR SHALL NOTIFY THE WATER RESOURCES COMMISSIONER'S OFFICE, OPERATIONS AND MAINTENANCE DIVISION THROUGH THE LOCAL ENGINEER FOR NEW CONSTRUCTION TAP, PRESSURE TESTING, BACTERIOLOGICAL SAMPLING, CONNECTIONS TO EXISTING WATER MAIN AND FINAL FIELD REVIEW. A SEVENTY-TWO (72) HOUR ADVANCE NOTICE IS REQUIRED.
- THE CONTRACTOR SHALL DISINFECT AND PRESSURE TEST ALL NEW WATER MAIN CONSTRUCTION PURSUANT TO THE CURRENT STANDARDS SPECIFIED BY THE WATER RESOURCES COMMISSIONER'S OFFICE.
- HYDROSTATIC TESTING FOR DUCTILE IRON WATER MAIN SHALL BE COMPLETED IN ACCORDANCE WITH ANSI/AWWA C600, SEC 5.2. THE SPECIFIED TEST PRESSURE IS 150 PSI OR 1.5 TIMES THE MAXIMUM ALLOWABLE OPERATING PRESSURE (MAOP) OF THE TEST SECTION, WHICHEVER IS GREATER. THE TEST METHOD IS GENERALLY SUMMARIZED AS FOLLOWS:
 - SLOWLY FILL PIPELINE WITH WATER, VENTING ENTRAPPED AIR AS NECESSARY.
 - REPAIR ANY VISIBLE LEAKS THAT OCCUR DURING FILLING OR AT ANY POINT DURING THE TEST.
 - GRADUALLY APPLY PRESSURE UP TO THE SPECIFIED WORKING PRESSURE USING A SUITABLE PUMP CONNECTED TO THE PIPELINE, BLEEDING TRAPPED AIR, AND ADDING WATER AS NECESSARY UNTIL A STABLE PRESSURE IS HELD.
 - HYDROSTATIC TEST BEGINS AFTER THE PIPELINE IS STABILIZED AT THE WORKING PRESSURE BY INCREASING THE PRESSURE UP TO THE SPECIFIED TEST PRESSURE AND HOLD IT WITHIN PLUS/MINUS 5 PSI FOR THE DURATION OF THE TEST, OR A MINIMUM OF TWO HOURS.
 - CAREFULLY RECORD THE AMOUNT OF MAKEUP WATER ADDED DURING THE TEST. THE HYDROSTATIC TEST PASSES IF THE AMOUNT OF MAKEUP WATER DOES NOT EXCEED THE TESTING ALLOWANCE.
 - IF THE TESTING ALLOWANCE IS EXCEEDED, LOCATE AND REPAIR ANY LEAKS AND REPEAT TEST.
- REFER TO SHEET 5 FOR HYDROSTATIC TESTING REQUIREMENTS FOR HDPE PIPE.
- PRESSURE TESTING AGAINST VALVES PHYSICALLY CONNECTED TO AN EXISTING WATER SUPPLY SYSTEM IS STRICTLY PROHIBITED.
- WHERE CONTRACTOR SUPPLIED GAUGES ARE REQUIRED, MINIMUM SIZE SHALL BE 3/4" DIAMETER OR LARGER GRADUATED IN ONE (1) OR TWO (2) POUND INCREMENTS FROM 1 TO 160 P.S.I. OR HIGHER.
- PRESSURE TESTING AND BACTERIA TESTING MUST BE SUCCESSFULLY COMPLETED PRIOR TO CONNECTING TO THE EXISTING WATER SUPPLY SYSTEM.

WATER RESOURCES COMMISSIONER
WATER SYSTEM STANDARDS –
GATE VALVES

COMMUNITY	DIRECTION TO OPEN	VALVE TYPE	
		STD. GATE VALVE	TAPPING VALVE
BINGHAM FARMS	RIGHT	C515	C515
BLOOMFIELD HILLS	RIGHT	C515	C515
COMMERCE TOWNSHIP	LEFT	C515	C515
FARMINGTON HILLS	RIGHT	C515	C515
HIGHLAND TOWNSHIP	LEFT	C515	C515
KEEGO HARBOR	RIGHT	C515	C515
OAKLAND TOWNSHIP	LEFT	C515	C515
ORCHARD LAKE VILLAGE	LEFT	C515	C515
OXFORD TOWNSHIP	LEFT	C515	C515
PONTIAC	LEFT	C515	C515
ROYAL OAK TOWNSHIP	RIGHT	C515	C515
SPRINGFIELD TOWNSHIP	LEFT	C515	C515
WALLED LAKE	LEFT	C515	C515

1.) C515 RESILIENT SEATED GATE VALVE – MANUFACTURED BY U.S. PIPE, MUELLER, EAST JORDAN IRON WORKS, AMERICAN FLOW CONTROL OR APPROVED EQUAL.

FIRE HYDRANT NOZZLE SIZE AND
THREAD SPECIFICATIONS

CVT	PUMPER NOZZLE	HOSE NOZZLE	OPERATING NUT	DEPTH OF BURY	STYLE	MODEL #
BINGHAM FARMS	(1) – 3-3/4"-DFD	(2) – 2-1/2"-DFD	1-1/8"	5'-6"	5BR250	54826D
BLOOMFIELD HILLS	(1) – 3-3/4"-DFD	(2) – 2-1/2"-DFD	1-1/8"	6'-0"	5BR250	55825D
COMMERCE TWP/ WOLVERINE LAKE	(1) – 5"-STORZ	(2) – 2-1/2"-NST	1-1/2"	5'-6"	5BR250	54913D
FARMINGTON HILLS	(1) – 3-3/4"-DFD	(2) – 2-1/2"-NST	1-1/8"	5'-6"	5BR250	54329D
HIGHLAND TWP	(1) – 5"-STORZ	(2) – 2-1/2"-NST	1-1/2"	5'-6"	5BR250	54913D
KEEGO HARBOR	(1) – 3-3/4"-DFD	(2) – 2-1/2"-DFD	1-1/8"	5'-6"	5BR250	54826D
OAKLAND TWP	(1) – 4"-STORZ	(2) – 2-1/2"-DFD	1-1/2"	5'-6"	5BR250	54831D
ORCHARD LAKE	(1) – 3-3/4"-DFD	(2) – 2-1/2"-DFD	1-1/8"	6'-0"	5BR250	55825D
OXFORD TWP	(1) – 5"-STORZ (1) – 4-1/2"-NST		1-1/2"	6'-0"	5BR250	55601D
PONTIAC	(1) – 3-3/4"-DFD	(2) – 2-1/2"-DFD	1-1/2"	6'-0"	5BR250	55822D
ROYAL OAK TWP	(1) – 3-3/4"-DFD	(2) – 2-1/2"-NST	1-1/8"	5'-6"	5BR250	54329D
SPRINGFIELD TWP	(1) – 5"-STORZ	(2) – 2-1/2"-NST	1-1/2"	5'-6"	5BR250	54913D
WALLED LAKE	(1) – 4-1/2"-NST	(2) – 2-1/2"-NST	1-1/8"	5'-6"	5BR250	54534D

- D.F.D. – DETROIT FIRE DEPARTMENT THREAD
- N.S.T. – NATIONAL STANDARD THREAD
- STORZ NOZZLES SHALL BE COMPATIBLE WITH STORZ COUPLED LARGE DIAMETER FIRE HOSE. NOZZLES SHOULD BE MADE OF "LEAD FREE" BRASS OR ALUMINUM, AS APPROVED BY LOCAL CITY, VILLAGE OR TOWNSHIP. THE NOZZLE SHALL BE AN INTEGRAL PART OF THE HYDRANT, RESISTANT TO TAMPER AND REMOVAL. ENGAGEMENT LUGS SHALL BE ON THE NOZZLE AND CAP TO PREVENT FAILURE UNDER HIGH PRESSURE. NOZZLE AND CAP SHALL MEET AWWA C502 SPECIFICATIONS. NOZZLE SHALL BE COMPATIBLE WITH HOSE LOCK TO PREVENT HOSE FROM DISCONNECTING WHILE IN USE.

WATER RESOURCES COMMISSIONER'S OFFICE
WATER SYSTEMS OPERATIONS AND MAINTENANCE DIVISION
RECORD DRAWING SPECIFICATIONS

IN AREAS WHERE WATER SYSTEMS ARE OPERATED AND MAINTAINED BY THE WATER RESOURCES COMMISSIONER'S OFFICE, OPERATIONS AND MAINTENANCE DIVISION, FINAL ACCEPTANCE OF THE WATER SYSTEM MUST BE RENDERED BY THE WATER RESOURCES COMMISSIONER'S OFFICE, OPERATIONS AND MAINTENANCE DIVISION, BEFORE THE SYSTEM CAN BE USED FOR THE SERVICE INTENDED.

ONE ITEM REQUIRED FOR FINAL ACCEPTANCE SHALL BE THE SUBMISSION OF RECORD DRAWINGS TO THE WATER RESOURCES COMMISSIONER, OPERATIONS AND MAINTENANCE DIVISION, BY THE DESIGN ENGINEER. RECORD DRAWINGS SHALL BE DEFINED AS AND CONTAIN THE FOLLOWING INFORMATION:

- THE DESIGN ENGINEER SHALL FURNISH "RECORD DRAWINGS" WATER MAIN PLANS UPON JOB COMPLETION. "RECORD DRAWINGS" SHALL BE FORWARDED TO THE WATER RESOURCES COMMISSIONER BY THE LOCAL MUNICIPAL ENGINEER AFTER THEIR REVIEW AND APPROVAL.
- THE COVER SHEET SHALL BE SIGNED AND SEALED BY THE PROJECT DESIGN ENGINEER AND INCLUDE THE FOLLOWING CERTIFICATION STATEMENT:

HEREBY CERTIFY THAT OUR FIRM HAS PREPARED THESE RECORD DRAWINGS OF THE IMPROVEMENTS AS CONSTRUCTED, AND THAT TO THE BEST OF MY KNOWLEDGE THOSE IMPROVEMENTS NOTED AS "RECORD DRAWINGS" WERE CONSTRUCTED IN SUBSTANTIAL CONFORMANCE WITH THE APPROVED CONSTRUCTION PLANS; AND ALSO THAT THE WATER MAIN AND STRUCTURES, AS CONSTRUCTED, LIE WITHIN THE EASEMENT DESCRIPTIONS REQUIRED BY THE WATER RESOURCES COMMISSIONER'S OFFICE.

(COMPANY NAME)

(ENGINEER'S SIGNATURE)

PROFESSIONAL ENGINEER NO. _____

ENGINEER SEAL

- THE MINIMUM SCALE SHALL BE ONE (1) INCH EQUALS FIFTY (50) FEET.
- THE SIZE, LENGTH, CLASS AND MANUFACTURER OF PIPE INSTALLED SHALL BE INDICATED.
- THE SIZE, BRAND AND MODEL NUMBERS OF ALL VALVES AND HYDRANTS INSTALLED SHALL BE INDICATED.
- A TOTAL RECORD DRAWING QUANTITY LIST SHALL BE INCLUDED, AS WELL AS A RECORD DRAWING QUANTITY LIST ON EACH INDIVIDUAL SHEET.
- THE LOCATIONS SHALL BE SHOWN ON THE PLANS WITH AN ACCURACY OF ONE (1) FOOT.
- THE OFFSET OF THE WATER MAIN FROM PROPERTY LINES SHALL BE INDICATED.
- ALL GATE VALVE WELLS, HYDRANTS AND ALL WATER SYSTEM APPURTENANCES SHALL BE LOCATED FROM THE NEAREST PROPERTY CORNER.
- ALL UNDERGROUND APPURTENANCES, SUCH AS GATE VALVE WELLS, METER PITS, PRESSURE REDUCING VALVE PITS, ETC. SHALL BE LOCATED FROM THE NEAREST HYDRANT THAT IS CONNECTED TO THE SAME WATER MAIN AS THE APPURTENANCE.
- THE LOCATION, SIZE, BRAND AND MODEL NUMBER OF EVERY RESTRAINED JOINT SHALL BE NOTED.
- THE ACCURATE LOCATION OF ALL UTILITY CROSSINGS WHERE THE RECOMMENDED SEPARATION, VERTICALLY OR HORIZONTALLY, IS LESS THAN THE TEN STATE STANDARDS SHALL BE NOTED.
- WATER MAINS 12" AND LARGER IN DIAMETER SHALL BE DRAWN IN PROFILE VIEW IN ADDITION TO PLAN VIEW ON THE CONSTRUCTION PLANS.

C-6

WATER MAIN
STANDARD DETAILS

REVISION BLOCK


Data Source / Source Date:		N/A	
Rev. No.:	Rev. By:	Rev. Date:	Description:
1	DL	03/23/15	FINAL CHANGES TO GATE VALVE STANDARDS, HYDRANT SPECIFICATIONS AND PIPE CLASS UPDATES
2	DL	01/03/17	UPDATE DIRECTION TO OPEN COMMERCE TOWNSHIP FROM RIGHT TO LEFT
3	KB	02/14/18	MARKUPS PER G. APPEL
4	WRC	08/01/20	GENERAL UPDATE

ORIG. DATE: 01/01/01

SCALE: NONE

DESIGNED BY: WRC

DRAWN BY: WRC Mapping

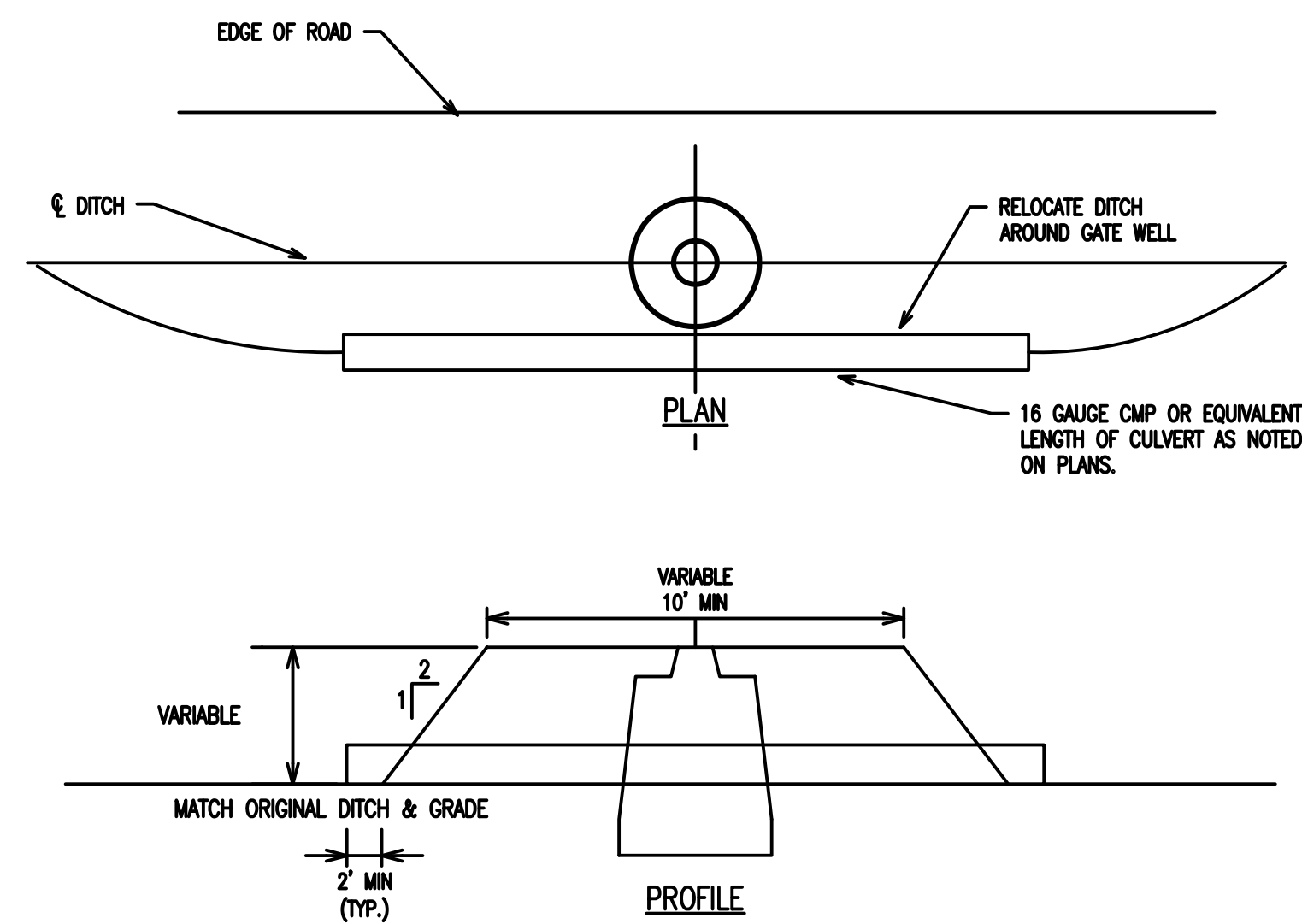


WATER RESOURCES COMMISSIONER
Jim Nash

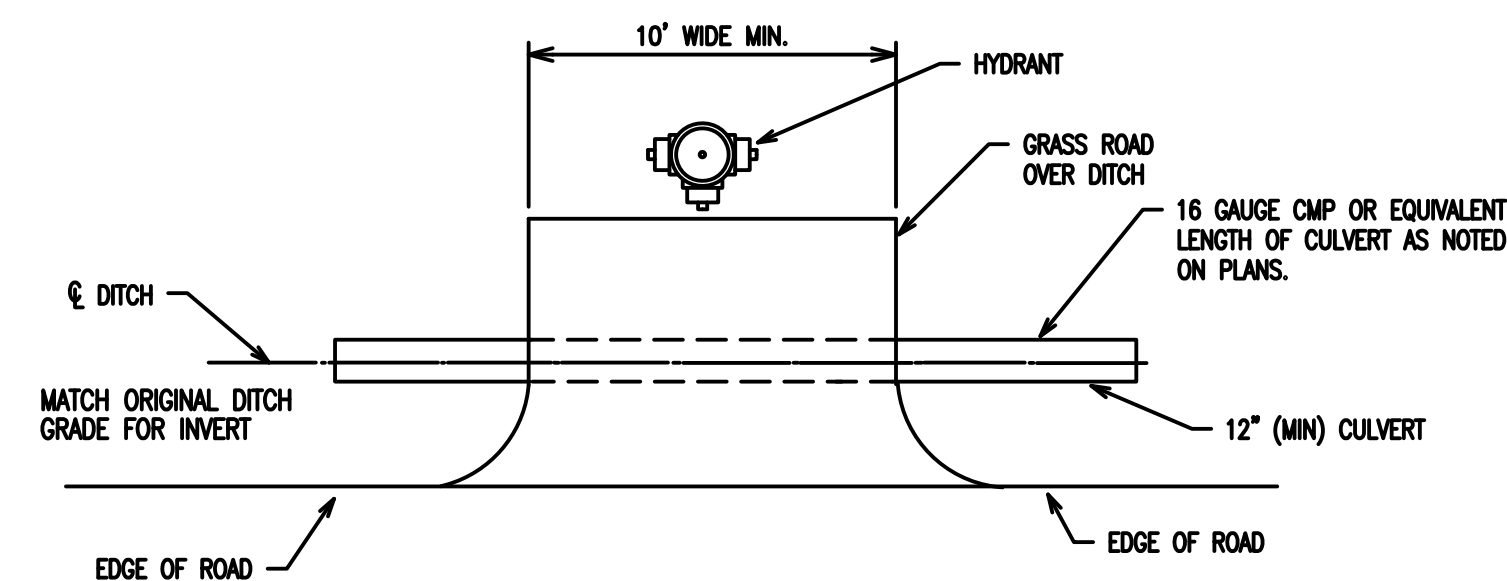
ONE PUBLIC WORKS DRIVE, BLDG 95 WEST
WATERFORD, MICHIGAN
48329-1907

SHEET NO.:

Packet Pg. 23



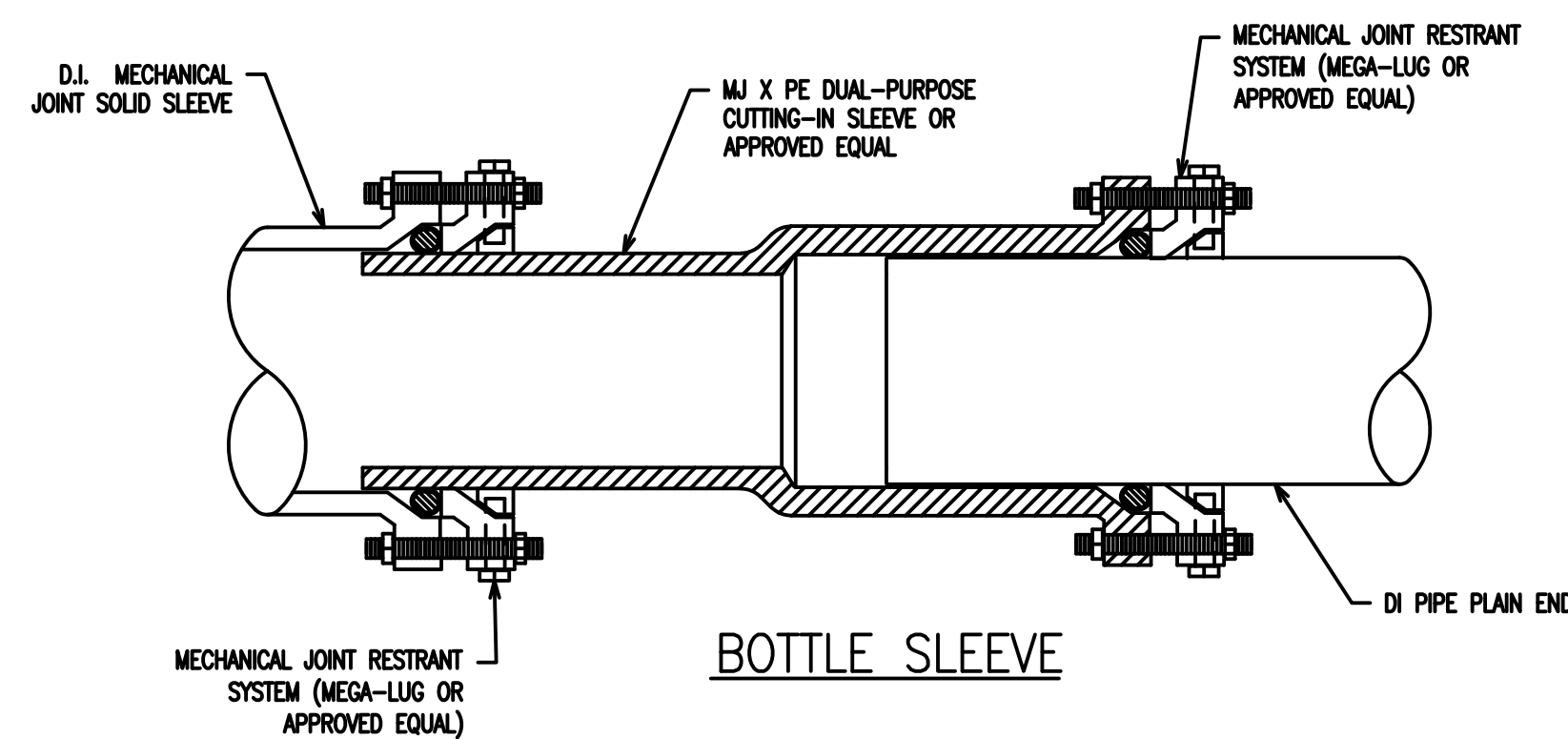
DITCH ENCLOSURE AT GATE WELL



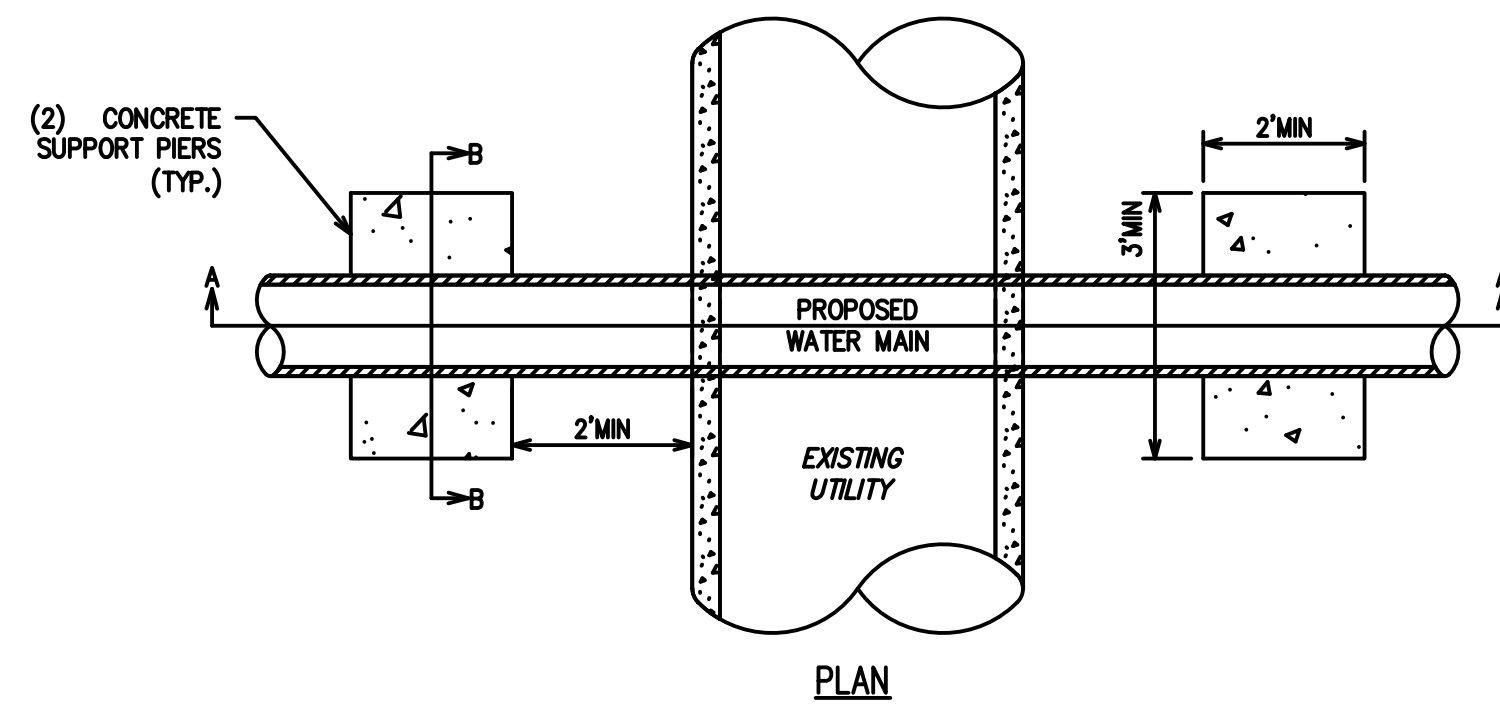
DITCH ENCLOSURE AT HYDRANT

NOTES:

