GENOA CHARTER TOWNSHIP
PLANNING COMMISSION
PUBLIC HEARING
NOVEMBER 13, 2023
MONDAY
6:30 P.M.
AGENDA

CALL TO ORDER:

PLEDGE OF ALLEGIANCE:

APPROVAL OF AGENDA:

DECLARATION OF CONFLICT OF INTEREST:

CALL TO THE PUBLIC: (*Note: The Board reserves the right to not begin new business after 10:00 p.m.)*

OPEN PUBLIC HEARING #1…Consideration of a special land use application, environmental impact assessment and site plan to allow for a proposed automatic car wash located on vacant parcel #4711-04-300-017 Latson Road, east side of Latson Road, south side of Grand River Avenue. The request is petitioned by CWP West, LLC.

A. Recommendation of Special Use Application.
B. Recommendation of Environmental Impact Assessment (10-26-23)
C. Recommendation of Site Plan (10-25-23)

OPEN PUBLIC HEARING #2…Consideration of a special land use application, environmental impact assessment and site plan to allow for a proposed multi-tenant commercial center including a drive through coffee shop and outdoor seating restaurant located on vacant parcels#:4711-04-300-017 and 4711-09-100-017 Latson Road, east side of Latson Road, south side of Grand River Avenue. The request is petitioned by Kevin Bahnam, 1015 Latson Road LLC.

A. Recommendation of Special Use Application.
B. Recommendation of Environmental Impact Assessment (10-26-23)
C. Recommendation of Site Plan (10-25-23)

OPEN PUBLIC HEARING #3…Consideration of a sketch plan application, environmental impact assessment and sketch plan for proposed bike trails located at the Fillmore Park. The park is located at 7075 McClements, northwest corner of McClements and Kellogg Roads. The request is petitioned by the Livingston County Planning Department.

A. Recommendation of Environmental Impact Assessment (10-25-23)
B. Disposition of Site Plan. (10-25-23)

OPEN PUBLIC HEARING #4… Consideration of a site plan application, environmental impact assessment and site plan for additional parking at the Woodland Village senior living facility located at 7533 Grand River Avenue, Brighton located on the north side of Grand River, west of Bendix.

A. Recommendation of Environmental Impact Assessment (10-16-23)
B. Disposition of Site Plan (10-23-23)

OPEN PUBLIC HEARING #5…Consideration of a site plan amendment to a previously approved site plan to allow for LED strip lighting around the existing Panda Restaurant located at 4015 Latson Road, northwest corner of Latson Road and Grand Oaks Drive. The request is petitioned by Panda Restaurant Group.

A. Disposition of Site Plan Amendment for Elevations (7-21-22)

ADMINISTRATIVE BUSINESS:

- Staff Report
- Approval of October 19, 2023 Planning Commission meeting minutes
- Member discussion
- Adjournment

*Citizen's Comments- In addition to providing the public with an opportunity to address the Township Board at the beginning of the meeting, opportunity to comment on individual agenda items may be offered by the Chairman as they are presented. Anyone speaking on an agenda item will be limited to 2 minutes.

GENOA CHARTER TOWNSHIP
Application for Site Plan Review

GENOA TOWNSHIP
OCT 04 2023
RECEIVED

TO THE GENOA TOWNSHIP PLANNING COMMISSION AND TOWNSHIP BOARD:

APPLICANT NAME & ADDRESS: CWP West, LLC, 222 E. 5th Ave. Tucson, AZ 85705
If applicant is not the owner, a letter of Authorization from Property Owner is needed.

OWNER'S NAME & ADDRESS: 1015 Latson Road LLC 29592 Beck Road, Wixom, MI 48393

SITE ADDRESS: 1015 S. Latson Road, Howell, MI 48843 PARCEL #(s): 4711-04-300-017

APPLICANT PHONE: (206) 664-1303 OWNER PHONE: (248) 767-5337

OWNER EMAIL: kbahnam@usa2goquickstores.com

LOCATION AND BRIEF DESCRIPTION OF SITE: Site is located on east side of Latson Rd just south of Grand River Avenue. Site is currently a vacant, cleared site. Site is immediately south of existing O'Reilly Auto Parts store at the intersection.

BRIEF STATEMENT OF PROPOSED USE: Proposed use is an automatic car wash with vacuum cleaning stations.

THE FOLLOWING BUILDINGS ARE PROPOSED: An automatic car wash building approximaely 5,432 sft in footprint.

I HEREBY CERTIFY THAT ALL INFORMATION AND DATA ATTACHED TO AND MADE PART OF THIS APPLICATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: [signature]

ADDRESS: 29592 Beck Rd, Wixom MI 48393

Contact Information - Review Letters and Correspondence shall be forwarded to the following:

1.) Scott Tousignant (Name) of Boss Engineering (Business Affiliation) at scottt@bosseng.com (E-mail Address)

FEE EXCEEDANCE AGREEMENT

As stated on the site plan review fee schedule, all site plans are allocated two (2) consultant reviews and one (1) Planning Commission meeting. If additional reviews or meetings are necessary, the applicant will be required to pay the actual incurred costs for the additional reviews. If applicable, additional review fee payment will be required concurrent with submittal to the Township Board. By signing below, applicant indicates agreement and full understanding of this policy.

SIGNATURE: _____ DATE: 10-2-23

PRINT NAME: Karam Bahnam PHONE: 248-767-5337

ADDRESS: 29592 Beck Rd, Wixom MI 48393

GENOA CHARTER TOWNSHIP
Special Land Use Application

GENOA TOWNSHIP
OCT 04 2023
RECEIVED

This application **must** be accompanied by a site plan review application and the associated submittal requirements. (The Zoning Official may allow a less detailed sketch plan for a change in use.)

APPLICANT NAME & ADDRESS: CWP West, LLC , 222 E. 5th Ave. Tucson, AZ 85705
Submit a letter of Authorization from Property Owner if application is signed by Acting Agent.

APPLICANT PHONE: (206) 664-1303 EMAIL: nkastern@mistercarwash.com

OWNER NAME & ADDRESS: 1015 Latson Road LLC, 29592 Beck Rd, Wixom, MI 48393

SITE ADDRESS: 1015 S Latson Rd, Howell, MI 48843 PARCEL #(s): 4711-04-300-017

OWNER PHONE: (248) 767-5337 EMAIL: kbahnam@usa2goquickstores.com

Location and brief description of site and surroundings:
Site is located on the East side of South Latson road, just South of Grand River Ave. The site is currently vacant. The site is zoned GCD with HDR and GCD to the east, GCD to the north, and NRPUD to the south and west. Site is immediately south of the existing O-Reilly Auto Parts on the south side of the Latson and Grand River Ave intersection. The site is currently vacant with tall grasses.

Proposed Use:
The proposed use will be an automatic automobile wash with supporting vacuum cleaning stations.

Describe how your request meets the Zoning Ordinance General Review Standards (section 19.03):

a. Describe how the use will be compatible and in accordance with the goals, objectives, and policies of the Genoa Township Comprehensive Plan and subarea plans, and will promote the Statement of Purpose of the zoning district in which the use is proposed.

The proposed use will still have commercial identity and promote internal revenue and jobs within the Township. The site is currently vacant and the proposed development will provide a nice landscaped corridor along the east side of Latson as the site is currently vacant and cleared land.

b. Describe how the use will be designed, constructed, operated, and maintained to be compatible with, and not significantly alter, the existing or intended character of the general vicinity.

The proposed car wash will be designed, constructed, operated, and maintained to be compatible with the surrounding GCD zoned parcels. A large existing berm buffers to the HDR zoning to the east and additional plantings will be added to the east property line. A car wash is appropriate in this location given its proximity to the access points to I-96 on Latson Road. All surrounding uses are commercial uses with the exception of the HDR zoning to the rear of the property.

c. How will the use be served adequately by essential public facilities and services such as highways, streets, police and fire protection, drainage structures, water and sewage facilities, refuse disposal and schools?

The site has access from Latson Road and will have proposed cross access to an adjacent development to the south. Public water is available at the rear of the parcel and existing santiary leads are stubbed for this vacant site. The site will be designed to accommodate fire truck circulation and will have adequate signing to promote vehicular and pedestrian safety. Continuation of the 8' wide sidewalk along Latson Road will be completed along the frontage.

d. Will the use involve any uses, activities, processes, or materials potentially detrimental to the natural environment, public health, safety, or welfare by reason of excessive production of traffic, noise, vibration, smoke, fumes, odors, glare, or other such nuisance? If so, how will the impacts be mitigated?

The proposed use will provide adequate stacking spaces and parking on the site to ensure no impact on traffic on Latson Road. The use will contain additional landscaping at the rear of the property for additional screening to HDR zoning. The site lighting will be designed for compliance with Twp Ordinance to ensure no excess lighting. The site will not generate odors, smoke, fumes, or vibration.

e. Does the use have specific criteria as listed in the Zoning Ordinance (sections 3.03.02, 7.02.02, & 8.02.02)? If so, describe how the criteria are met.

7.02.02 (l) 1. The use will only have 1 ingress driveway to Latson Road. 2) A landscaped berm currently exists on the property to the east. The development proposes additional landscape plantings ILO of a wall as the wall will be screened by the berm. 3) The washing facilities are enclosed within the building. 4) Vacuuming is not located in the required front yard and is 50+ ft from the HDR zoning. 5) Adequate stacking spaces are provided prior to entry into the automatic car wash and adequate drive aisles not in street ROW.

I HEREBY CERTIFY THAT ALL INFORMATION AND DATA ATTACHED TO AND MADE PART OF THIS APPLICATION ARE TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I AGREE TO DESIGN, CONSTRUCT AND OPERATE, AND MAINTAIN THESE PREMISES AND THE BUILDINGS, STRUCTURES, AND FACILITIES WHICH ARE GOVERNED BY THIS PERMIT IN ACCORDANCE WITH THE STATED REQUIREMENTS OF THE GENOA TOWNSHIP ZONING ORDINANCE, AND SUCH ADDITIONAL LIMITS AND SAFEGUARDS AS MAY BE MADE A PART OF THIS PERMIT.

THE UNDERSIGNED Kevin Bahnam, 1015 Latson Road LLC STATES THAT THEY ARE THE FREE OWNER OF THE PROPERTY OF PROPERTIES DESCRIBED ABOVE AND MAKES APPLICATION FOR THIS SPECIAL LAND USE PERMIT.

BY: _____

ADDRESS: 29592 Beck Rd, Wixom MI 48393

Contact Information - Review Letters and Correspondence shall be forwarded to the following:

Scott Tousignant	of Boss Engineering	at scottt@bosseng.com
Name	Business Affiliation	Email

FEE EXCEEDANCE AGREEMENT

As stated on the site plan review fee schedule, all site plans are allocated two (2) consultant reviews and one (1) Planning Commission meeting. If additional reviews or meetings are necessary, the applicant will be required to pay the actual incurred costs for the additional reviews. If applicable, additional review fee payment will be required concurrent with submittal to the Township Board. By signing below, applicant indicates agreement and full understanding of this policy.

SIGNATURE: _____ DATE: 10-2-23

PRINT NAME: Karan Bahnam PHONE: 248-767-5337

Revised 08-15-13, kasp

GENOA TOWNSHIP

OCT 04 2023

RECEIVED

Letter of Authorization

I, Kevin Bahnam 1015 Latson Road LLC, whose address is 29592 Beck Road, Wixom, MI 48393, Owner of the parcel located at 1015 S. Latson Road, Howell MI 48843 whose parcel ID is 4711-04-300-017 does hereby authorize CWP West, LLC, whose address is 222 E. 5th Ave, Tucson, AZ 85705, to make application for development on the aforementioned parcel.

Owner Signature: Kevin Bahnam, USA 2 Go Quick Stores

10-2-23

Date

2911 Dorr Road
Brighton, MI 48116
810.227.5225
810.227.3420 fax
genoa.org

NOTICE OF PUBLIC HEARING – NOVEMBER 13, 2023
(SPECIAL USE)

October 27, 2023

To Whom It May Concern:

Please be advised that the Planning Commission of Genoa Charter Township will conduct a public hearing on **Monday, November 13, 2023 commencing at 6:30 p.m**. As required by state law, you are receiving this notice because you have been identified as an owner or occupant of real property within 300 feet of the subject parcels.

The property in question is located on vacant parcels# 4711-04-300-017 and 4711-09-100-004 Latson Road, east side of Latson Road, just south of Grand River Avenue. **The applicant is requesting a special use permit to allow for a proposed automatic car wash and a multi-tenant commercial building with a drive through coffee shop and restaurant with outdoor seating. This request is petitioned by CWP West, LLC and Kevin Bahnam, 1015 Latson Road LLC.**

You are invited to attend this hearing. Members of the public will be able to speak during the public hearing portions of the meeting. If, prior to the meeting, members of the public have certain questions or wish to provide input on any business that will be addressed at the meeting then such persons may contact the Planning Commissioners through email to amy@genoa.org, or by mail at 2911 Dorr Road, Brighton, Michigan 48116.

Genoa Charter Township will provide necessary reasonable auxiliary aids and services to individuals with disabilities at the meeting/hearing upon seven (7) days' notice to the Township. Individuals with disabilities requiring auxiliary aids or services should contact the Township in writing or by calling at (810) 227-5225.

Sincerely,

Amy Ruthig,
Planning Director

November 8, 2023

Planning Commission
Genoa Township
2911 Dorr Road
Brighton, Michigan 48116

Attention:	Amy Ruthig, Planning Director
Subject:	Mister Car Wash – Special Land Use and Site Plan Review #2
Location:	1015 Latson Road – east side of Latson Road, south side of Grand River Avenue
Zoning:	GCD General Commercial District

Dear Commissioners:

At the Township's request, we have reviewed the revised submittal from CWP West, LLC for development of a Mister Car Wash automatic car wash at 1015 Latson Road (plans dated 10/25/23).

A. Summary

1. **Special Land Uses (Section 19.03):**
   a. The special land use standards of Section 19.03 are generally met.
   b. In order to make favorable findings related to compatibility and impacts, the conditions of Section 7.02.02(l) need to be met to the Commission's satisfaction.
   c. We suggest the applicant restrict the hours of operation to ensure compliance with the Township's Noise Ordinance.
   d. The applicant must address any comments provided by the Township Engineer or Brighton Area Fire Authority regarding public facilities and services.
2. **Use Conditions (Section 7.02.02(l)):**
   a. Landscaping is proposed in lieu of the required 6' solid fence or wall adjacent to the residential district. The Commission may allow this substitution, though a berm is not included.
3. **Site Plan Review:**
   a. The revised building elevations are generally compliant with the standards of Section 12.01; however, the west elevation is slightly deficient in the amount of brick/stone.
   b. Building materials, design and color scheme are subject to review and approval by the Planning Commission.
   c. The proposed sidewalk easement is subject to review and approval by the Township Engineer.
   d. Consideration of the vacuum spaces as parking spaces results in excess parking that requires Planning Commission approval.
   e. The landscape plan is deficient in width for the Latson Road greenbelt and the wall/berm requirement for the easterly buffer zone.
   f. The waste receptacle details must denote the required concrete base pad.

B. Proposal/Process

The applicant proposes development of an automatic car wash on the vacant 1.48 acre site. The project includes a 5,432 square foot car wash building and 20 vacuum stations.

Table 7.02 allows automobile wases (automatic or self-serve) with special land use approval in the GCD. The request is also subject to the use conditions of Section 7.02.02(l).

Procedurally, the Planning Commission is to review the special land use, site plan, and Environmental Impact Assessment, and put forth recommendations to the Township Board following a public hearing.

Aerial view of site and surroundings (looking east)

C. Special Land Use Review

Section 19.03 of the Zoning Ordinance identifies the review criteria for Special Land Use applications as follows:

1. **Master Plan.** The Township Master Plan identifies the subject site as Mixed Use – West Grand River. This classification is states that "regional commercial uses, such as auto-oriented uses (including fast-food) are only intended at interchange uses and where otherwise currently existing along Grand River Avenue."

   The subject site is located near a major roadway intersection and within close proximity to an interchange. Furthermore, there are other auto-oriented uses (gas stations and a drive-through coffee shop) in the immediate area.

   As such, the Commission may find that the proposal is consistent with the Master Plan and Future Land Use Map.

2. **Compatibility.** Surrounding properties are primarily commercial/service in nature, though the site does abut residential zoning and land use along the south half of the east side lot line.

   The use conditions of Section 7.02.02(c), which include setbacks for vacuum stations and screening requirements, are intended to help mitigate potential impacts of car washes.

   The revised submittal includes a noise impact analysis related to the car wash dryer and vacuum stations. In summary, the analysis finds that the proposed use will not generate noise levels above 80 dB at a property line between 7AM and 10PM.

   This is in line with the Township's Noise Ordinance; however, the analysis also notes that use past 10PM will exceed the 50 dB limitation of said Ordinance. As such, we suggest the applicant restrict the hours of operation to avoid any potential issues.