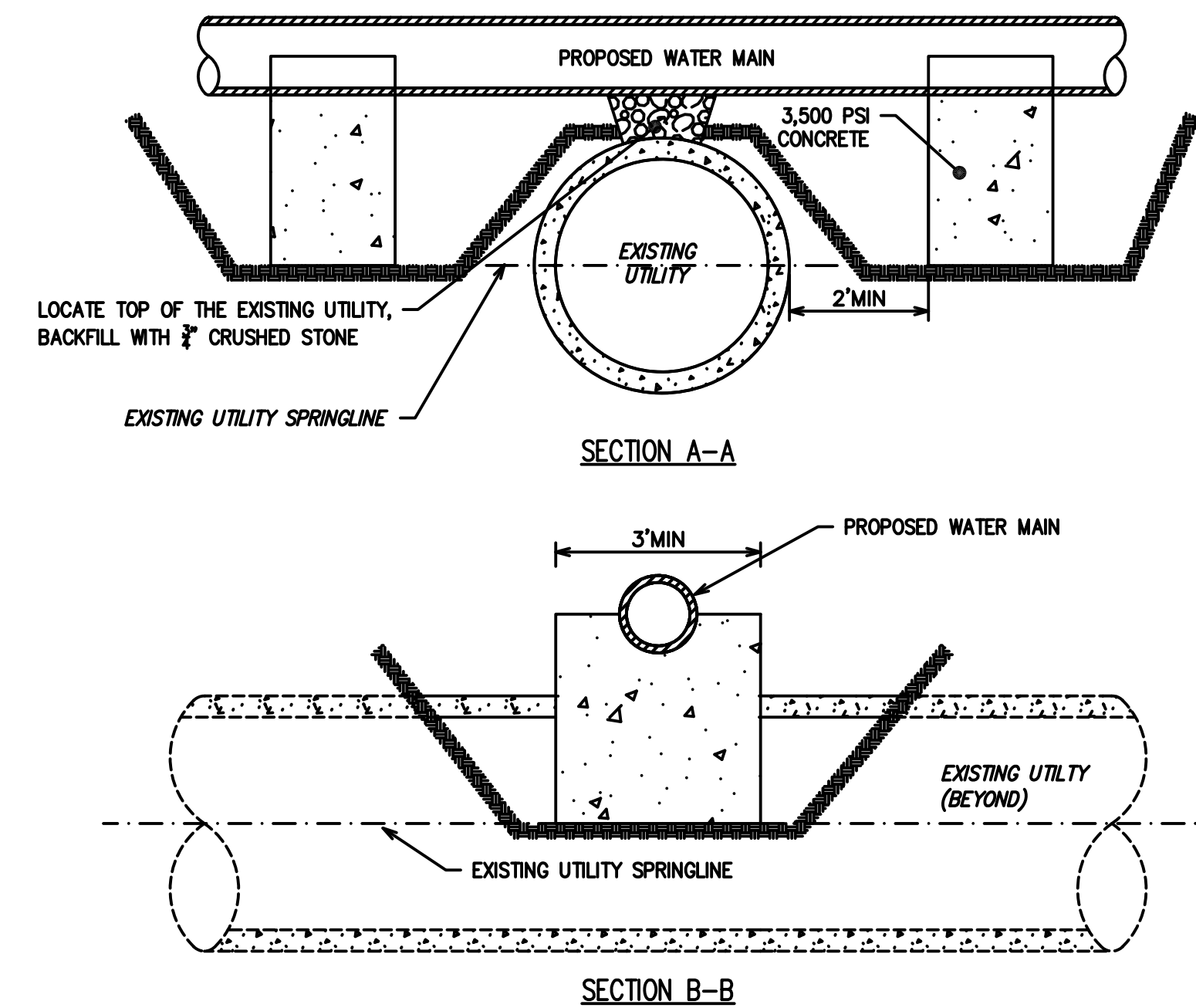
- 1) REQUIRED FOR DITCHES GREATER THAN 18 INCHES IN DEPTH.
- 2) CULVERT SHALL BE SIZED BASED ON THE EXISTING CARRY CAPACITY OF THE DITCH OR AS REQUIRED BY THE PERMITTING AUTHORITY FOR THE LOCAL ROAD AGENCY. STAMPED ENGINEERING CALCULATIONS ARE REQUIRED FOR ALL CULVERT INSTALLATION.
- 3) MINIMUM DEPTH OF COVER FOR CULVERT PIPE IS 12 INCHES UNLESS OTHERWISE AUTHORIZED BY CULVERT MANUFACTURER.
- 4) END SECTIONS ON CULVERTS GREATER THAN 12 INCHES IN DIAMETER.



BOTTLE SLEEVE



PLAN



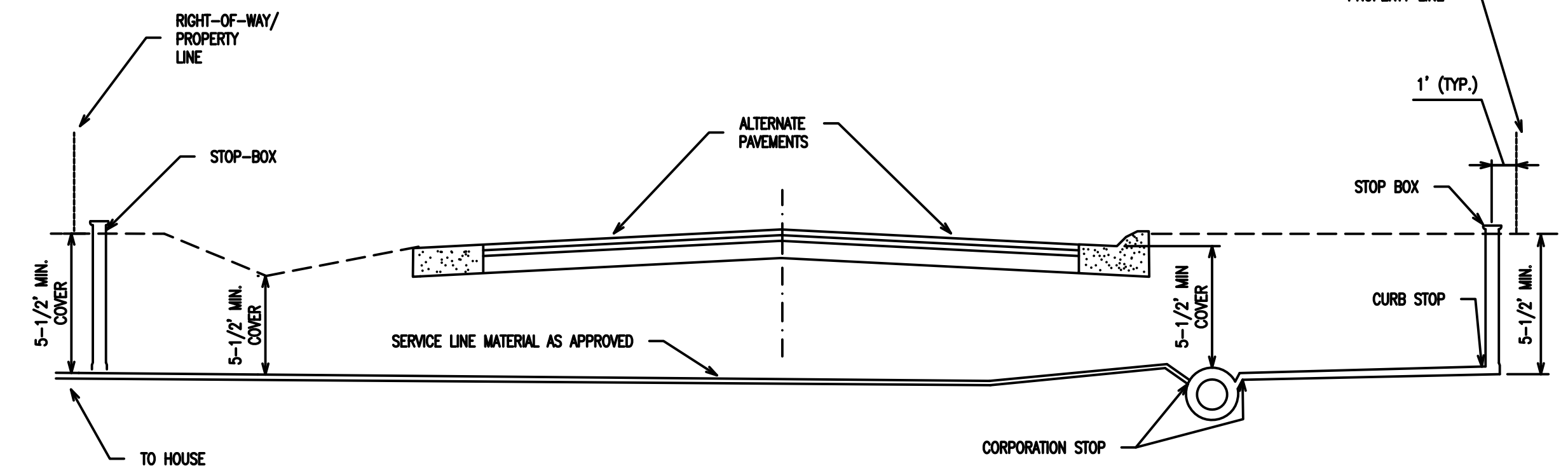
SECTION A-A

SECTION B-B

WATER MAIN CROSSING BRIDGE

NOTES:

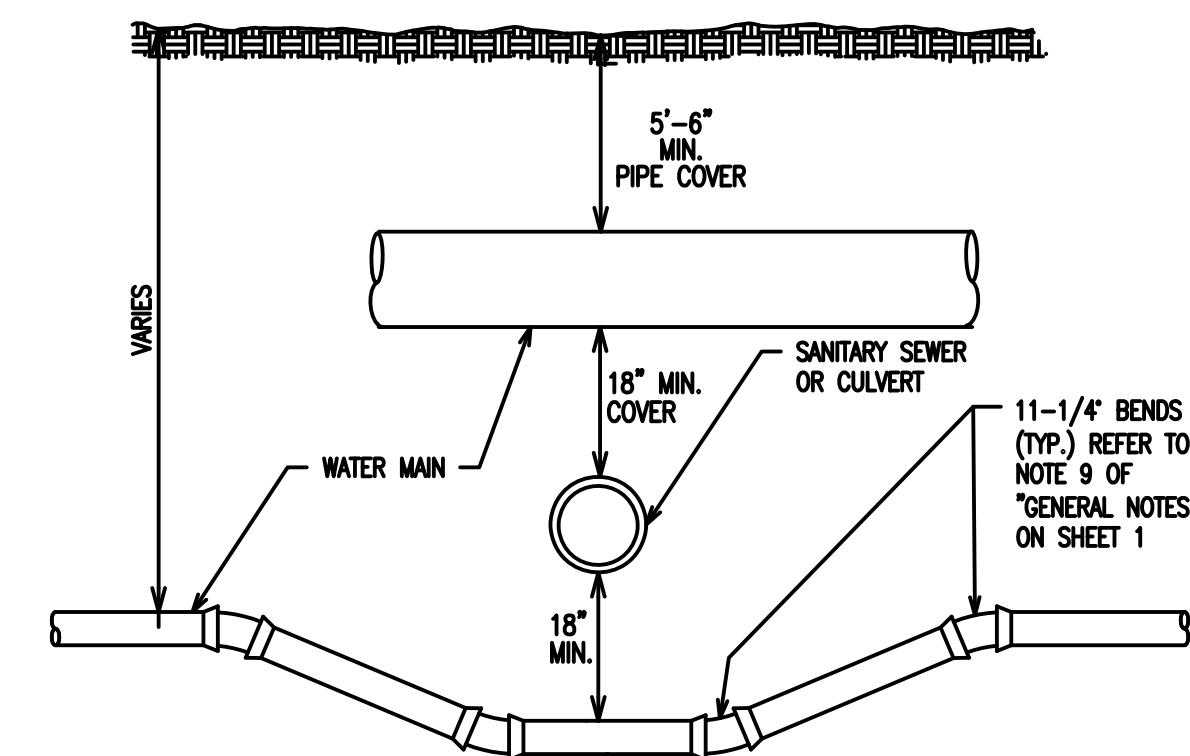
1. CROSSING BRIDGE IS REQUIRED WHEN 18 INCHES OF CLEARANCE OR GREATER ABOVE (WITHIN A 1:1 INFLUENCE OF THE SPRING LINE) AN EXISTING UTILITY CANNOT BE MAINTAINED.
2. WATER MAIN PIPE SPANNING THE EXISTING UTILITY MUST BE CENTERED BETWEEN JOINTS OVER THE EXISTING UTILITY.
3. ALL WORK NECESSARY TO INSTALL THE WATER MAIN CROSSING BRIDGE AS SHOWN SHALL BE CONSIDERED INCLUDED IN THE COST OF THE PROJECT UNLESS OTHERWISE NOTED.
4. CROSSING FOR PROPOSED WATER MAIN 16-INCH AND LARGER SHALL BE DESIGNED BY A LICENSED PROFESSIONAL ENGINEER.



TYPICAL PUBLIC ROAD WATER SERVICE CONNECTION

NOTES:

1. WATER SERVICE CURB STOP TO BE PLACED ONE (1) FOOT OFF THE PROPERTY LINE.
2. LATERAL LOCATION SHALL BE AS REQUESTED BY THE ABUTTING PROPERTY OWNER.
3. SERVICE TAP LOCATION TO BE AT CLOCK POSITION 10:30 OR 1:30 UNLESS OTHERWISE INDICATED.



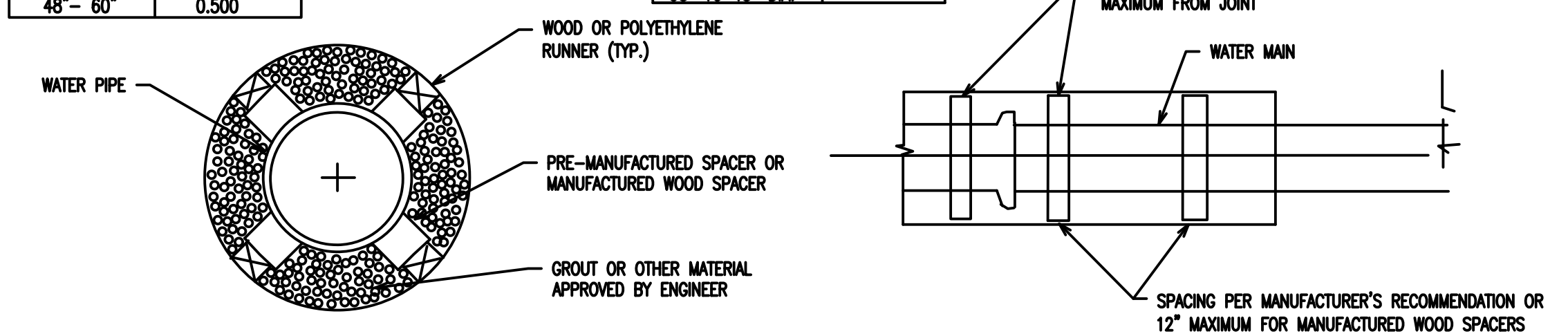
SEWER OR CULVERT CROSSING

UNLESS OTHERWISE SPECIFIED, MINIMUM CASING PIPE SHALL BE ASTM A-139 GRADE B, WALL THICKNESS AS FOLLOWS:

NOMINAL SIZE	MINIMUM WALL THICKNESS
8" - 42"	0.375
48" - 60"	0.500

REQUIRED QUANTITY OF RUNNERS IN ACCORDANCE WITH SIZE

TO 14" DIA.	4 RUNNERS
16" TO 36" DIA.	6 RUNNERS
38" TO 48" DIA.	8 RUNNERS


SUPPORT FOR WATER MAIN
CONSTRUCTED IN CASING PIPE

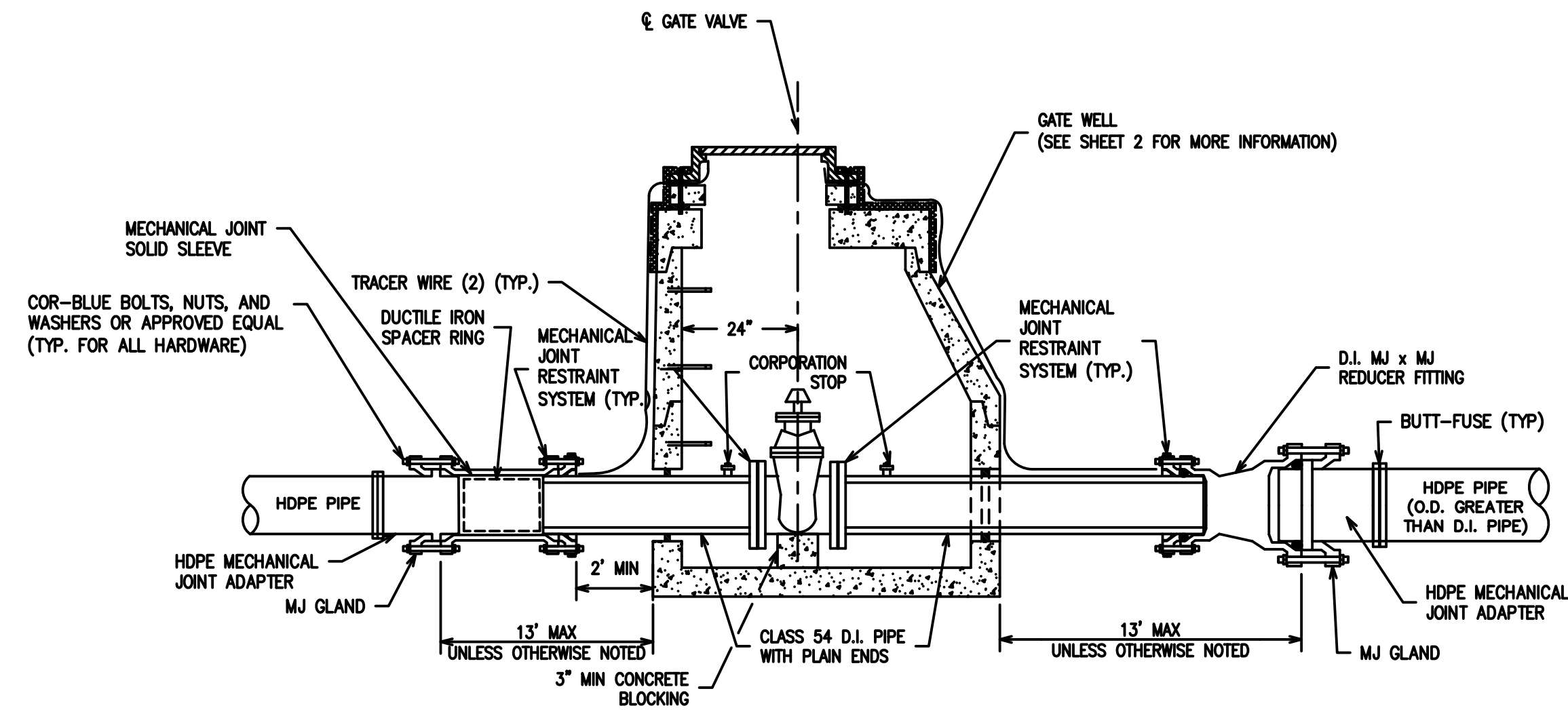
WATER MAIN IN CASING SECTION

WATER MAIN IN CASING DETAILS

C-7

WATER MAIN
SPECIAL DETAILS

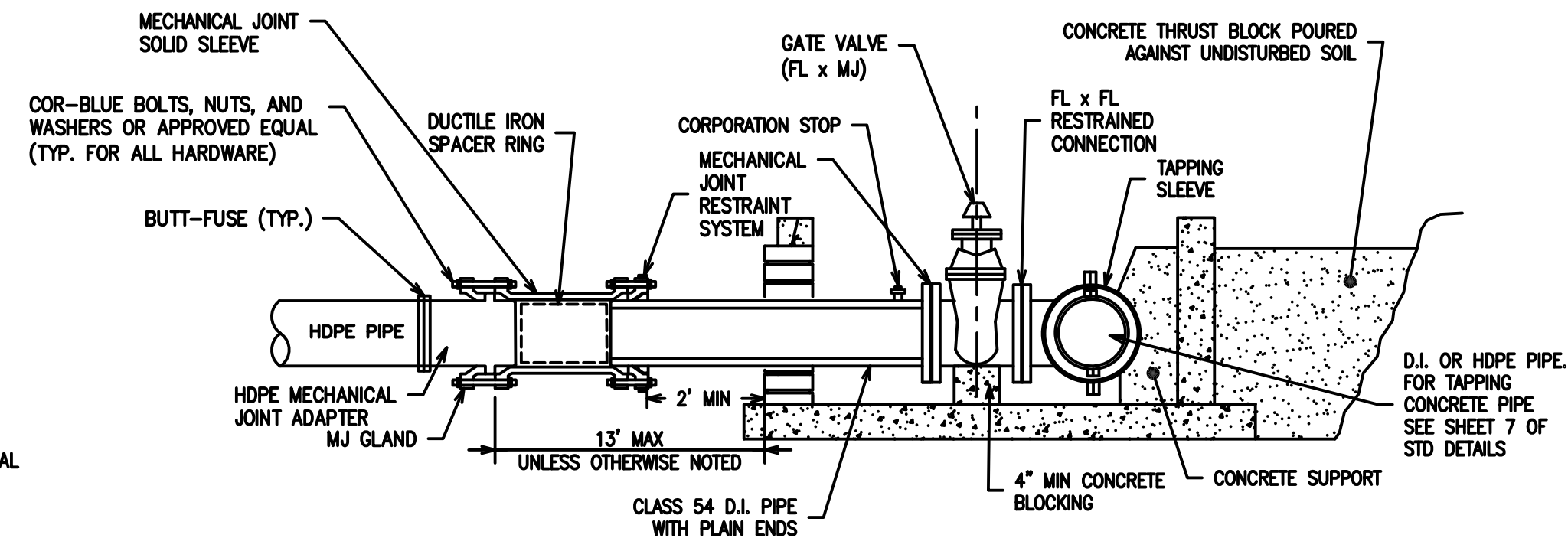
REVISION BLOCK			
Rev.	Rev.	Rev.	Description
No.	By	Date	
1	WRC	03/18/19	MARKUPS PER G. APPEL
2	WRC	08/11/20	GENERAL UPDATE
3			
4			
ORIG. DATE:		01/01/01	
SCALE:		NONE	
DESIGNED BY:		OCDC	
DRAWN BY:		OCDC Mapping	
			
		ONE PUBLIC WORKS DRIVE, BLDG 95 WEST WATERFORD, MICHIGAN 48328-1907	
		SHEET NO.: 4 OF 7	



TYPICAL HDPE CONNECTION TO GATE VALVE

NOTES:

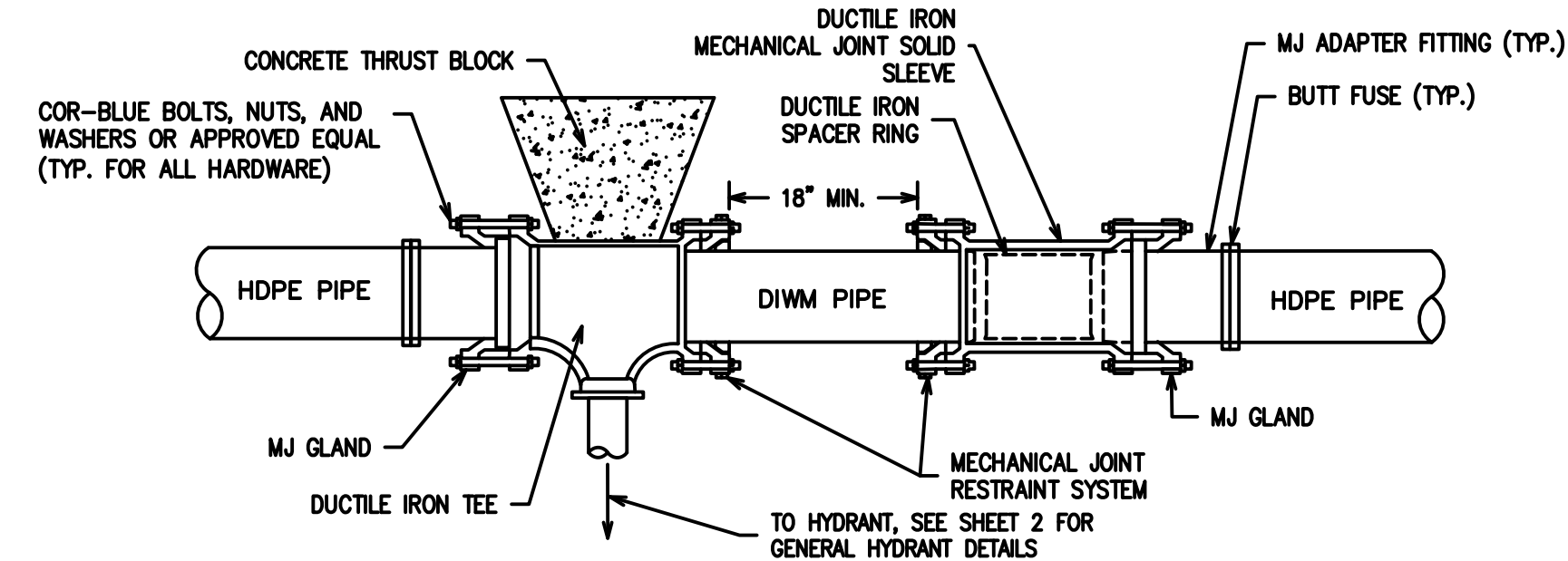
- WHERE GATE VALVE IS IN LINE WITH THE HDPE WATER MAIN, INSTALL D.I. PIPE THROUGH GATE WELL MAKING CONNECTION TO HDPE PIPE OUTSIDE OF GATE WELL AS SHOWN.
- TRACER WIRES SHALL BE INSTALLED ALONG THE OUTSIDE OF THE GATE WELL AND BENEATH THE FRAME AND COVER.



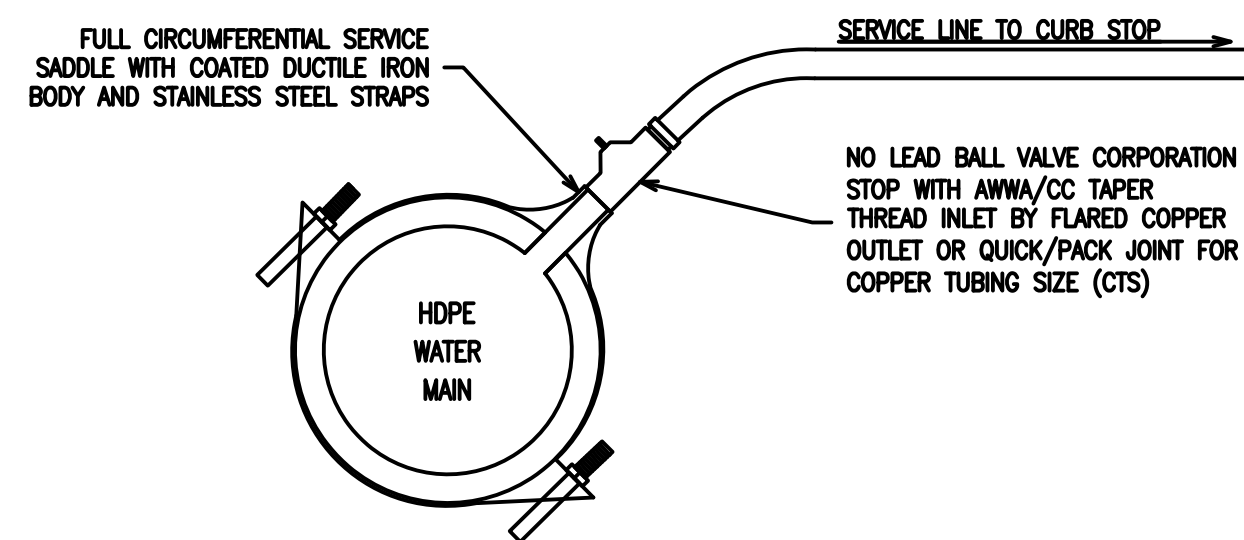
HDPE TAPPING SLEEVE, VALVE & WELL

NOTES:

- SEE SHEET 2 OF THE WATER MAIN STANDARD DETAIL SHEETS FOR GENERAL TAPPING SLEEVE VALVE AND WELL DETAILS.
- TAPPING SLEEVES FOR HDPE PIPE REQUIRE AN OUTLET SEAL GASKET AND SPRING WASHERS IN ADDITION TO THE REQUIREMENTS DETAILED IN SHEET 2 (JCM 452, ROMAC S5TH OR APPROVE EQUAL).



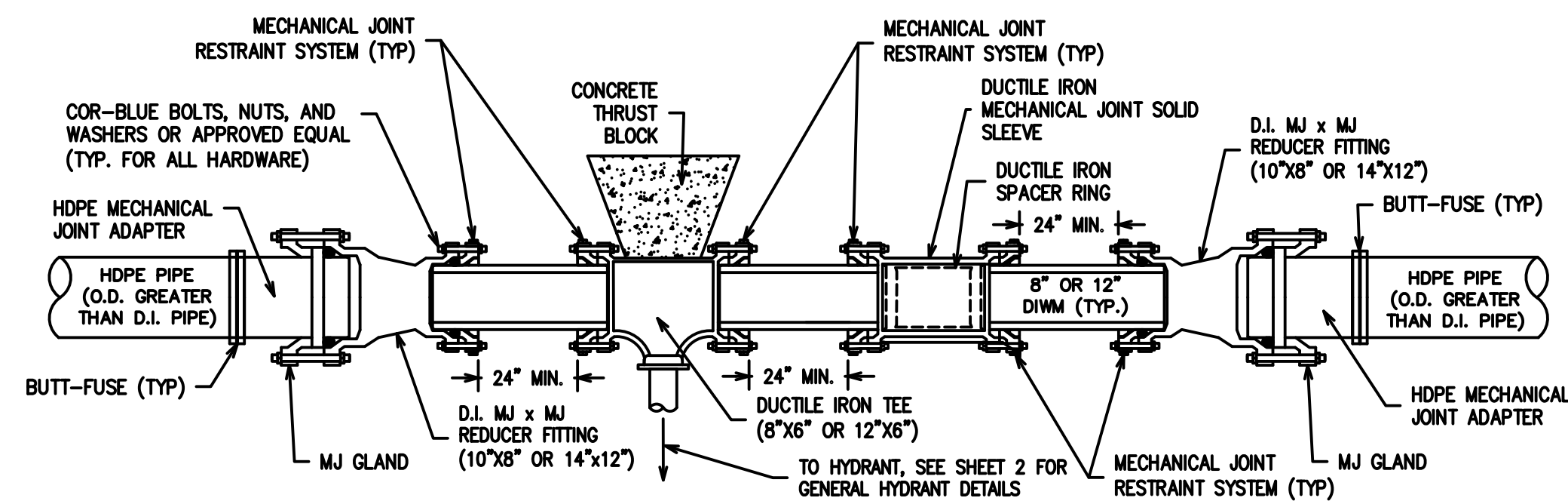
CUT-IN HYDRANT TEE DETAIL



SERVICE LINE CONNECTION TO HDPE PIPE


NOTES:

- FLARED HDPE SERVICE LINES ARE PROHIBITED.

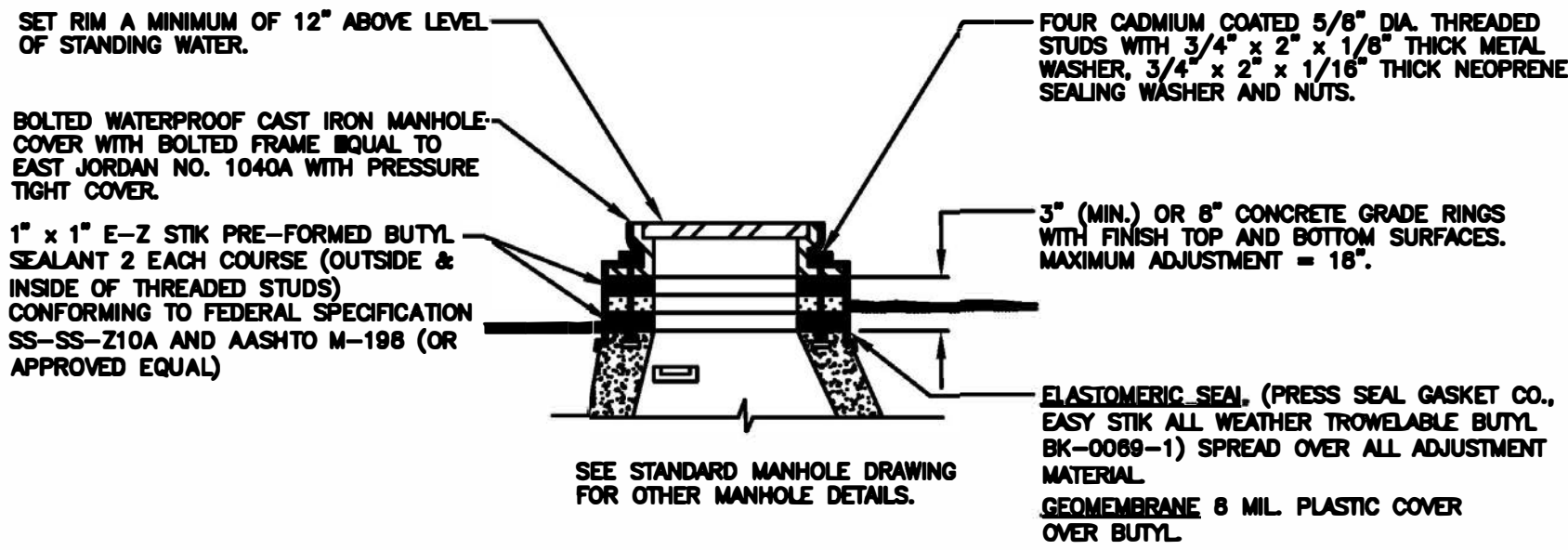


CUT-IN HYDRANT TEE DETAIL WITH 14" OR 10" HDPE

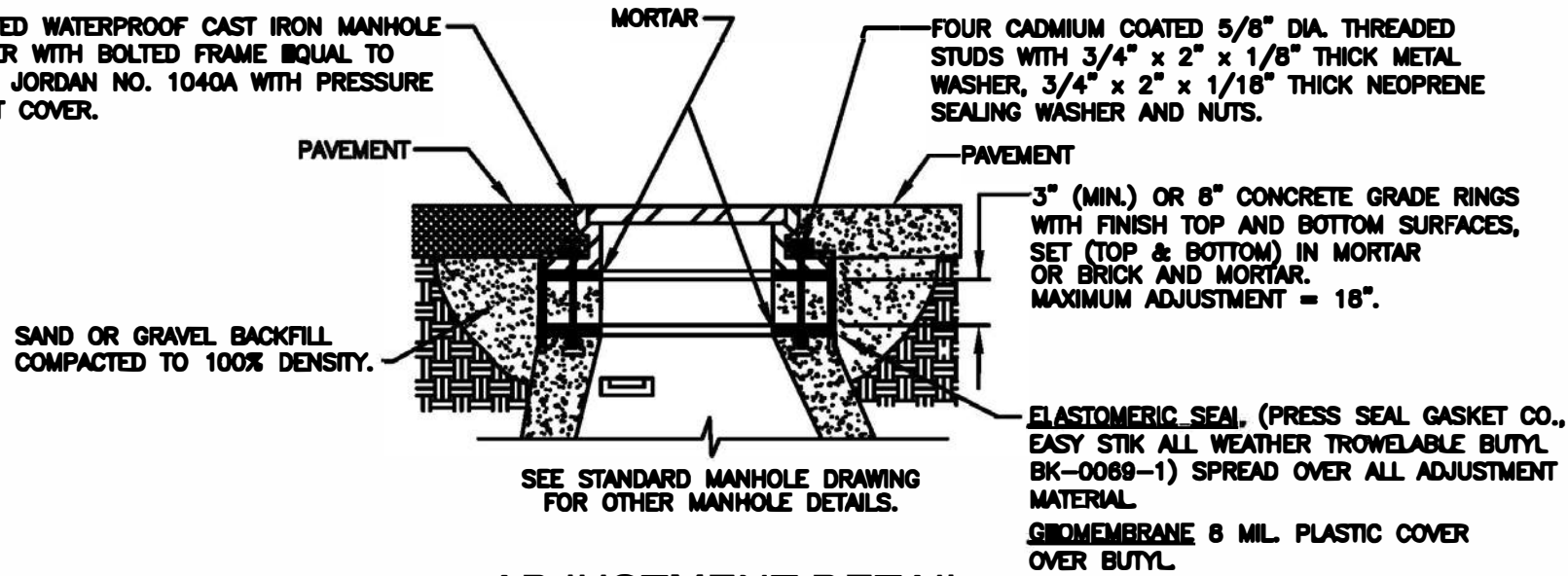
C-8

WATER MAIN			
HIGH DENSITY POLYETHYLENE PIPE (HDPE) DETAILS			
REVISION BLOCK			
Rev. No.	Rev. Date	Rev. Description	Rev. Date
1	03/18/10	MARKUPS PER G. APPEL	
2	08/31/10	GENERAL UPDATE	
3			
4			
ORIG. DATE:		01/01/01	
SCALE:		NONE	
DESIGNED BY:		OCDG	
DRAWN BY:		OCDG Mapping	
			
		ONE PUBLIC WORKS DRIVE, BLDG 95 WEST WATERFORD, MICHIGAN 48328-1807	
		SHEET NO.: 6 of 7	

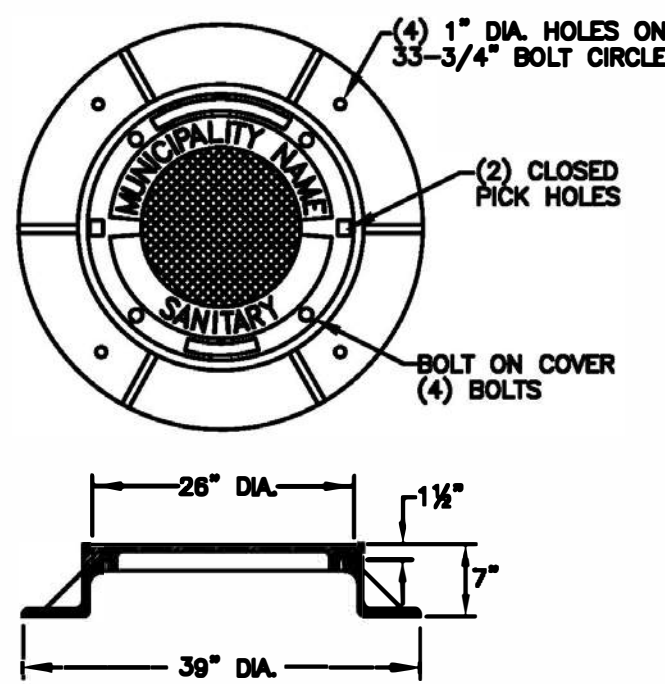
MANHOLE RIM ADJUSTMENT CHART	
MANHOLE LOCATION	SET RIM ELEVATION
DITCH	12" ABOVE FINISH GRADE
FLOOD PLAIN	12" ABOVE STANDING WATER
GRAVEL ROAD / SHOULDER	6" BELOW FINISH GRADE
PAVEMENT / GREENBELT	FLUSH WITH FINISH GRADE



ADJUSTMENT DETAIL FOR
MANHOLE TOPS WITHIN FLOOD PRONE AREAS

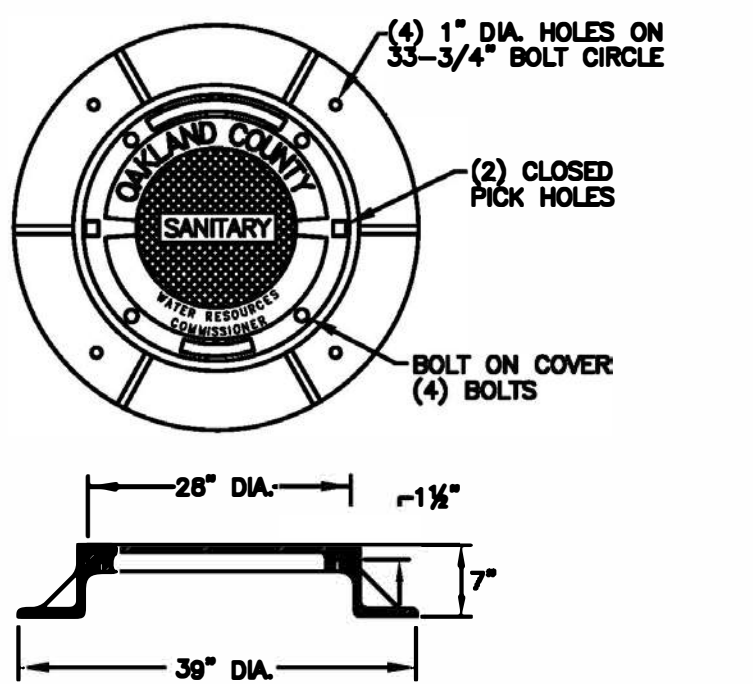


ADJUSTMENT DETAIL
MANHOLE TOPS WITHIN PAVEMENT AREAS



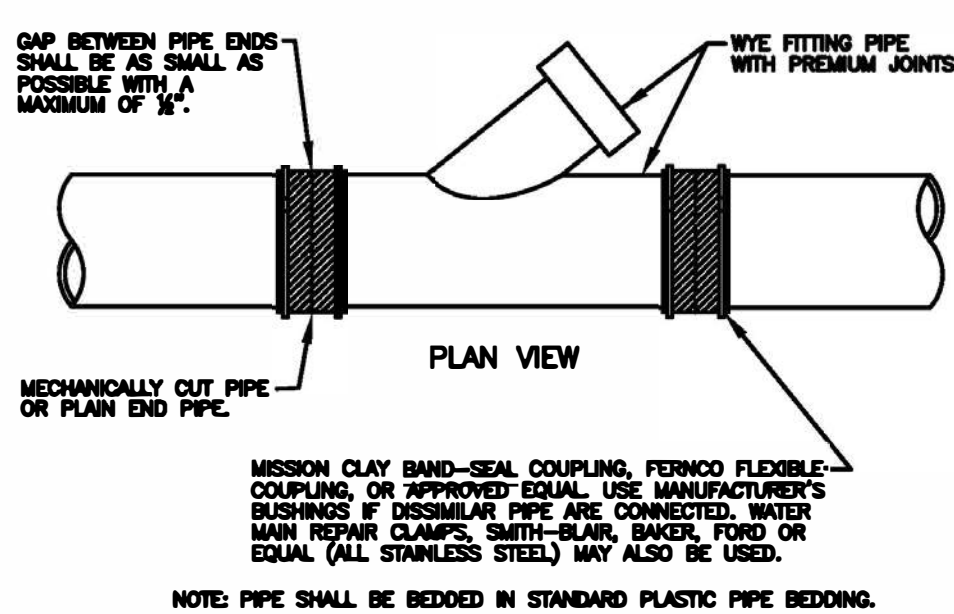
EAST JORDAN IRON WORKS
HEAVY DUTY MATERIAL ASTM A48 CL-35
COVER WT. 150 LBS., CATALOG NO. 1040A
PATTERN NO. 1040A, PRODUCT NO. 1040XX OAKGOSTD.
2" RAISED LETTERS, 1" RAISED LETTERS
ALL RECESSED FLUSH.

LOCAL MUNICIPALITIES MANHOLE COVER

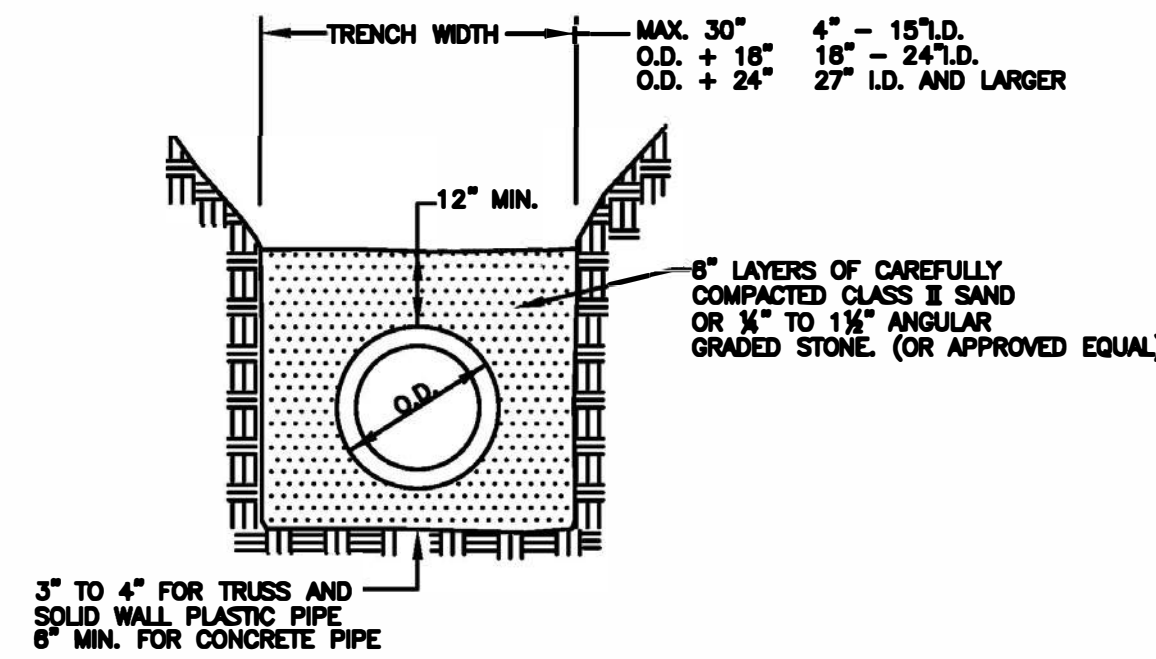


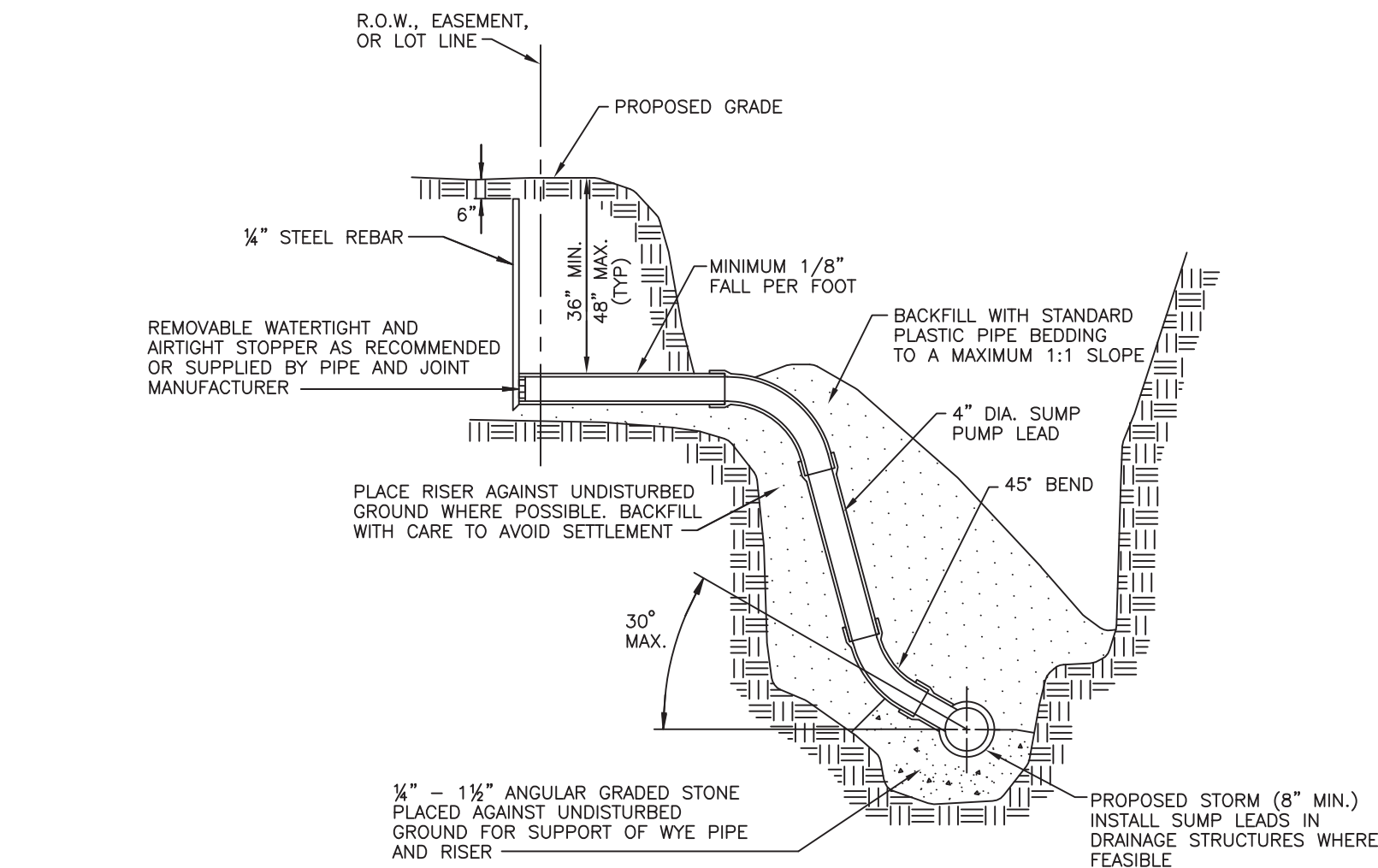
EAST JORDAN IRON WORKS
HEAVY DUTY MATERIAL ASTM A48 CL-35
COVER WT. 150 LBS., CATALOG NO. 1040APT
PATTERN NO. 1040A, PRODUCT NO. NCR08-1280 C
2" RAISED LETTERS, 1" RAISED LETTERS, 3/4" RAISED LETTERS
ALL RECESSED FLUSH.