3. **Public Facilities and Services.** Given that the site fronts Latson Road near Grand River Avenue and was previously developed, we anticipate that necessary public facilities and services are in place.

   However, the applicant must address any comments provided by the Township Engineer and/or Brighton Area Fire Authority related to this criterion.

4. **Impacts.** Similar to comments above, in order to make a favorable finding under this criterion, the use conditions must be met to the Commission's satisfaction.

5. **Mitigation.** If further concerns arise as part of the review process, the Township may require additional efforts to mitigate potential adverse impacts.

D. Use Conditions

Automobile washes are subject to the use requirements of Section 7.02.02(l), as follows:

1. **Only one (1) ingress/egress driveway shall be permitted on any single street.**

The site plan proposes 1 ingress/egress driveway to/from Latson Road. The site also has cross-access with the proposed development to the south.

2. **Where adjoining a residential district, a solid fence or wall six (6) feet in height shall be erected along any common lot line. Such fence or wall shall be continuously maintained in good condition. The Planning Commission may require landscaping, including a berm, as an alternative.**

A portion of the east side lot line abuts residential zoning (HDR); however, the site plan does not provide the required 6' solid fence or wall.

The landscape plan does provide the required buffer zone plantings, but does not include a wall or berm.

3. **All washing facilities shall be within a completely enclosed building.**

This standard is met.

4. **Vacuuming and drying may be located outside the building, but shall not be in the required front yard and shall be set back at least fifty (50) feet from any residential district.**

The site plan includes 20 vacuum stations in the east side yard. The stations provide 50' spacing from the adjacent residential district.

5. **All cars required to wait for access to the facilities shall be provided stacking spaces fully off the street right-of-way which does not conflict with vehicle maneuvering areas to access gasoline pumps or vacuums, and as required Article 14, Parking and Loading-Unloading Standards.**

Section 14.04 requires 15 stacking spaces. The site plan depicts 22 stacking spaces across 3 service lanes.

E. Site Plan Review

1. **Dimensional Requirements.** As noted in the table below, the proposal complies with the dimensional requirements of the GCD:

	Min. Lot Req.		Minimum Yard Setbacks (feet)				Max. Lot Coverage (%)	Max. Height
	Area (acres)	Width (feet)	Front Yard	Side Yard	Rear Yard	Parking Lot		
GCD	1	150	35	15	50	20 front 10 side/rear	35% building 75% impervious	35' 2 stories
Proposed	1.48	390	41.5	47.6 (N) 207 (S)	57.5	55 side (N) 23 side (S) 10 rear	10.3% building 71.9% impervious	35' 1 story

2. **Building Design and Materials.** The primary building materials are stone and brick with metal panels and EIFS as accents.

The revised submittal includes material calculations that generally demonstrate compliance with the standards of Section 12.01; however, the west elevation provides 72% brick/stone, while a minimum of 75% is required.

Lastly, Section 12.01 requires the use of earth tone colors. The revised submittal has reduced the amount of bright blue, though it still remains as a prominent color element (in particular for the canopy).

Building materials and colors are subject to review and approval by the Planning Commission.

3. **Pedestrian Circulation.** The site plan proposes an 8-foot wide concrete sidewalk along S. Latson. A portion of the sidewalk encroaches onto the property, though a note indicates that an easement will be provided. The easement is subject to review and approval by the Township engineering consultant.

   The plan also provides internal pedestrian circulation between the vacuum stations and building, and attendant shelter and building.

4. **Vehicular Circulation.** The site plan proposes 1 curb cut for a full turning movement driveway along S. Latson. Cross-access is also provided with the proposed development to the south.

   Our initial review letter noted potential visibility issues with cars exiting the wash and turning left towards Latson Road and cars traveling from Latson Road to the vacuum stations. In response, the applicant has indicated that pavement markings and directional signage will be added.

   Additionally, the applicant states that a "collision detection system" will be used, which will slow/stop the was progression if a vehicle is stopped at the exit.

   The proposed driveway meets the spacing requirements from the existing driveway to the north on the same side of the road, and is offset by more than 200' from the existing driveway to the north across Latson Road.

   The applicant must address any comments provided by the Township Engineer and/or the Brighton Area Fire Authority with respect to vehicular circulation.

5. **Parking.** Based on information contained in the submittal, the project requires 5 parking spaces. The site plan provides 22 vacuum station/parking spaces along the east side of the site.

   In this instance, consideration of the vacuum stations as parking spaces results in excess parking.

   More specifically, the Ordinance limits parking to 120% of the minimum requirement. In this instance, 6 spaces are allowed. As such, Planning Commission approval is required for the 22 spaces proposed.

   The design and dimensions of parking spaces and drive aisles comply with Ordinance standards.

6. **Exterior Lighting.** The lighting plan identifies 8 light poles, 4 wall mounted fixtures, 21 vacuum station fixtures, and 1 canopy fixtures.

   Based on the detail sheets, the proposed fixtures are downward direct LED, as required.

   Pole heights and photometric readings along property lines comply with Ordinance standards. The revised plan also complies with the maximum on-site lighting intensity (10 footcandles).

7. Landscaping. The landscape plan has been reviewed for compliance with the standards of Section 12.02, as follows:

Standard	Required	Proposed	Notes
Front yard greenbelt	20' width 10 canopy trees	10' to 20' width 10 canopy trees	Partially deficient in width
Buffer Zone C (N)	10' width 8 canopy trees OR 8 evergreen trees OR 30 shrubs	10' width 30 shrubs	In compliance
Buffer Zone C (S)	10' width 9 canopy trees OR 9 evergreen trees OR 35 shrubs	10' to 20' width 3 canopy trees 23 shrubs	In compliance
Buffer Zone C (E)	10' width 6 canopy trees OR 6 evergreen trees OR 24 shrubs	10' width 39 shrubs	In compliance
Buffer Zone B (E)	20' width 6' wall OR 3' berm 10 canopy trees 10 evergreen trees 40 shrubs	23' width 10 canopy trees 14 evergreen trees 40 shrubs	Deficient by wall OR berm
Parking lot	2 canopy trees 220 SF landscaped area	2 canopy trees 300+ SF landscaped area	In compliance

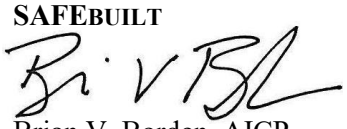
The Commission has the authority to modify landscaping requirements, per Section 12.02.13.

8. Waste Receptacle. The proposed waste receptacle has been reviewed for compliance with the standards of Section 12.04, as follows:

	Requirement	Proposed	Comments
Location	Rear yard or non-required side yard	Rear side yard	Requirement met
Access	Clear access w/ out damaging buildings/vehicles	Turning template demonstrates sufficient maneuvering area	Requirement met
Base design	9' x 15' concrete pad	Not depicted	Plans must denote required concrete base pad
Enclosure	3-sided enclosure w/ gate Masonry walls 6' height/taller than receptacle	3 sides w/ gate across 4th CMU; colors match building 8' height	Requirements met

Should you have any questions concerning this matter, please do not hesitate to contact our office.

Respectfully,
SAFEBUILT



Brian V. Borden, AICP
Michigan Planning Manager

November 8, 2023

Ms. Amy Ruthig
Genoa Township
2911 Dorr Road
Brighton, MI 48116

Re: Mister Car Wash
Site Plan Review No. 2

Dear Ms. Ruthig:

Tetra Tech conducted a second review of the proposed Mister Car Wash site plan last dated October 25, 2023. The plan was prepared by Boss Engineering on behalf of 1015 Latson Road, LLC. The development is located on two parcels with a total of 3.38 acres on the east side of Latson Road, approximately 350 feet south of the Latson Road and Grand River Avenue intersection. The Petitioner is proposing to split the site into two parcels that are being reviewed separately, and this review includes a proposed 5,432-square-foot car wash building on the proposed north parcel. The proposed improvements include a new parking lot, storm sewer, and underground detention. We offer the following comments for your consideration:

GENERAL

1. The Petitioner should obtain approval from the Livingston County Road Commission (LCRC) for the proposed site driveway prior to final site plan approval.
2. The impact assessment provides a predicted water and sewer usage based on the Township's REU table, which provides 25.2 REUs per car wash with recycle. Historic water usage was also provided from other Mister Car Wash facilities with an average usage of 21,277 gallons per day. This average water usage from similar facilities should be considered when calculating the REU amount for the proposed development.