W.R.C. LETTERED MANHOLE COVER



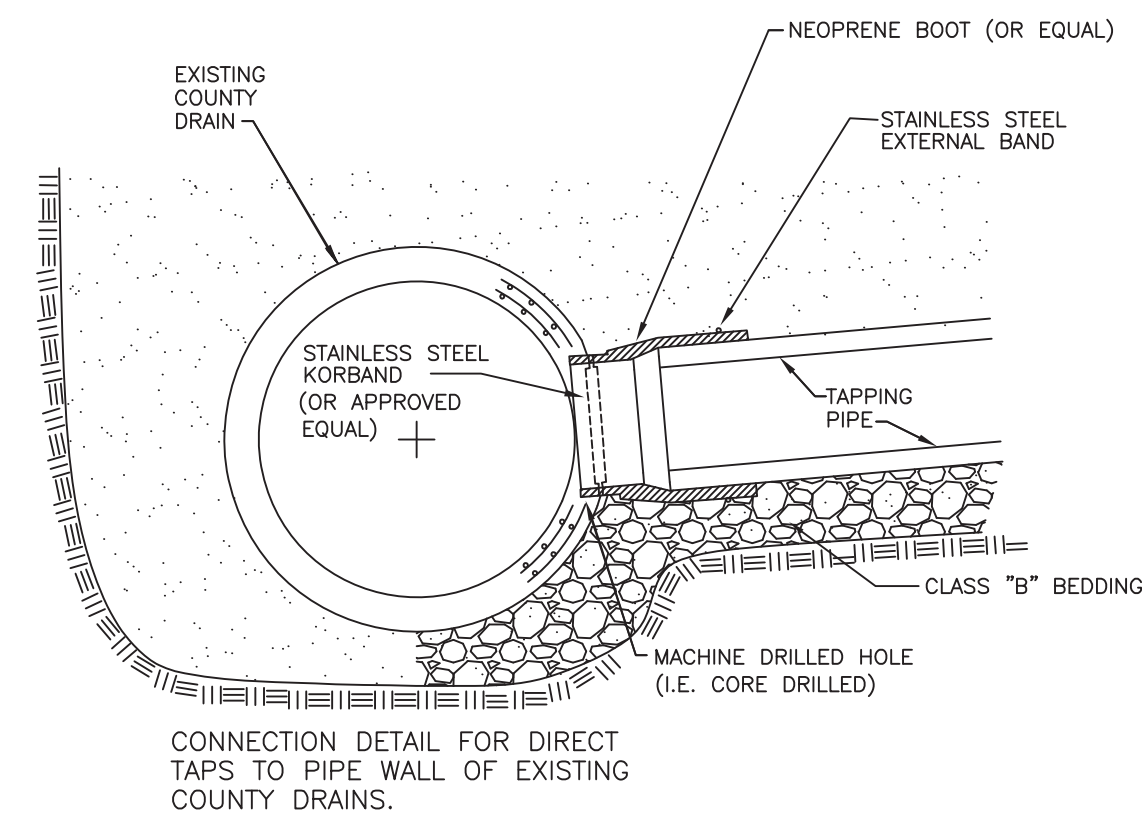
WYE PIPE INSERTION WITH FLEXIBLE COUPLINGS
(RIGID PIPE)





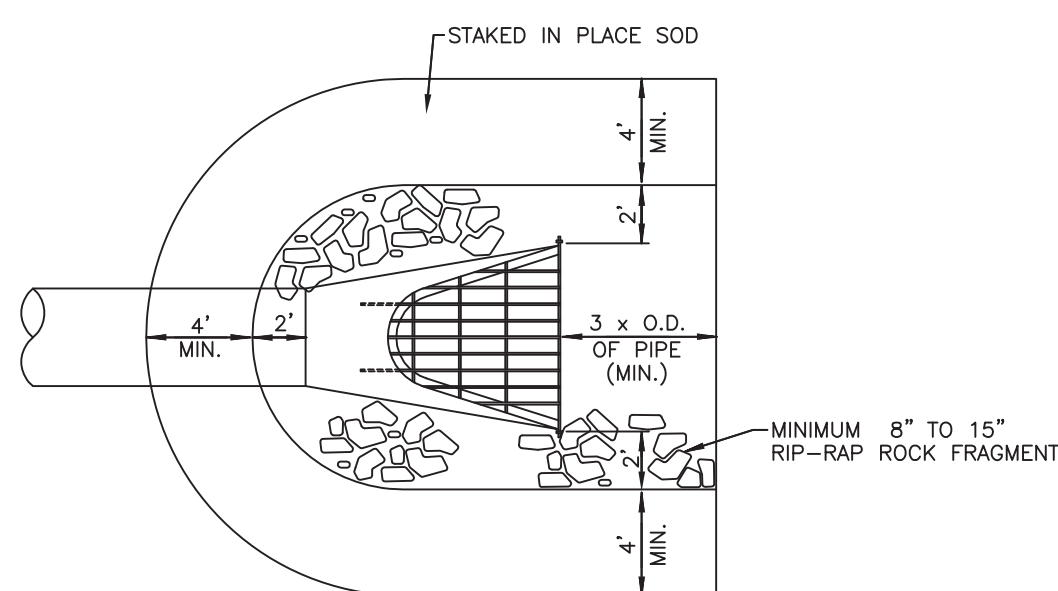
HOUSE LEAD DETAIL FOR 4" DIA. PLASTIC SUMP PUMP LEADS

NO SCALE

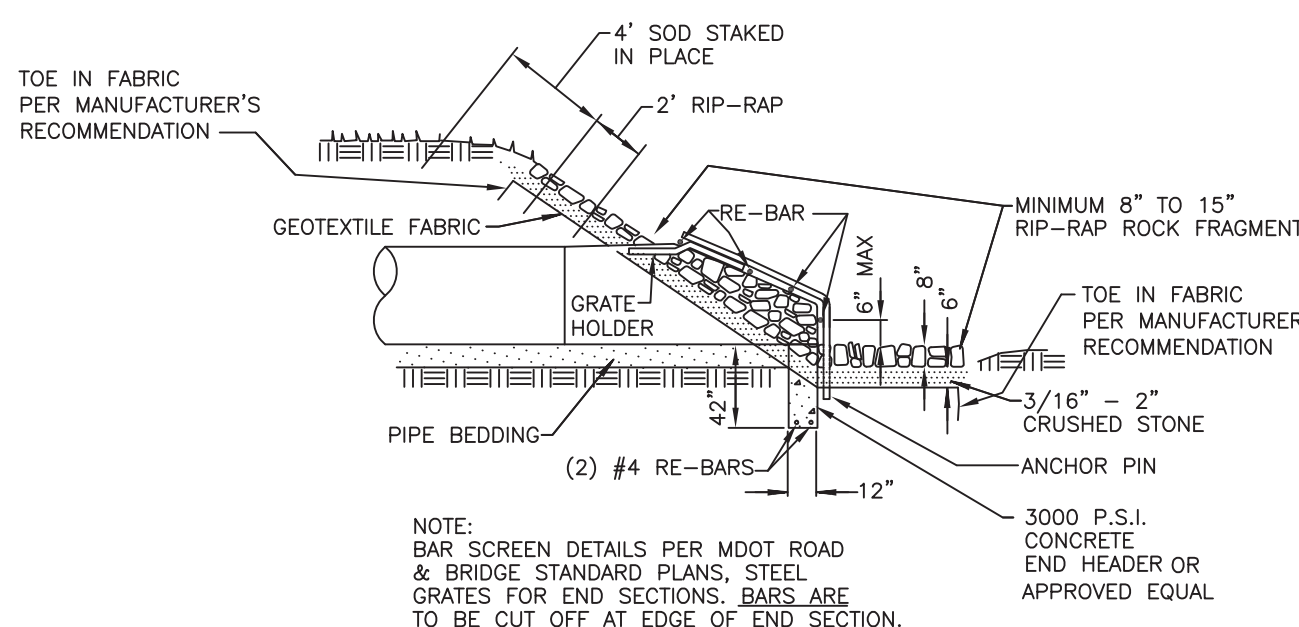


KOR-N-TEE TAP (OR APPROVED EQUAL)

NO SCALE
* For non-concrete to concrete taps.
* Use link-seal, A-lock or approved equal for concrete to concrete taps.



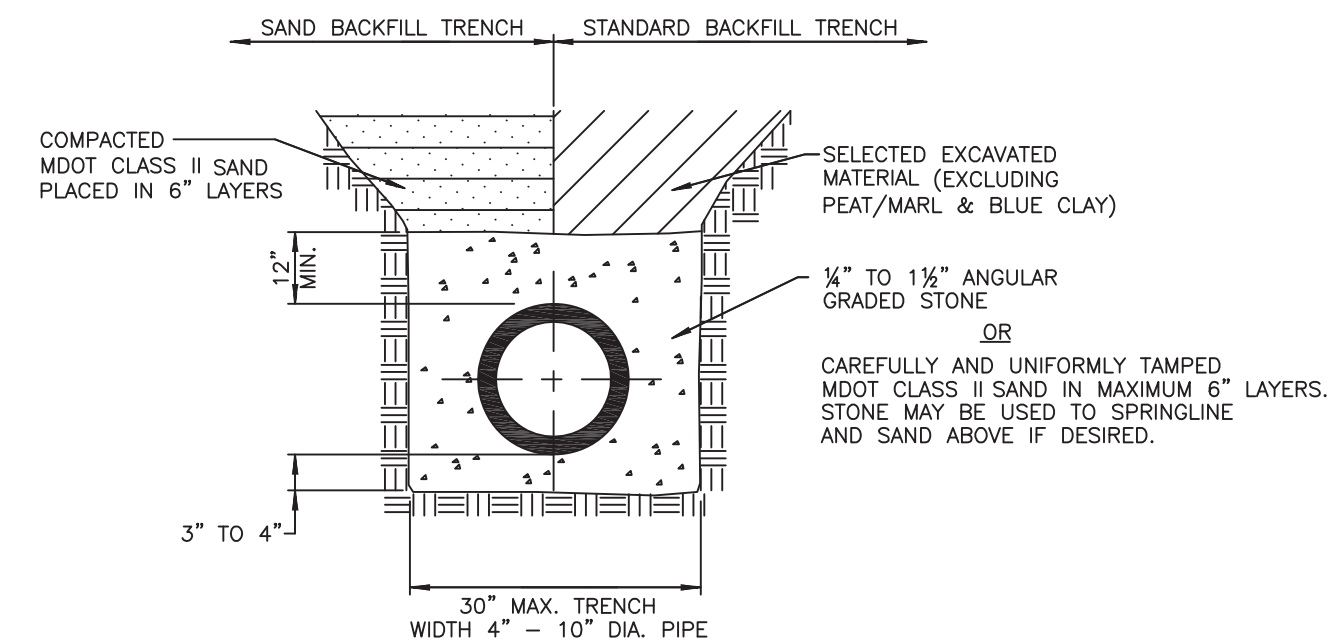
PLAN VIEW



PROFILE VIEW

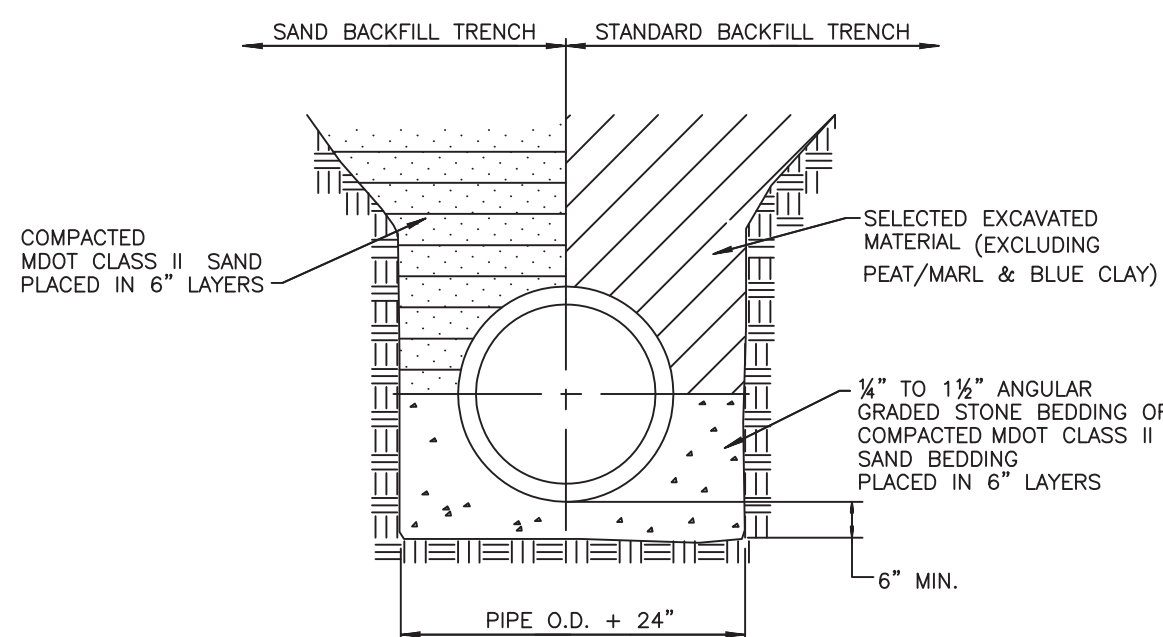
END SECTION AND BAR SCREEN DETAIL

NO SCALE



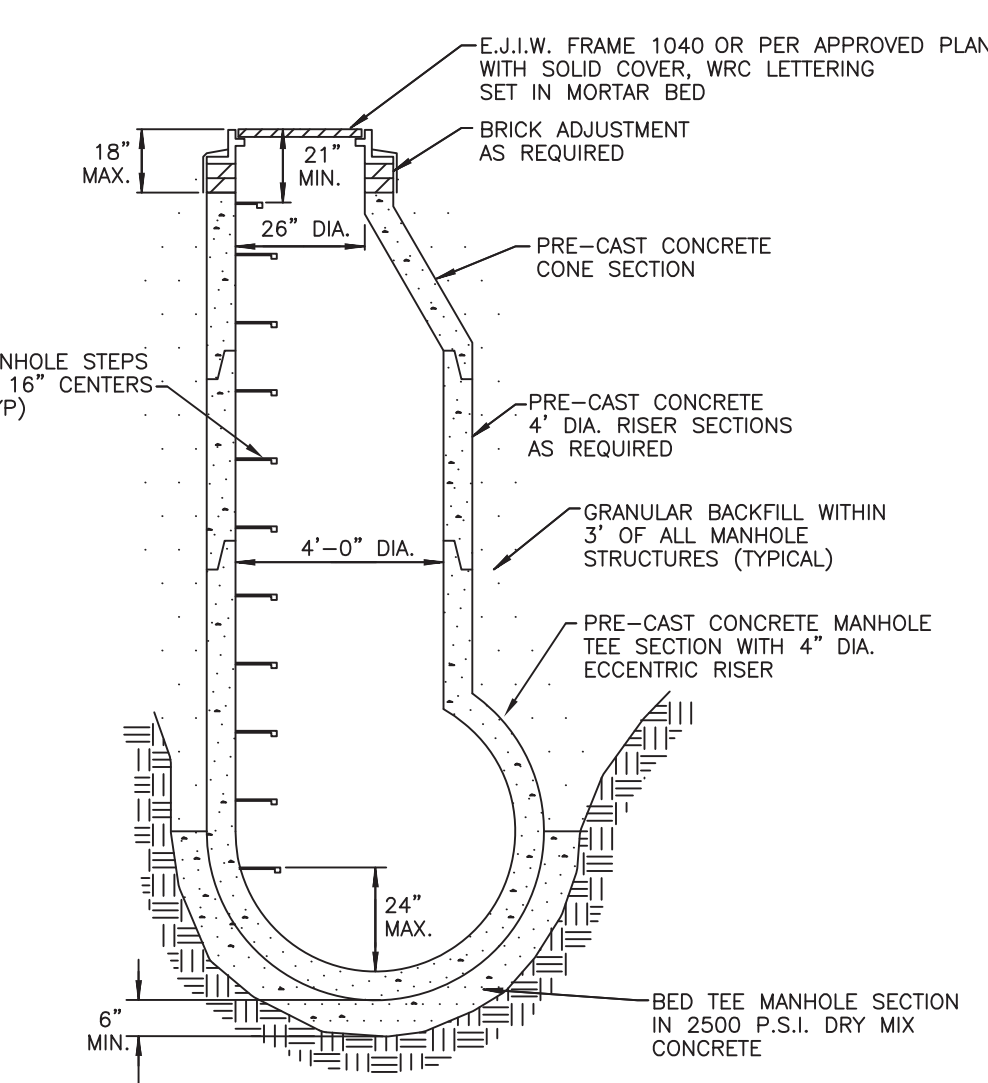
ABS (TRUSS AND SOLID WALL), PVC (TRUSS, SOLID WALL, A2000), ADS N-12 WT PIPE BEDDING DETAIL

NO SCALE



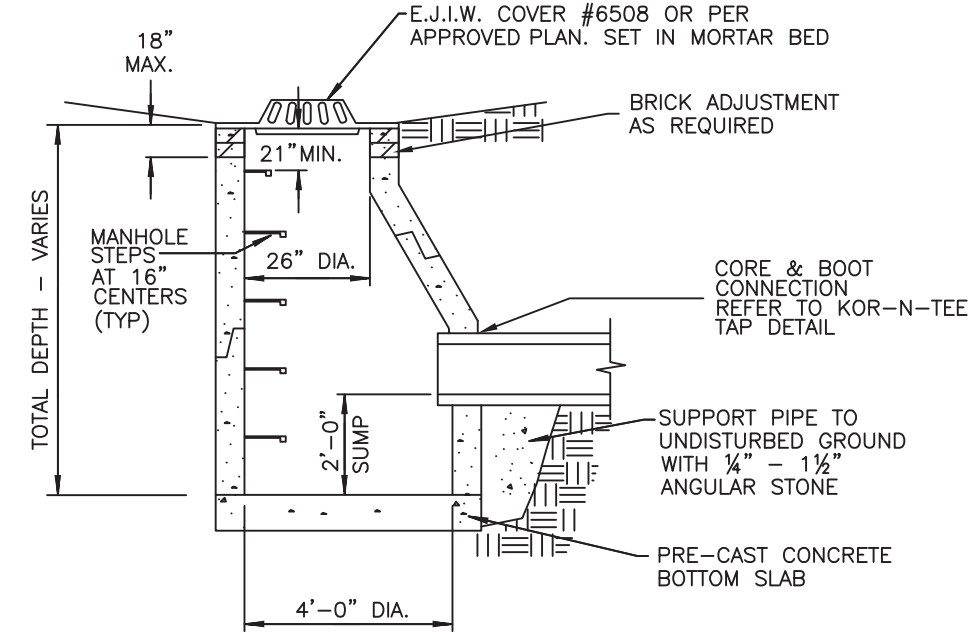
CLASS "B" BEDDING TRENCH DETAIL FOR 27" DIAMETER AND LARGER CONCRETE PIPE

NO SCALE



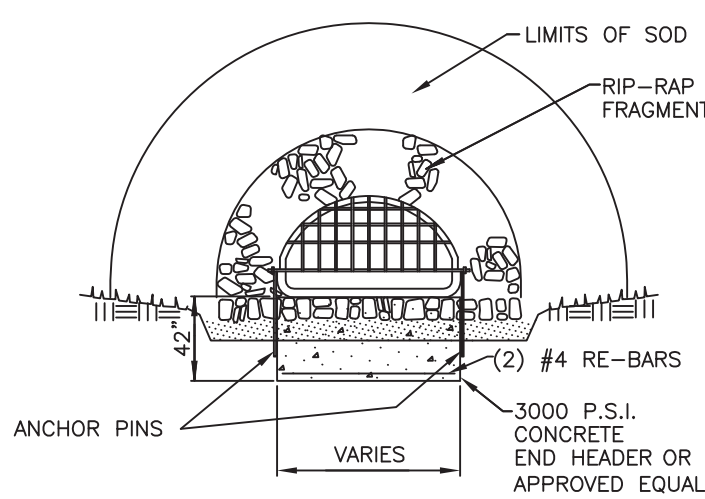
PRE-CAST TEE MANHOLE DETAIL

NO SCALE

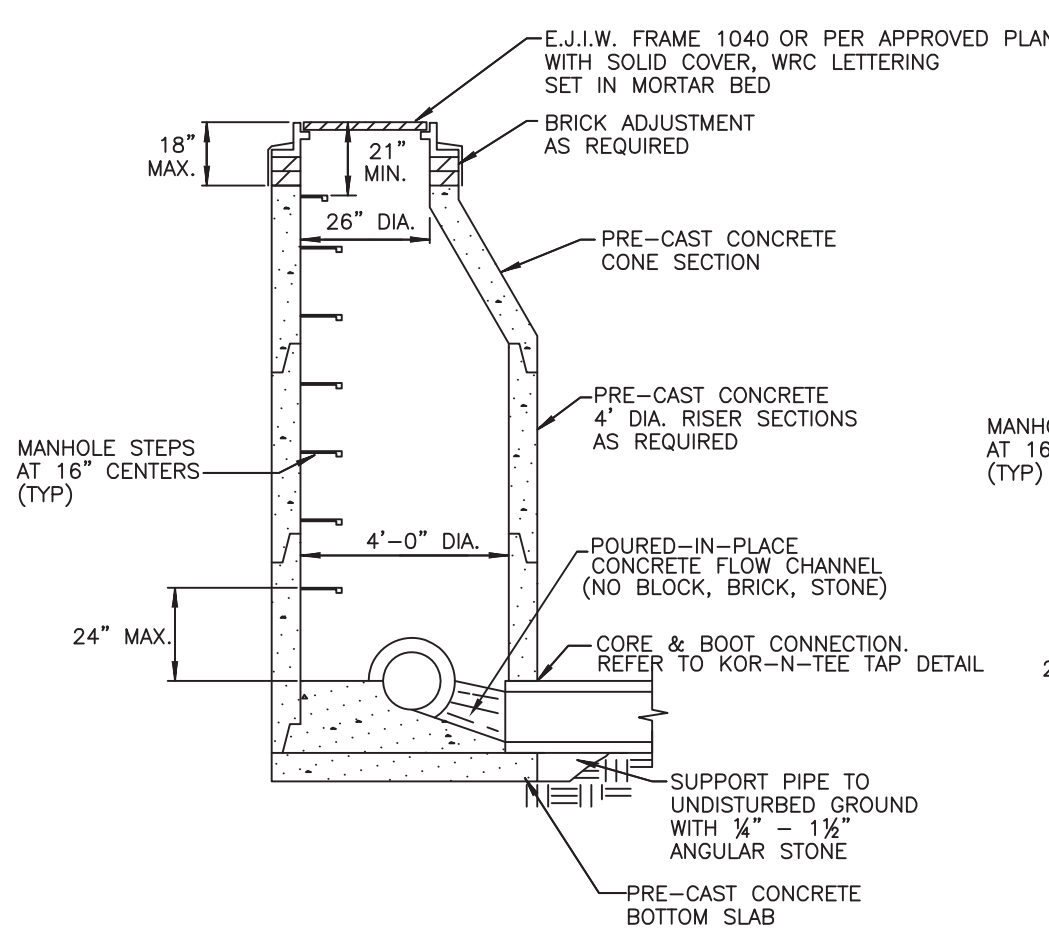


PRE-CAST CATCH BASIN DETAIL

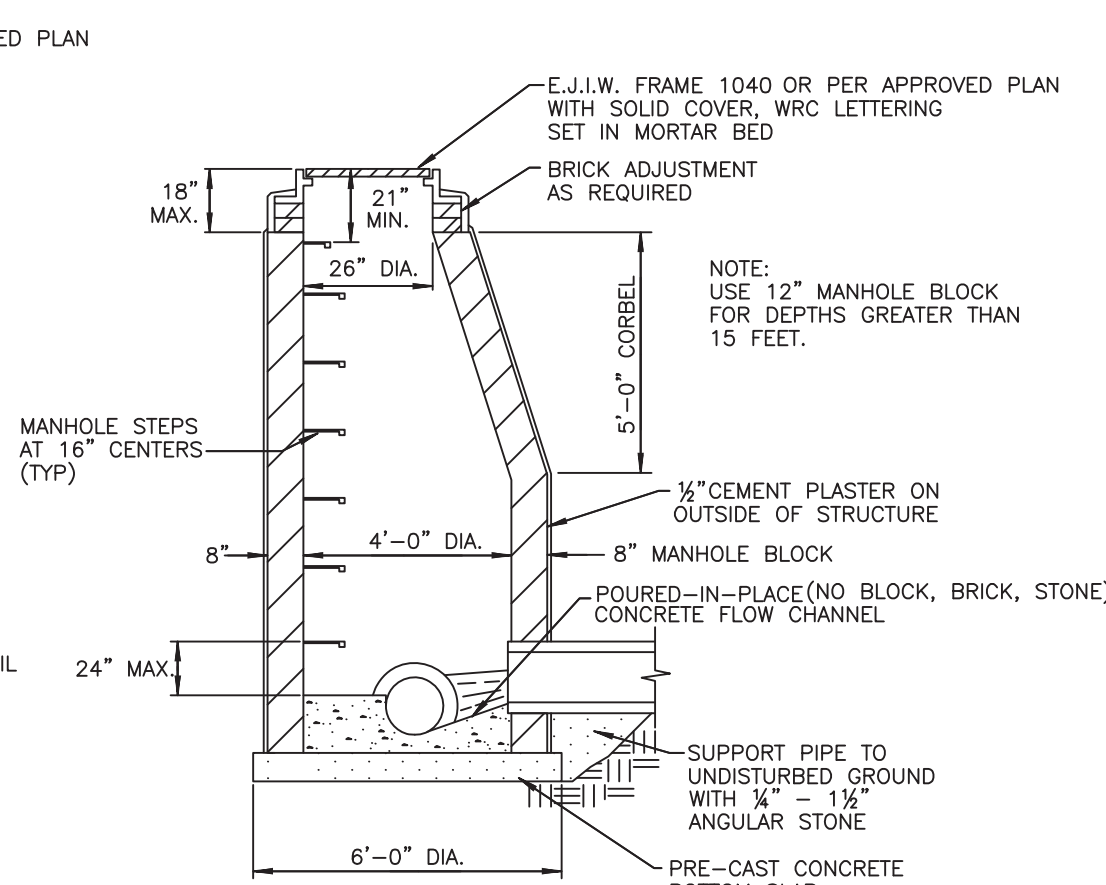
NO SCALE



END VIEW

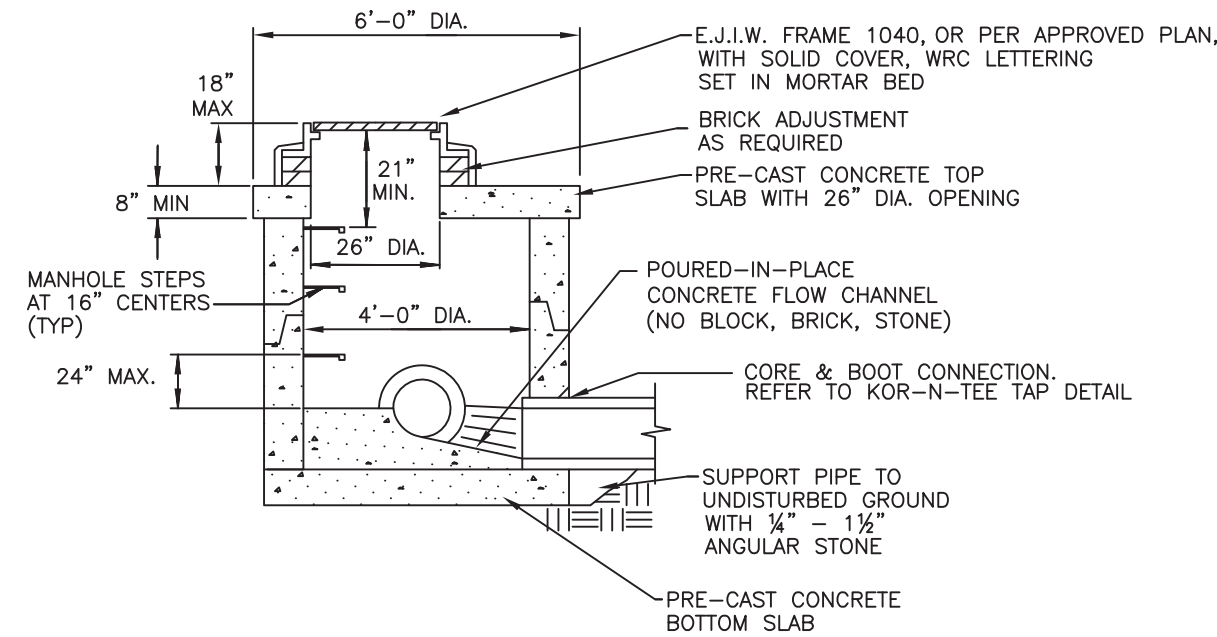


PRE-CAST MANHOLE



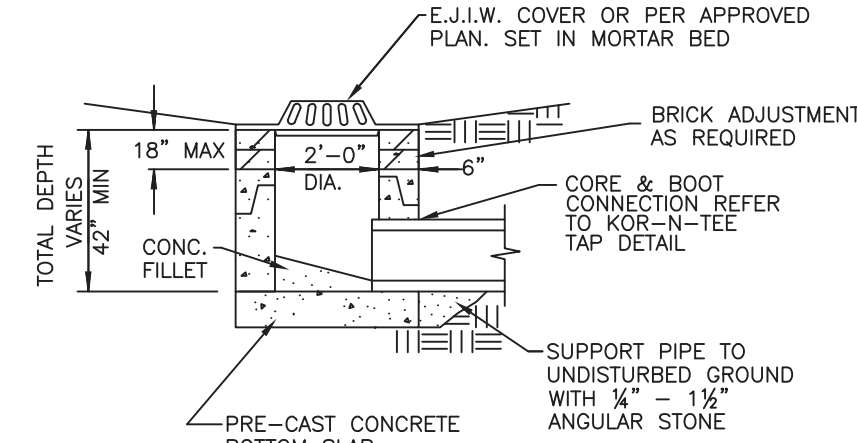
BLOCK MANHOLE (PRIOR APPROVAL ONLY)

NO SCALE



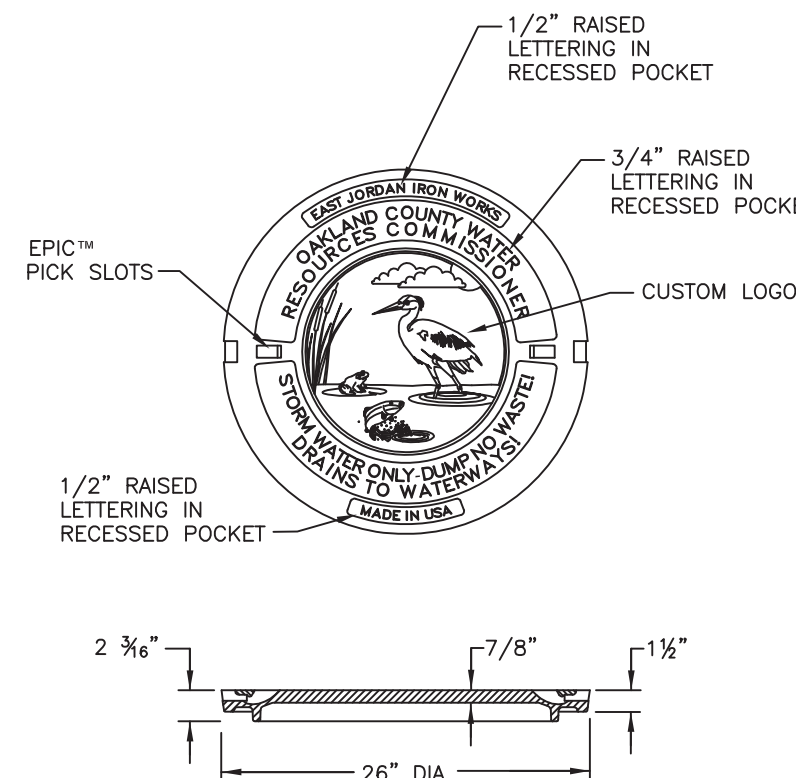
PRE-CAST LOW HEAD MANHOLE DETAIL

NO SCALE
(PRIOR APPROVAL ONLY)



PRE-CAST INLET DETAIL

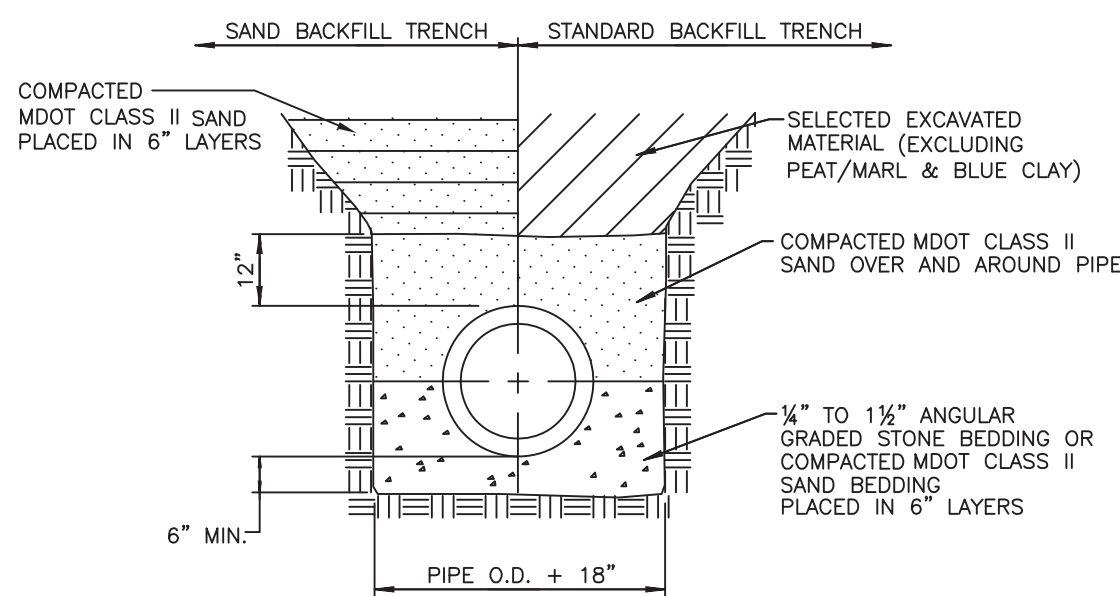
NO SCALE



EAST JORDAN IRON WORKS OR APPROVED EQUAL
HEAVY DUTY MATERIAL ASTM A48 CL35B
CATALOG NO. 1040A
PATTERN NO. 1040A, PRODUCT NO. 104718 OAKCOSTD.
2" HIGH RAISED LETTERS, 1" WIDE RAISED LETTERS
ALL IN RECESSED POCKET.

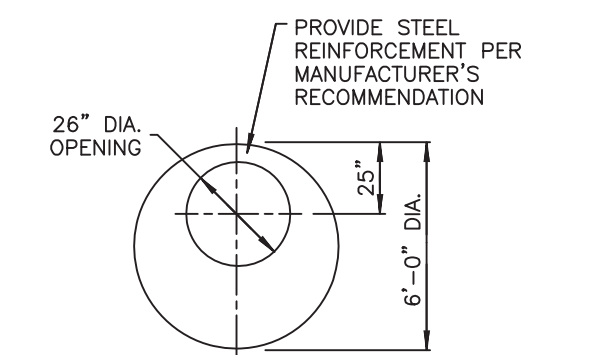
LETTERED MANHOLE COVER FOR WRC

NO SCALE



CLASS "B" BEDDING TRENCH DETAIL FOR 24" DIAMETER AND SMALLER CONCRETE PIPE

NO SCALE



PRECAST CONCRETE TOP SLAB DETAIL

GENERAL NOTES

- Type and class of pipe shall be as specified on plans.
- Class "B" bedding shall be used throughout, unless otherwise specified on the plan.
- All end sections 18" and larger shall be provided with a bar screen unless otherwise approved.
- Standard rip-rap shall be 8"-15" fragmented rock, heavy rip-rap shall be 16"-24" fragmented rock. (No Broken Concrete)
- MANHOLE REQUIREMENTS:
 - All new catch basins, inlets, and manholes are to be manufactured to ASTM C-478 specifications.
 - All new catch basins, inlets, and manholes shall have WRC approved flexible, watertight seals where pipes pass through walls. Manholes shall be of precast sections with modified groove tongue and rubber gasket type joints. Pre cast manhole cone sections shall be WRC approved modified eccentric cone type.
 - Taps through manhole joints or cone sections are prohibited unless otherwise approved.
 - Manhole steps to be plastic coated steel meeting the requirements in ASTM D 2146, Type II, Grade 49108, MA. Industries P.S.I. Polypropylene, (or approved equal). Steps to be installed during manhole manufacture. Place at 16" centers 45" from centerline of sewer.
 - Cone section with modified groove tongue joints and with stud inserts cast in place. Top to have flush surface.
 - ASTM C-478 riser section with modified groove tongue joints.
 - Res-seal, link-seal, press wedge II, or kor-n-seal boot (with stainless steel korbard) flexible rubber manhole joints. (or approved equal).
 - The inside joints of manholes, catch basins, and pipe sizes over 42" and larger in diameter shall be pointed up with mortar upon completion of backfilling.
- CONCRETE PIPE REQUIREMENTS:
 - Concrete pipe to be per ASTM C76 standards.
 - It will be required to TV all pipe 30 days after installation
 - The contractor shall provide reinforced concrete pipe as specified on the plans.
 - All reinforced concrete pipe shall have modified grooved tongue joints with o-ring type rubber gasket, per A.S.T.M. specifications C443.
 - The inside joints of manholes, catch basins, and pipe sizes over 42" and larger in diameter shall be pointed up with mortar upon completion of backfilling.
- SUMP PUMP LEAD REQUIREMENTS:
 - All sump pump leads connected to a County Drain pipe shall be pre-manufactured.
 - Sump pump leads connected to a manhole shall be cored and booted. Refer to Kor-N-Tee Tap Detail.
 - Sump pump mains and leads shall be ADS (truss and solid wall), PVC (truss, solid wall , A2000), ADS N-12 WT with premium joints.
 - Ends of all 4" sump pump leads shall be temporarily capped and their location staked, witnessed and recorded.
 - All sump pump leads to be taken to the property line, easement line or as indicated on the plan.
 - Sump pump mains must have a cleanout with a minimum inside diameter of 24" and be constructed at changes of alignment, ends of sump pump mains or as indicated on the plan.
- RESTORATION REQUIREMENTS:
 - All disturbed area within the County Drain right-of-way shall be restored as follows:
 - Under roads, sidewalks, driveways and parking areas, backfill material shall be placed loosely into trenches in six (6) inch layers with each layer compacted to not less than 95% of maximum dry density as determined by the ASTM D 1557 Compaction Standard (modified proctor compaction test). All other areas shall have each layer compacted to not less than 90% of maximum dry density.
 - Finish subgrade
 - Place 3" thickness clean topsoil acceptable to the engineer to attain finished grade. Topsoil must not be contaminated and may not be a mixture of natural underlying soils, subbase materials, or other materials. It must consist of natural loam, sandy loam, silty loam or clay loam humus-bearing soil adapted to the sustenance of plant life. Topsoil must be neither excessively acidic nor excessively alkaline. It must be of mineral origin, exclusive of any peat or muck.
 - Apply seed and fertilizer as follows:

Location	Seeding Requirements	Fertilizer Requirement
Slopes and Ditch, Banks, Etc.	M.D.O.T. "Roadside Mix" Turf Seed Mixture TGM (10% Kentucky Blue, 20% Perennial Rye, 30% Hard Fescue, 40% Creeping Red Fescue) applied at 220 lb/acre	M.D.O.T. Seeding and Sodding Fertilizers, Class A
Other Areas	M.D.O.T. "Roadside Mix" Turf Seed Mixture THM (30% Kentucky Blue, 20% Perennial Rye, 50% Creeping Red Fescue) applied at 220 lb/acre	M.D.O.T. Seeding and Sodding Fertilizers, Class A

 - Sod is required in maintained lawn areas. Refer to WRC General Specifications for additional requirements and information.
 - apply straw or marsh hay mulch in an air-dry condition to all seeded areas over the surface to a uniform thickness at 2 tons/acre.
 - mulch shall be anchored in place with biodegradable netting, not larger than 1 1/2" by 2" nor smaller than 1/2" by 1/2".
 - The contractor shall be responsible to insure the growth of all seeded areas, and shall re-seed as necessary to accomplish this.
- The Storm Drain Notes and Details Sheet shall be a supplement to WRC Standards and Specifications, which are available on the WRC website (www.oakgov.com/water/).

STORM DRAIN NOTES AND DETAILS

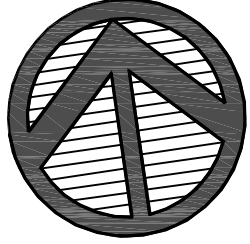
REVISION BLOCK			
Data Source / Source Date: N/A			
Rev. No.	Rev.	Date	Description
1	1	3/17/08	PROPOSED DETAIL CHANGES NEW LOGO
2	1	06/12/09	APPROVAL PER STANDARDS COMMITTEE
3	1	03/28/10	REVISED MH COVER DETAIL
4	05	04/27/10	REVISED GENERAL NOTES
ORIG. DATE: 05/05/97			
SCALE: NONE			
DESIGNED BY: WRC			
DRAWN BY: Mapping			
ONE PUBLIC WORKS DRIVE, BLDG 95 WEST WATERFORD, MICHIGAN 48328-1907		SHEET NO.:	



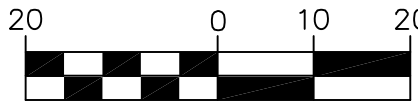
Jim Nash

Packet PG. 27

NORTH



GRAPHIC SCALE



(IN FEET)
1 inch = 20 ft.

PROPERTY DESCRIPTION:

PARCEL 'B', 494 S BROADWAY STREET (PER FLSE PARCEL SPLIT DRAWINGS)
PART OF THE NORTHEAST 1/4 OF SECTION 11 AND PART OF THE SOUTHEAST 1/4 OF SECTION 2, T4N-R10E,
VILLAGE OF LAKE ORION, OAKLAND COUNTY, MICHIGAN AND BEING PART OF LOT 52 AND LOT 54 THRU LOT 56
OF THE "ASSESSOR'S REPLAT OF DECKER'S ADDITION TO THE VILLAGE OF ORION AND PART OF CANANDAIGUA
CITY" AS RECORDED IN LIBER 52, PAGES 17 AND 17A OF OAKLAND COUNTY PLAT RECORDS, MORE
PARTICULARLY DESCRIBED AS: BEGINNING AT THE SOUTHEAST CORNER OF LOT 54, BEING ALSO THE SOUTHWEST
CORNER OF LOT 56 OF SAID PLAT, FROM WHICH THE EAST 1/4 CORNER OF SECTION 11, T4N-R10E, LIES
S80°07'47"W, 281.28 FEET, AND S03°11'40"E, 24.16 FEET, AND N80°07'47"E, 1,177.00 FEET; THENCE
S80°07'47"W, 170.00 FEET; THENCE N09°50'46"W, 33.98 FEET; THENCE N25°38'00"E, 142.86 FEET; THENCE
N85°49'40"E, 163.97 TO A POINT ON THE WEST RIGHT OF WAY LINE OF M-24 AS WIDENED (89.00 FEET WIDE);
THENCE S04°10'20"E, 126.84 FEET ALONG SAID WEST LINE OF M-24, BEING A LINE 31.00 FEET WEST OF AND
PARALLEL TO THE EAST LINE OF LOTS 52, 55 AND 56; THENCE CONTINUING ALONG SAID WESTERLY RIGHT OF
WAY LINE OF SAID M-24 AS WIDENED THE FOLLOWING TWO (2) COURSES: S85°47'13"W, 63.48 FEET, AND
S08°20'19"E, 14.05 FEET TO THE POINT OF BEGINNING, CONTAINING 0.671 ACRES OF LAND, MORE OR LESS.
SUBJECT TO ANY AND ALL EASEMENTS OR RESTRICTIONS OF RECORD

SITE LIGHTING/PHOTOMETRIC PLAN

Luminaire Schedule

Symbol	Qty	Label	Arrangement	Description	LLF	Arr Lum Lumens	Arr Watts
	4	A	DOUBLE	MRM-LED - 94 WATT ON 16'-8" HIGH POLE	1.000	11444	94
	9	B	SINGLE	GSR-04L - 33 WATT (12' ABOVE FINISH GRADE)	1.000	4199	33

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
ALL POINTS AT GRADE 5' x 5'	Illuminance	Fc	0.47	9.9	0.0	N.A.	N.A.
POINTS ALONG PROPERTY LINE	Illuminance	Fc	0.15	0.5	0.0	N.A.	N.A.

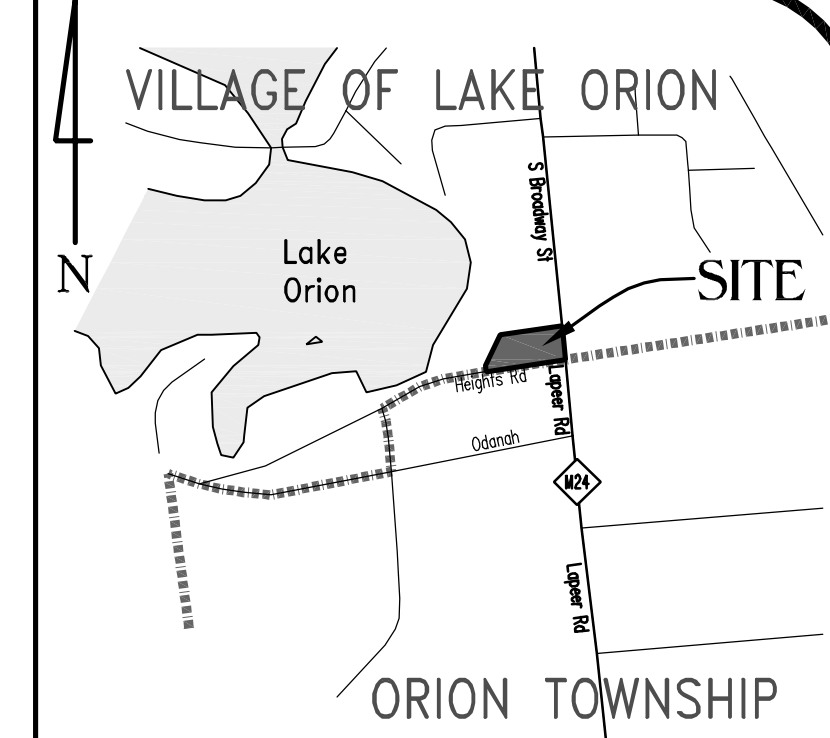
LIGHTING STATEMENTS:

BASED ON THE INFORMATION PROVIDED, ALL DIMENSIONS AND LUMINAIRE LOCATIONS SHOWN REPRESENT RECOMMENDED POSITIONS. THE ENGINEER AND/OR ARCHITECT MUST DETERMINE THE APPLICABILITY OF THE LAYOUT TO EXISTING OR FUTURE FIELD CONDITIONS.

THIS LIGHTING PLAN REPRESENTS ILLUMINATION LEVELS CALCULATED FROM LABORATORY DATA TAKEN UNDER CONTROLLED CONDITIONS IN ACCORDANCE WITH THE ILLUMINATING ENGINEERING SOCIETY (IES) APPROVED METHODS. ACTUAL PERFORMANCE OF ANY MANUFACTURER'S LUMINAIRES MAY VARY DUE TO CHANGES IN ELECTRICAL VOLTAGE, TOLERANCE IN LAMPS/LEDS AND OTHER VARIABLE FIELD CONDITIONS. CALCULATIONS DO NOT INCLUDE OBSTRUCTIONS SUCH AS BUILDINGS, CURBS, LANDSCAPING, OR ANY OTHER ARCHITECTURAL ELEMENTS UNLESS NOTED.

L E G E N D

- PROP 16'-8" LIGHT POLE (TYPE A)
- PROP BUILDING WALL PACK LIGHT
- PROP Fc GRID POINT
- PROP LIGHT FIXTURE TYPE



VICINITY MAP

SITE LIGHTING NOTES:

- ALL OUTDOOR LIGHTING IN ALL USE DISTRICTS, ESPECIALLY RESIDENTIAL DISTRICTS SHALL BE SHIELDED SO THE SURFACE OF THE SOURCE OF THE LIGHT SHALL NOT BE VISIBLE FROM ALL ADJACENT RESIDENTIAL DISTRICTS, ADJACENT RESIDENCES AND PUBLIC RIGHTS-OF-WAY.
- LIGHT FIXTURES WERE DESIGNED AND SHIELDED SO THAT LIGHT IS DIRECTED ONTO THE PARKING AREA AND DIRECTED AWAY FROM ADJACENT PROPERTY AND TRAFFIC.
- THE DESIGN AND STYLE OF FIXTURES (COLOR, SHAPE, STYLE, AND MATERIALS) SHALL MATCH OR COMPLEMENT THE STYLE AND MATERIALS OF THE BUILDINGS SERVED.
- ALL LIGHTING EXCEPT SECURITY LIGHTING SHALL BE ON A TIME-CLOCK OR PHOTO-SENSOR SYSTEM, AS APPROVED BY LAKE ORION.
- PARKING LOTS SHALL BE ILLUMINATED WITH A LIGHT-EMITTING DIODE (LED) OR OTHER APPROVED LIGHTING SYSTEM WITH RESIDENTIAL SHIELDS TO PROTECT THE ADJACENT RESIDENTIAL PROPERTIES.
- LIGHTING STANDARDS IN PARKING LOTS IN AND ADJACENT TO RESIDENTIAL ZONES SHALL NOT EXCEED TWENTY FEET IN HEIGHT AS MEASURED FROM THE ADJACENT GRADE TO THE TOP OF THE LIGHT FIXTURE. THE TOTAL LIGHT CUTOFF ANGLE MAY BE NO GREATER THAN 85 DEGREES. ILLUMINATION SHALL NOT BE OF A FLASHING, MOVING OR INTERMITTENT TYPE. ALL ILLUMINATION SHALL BE CONSTANT IN INTENSITY AND COLOR AT ALL TIMES WHEN IN USE.
- PARKING LOT LIGHTS MUST BE FULL CUT OFF TYPE FIXTURES AND LAMPS MUST BE SHIELDED TO PREVENT LIGHT TRESPASS OR GLARE. A WHITE LIGHT SOURCE SHOULD BE USED FOR THE WALL MOUNTED LIGHTS, SUCH AS INCANDESCENT, METAL HALIDE, OR OTHER LAMPS WITH A COLOR RENDERING INDEX OF AT LEAST 70. MAXIMUM LIGHT LEVELS MUST BE LESS THAN OR EQUAL TO 0.5 FOOTCANDLE BEYOND A PROPERTY LINE, PER FLINT TOWNSHIP ZONING.
- ONLY LIGHTING NECESSARY FOR SITE SECURITY MAY BE LEFT ON BETWEEN MIDNIGHT AND 6:00 AM.
- SEE THIS SHEET FOR THE LIGHT POLE CONSTRUCTION DETAIL. ALL 13 FEET STEEL POLES TO BE MOUNTED ON CONCRETE PEDESTAL, 2 FEET ABOVE TOP OF GROUND, FOR A TOTAL HEIGHT OF 15 FEET, ABOVE FINISH GRADE (AFG). THE CONTRACTOR SHALL CONTACT MISS DIG 72 HOURS PRIOR TO CONSTRUCTION TO VERIFY IF ANY UNDER GROUND UTILITIES WILL BE IN DIRECT CONFLICT.



"SHOE-BOX" TYPE HOUSING

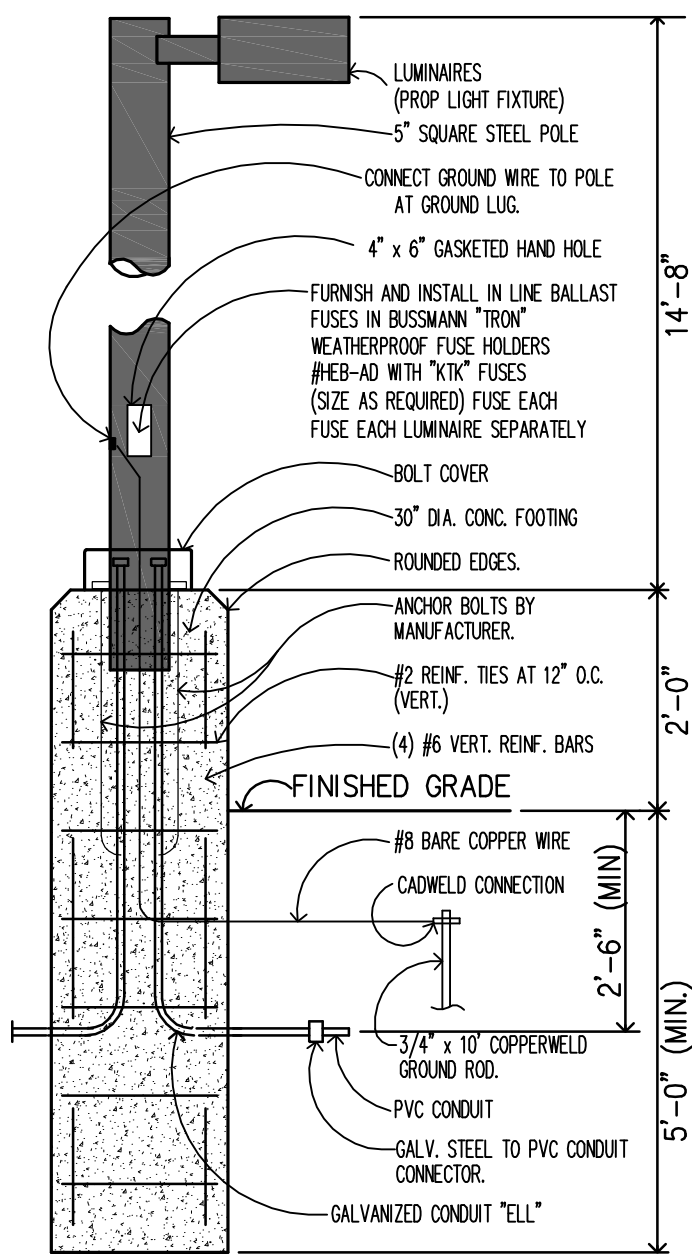


GSR WALLMOUNTED LED
LIGHT FIXTURE ON BUILDING
(33 WATT LED LIGHT)
TYPE B - 12' A.F.G.