DRAINAGE AND GRADING

1. The Petitioner is proposing a closed pipe type underground detention basin comprised of four 48-inch diameter pipes to provide 12,489 cubic feet of storage. The current car wash, site drive, and parking improvements do not allow enough space for any at-grade stormwater detention or retention.
2. The proposed underground detention basin will tie into the existing storm sewer on Latson Road. The Petitioner will need to obtain approval from the LCRC to connect to their storm sewer and said approval should be provided to the Township prior to final site plan approval. In the past, the LCRC has not allowed any increase in storm volume into their storm sewer. The underground detention design has been revised since the last submittal to allow for additional infiltration to limit the storm volume that would outlet into the LCRC sewer.

TRAFFIC AND PAVEMENT

1. The Petitioner has provided a traffic impact study for the proposed development. The study included expected traffic volumes from other proposed developments in the area in the no-build condition and recommended signal timing and length be modified at the Grand River Avenue and Latson Road for both

Tetra Tech
3497 Coolidge Road, East Lansing, MI 48823
Tel 517.316.3930 Fax 517.484.8140 www.tetratech.com

the no-build and build condition. The Livingston County Road Commission will review the traffic impact study as part of their approval for the proposed site driveways and they will need to review the recommendation of optimized signal timings at the Grand River Avenue and Latson Road intersection.

We recommend the petitioner address the above comments prior to Township approval. Please call or email if you have any questions.

Sincerely,

Shelby Byrne

Shelby Byrne, P.E.
Project Engineer

BRIGHTON AREA FIRE AUTHORITY
615 W. Grand River Ave.
Brighton, MI 48116
o: 810-229-6640 f: 810-229-1619

November 3, 2023

Amy Ruthig
Genoa Township
2911 Dorr Road
Brighton, MI 48116

RE: Mister Car Wash
1015 S. Latson Rd.
Genoa Twp., MI

Dear Amy,

The Brighton Area Fire Department has reviewed the above-mentioned site plan. The plans were received for review on October 12, 2023, and resubmitted with revisions on October 27, 2023, and the revised drawings are dated October 26, 2023. The project is based on proposed redevelopment of an existing vacant parcel for a new 5,432 square foot car wash development. The plan review is based on the requirements of the International Fire Code (IFC) 2021 edition.

1. The water main location on the submittal is at the rear of the property along with the proposed new HYD200; however, this is not conducive for firefighting operations. Relocate the hydrant 110-feet West and 25-feet South adjacent to the driveway entrance and monument sign. **(The hydrant was relocated 133 feet to the West. The new proposed location is acceptable to the fire authority.)**

   IFC 912.8

2. The building address shall be a **minimum of 6"** high letters of contrasting colors and be clearly visible from the street. The location and size shall be verified prior to installation. Provide clarification on building addressing. It is recommended that each tenant space have an individual address. **(Noted on Sheet 5 General Note 3)**

   IFC 505.1

3. Two-way emergency vehicle access roads shall be a minimum of 26-feet wide. With a width of 26-feet, one side (building side) of the drive shall be marked as a fire lane. Include additional signage along curblines at least every 50-feet. Access roads to the site shall be provided and maintained during construction. Access roads shall be constructed to be capable of supporting the imposed load of fire apparatus weighing at least 84,000 pounds, this includes over the underground retention. **(Noted on Sheet 5 General Note 6 & 7)**

   IFC D 103.6
   IFC D 103.1
   IFC D 102.1
   IFC D 103.3

4. Access around the building shall provide emergency vehicles with a turning radius of 50-feet outside and 30-feet inside. Vehicle circulation shall account for non-emergency traffic and maintain the vehicle within the boundary of lanes of travel. The entry drive radius into the parking lot must be softened to allow for proper vehicle turning and circulation. Additionally, the SW and SE corners of the development do not properly accommodate turning radius. Turning must be wall to wall as it relates to lane boundary and curblines and vehicles. This may require an increase in drive width to 32-feet to accommodate. **(Circulation has been modified**

as much as possible to accommodate emergency vehicle access. The access provided is sufficient for emergency vehicle operations as required.)

IFC 503.2.4

5. A minimum vertical clearance of 13½ feet shall be maintained along the length of all apparatus access drives. This includes but is not limited to porte-cochere's, lighting, and large canopy trees. The entire East side of the drive and on multiple landscape islands are proposed with large canopy trees that overhang the access drives. The species must be revised and approved by the township or the drive widths increased to 32-feet to allow for large canopy trees. **(Note regarding tree canopies acknowledged and symbols modified to be more accurate.)**

   IFC 503.2.1

6. A Knox box shall be installed adjacent to the main entrance of the structure, in a location coordinated with the fire authority. **(Noted on Sheet 5 General Note 4.)**

   IFC 506.1

7. During the construction process, the building will be evaluated for emergency responder radio signal strength. If coverage is found to be questionable or inadequate; the contractor or the building owner shall hire an approved contractor to conduct a grid test of the facility. If the signal strength coverage is found to be non-compliant, an approved emergency responder radio coverage system shall be provided in the building. **(Noted on Sheet 5 General Note 9)**

   IFC 510

8. Provide names, addresses, phone numbers, emails of owner or owner's agent, contractor, architect, on-site project supervisor. **(Provided on the Cover Sheet.)**

Additional comments will be given during the building plan review process (specific to the building plans and occupancy). The applicant is reminded that the fire authority must review the fire protection systems submittals (sprinkler & alarm) prior to permit issuance by the Building Department and that the authority will also review the building plans for life safety requirements in conjunction with the Building Department.

If you have any questions about the comments on this plan review please contact me at 810-229-6640.

Cordially,

Rick Boisvert, CFPS
Fire Marshal

cc: Kelly VanMarter kelly@genoa.org

GENOA TOWNSHIP IMPACT ASSESSMENT
Mister Car Wash

Prepared for:

Property Owner
1015 Latson Road LLC
Kevin Bahnam

Applicant
CWP West, LLC
Nicole Kastern

Prepared by:

Scott Tousignant, P.E.

BOSS ENGINEERING

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

October 4, 2023
Revised: October 26, 2023

DISCUSSION ITEMS

A. Name(s) and address(es) of person(s) responsible for preparation of the Impact Assessment and a brief statement of their qualifications.

Prepared by:

Scott Tousignant, P.E.
Professional Engineer/Project Manager
Boss Engineering
3121 E Grand River
Howell, MI 48843

Prepared for:

Owner:
1015 Latson Road LLC / Kevin Bahnam
29592 Beck Road
Wixom, MI 48393

Applicant:
CWP West LLC / Nicole Kastern
222 E. 5th Ave
Tucson, AZ 85705

B. Description of the site, including existing structures, man-made facilities, and natural features, all-inclusive to within 10' of the property boundary.

The project site is on parcel # 4711-04-300-017 in Section 4, Genoa Township, Livingston County, MI.

The subject site is bordered:

- On the north by the 1.14 acre +/- parcel zoned General Commercial (GCD) with an existing O'Reilly Auto Parts store.
- On the east by the 9.13 acre +/- parcel zoned General Commercial (GCD) with the Country Corners Shopping center.
- On the east and south by the 12.09 acre +/- parcel zoned High Density Residential (HDR) with the Prentis Estates Apartments. An approximately 4' tall berm is directly along the property line here on the adjacent HDR parcel and is planted with large Red and Scotch Pines ranging in size from 11" d.b.h. to 24" d.b.h. There is an additional evergreen screen just south of the berm along the east property line planted with White Cedar.
- On the west by S. Latson Road and the Non-Residential PUD shopping center with Walmart, PetSmart, Lowe's and various fast-food restaurants.
- And on the south by a proposed commercial development immediately adjacent to the subject site.

MHOG sanitary runs along the west property line and South Latson Road. MHOG water runs along the east property line in the adjacent parcel. See the Existing Conditions for locations.

The subject site is a vacant parcel of land consisting of tall, unmaintained grasses and minimal trees. There is currently one existing commercial drive approach accessing the south end of the subject property. This commercial drive will be removed and a new drive installed further to the north as per LCRC recommendations.

C. Impact on natural features: A written description of the environmental characteristics of the site prior to development, i.e., topography, soils, vegetative cover, drainage, streams, creeks or ponds.

These currently vacant parcels are flat (2-6% slopes) and covered by grass and weeds.

The soils are largely Wawasee Loam with 2 to 6% slopes. Other soils on site are Conover Loam and Washtenaw Silt Loam. The site drains via surface flow from east to west to the South Latson Road storm sewer system. No wetlands/streams/creeks or other water bodies are located on site.