MIRADA MEDIUM AREA LED
LIGHT FIXTURE ON POLE
(94 WATT LED LIGHT)
TYPE A - 16'-8" POLE

NOTE: ALL 14'-8" POLES TO BE MOUNTED ON CONCRETE PEDESTALS 2'-0" ABOVE GRADE, FOR A TOTAL MOUNTING HEIGHT OF 16'-8" ABOVE TOP OF PROPOSED GRADE



NOTE: THIS DESIGN IS BASED ON GOOD SOIL CONDITIONS HAVING 3,000 PSI CAPACITY OR BETTER.

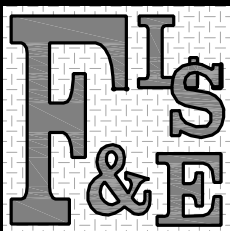
LIGHT POLE DETAIL

SCALE: 1"=20'

JOB NO. 22-317

OWNER/DEVELOPER:
BZ LAKE ORION, LLC
1822 ARROWHEAD TRAIL
OXFORD, MI 48371
ATTN: STUCKY VITALE ARCHITECTS PHONE 248.546.6700

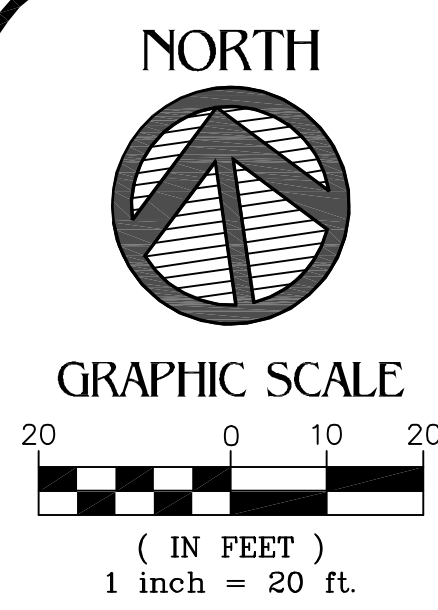
PART OF THE NORTHEAST 1/4,
SECTION 11, T4N-R10E
VILLAGE OF LAKE ORION, OAKLAND CO, MI



Fenton Land Surveying & Engineering, Inc
14165 N. FENTON ROAD, SUITE 101A, FENTON, MI 48430
PHONE: 810.354.8115 EMAIL: INFO@FENTONLSE.COM

SITE LIGHTING/PHOTOMETRIC PLAN FOR:
LAKE ORION RETAIL
DEVELOPMENT CENTER
494 S BROADWAY ST (M-24), LAKE ORION, MI 48362

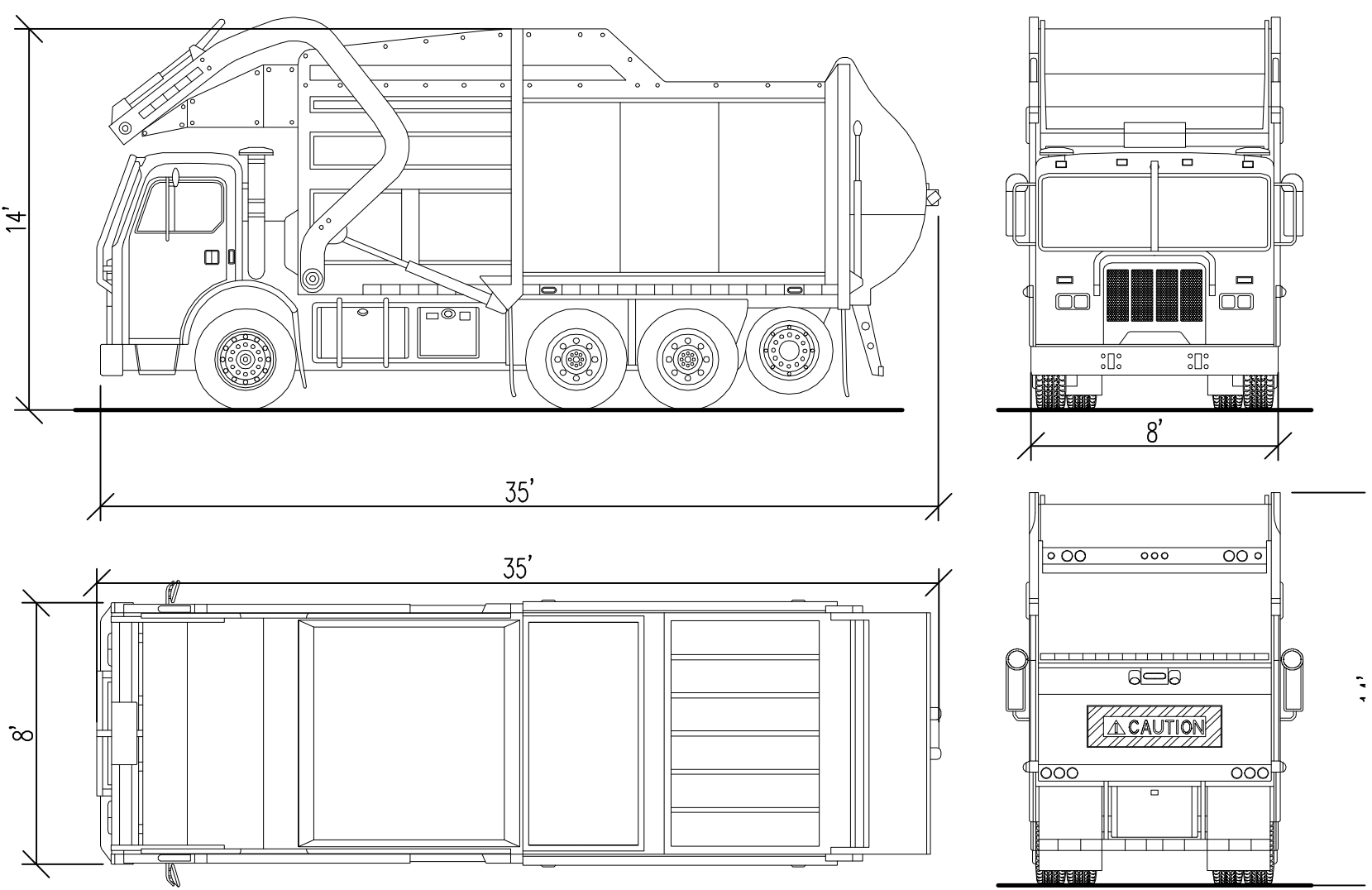
REVISIONS	DRN. BY:	J.R.B.	02.13.2023	SHEET NO:
03.14.2023	DSN BY:	J.R.B.	"	C-11
	CHK'D BY:	D.J.K.	"	
	APPR BY:	J.B.M.	"	



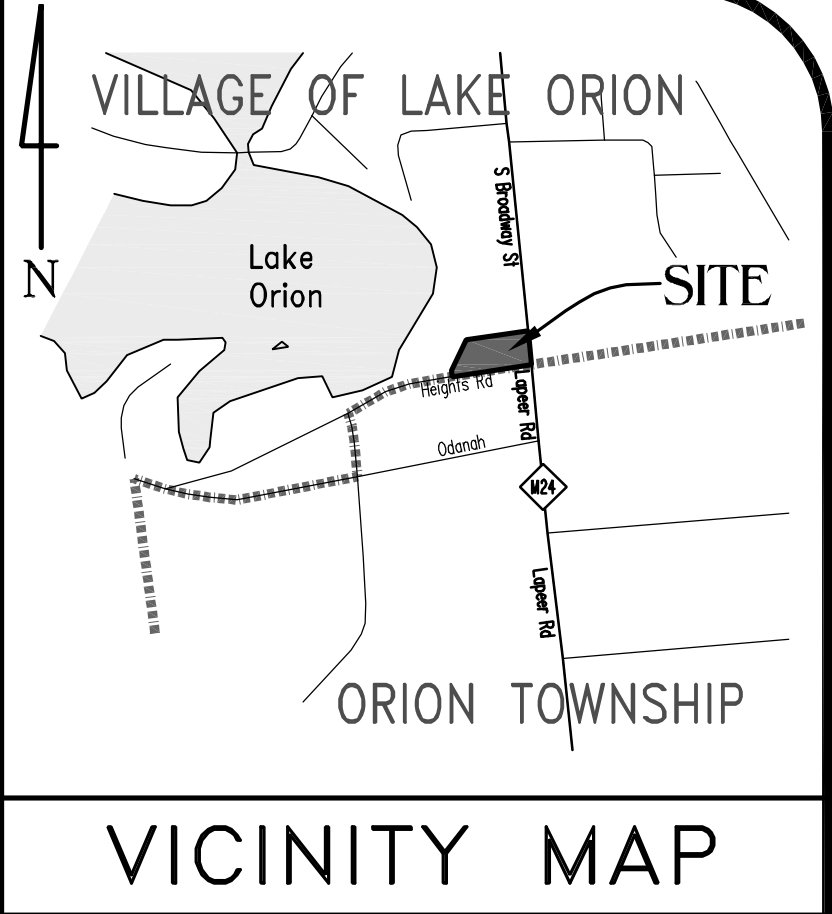
PROPERTY DESCRIPTION:

PARCEL "B", 494 S BROADWAY STREET (PER FLSE PARCEL SPLIT DRAWINGS)
PART OF THE NORTHEAST 1/4 OF SECTION 11 AND PART OF THE SOUTHEAST 1/4 OF SECTION 2, T4N-R10E,
VILLAGE OF LAKE ORION, OAKLAND COUNTY, MICHIGAN AND BEING PART OF LOT 52 AND LOT 54 THRU LOT 56
OF THE "ASSESSOR'S REPLAT OF DECKER'S ADDITION TO THE VILLAGE OF ORION AND PART OF CANANDAIGUA
CITY" AS RECORDED IN LIBER 52, PAGES 17 AND 17A OF OAKLAND COUNTY PLAT RECORDS, MORE
PARTICULARLY DESCRIBED AS: BEGINNING AT THE SOUTHEAST CORNER OF LOT 54, BEING ALSO THE SOUTHWEST
CORNER OF LOT 56 OF SAID PLAT, FROM WHICH THE EAST 1/4 CORNER OF SECTION 11, T4N-R10E, LIES
S80°07'47"W, 281.28 FEET, AND S03°11'40"E, 24.16 FEET, AND N80°07'47"E, 1,177.00 FEET; THENCE
S80°07'47"W, 170.00 FEET; THENCE N09°50'46"W, 33.98 FEET; THENCE N25°38'00"E, 142.86 FEET; THENCE
N85°49'40"E, 163.97 TO A POINT ON THE WEST RIGHT OF WAY LINE OF M-24 AS WIDENED (89.00 FEET WIDE);
THENCE S04°10'20"E, 126.84 FEET ALONG SAID WEST LINE OF M-24, BEING A LINE 31.00 FEET WEST OF AND
PARALLEL TO THE EAST LINE OF LOTS 52, 55 AND 56; THENCE CONTINUING ALONG SAID WESTERLY RIGHT OF
WAY LINE OF SAID M-24 AS WIDENED THE FOLLOWING TWO (2) COURSES: S85°47'13"W, 63.48 FEET, AND
S08°20'19"E, 14.05 FEET TO THE POINT OF BEGINNING, CONTAINING 0.671 ACRES OF LAND, MORE OR LESS.
SUBJECT TO ANY AND ALL EASEMENTS OR RESTRICTIONS OF RECORD

TRUCK CIRCULATION PLAN



TYPICAL GARBAGE TRUCK DETAIL



VICINITY MAP

EXISTING IMPERVIOUS ON-SITE AREA:

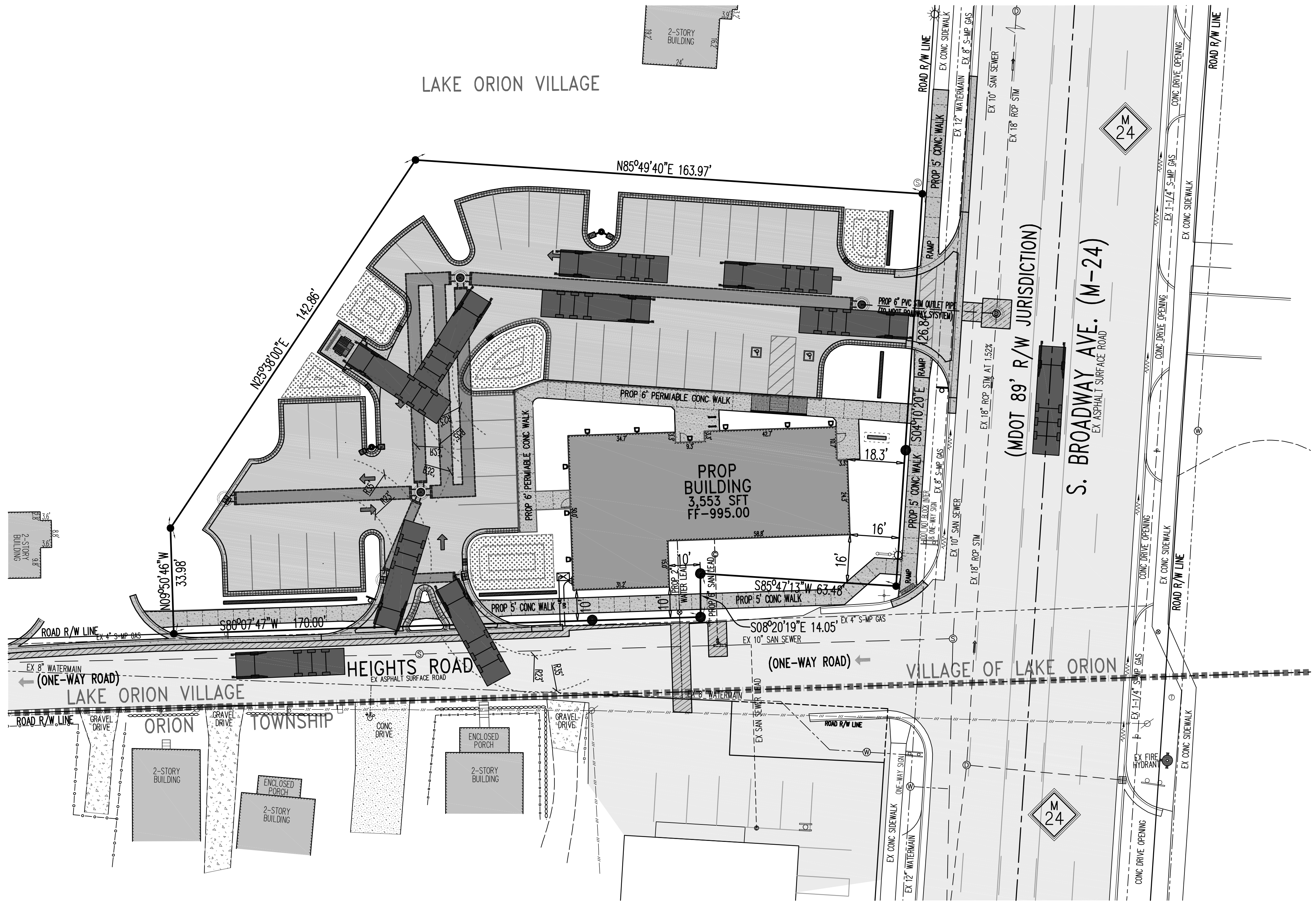
THERE IS A TOTAL OF 7,288 SFT OF IMPERVIOUS AREA
COMBINING THE EXISTING PAVEMENT AREAS, BUILDINGS,
WALKS, AND DECKS/PATIOS.

THEREFORE 7,288/29,255 = 0.2491 or 25% IMPERVIOUS

PROPOSED IMPERVIOUS ON-SITE AREA:

THERE IS A TOTAL OF 19,347 SFT OF IMPERVIOUS AREA
COMBINING THE PROPOSED ASPHALT AND CONCRETE
PAVEMENT AREAS, BUILDINGS, AND WALKS.

THEREFORE 19,347/29,255 = 0.6613 or 66% IMPERVIOUS



LEGEND

- EX ROAD SIGNS
- EX UTILITY AND/OR LIGHT POLE
- EX OVERHEAD POWERLINES
- EX STREET LIGHT POLE
- EX PEDESTAL
- EX BUILDING LINE
- EX GAS LINE
- EX GAS/ELEC METER
- EX STORM SEWER
- EX STORM MANHOLE
- EX STORM CATCHBASIN
- EX SANITARY SEWER
- EX SANITARY MANHOLE
- EX WATERMAIN
- EX FIRE HYDRANT
- EX WATER MANHOLE
- EX GATEVALVE
- EX CENTERLINE DITCH
- EX TOP OF BANK
- EX WOODS AREA
- EX TREE
- FOUND MONUMENTATION
- BACK TO BACK
- EXISTING
- EX BUILDING AREA
- EX PAVEMENT AREAS
- PROP PARKING SPACE COUNT
- PROP BARRIER FREE (ADA) PARKING
- PROP PAINTED TRAFFIC FLOW ARROW
- PROP CONCRETE AREAS
- PROP MDT ROADWAY PAVEMENT
- PROP COUNTY ROAD PAVEMENT
- PROP ASPHALT PARKING PAVEMENT
- PROP BUILDING AREA
- PROP RAIN GARDEN AREAS
- PROP SIGN
- PROP 16'-8" HIGH LIGHT POLE
- PROP BUILDING WALL PACK LIGHT (12' A.F.G.)

EXISTING ZONING INFORMATION:

ACCORDING TO THE CURRENT VILLAGE OF LAKE ORION
ZONING ORDINANCE THIS PROPERTY IS CURRENTLY
ZONED MU (MIXED USE DISTRICT), AND IS SUBJECT TO
THE FOLLOWING CONDITIONS:

- 1) MINIMUM LOT SIZE = NONE SPECIFIED
- 2) MINIMUM LOT WIDTH = 60 FEET
- 3) FRONT SETBACK = 10 FEET
- 4) SIDE SETBACK = 0 FEET
- 5) SIDE SETBACK = 10 FEET (HEIGHTS ROAD)
- 6) REAR SETBACK = 25 FEET
- 7) MAXIMUM BUILDING HEIGHT = 42 FEET
- 8) MAXIMUM LOT COVERAGE = 50%

SANITARY SEWER & WATER NOTE:

THE PROPOSED BUILDING HAS ACCESS TO AN EXISTING PUBLIC
WATERMAIN, AND AN EXISTING PUBLIC SANITARY SEWER.

FLOOD PLAIN NOTE:

THIS PROPERTY LIES IN ZONE "X" (AREAS OUTSIDE THE 0.2%
ANNUAL CHANCE FLOODPLAIN) OF THE FLOOD INSURANCE RATE
MAP COMMUNITY PANEL NO. 26125C0238F WHICH BEARS AN
EFFECTIVE DATE OF SEPTEMBER 29, 2006 AND IS NOT IN A
SPECIAL FLOOD HAZARD AREA.

WETLAND NOTE:

ACCORDING TO THE FINAL WETLAND INVENTORY MAPS OF
MICHIGAN, THERE ARE NO WETLAND AREAS ON THIS PROPERTY.

NOTE:
ANY WORK WITHIN THE OAKLAND COUNTY ROAD COMMISSION (RCOC) AND/OR
MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) RIGHT-OF-WAY
REQUIRES A ROAD RIGHT-OF-WAY PERMIT APPLICATION ISSUED. THE
CONTRACTOR MUST CONTACT THE GENESEE COUNTY ROAD COMMISSION,
PERMITS DEPARTMENT, AND SECURE THE REQUIRED PERMIT AND BOND PRIOR
TO BEGINNING CONSTRUCTION. CONTRACTOR MUST FOLLOW ALL REQUIREMENTS
IN THE PERMIT, INCLUDING THE PROPER CONSTRUCTION TRAFFIC SIGNAGE.

UTILITY STATEMENT

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND
EXISTING DRAWINGS, IF AVAILABLE. THE SURVEYOR AND/OR ENGINEER MAKES NO GUARANTEES
THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN
SERVICE OR ABANDONED. THE SURVEYOR AND/OR ENGINEER FURTHER DOES NOT WARRANT THAT
THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES
CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE.
THE SURVEYOR AND/OR ENGINEER HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.



FLSE 0085/22-317/SV-M/494 S BROADWAY-M24/TRUCK - C-12

SCALE: 1"=20'	OWNER/DEVELOPER: BZ LAKE ORION, LLC 1822 ARROWHEAD TRAIL OXFORD, MI 48371 ATTN: STUCKY VITALE ARCHITECTS PHONE 248.546.6700	PART OF THE NORTHEAST 1/4, SECTION 11, T4N-R10E VILLAGE OF LAKE ORION, OAKLAND CO, MI		Fenton Land Surveying & Engineering, Inc 14165 N. FENTON ROAD, SUITE 101A, FENTON, MI 48430 PHONE: 810.354.8115 EMAIL: INFO@FENTONLSE.COM	TRUCK CIRCULATION PLAN FOR: LAKE ORION RETAIL DEVELOPMENT CENTER 494 S BROADWAY ST (M-24), LAKE ORION, MI 48362	REVISIONS	DRN. BY:	J.R.B.	02.17.2023	SHEET NO: C-12
						03.14.2023	DSN BY:	J.R.B.	"	
							CHK'D BY:	D.J.K.	"	
							APPR BY:	J.B.M.	"	
JOB NO. 22-317										

M-24 BUFFER STRIP LANDSCAPE REQUIREMENTS

REQUIRED LANDSCAPING:

ONE (1) DECIDUOUS TREE PER FORTY (40') FEET OF ROAD FRONTAGE (ROAD FRONTAGE = (361'))	9 TREES
TEN (10) SHRUBS PER TWENTY FIVE (25') FEET OF ROAD FRONTAGE (ROAD FRONTAGE = (361'))	144 SHRUBS

PROPOSED GREENBELT LANDSCAPING:

TOTAL CANOPY TREES PROVIDED ON SITE TO MEET BUFFER REQUIREMENTS:	9 TREES
TOTAL SHRUBS PROVIDED ON SITE TO MEET BUFFER REQUIREMENTS:	144 SHRUBS
TOTAL ORNAMENTAL GRASSES OF 36" PROVIDED ON SITE TO MEET BUFFER & RAIN GARDEN REQ.S:	180 GRASSES

9 PROPOSED CANOPY TREES
144 PROPOSED SHRUBS
180 PROPOSED GRASSES

PARKING LOT & LOADING AREA LANDSCAPE REQUIREMENTS

REQUIRED LANDSCAPING:

5% OF PARKING LOT GREATER THAN 20 SPACES TO BE GREEN SPACE. PARKING LOT IS 13,693 SF. 5% OF 13,693 SF. = 685 SF. OF GREEN SPACE	685 SF. LANDSCAPE
ONE (1) DECIDUOUS TREE PER 150 SQUARE FEET OF REQUIRED LANDSCAPE (685 SF. OF REQUIRED LANDSCAPE)	5 TREES

PROPOSED PARKING LOT LANDSCAPING:

LAWN AREA PROVIDED WITHIN PROPERTY LIMITS	1,540 SF.
LANDSCAPE BED AREA PROVIDED WITHIN PROP. LIMITS	6,689 SF.
TOTAL LANDSCAPE AREA PROVIDED WITHIN PROP. LIMITS	8,229 SF.
TOTAL DECIDUOUS TREES PROVIDED	6 TREES

6 PROPOSED TREES

LANDSCAPE
ARCHITECTUREMICHAEL J. DUL
& ASSOCIATES, INC212 DAINES STREET
BIRMINGHAM
MICHIGAN 48009P 248 644 3410
F 248 644 0819

www.mjdul.com

Lake Orion Retail Center
494 S. Broadway St.
Lake Orion, Michigan 48362

PROJECT

Landscape Development

Conceptual Landscape Plan

SHEET TITLE

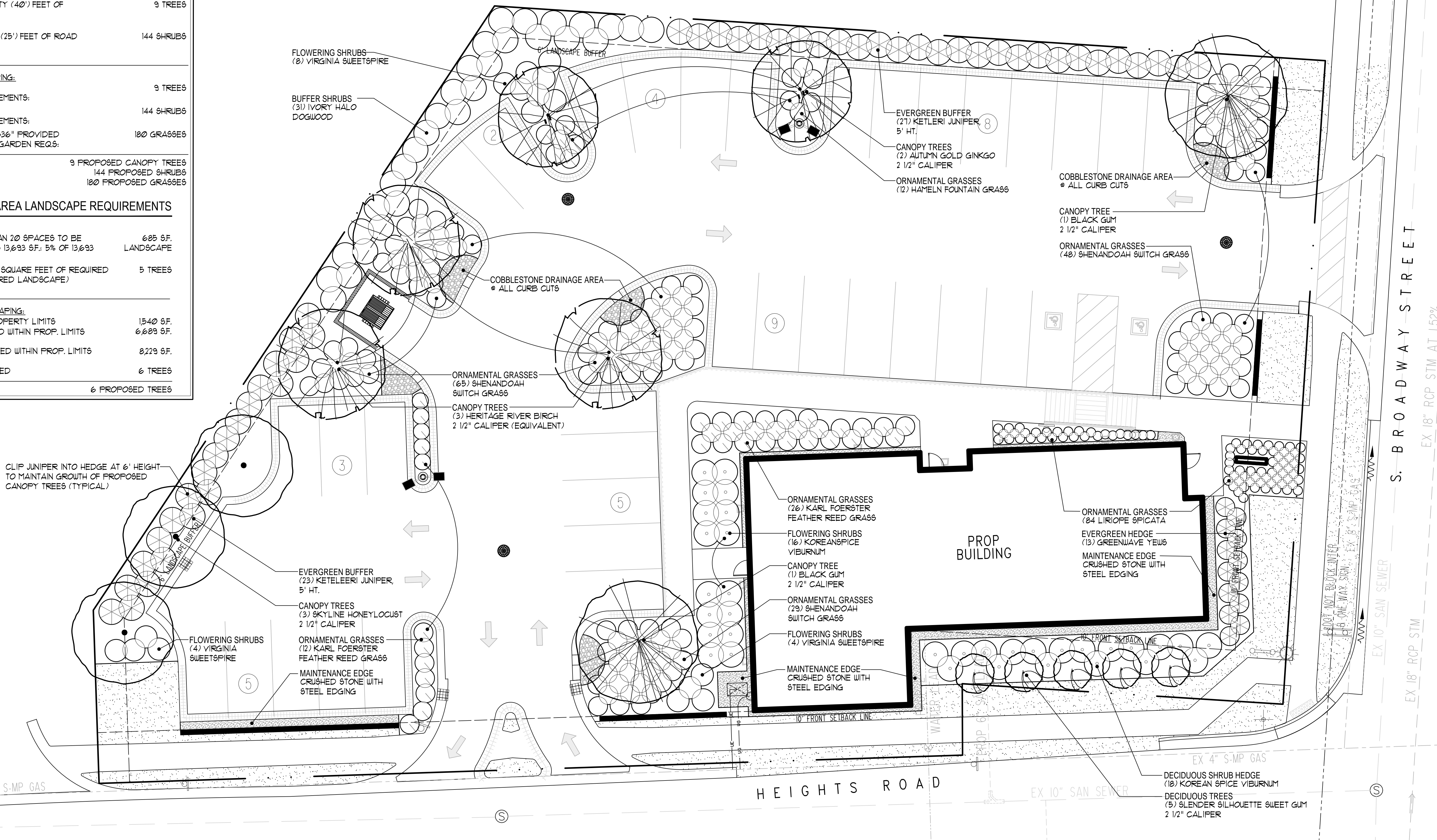


1" = 10'-0"

SCALE

PROJECT NUMBER: 22137
 DRAWN: T. Shoemaker
 CHECKED: M. Dul
 DATE: July 12, 2022 Site Plan Approval
 REVISIONS: November 10, 2022 Site Plan Approval
 February 15, 2023 Per Village Review
 March 5, 2023 Per Village Review

L1



PLANT & MATERIAL SCHEDULE

Symb.	Qty.	Botanical Name	Common Name	Size	Root	Comments
Deciduous Trees						
3		Betula nigra 'Heritage'	Heritage River Birch	2 1/2" cal.	B4B	Full uniform heads, min. 3 canes
2		Ginkgo biloba 'Autumn Gold'	Autumn Gold Ginkgo	2 1/2" cal.	B4B	Full uniform heads, single stem
3		Gleditsia tricanthos inermis 'Skyline'	Skyline Thornless Honeylocust	2 1/2" cal.	B4B	Full uniform heads, single stem
5		Liquidambar styr. 'Slender Silhouette'	Slender Silhouette Sweet Gum	2 1/2" cal.	B4B	Full uniform heads, single stem
2		Nyssa sylvatica	Black Gum	2 1/2" cal.	B4B	Full uniform heads, single stem
Shrubs						
31		Cornus alba 'Ballhalo'	Ivory Halo Dogwood	36"	Can	Min. 5 gal, space 48" o.c.
16		Itea virginica 'Henry's Garnet'	Virginia Sweetspire	36"	Can	Min. 5 gal, space 42" o.c.
50		Juniperus chin. 'Ketterli'	Ketterli Juniper	60"	Can	Min. 5 gal, space 48" o.c.
13		Taxus cuspidata 'Green Wave'	Green Wave Yew	24-30"	B4B	Space 36" o.c., clip into mass
34		Viburnum Carlesii 'Korean Spice'	Korean Spice Viburnum	30-36"	Can	Min. 5 gal, space 48" o.c.
Ornamental Grasses						
38		Calamagrostis acutiflora 'Karl Foerster'	Karl Foerster Feather Reed Grass	2 gal.	Can	Space 36" o.c.
84		Liriope spicata	Liriope Spicata	1 gal.	Can	Space 18" o.c.
142		Panicum virgatum 'Shenandoah'	Shenandoah Switch Grass	2 gal.	Can	Space 36" o.c.
12		Pennisetum alopecuroides 'Hameln'	Hameln Fountain Grass	1 gal.	Can	Space 36" o.c.