D. Impact on storm water management: description of soil erosion control measures during construction.

Storm water will be managed on site and installed before any building construction. Underground storm water detention is planned with a discharge to the South Latson Road storm system and ultimately to the regional detention basin to the south at I-96. Detailed construction plans will be reviewed by the Township Engineer and the Soil Erosion Control plans will be reviewed and permit issued by the Livingston County Drain Commissioners office prior to construction commencing. Ongoing/periodic soil erosion inspections will occur per County requirements to ensure soil erosion is managed proactively.

E. Impact on surrounding land use: Description of proposed usage and other man-made facilities; how it conforms to existing and potential development patterns. Effects of added lighting, noise or air pollution which could negatively impact adjacent properties.

The proposed use on this General Commercial site includes an automatic car wash with supporting vacuum cleaning stations at the rear of the site. The proposed uses conform to existing and potential development patterns and will not negatively impact adjacent properties with added lighting, noise or air pollution. The site development will comply with Township Ordinances for lighting levels as well as noise levels. The uses proposed do not impact adjacent properties with noise, light or air pollution.

An existing berm and evergreen screening in the adjacent parcel to the north along the High-Density Residential (HDR) property line screens that use from these proposed commercial uses. Additional landscaping is proposed for the east property line to screen the HDR use. Proposed uses on this site are compatible with existing zoning and adjacent zoning on S. Latson Road. Given its proximity to the I-96/Latson interchange, a car wash use would be appropriate and consistent with surrounding land and uses.

F. Impact on public facilities and services: Description of number of residents, employees, patrons, and impact on general services, i.e., schools, police, fire.

The proposed car wash does not add additional burden on the fire and police services as the site is surrounded by similar development that already receives coverage. The uses do not add population that impacts schools. The car wash will add to Township tax revenue as the site currently sits vacant. The car wash will add approximately 16 jobs which has a positive impact on the community.

G. Impact on public utilities: description of public utilities serving the project, i.e., water, sanitary sewer, and storm drainage system. Expected flows projected in residential units.

Storm water will be detained on-site via the use of an underground detention system. The storm water will be discharge at pre-development rates to the South Latson Road storm sewer system as the site currently sheet flows into this road storm system. Detailed construction plans would be reviewed by the Township Engineer and the Soil Erosion Control permit would be reviewed and issued by the Livingston County Drain Commissioner. MHOG sanitary sewer runs along the west property line and South Latson Road. It is expected that the site will be connected to MHOG sanitary sewer along South Latson Road and MHOG water along the east property line in the adjacent parcel. The proposed car wash use does utilize a good amount of water. One method in calculating water usage is utilizing the Townships REU Factor Table (at 25.2 REU's per automated car wash with recycle). This REU count calculates to approximate average daily usage of 6,500 gpd and peak day usage of 28,000 gpd. Per water usage records at three comparable facilities for Mister Car Wash, data that spans the last year and a half for those 3 locations averages out to 21,177 gpd of daily water usage. The MHOG public water is anticipated to accommodate the use. In response to the proposed uses water usage, the Mister Car Wash facility will utilize a water recycle system. The water recycle system is outlined in Appendix A attached herein.

H. Storage or handling of any hazardous materials: Description of any hazardous materials used, stored, or disposed of on-site.

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

I. Impact on traffic and pedestrians: Description of traffic volumes to be generated and their effect on the area.

A traffic study has been performed. It is prepared under separate cover and submitted to the Township and Livingston County Road Commission. In summary of the Traffic Impact Study performed by Colliers Engineering & Design, *"With the improvements outlined below, all study network intersection and site driveways will operate acceptably, or in a manner similar or improved compared to no-build conditions during the peak hours. Optimize signal timings at the intersection of Grand River Avenue and Latson Road."*

The Livingston County Road Commission will be required to review and approve the commercial driveway approaches on South Latson Road.

J. Special provisions: Deed restrictions, protective covenants, etc.
Detroit Edison easements are located at the north end of the northern parcel.

K. Description of all sources:

- Genoa Township Zoning Ordinance
- "Soil Survey of Livingston County Michigan" Soil Conservation Services, USDA
- Traffic Impact Study by Colliers Engineering & Design dated September 15, 2023

APPENDIX A

Water Reclaim System

Reducing and Recycling Water Through the Wash Process

We take water conservation seriously with state-of-the-art technologies

Reducing Freshwater Usage Through Recycling

Implementation of our water systems reduces freshwater usage by 11%

Freshwater Use Reduced

- Freshwater usage **reduced 11%** by our water system design
- 33% of water, on average, is **recycled** during the wash process
- Sophisticated water filtration and storing systems that enable us to **recycle and reuse water** through the wash process

Environmentally Friendly

- Our proprietary cleaning products are **free of dyes**
- Concentrated proprietary chemistry **reduces plastic usage** in chemical storage
- Industry leader with installation of air gates on blower systems to **reduce energy pull** during the drying process

*It's not just about washing cars. It's about **how** we wash them. We are focused on finding smarter ways to reduce our environmental impact and be more efficient in energy usage.*

1) On average, during the wash process.
2) RO: Reverse Osmosis process of filtering water and removing total dissolved solids to create soft water.

Mister

Inspection and Maintenance Guide

Prepared for:

Mister Car Wash
1015 S. Latson Road
Howell, MI 48843

Prepared by:

BOSS Engineering
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CONTECH®
ENGINEERED SOLUTIONS

Cascade Separator® Inspection and Maintenance Guide

CASCADE
separator®

Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

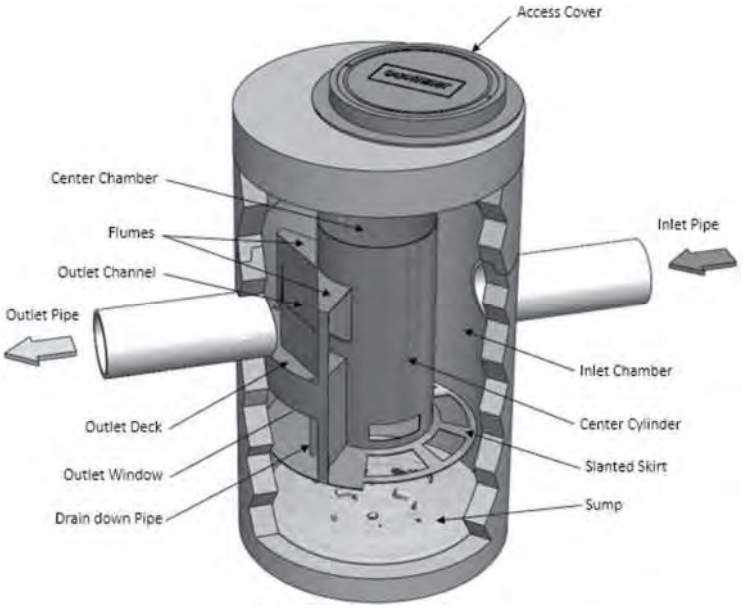
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	2.5	0.8	0.7	0.5
CS-5	5	1.3	3	0.9	1.1	0.8
CS-6	6	1.8	3.5	1	1.6	1.2
CS-8	8	2.4	4.8	1.4	2.8	2.1
CS-10	10	3.0	6.2	1.9	4.4	3.3
CS-12	12	3.6	7.5	2.3	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.

A Cascade Separator unit can be easily cleaned in less than 30 minutes.

A vacuum truck excavates pollutants from the systems.

Cascade Separator® Inspection & Maintenance Log

Cascade Model:			Location:		
Date	Depth Below Invert to Top of Sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- **Drawings and specifications are available at www.ContechES.com.**
- **Site-specific design support is available from our engineers.**

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, and earth stabilization products. For information, visit www.ContechES.com or call 800.338.1122

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www.ContechES.com

Contech® CMP Detention Inspection and Maintenance Guide

Underground stormwater detention and infiltration systems must be inspected and maintained at regular intervals for purposes of performance and longevity.

Inspection

Inspection is the key to effective maintenance of CMP detention systems and is easily performed. Contech recommends ongoing, annual inspections. Sites with high trash load or small outlet control orifices may need more frequent inspections. The rate at which the system collects pollutants will depend more on-site specific activities rather than the size or configuration of the system.

Inspections should be performed more often in equipment washdown areas, in climates where sanding and/or salting operations take place, and in other various instances in which one would expect higher accumulations of sediment or abrasive/corrosive conditions. A record of each inspection is to be maintained for the life of the system.