IRRIGATION NOTES

- 1.) INSTALL UNDERGROUND AUTOMATIC IRRIGATION SYSTEM FOR ALL LAWN AND PLANTING BEDS.
- 2.) USE SEPARATE ZONES FOR LAWN, DECIDUOUS SHRUBS, AND EVERGREEN SHRUBS.
- 3.) WATER SOURCED FROM CITY WATER/ BUILDING TAP
- 4.) OWNER TO DECIDE IRRIGATION CONTROLLER LOCATION.

PLANTING BED NOTES

1. ALL PLANTING BEDS SHALL INCLUDE SPECIFIED PLANTING MIX AT MINIMUM 9" DEPTH:
3 PARTS WELL DRAINED SCREENED IMPORTED TOPSOIL, TO 1 PART CLEAN SAND, TO 1 PART CANADIAN SPHAGNUM PEAT MOSS, TO 1 PART NATURAL COMPOST (WEED-FREE), AND 10% POULTRY MANURE.
2. ALL PLANTING BEDS SHALL INCLUDE SHREDDED HARDWOOD BARK MULCH (SEASONED, DARK BROWN) AT MINIMUM 4" DEPTH

LAWN SCHEDULE

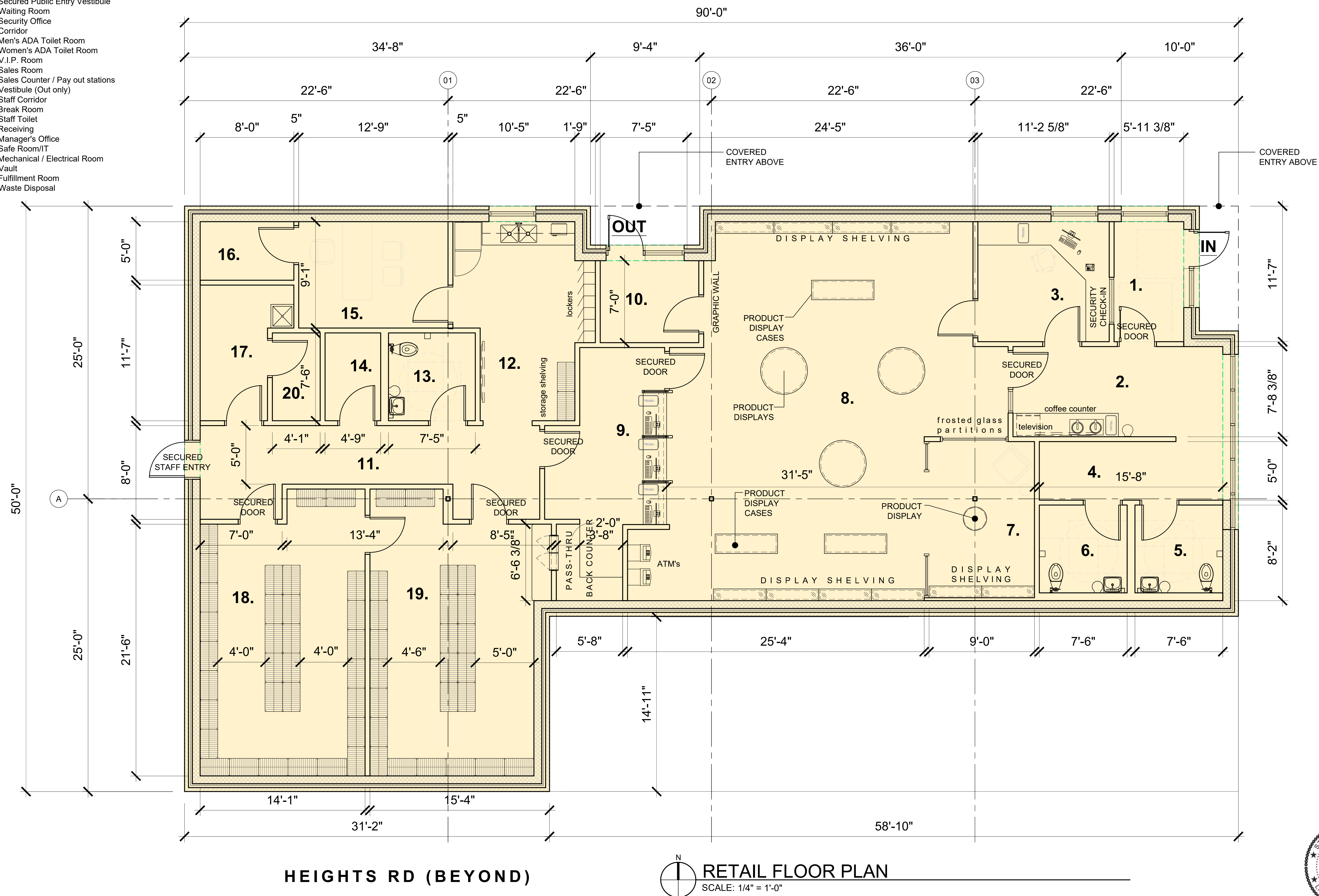
OVERALL SITE + RIGHT OF WAY
 +/- 325 S.Y.
 Supply and install Class 'A' Blended Blue Grass Seed on minimum 3" imported screened topsoil

LANDSCAPE DEVELOPMENT NOTES

- 1.) ALL EXISTING AND/OR PROPOSED SITE UTILITIES SHALL BE FIELD LOCATED, FLAGGED, AND VERIFIED PRIOR TO ANY LANDSCAPE CONSTRUCTION.
- 2.) ALL SPECIFIED AND INSTALLED PLANT MATERIAL SHALL BE IN FULL AND STRICT ACCORDANCE WITH AMERICAN NURSERYMAN STANDARDS (LATEST EDITION) AND BE:
A.) NURSERY GROWN.
B.) STATE DEPARTMENT OF AGRICULTURE INSPECTED AND APPROVED.
C.) NO. 1 GRADE WITH STRAIGHT, UNSCARRED TRUNKS & WELL-DEVELOPED UNIFORM CROWNS ON TREES.
D.) WARRANTED FOR A MIN. 1 YEAR FROM DATE OF ACCEPTANCE
- 3.) THE LANDSCAPE CONTRACTOR SHALL KEEP THE STREET AND DRIVE CLEAN AND FREE OF DIRT AND DEBRIS AT ALL TIMES, AND SHALL THOROUGHLY SWEEP AND/OR WASH THE DRIVE AT THE END OF EACH WORK DAY.
- 4.) ALL DEAD AND UNACCEPTABLE PLANT MATERIALS SHALL BE REPLACED BY THE LANDSCAPE CONTRACTOR DURING THE WARRANTY PERIOD. THE WARRANTY PERIOD SHALL BE ONE (1) YEAR FROM THE ACCEPTANCE OF INSTALLATION.
- 5.) PRUNING SHALL BE MINIMAL AT THE TIME OF INSTALLATION, ONLY TO REMOVE DEAD OR DISEASED BRANCHES. SUBSEQUENT PRUNING SHALL ASSURE PROPER MATURATION OF PLANTS TO ACHIEVE THEIR APPROVED PURPOSE.
- 6.) LANDSCAPED AREAS AND PLANT MATERIALS SHALL BE KEPT FREE FROM REFUSE AND DEBRIS. PLANT MATERIALS, INCLUDING LAWN, SHALL BE MAINTAINED IN A HEALTHY GROWING CONDITION, NEAT AND ORDERLY IN APPEARANCE IN ACCORDANCE WITH THE APPROVED SITE PLAN / LANDSCAPE PLAN. IF ANY PLANT MATERIAL DIES OR BECOMES DISEASED, IT SHALL BE REPLACED WITH 30 DAYS WRITTEN NOTICE FROM THE CITY OR WITHIN AN EXTENDED TIME PERIOD AS SPECIFIED IN SAID NOTICE.

Know what's below.
Call before you dig.

1. Secured Public Entry Vestibule
2. Waiting Room
3. Security Office
4. Corridor
5. Men's ADA Toilet Room
6. Women's ADA Toilet Room
7. V.I.P. Room
8. Sales Room
9. Sales Counter / Pay out stations
10. Vestibule (Out only)
11. Staff Corridor
12. Break Room
13. Staff Toilet
14. Receiving
15. Manager's Office
16. Safe Room/IT
17. Mechanical / Electrical Room
18. Vault
19. Fulfillment Room
20. Waste Disposal



M-24 (BEYOND)

2020.058: LAKE ORION RETAIL DEVELOPMENT

Attachment: Site Plan Resubmittal (5811 : 494 S Broadway Site Plan Review)



2020.058

LAKE ORION RETAIL DEVELOPMENT
494 S. BROADWAY ST. (M-24)
LAKE ORION MI 48362
DRAWN BY: ZAP/MAT/JPM

CONCEPTUAL DESIGN PACKAGE

MARCH 17, 2023

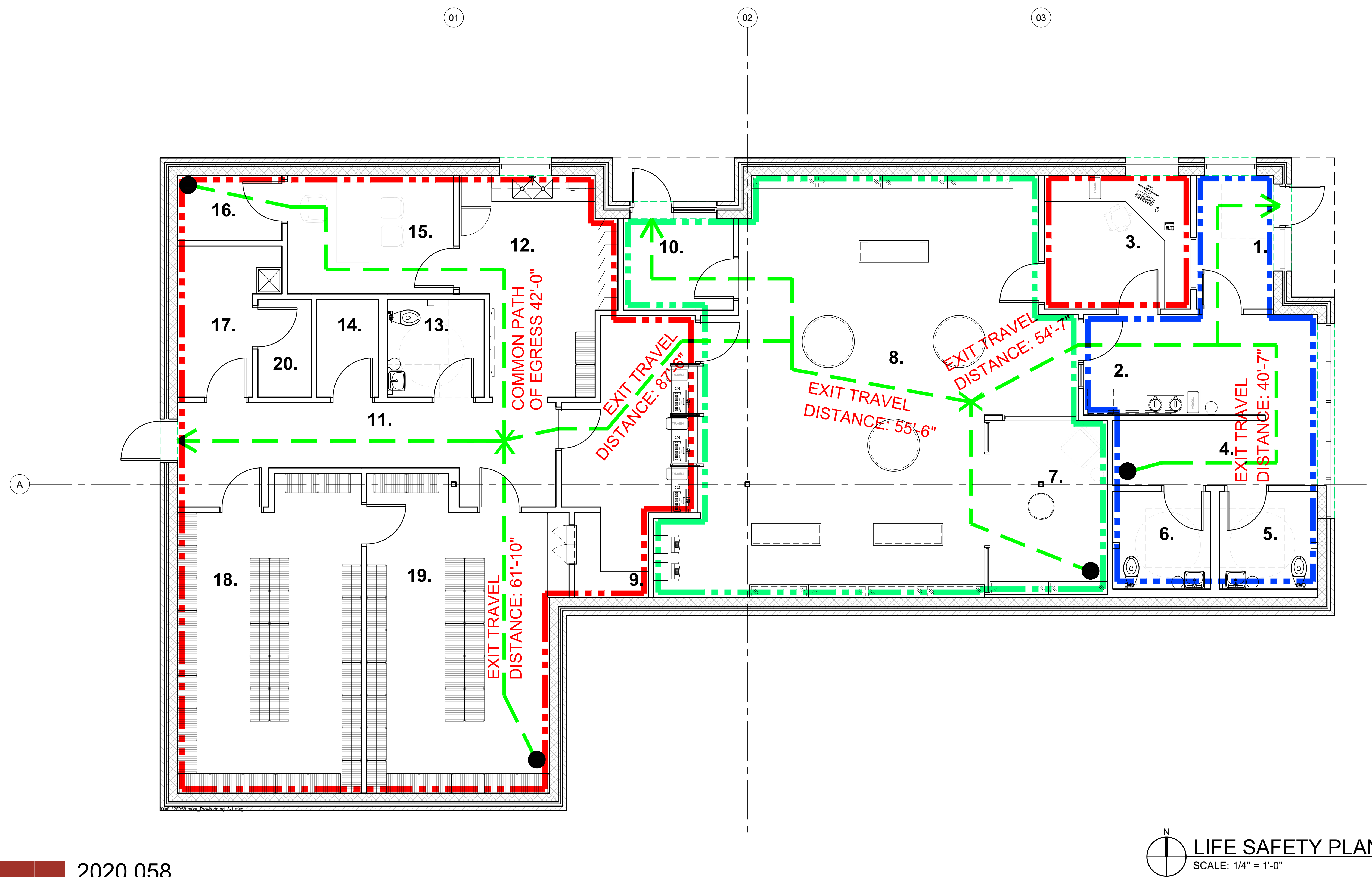
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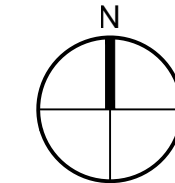


2020.058
LAKE ORION RETAIL DEVELOPMENT
494 S. BROADWAY ST. (M-24)
LAKE ORION MI 48362
DRAWN BY: ZAP/MAT/JPM

CONCEPTUAL DESIGN PACKAGE

MARCH 17, 2023



 LIFE SAFETY PLAN
SCALE: 1/4" = 1'-0"

LEGEND

LIFE SAFETY LEGEND

-  TRAVEL PATH
-  LIMITED ACCESS AREA
-  RESTRICTED ACCESS AREA
-  PUBLIC ACCESS AREA

ROOM DESIGNATIONS:

1. SECURED PUBLIC ENTRY VESTIBULE
2. WAITING ROOM
3. SECURITY OFFICE
4. CORRIDOR
5. MEN'S ADA TOILET ROOM
6. WOMEN'S ADA TOILET ROOM
7. V.I.P. ROOM
8. SALES ROOM
9. SALES COUNTER / PAY OUT STATIONS
10. VESTIBULE (OUT ONLY)
11. STAFF CORRIDOR
12. BREAK ROOM
13. STAFF TOILET
14. RECEIVING
15. MANAGER'S OFFICE
16. SAFE ROOM/IT
17. MECHANICAL / ELECTRICAL ROOM
18. VAULT
19. FULFILLMENT ROOM
20. WASTE DISPOSAL

LIFE SAFETY CODE STUDY

OCCUPANCY : MERCANTILE (M)
(AREA NOT SPRINKLED)

ALLOWABLE AREA: 12,500 SF

ACTUAL FLOOR AREA: 4,435 SF

MAXIMUM ALLOWABLE EXIT TRAVEL: 200'

MAXIMUM COMMON PATH OF EGRESS: 75'

MAXIMUM DEAD END CORRIDOR LENGTH: 50'

ALLOWABLE BUILDING HEIGHT
TYPE II-B CONSTRUCTION (NOT SPRINKLED): 55'
ACTUAL HEIGHT: 16'-8"

ALLOWABLE STORIES: 2
ACTUAL STORIES: 1

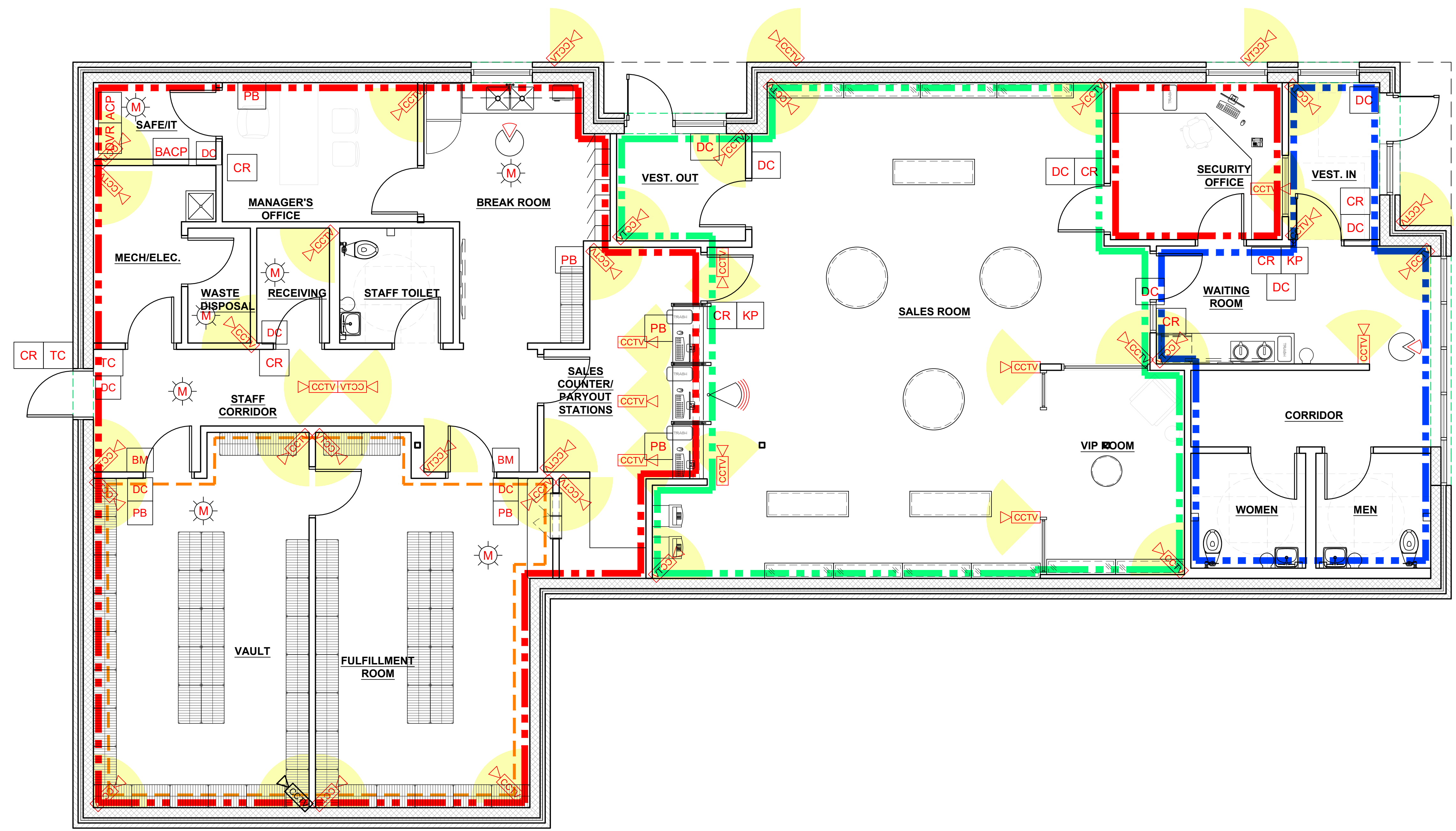




2020.058
LAKE ORION RETAIL DEVELOPMENT
494 S. BROADWAY ST. (M-24)
LAKE ORION MI 48362
DRAWN BY: ZAP/MAT/JPM

CONCEPTUAL DESIGN PACKAGE

MARCH 17, 2023



SECURITY PLAN
SCALE: 1/4" = 1'-0"

LEGEND
SECURITY DEVICES AND ACCESSORIES

SECURITY SYMBOLS (PANEL EQUIPMENT)

BACP	BURGLAR ALARM CONTROL PANEL
KP	KEY PAD
DC	DOOR CONTACT
PB	PANIC BUTTON
M	MOTION DETECTOR
[Siren Icon]	SOUNDER/ SIREN
[Glass Break Icon]	GLASS BREAK SENSOR

ACCESS SYMBOLS

ACP	ACCESS CONTROL PANEL PANEL EQUIPMENT
CR	CARD READER - STANDARD CARD READER
BM	BIOMETRIC CARD READER CARD READER
TC	TWO WAY COMMUNICATION SYSTEM CALL STATION SYSTEM INTERFACE

CCTV SYMBOLS (PANEL EQUIPMENT)

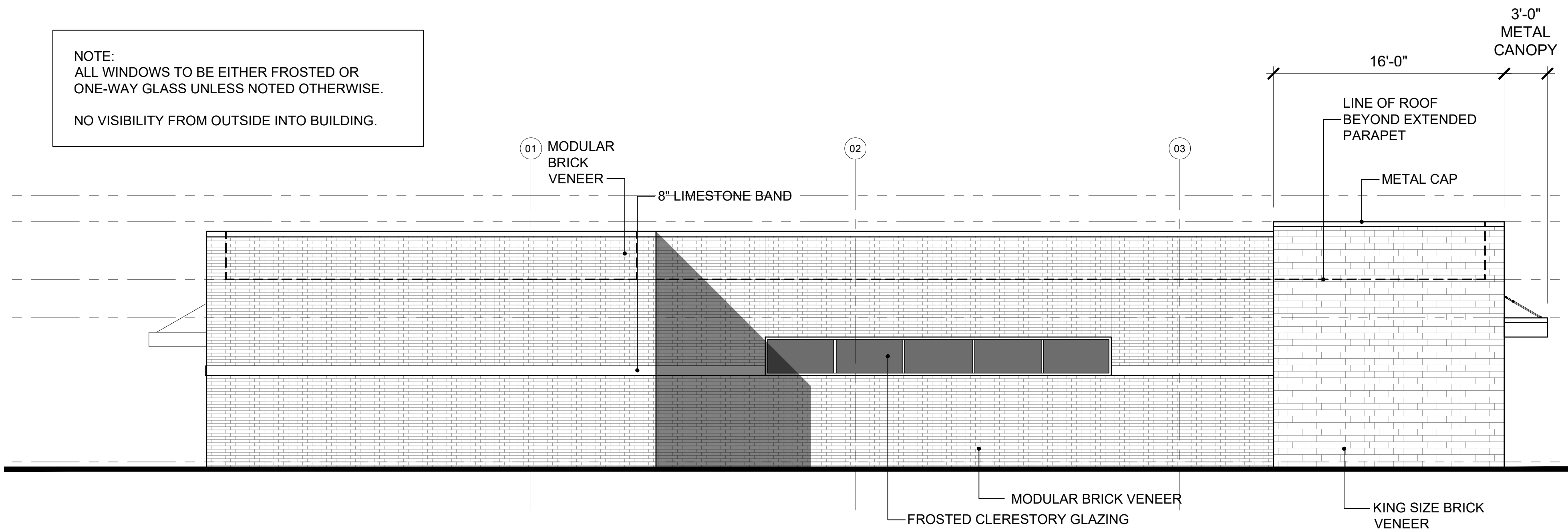
DVR	DIGITAL VIDEO RECORDER
[Camera Icon]	SECURITY CAMERA

AREA AND WALL DESIGNATIONS

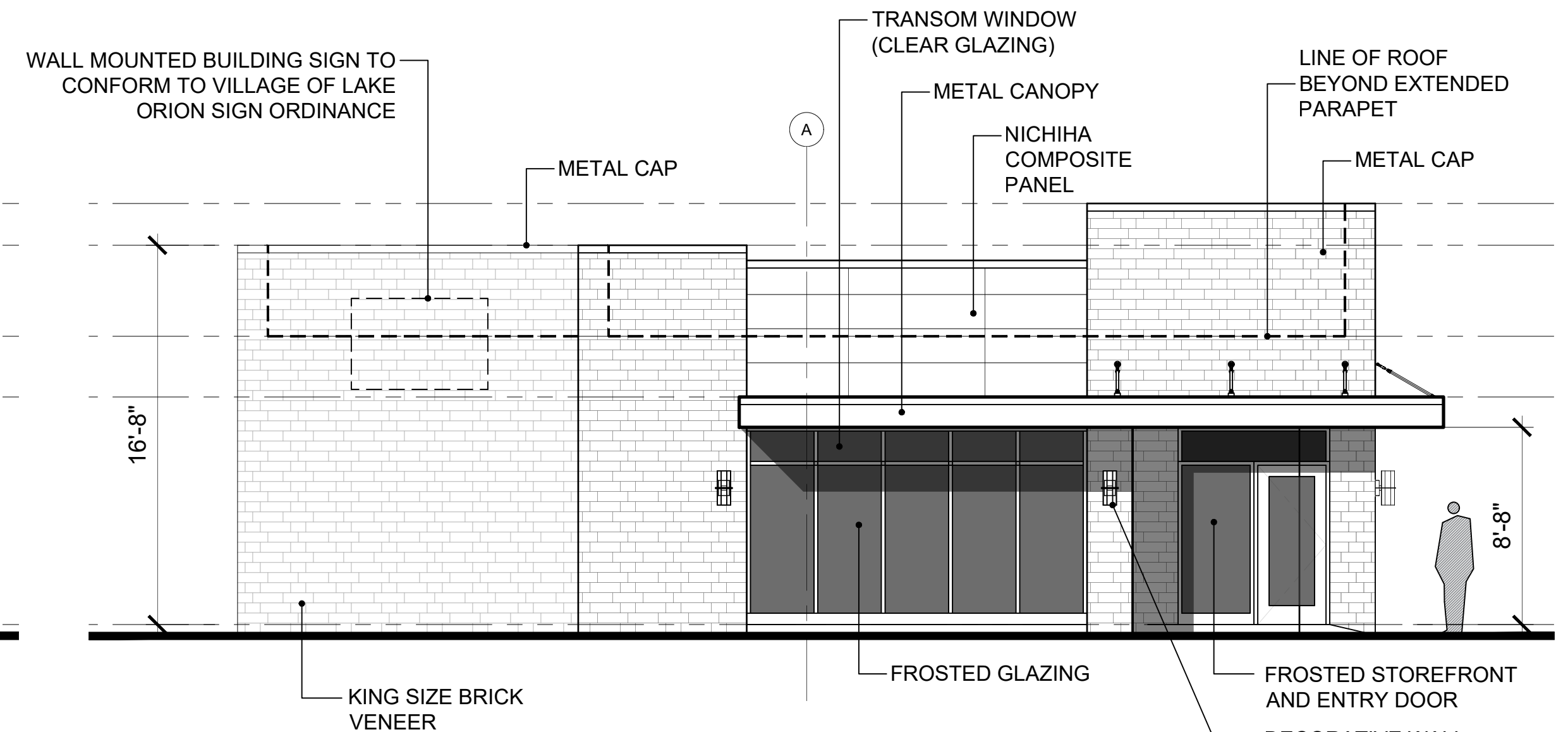
[Red Dashed Line]	LIMITED ACCESS AREA
[Green Dashed Line]	RESTRICTED ACCESS AREA
[Blue Dashed Line]	PUBLIC ACCESS AREA
[Orange Dashed Line]	INDICATES FULL HEIGHT MASONRY WALL CONSTRUCTION WITH THEFT DETERRENT HORIZONTAL AND VERTICAL REINFORCEMENT ALL AROUND AND STEEL SECURITY DOORS

JOHN A. VITALE
ARCHITECT
No. 1301029086
LICENSED ARCHITECT

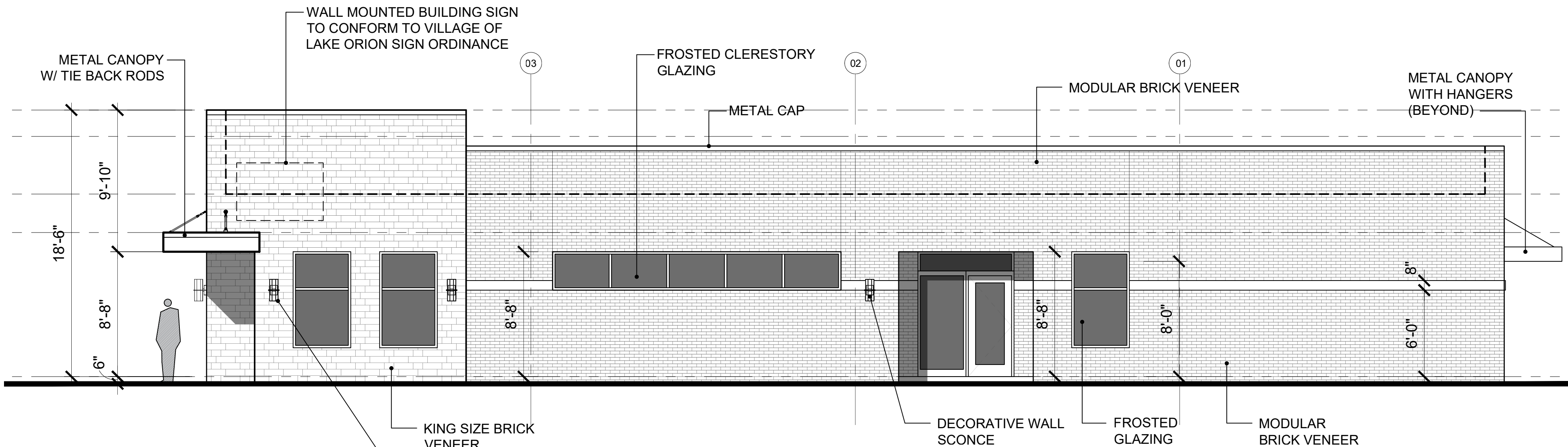
NOTE:
ALL WINDOWS TO BE EITHER FROSTED OR
ONE-WAY GLASS UNLESS NOTED OTHERWISE.
NO VISIBILITY FROM OUTSIDE INTO BUILDING.



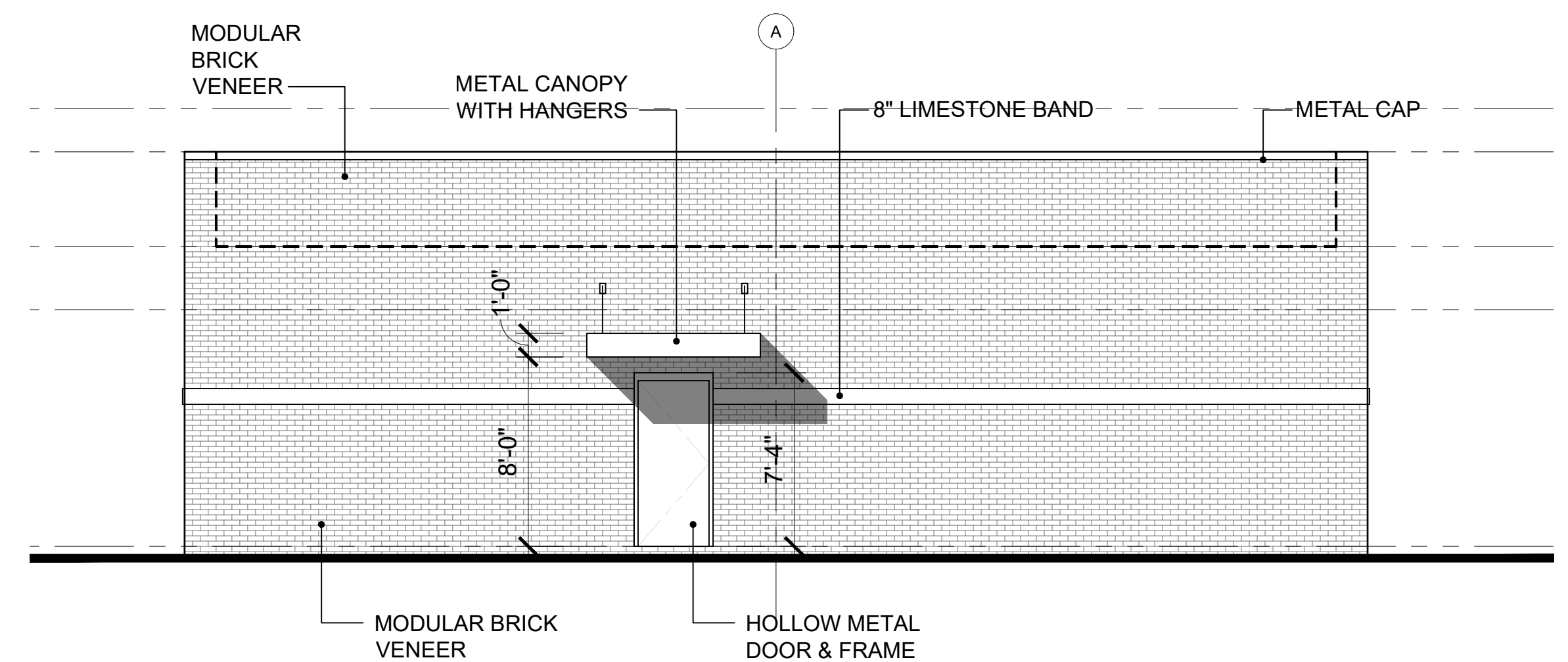
SOUTH ELEVATION (HEIGHTS RD.)
SCALE: 3/16" = 1'-0"



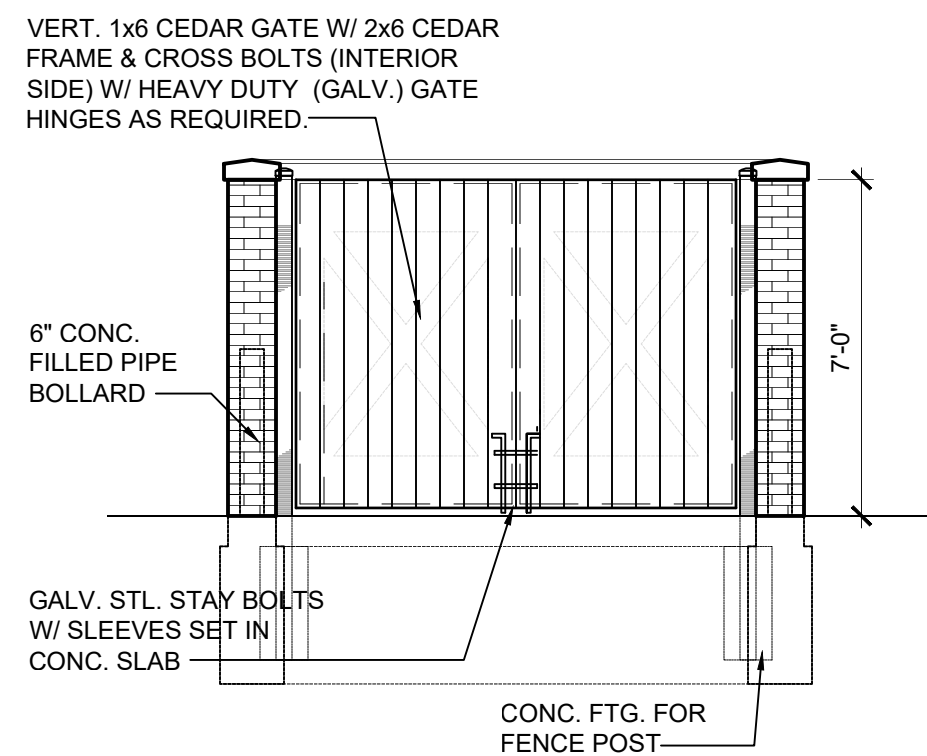
EAST ELEVATION (FRONT)
SCALE: 3/16" = 1'-0"



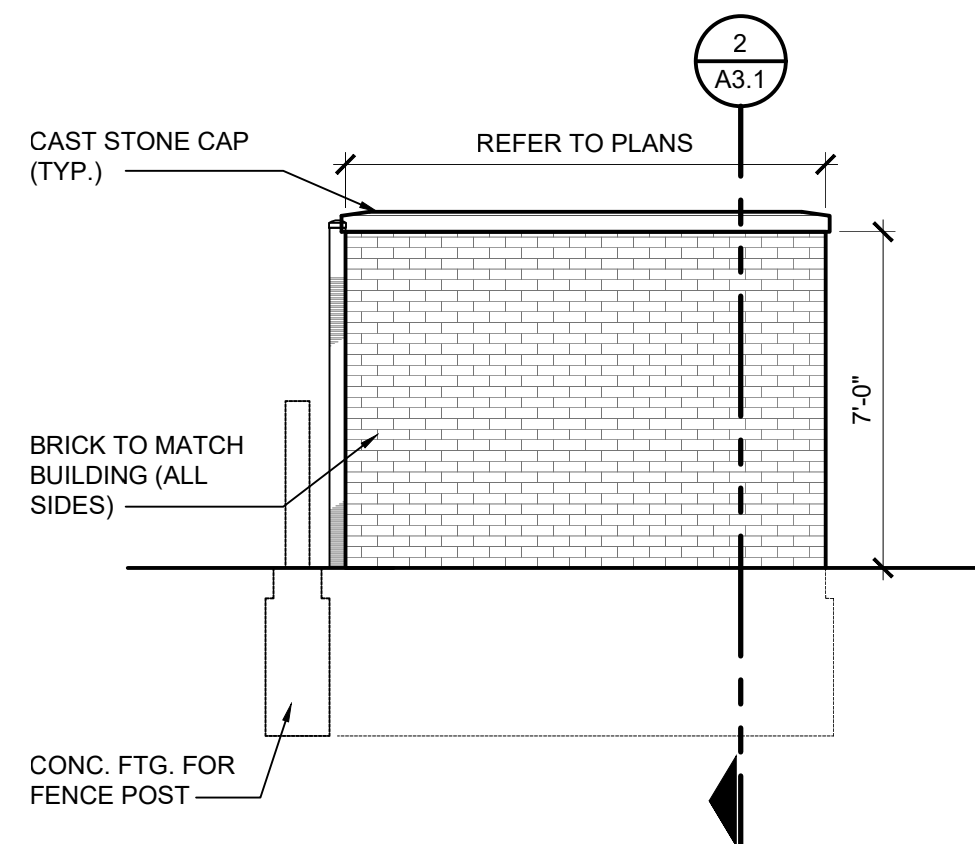
NORTH ELEVATION
SCALE: 3/16" = 1'-0"



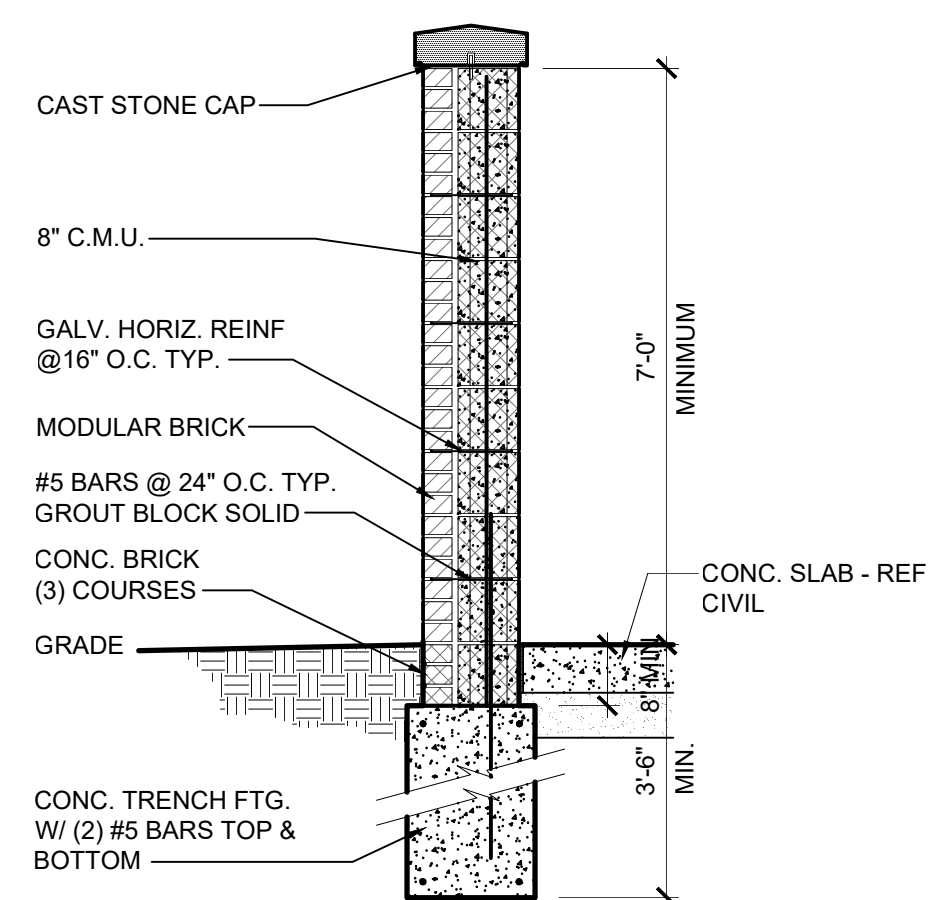
WEST ELEVATION (REAR)
SCALE: 3/16" = 1'-0"



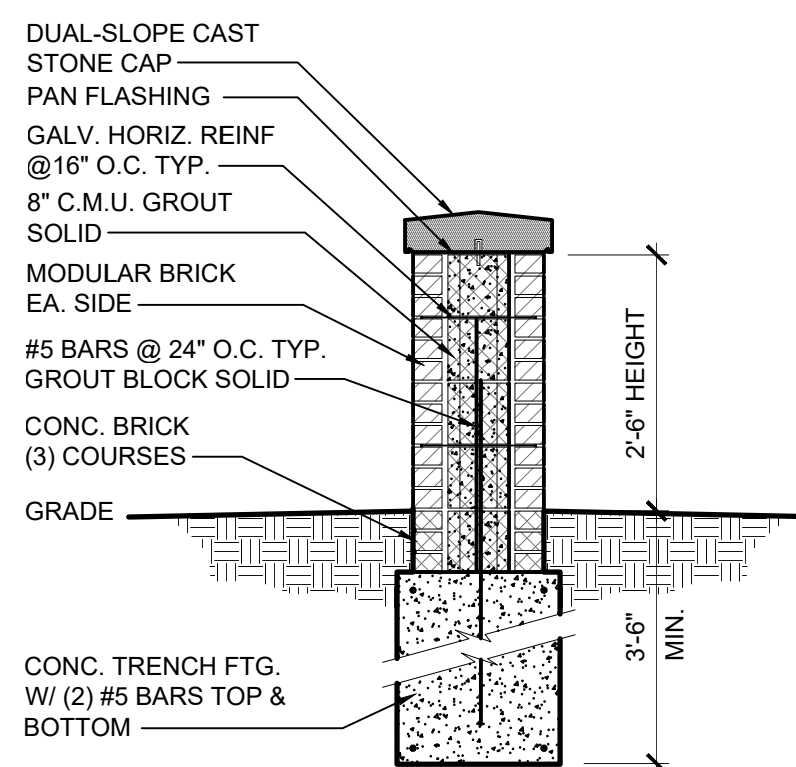
4 DUMPSTER SCREENWALL DETAIL - FRONT
SCALE: 1/4" = 1'-0"



3 DUMPSTER SCREENWALL DETAIL - SIDE
SCALE: 1/4" = 1'-0"



2 DUMPSTER SCREENWALL DETAIL - SECTION
SCALE: 1/2" = 1'-0"



1 KNEEWALL DETAIL - SECTION
SCALE: 1/2" = 1'-0"



2020.058

LAKE ORION RETAIL DEVELOPMENT
494 S. BROADWAY ST. (M-24)
LAKE ORION MI 48362
DRAWN BY: ZAP/MAT/JPM

CONCEPTUAL DESIGN PACKAGE

MARCH 17, 2023

A3.1



March 28, 2023

Darwin McClary
Village Manager
Village of Lake Orion
21 E. Church St.
Lake Orion, MI 48362

Re: Cloud Lake Orion
Site Plan Review, Third Submittal
Traffic Impact Study Review
NFE Job No. N038

Dear Mr. McClary:

We have reviewed the fourth Site Plan submittal for the above referenced site. We received a revised set of site plan drawings, totaling 19 sheets, on March 22, 2023. Our review is consistent with the requirements of Article 19 of the Zoning Ordinance, Section D – Required Information and provisions related to the zoning district of the site. Where wording is shown in bold text, it signifies specific missing information, issues for further discussion, or our recommendation to resolve the issue. We offer the following comments:

Comments remaining from Reviews #1, #2 and #3:

1. (Comment 7 first review; Comment 7 second review; Comment 2 third review) According to Article 9, Mixed-Use District, “all developments in the MU district shall permit pedestrian and vehicle cross access for adjacent MU sites.” The proposed development west and north of this site is zoned MU, and a 6’ high vinyl privacy fence is indicated along the boundary. **We note that the Planner highlighted this issue previously as well, and referenced the need for a cross-access agreement or a variance. We understand a variance may be the preferred solution.**
2. (Comment 8 first review; Comment 6 second review; Comment 3 third review) The site plan indicates an exit from the site to Heights Road. Heights Road is a one-way street. Users must execute a turn-around approximately 300 feet west of the site to return to M24. We recommend the applicant provide an opinion from a traffic consultant regarding the feasibility of the proposed traffic movements. We note that the Traffic Impact Study (TIS) submitted with Site Plan #3 application does not specifically address the U-turn issue. Additional comments regarding the TIS were provided with Review #3. The entrance is subject to the review and approval of the Road Commission for Oakland County (RCOC). **Provide documentation to confirm conceptual approval.**
3. (Comment 13 second review; Comment 5 third review) Per Zoning Ordinance provision 9.03.C.5, Common Area, “all developments in the MU district shall provide a minimum of 10% of the lot area as site amenities over and above the minimum landscape and open space requirements...” **The calculations provided do not separate the minimum areas required from the total proposed amenities. The consultant should separate out the areas of the required M-24 Buffer Strip**

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(15.02.D), the required Protective Screening Between Residential and Nonresidential uses (15.02.E), and the required Parking Lot and Loading Area Landscaping (15.02.F) from the total to show whether the required 10% of lot area over and above required minimums has been met.

4. (Comment 8 third review) While a detailed review of the proposed grading plan awaits an engineering submittal, we note that the proposed grades shown at both drive entrances are still exceedingly steep, now measuring between 4% and 8% slopes. Such steep transitions could cause vehicles to “bottom out” entering and exiting the site, creating an unsafe traffic situation. This is unlikely to be accepted by MDOT or RCOC within their rights-of-way. **This issue must be addressed when submitting plans for engineering review.**
5. (Comment 9 third review) We further note that the proposed grades along the north curb line of the parking lot will result in a 1:3 downward slope from the parking lot to the property line, minimizing the effect of the proposed landscape buffer and the adjacent property’s proposed 6’ vinyl screening fence; **functionally, the site’s proposed parking lot is just 4’ below the top of the proposed fence, not 6’.**
6. (Comment 10 third review) The steepness of the proposed grades near all three rain gardens along the property lines may negatively impact their effectiveness. Additionally, the revised preliminary grading has created a situation where some of the curb cuts intended to allow water into the rain gardens are no longer low point openings, which may cause runoff to bypass the rain gardens. **This issue must be addressed when submitting plans for engineering review.**

Comments related to Fourth Submittal:

1. We note that the existing hydrant that had been erroneously indicated directly adjacent to the southwest corner of the site has been revised to show the nearest existing hydrant on Heights Road, approximately 228 feet southwest of the property corner. **If the coverage available from the two nearest existing hydrants is acceptable to the Fire Department, we are satisfied that this issue has been resolved.**
2. A truck circulation plan has been provided in this submittal with a revised truck detail. We note that the circulation plan appears to indicate this vehicle style can maneuver through the site. **It appears the most logical route for this front-loading truck would be to enter from Heights Road and exit via Broadway Avenue.**
3. We note that the canopy trees shown within two of the proposed rain gardens have been revised from Red Pointe Maple to Sweet Gum, which is tolerant of wet soils; therefore, **this issue has been resolved.**

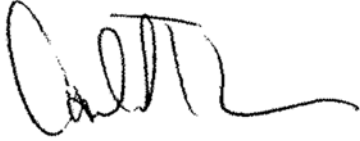
Complete Engineering Plans meeting the requirements of Ordinance Chapter 151, Design and Construction Standards must be submitted for review, and no construction shall begin prior to engineering approval.

Issues related to the proposed grading (Comments 4 and 6) may be addressed at the time of engineering submittal and the remaining issues can be reviewed administratively. We therefore recommend approval of the site plan subject to the remaining comments. If you have any questions, please do not hesitate to call.

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Sincerely,

Nowak & Fraus Engineers



Carol P. Thurber, PE, CFM

Cc: Laura Haw, McKenna
Wes Sanchez, Director, Lake Orion DPW
Harold Rossman, Chief of Police, Lake Orion
Jeffrey Williams, Fire Marshall, Orion Township
David Goodloe, Building Official, Orion Township
Susan Galeczka, Clerk, Lake Orion

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Attachment: N038 LT-04 Site Plan Review 4 (5811 : 494 S Broadway Site Plan Review)