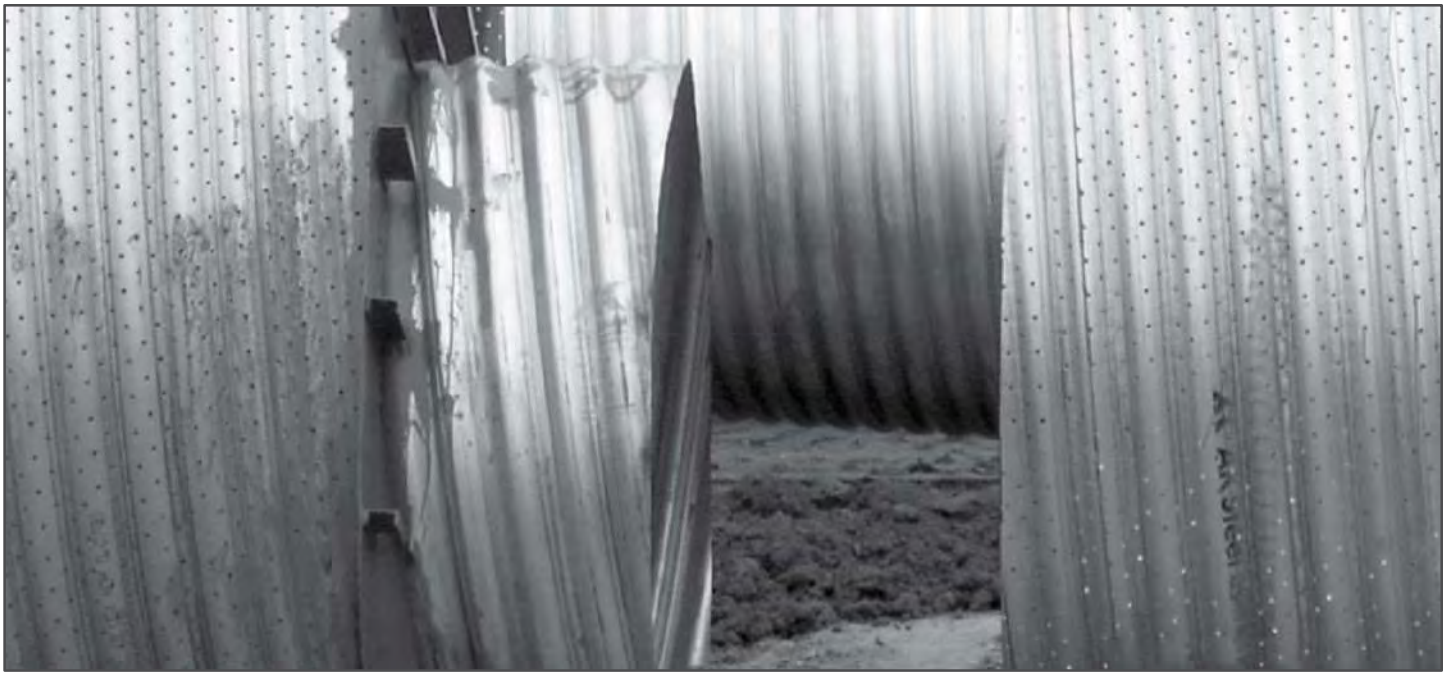
Maintenance

CMP detention systems should be cleaned when an inspection reveals accumulated sediment or trash is clogging the discharge orifice. Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities. Contech suggests that all systems be designed with an access/inspection manhole situated at or near the inlet and the outlet orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

Annual inspections are best practice for all underground systems. During this inspection if evidence of salting/de-icing agents is observed within the system, it is best practice for the system to be rinsed, including above the spring line soon after the spring thaw as part of the maintenance program for the system.

Maintaining an underground detention or infiltration system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather.

The foregoing inspection and maintenance efforts help ensure underground pipe systems used for stormwater storage continue to function as intended by identifying recommended regular inspection and maintenance practices. Inspection and maintenance related to the structural integrity of the pipe or the soundness of pipe joint connections is beyond the scope of this guide.



CONTECH® CMP DETENTION SYSTEMS

CONTECH® ENGINEERED SOLUTIONS

Colliers
Engineering
& Design

Traffic Impact Study

October 4, 2023

Latson Road Commercial Development
Genoa Township, Livingston County, Michigan

Prepared for:

Mr. Karam Bahnam
1015 Latson Road, LLC
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Colliers Engineering & Design

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Tables

Appendix

Colliers
Engineering & Design

Introduction

This report presents the methodologies, analyses, results, and recommendations of a Traffic Impact Study (TIS) for the proposed commercial development project in Genoa Township, Livingston County, Michigan. The project site is located on the east side of Latson Road approximately 500 feet south of Grand River Avenue (I-96 BL) as shown on **Figure 1** and is currently vacant. The proposed development plans include construction of a 2,950 SF coffee-shop with drive-through, 2,700, SF sit-down restaurant, 4,025 SF of general retail space, and automated car wash. Access for the development is proposed via two driveways to Latson Road. A representation of the site plan is shown on **Figure 2**.

Latson Road is under jurisdiction of the Livingston County Road Commission (LCRC); whereby access permitting will be subject to LCRC review and standards. In accordance with LCRC standards a Traffic Impact Study (TIS) is required for site access permitting and project approvals. Additionally, the project is subject to Township review and approval as part of the site plan review process.

The purpose of this study is to identify the traffic related impacts, if any, of the proposed project on the adjacent road network. This study therefore includes analysis of the site access points as well as key off-site intersections surrounding the site. Analysis of the site access points will determine appropriate lane configurations as well as traffic control to process site traffic safely and efficiently. Key off-site intersections are analyzed to determine if new site-generated traffic passing through these locations would require improvements to mitigate any impacted traffic operations.

The scope of this study was developed based on Colliers Engineering & Design (CED) knowledge of the study area, understanding of the development program, accepted traffic engineering practice, and information published by the Institute of Transportation Engineers (ITE). Additionally, CED solicited input regarding the proposed scope of work from LCRC. The study analyses were completed using Synchro and SimTraffic, Version 11 traffic analysis software and in accordance with the methodologies and practices published by ITE and the applicable requirements of LCRC and the Township. This report is intended for use by LCRC and the Township to guide decisions related to development project approvals, access permitting, and identifying future roadway improvement needs.

Latson Commercial Development
Genoa Township, MI

Figure 1
Study Area Map

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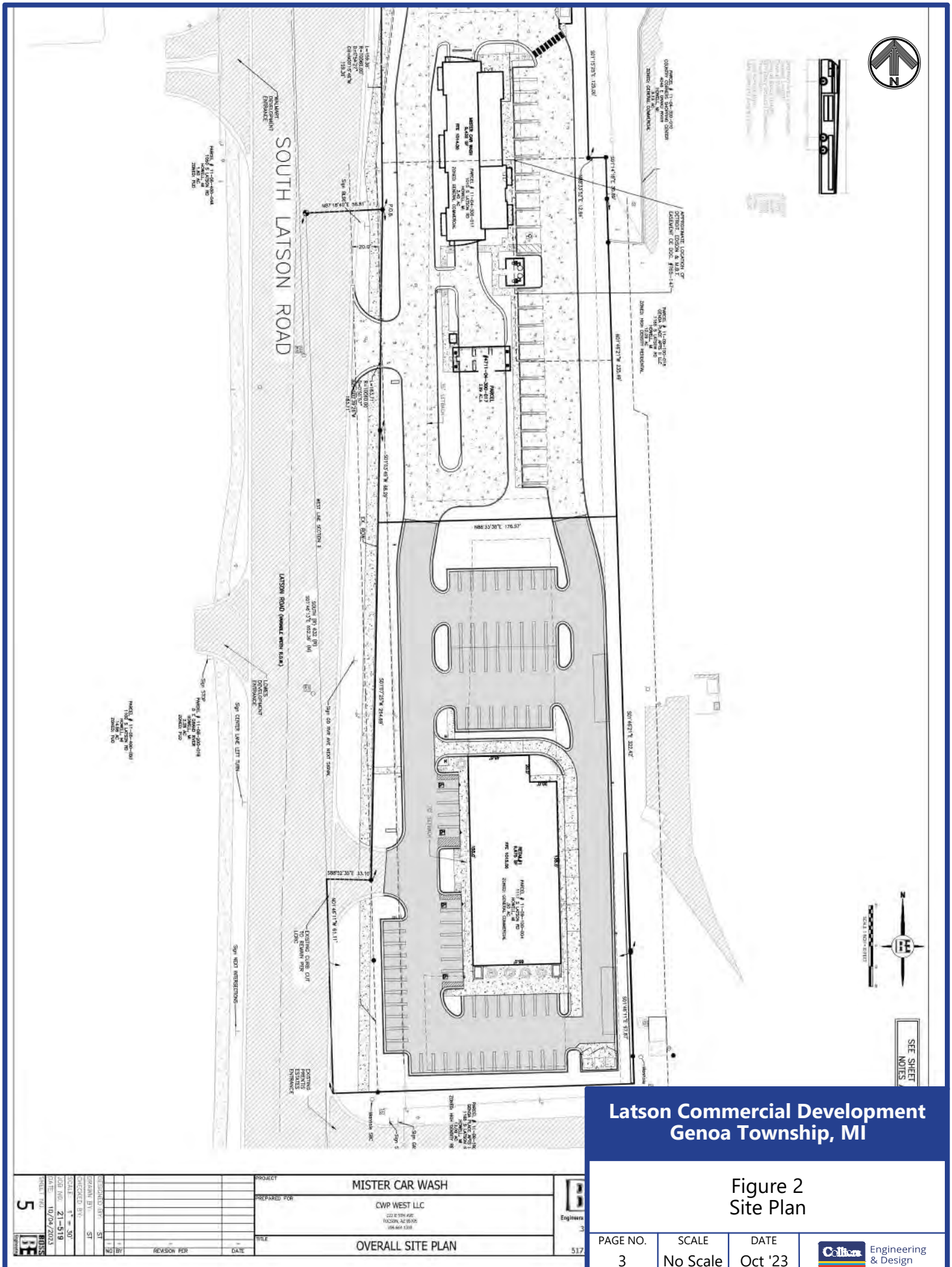

Latson Commercial Development
Genoa Township, MI

Figure 2
Site Plan

PAGE NO.	SCALE	DATE	
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Roadway Data

Road Network

Vehicle transportation for the proposed development will be provided primarily via Latson Road and Grand River Avenue. The study intersections are identified below, and further details on the study roadways are summarized in **Table 1**.

Table 1: Roadway Summary

Roadway Data	Grand River Avenue	Latson Road
Functional Class	Principal Arterial	Minor Arterial
Direction	E-W	N-S
Speed Limit (mph)	45	55
Jurisdiction	MDOT	LCRC
Cross Section	5-Lane	5-Lane
AADT	31,000	22,000
AM Peak Hour Volume	2,075	1,380
PM Peak Hour Volume	3,250	2,370

Study Intersections

Grand River Avenue & Latson Road

At the intersection of Grand River Avenue & Latson Road, all approaches have dual left-turn lanes, two through lanes, and an exclusive right-turn lane. The intersection is traffic signal controlled with leading protected only left-turn phasing, and right-turn overlap phasing provided for all approaches. Dynamic "No Turn on Red" signs are also provided for all approaches to prohibit right-turns during the opposing approaches protected left-turn phase. Vehicle and pedestrian actuation are provided for all approaches and movements and marked crosswalks are provided for crossing all legs.

Figure 3: Grand River Avenue & Latson Road Intersection

Latson Road & Grand Oaks Drive

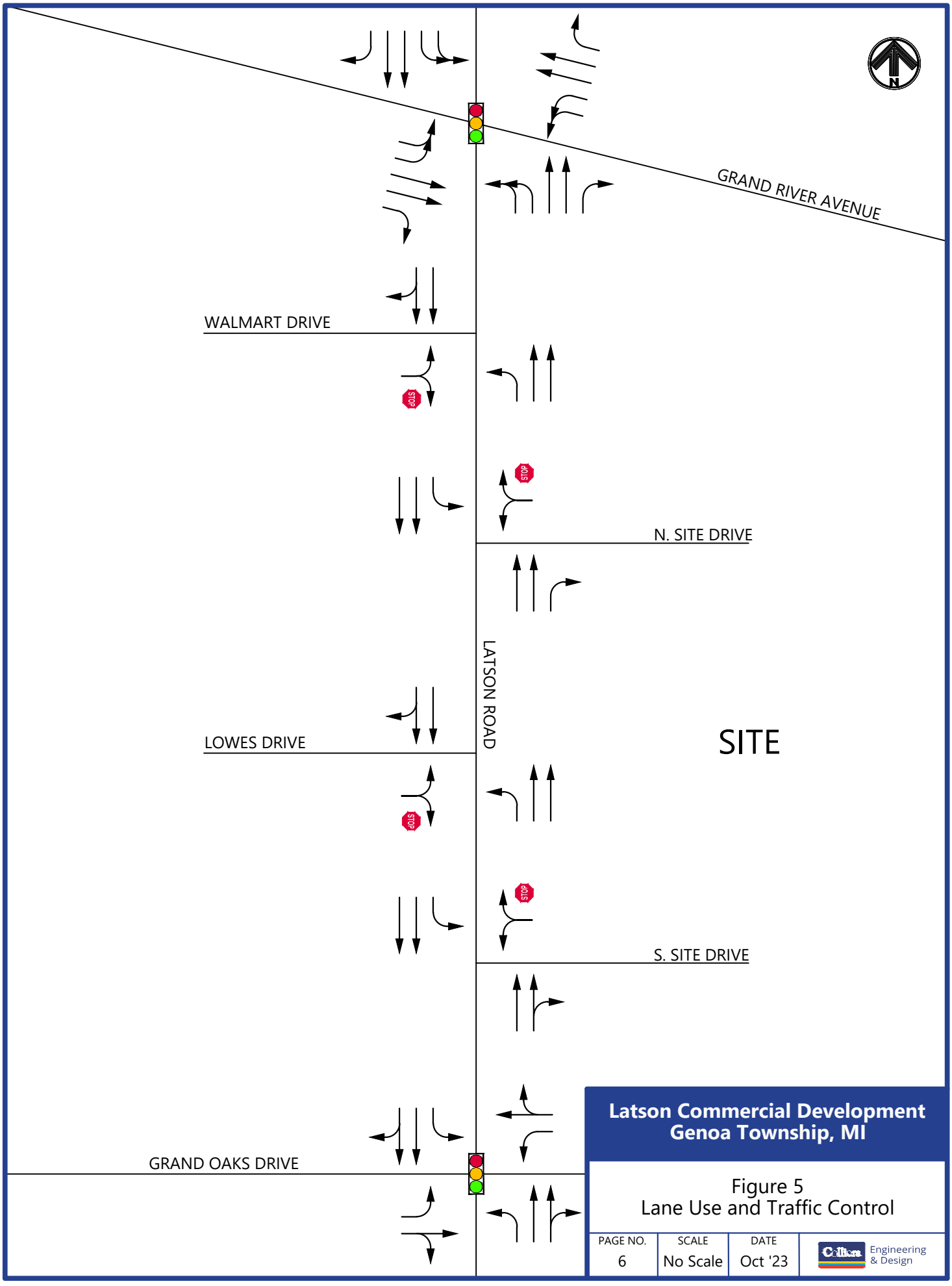
At the intersection of Latson Road & Grand Oaks Drive, the NB and SB approaches have an exclusive left-turn lane, through lane, and shared through/right-turn lane while the EB and WB approaches have an exclusive left-turn lane and shared through/right-turn lane. The intersection is traffic signal controlled with a leading permitted-protected left-turn phasing for the NB approach. Vehicle actuation is provided for all approaches and movements and marked crosswalks are provided for crossing the east, west, and north legs of the intersection with pedestrian actuation provided for the north crossing.

Figure 4: Latson Road & Grand Oaks Drive Intersection

Existing Traffic Data

Existing weekday AM (7:00 to 9:00) and PM (4:00 to 6:00) peak hour turning movement counts were collected by CED at the study intersections. At the signalized intersections of Latson Road with Grand River Avenue and Grand Oaks Drive, counts were collected on Wednesday, November 13th, 2019. At the unsignalized Lowes and Wal-Mart driveways with Latson Road, counts were collected on Thursday, August 10th, 2023.

Data were collected in 15-minute intervals to establish the current peak hour traffic volumes. Major weather events, holidays, and other local special events were avoided. During collection of the manual intersection turning movement count, pedestrian data and commercial truck percentages were also recorded and used in the traffic analysis. Peak hour factors (PHFs) and commercial truck percentages were calculated by approach based on the requirements of MDOT's *Electronic Traffic Control Device Guidelines*. Traffic volumes along Latson Road were balanced upward between the Wal-Mart driveway and Grand River Avenue. Between Grand Oaks Drive and the north Lowes driveway, a dummy node was utilized to account for the large amount of traffic that turns in and out of the south Lowes driveway. All relevant traffic volume data are included in Appendix A and the resulting 2023 baseline peak hour volumes utilized for this study are summarized on **Figure 6.**



Latson Commercial Development
Genoa Township, MI

Figure 5
Lane Use and Traffic Control

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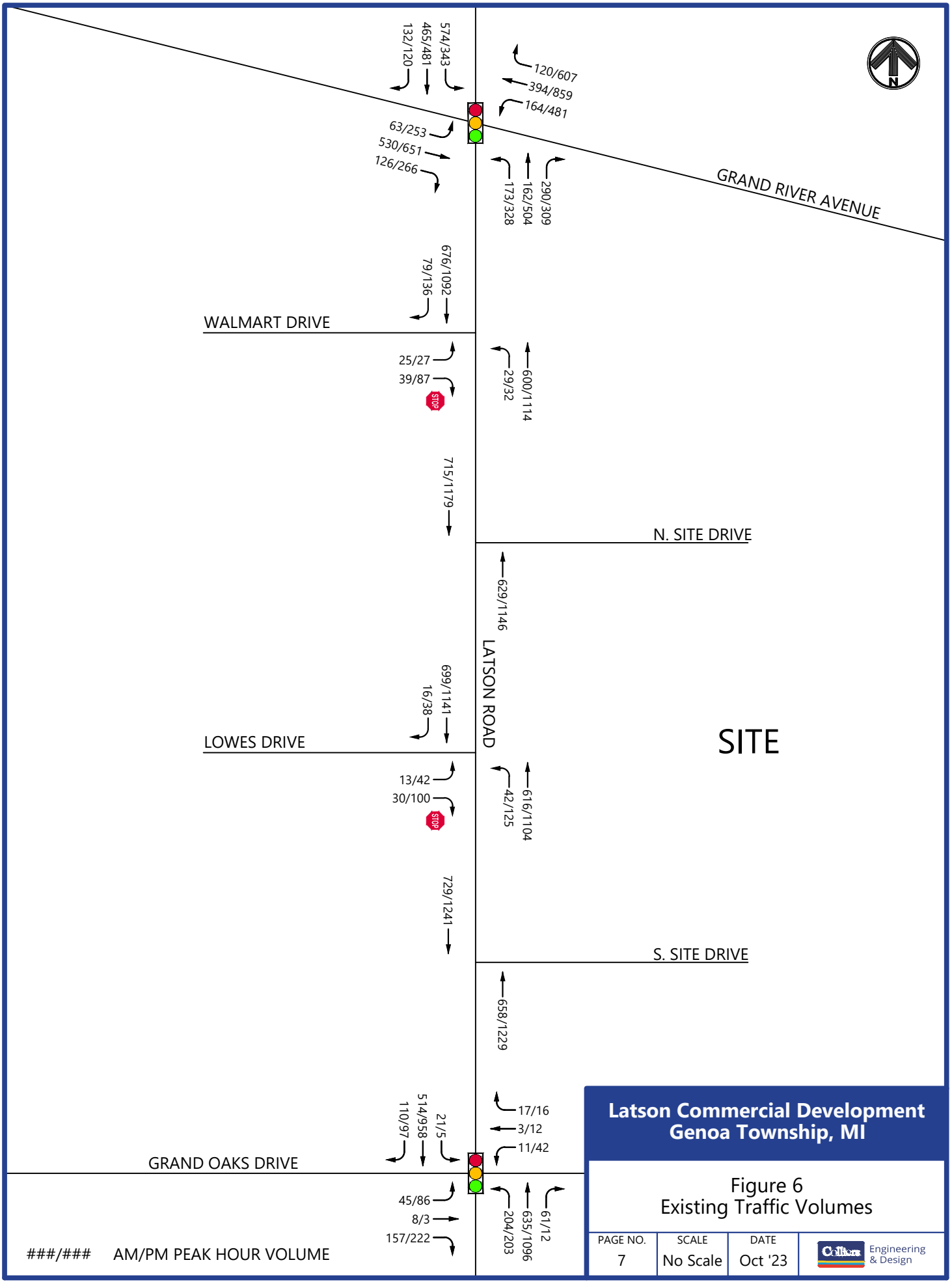

Latson Commercial Development
Genoa Township, MI

Figure 6
Existing Traffic Volumes

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2023 Existing Conditions

Analysis Methodologies

The performance of the study intersections was evaluated through a qualitative measure of operating conditions called Levels of Service (LOS). Six LOS are defined with letter designations from A to F with LOS A representing minimal delay, and LOS F indicating failing conditions. Typically, LOS D is considered acceptable in suburban/urban areas.

The LOS measurement for both signalized and unsignalized intersections is average control delay, which is quantified in terms of seconds of delay per vehicle. Control delay includes deceleration delay, stopped delay, queue move-up delay, and acceleration delay. The LOS criteria for unsignalized and signalized intersections taken from the HCM are included in Appendix B.

The LOS and delay calculations are based on the procedures and methodologies outlined in the Transportation Research Board's Highway Capacity Manual, 6th Edition (HCM6) which sets forth nationally accepted standards regarding traffic operations and capacity analysis. Traffic signal timings were modeled per traffic signal timing permits provided by LCRC.

Simulations of the study network were also observed using SimTraffic in order to identify potential issues related to vehicle queuing, traffic flow between intersections, and the overall study network. The existing conditions SimTraffic models were calibrated in accordance with the procedures outlined in the MDOT Electronic Traffic Control Device Guidelines.

Existing Traffic Conditions

Existing peak hour vehicle delays and LOS were calculated at the study intersections based on the existing lane configurations and traffic control shown on **Figure 5**, the existing traffic volumes shown on **Figure 6,** and the methodologies presented in the HCM. The results of the analysis of existing conditions are presented in **Appendix B**, summarized in **Table 2** and described in further detail below.

The results of the existing conditions analysis indicate that all approaches and movements at the study intersections are currently operating acceptably at a LOS D or better with the exception of the following:

- The NB right-turn movement at the signalized intersection of Grand River Avenue & Latson Road currently operates at a LOS E during the AM peak hour. During the PM peak hour, the NB left-turn movement operates at a LOS E while the WB left, and right-turn movement and SB left-turn movement operate at a LOS F.
- The STOP controlled Lowes Drive approach which currently operates at a LOS E during the PM peak hour.

Observation of peak hour simulations indicates acceptable traffic operations during the AM peak hour and significant vehicle queues are not observed. During the PM peak hour, long vehicle queues are observed for the WB right-turn movement and NB and SB left-turn movements at the

intersection of Grand River Avenue & Latson Road which occupy available storage lengths. A long vehicle queue is also observed for the STOP controlled Lowes driveway approach which lasts throughout the majority of the PM peak hour.

Table 2: Existing Conditions

Intersection	Control	Approach	Movement	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
Latson Road & Grand River Avenue (I-96 BL)	Signal	EB	Left	43.5	D	44.7	D
			Thru	32.1	C	42.0	D
			Right	22.2	C	27.9	C
		WB	Left	54.8	D	79.3	F
			Thru	28.1	C	41.7	D
			Right	13.6	B	69.4	F
		NB	Left	44.3	D	75.6	E
			Thru	36.5	D	39.8	D
			Right	67.0	E	29.1	C
		SB	Left	41.8	D	112.4	F
			Thru	30.2	C	40.9	D
			Right	25.0	C	25.3	C
		Overall		**37.2**	**D**	**53.1**	**D**
Latson Road & Grand Oaks Drive / Ascension Medical Drive	Signal	EB	Left	30.8	C	27.4	C
			Thru/Right	37.9	D	33.3	C
		WB	Left	37.9	D	37.1	D
			Thru/Right	28.9	C	24.5	C
		NB	Left	8.4	A	15.2	B
			Thru/Right	6.0	A	10.3	B
		SB	Left	10.2	B	12.8	B
			Thru/Right	13.0	B	21.7	C
		Overall		**13.0**	**B**	**18.3**	**B**
Latson Road & Wal-Mart Drive	STOP (Minor)	EB	Left/Right	16.0	C	24.6	C
		NB	Left	10.1	B	12.2	B
			Thru	Free		Free	
		SB	Thru/Right	Free		Free	
Latson Road & Lowes Drive	STOP (Minor)	EB	Left/Right	15.0	C	42.2	E
		NB	Left	10.0	B	13.5	B
			Thru	Free		Free	
		SB	Thru/Right	Free		Free	

No-Build Conditions

No-Build Traffic Volumes

Traffic impact studies typically include an evaluation of traffic operations in the future as they would be without the proposed development. This no-build condition serves to identify any mitigation that may be required, regardless of the project, and as a baseline for comparison of future buildout

conditions. This scenario is comprised of existing traffic conditions, plus ambient traffic growth, plus traffic from approved developments in the study area that have yet to be constructed. At the time of this study the following developments were identified within the study area and immediate vicinity that have yet to be constructed or were currently under construction:

1. Versa Mixed-Use Development
2. Westbury Phase II Residential Development
3. SJMHS Hospital Expansion

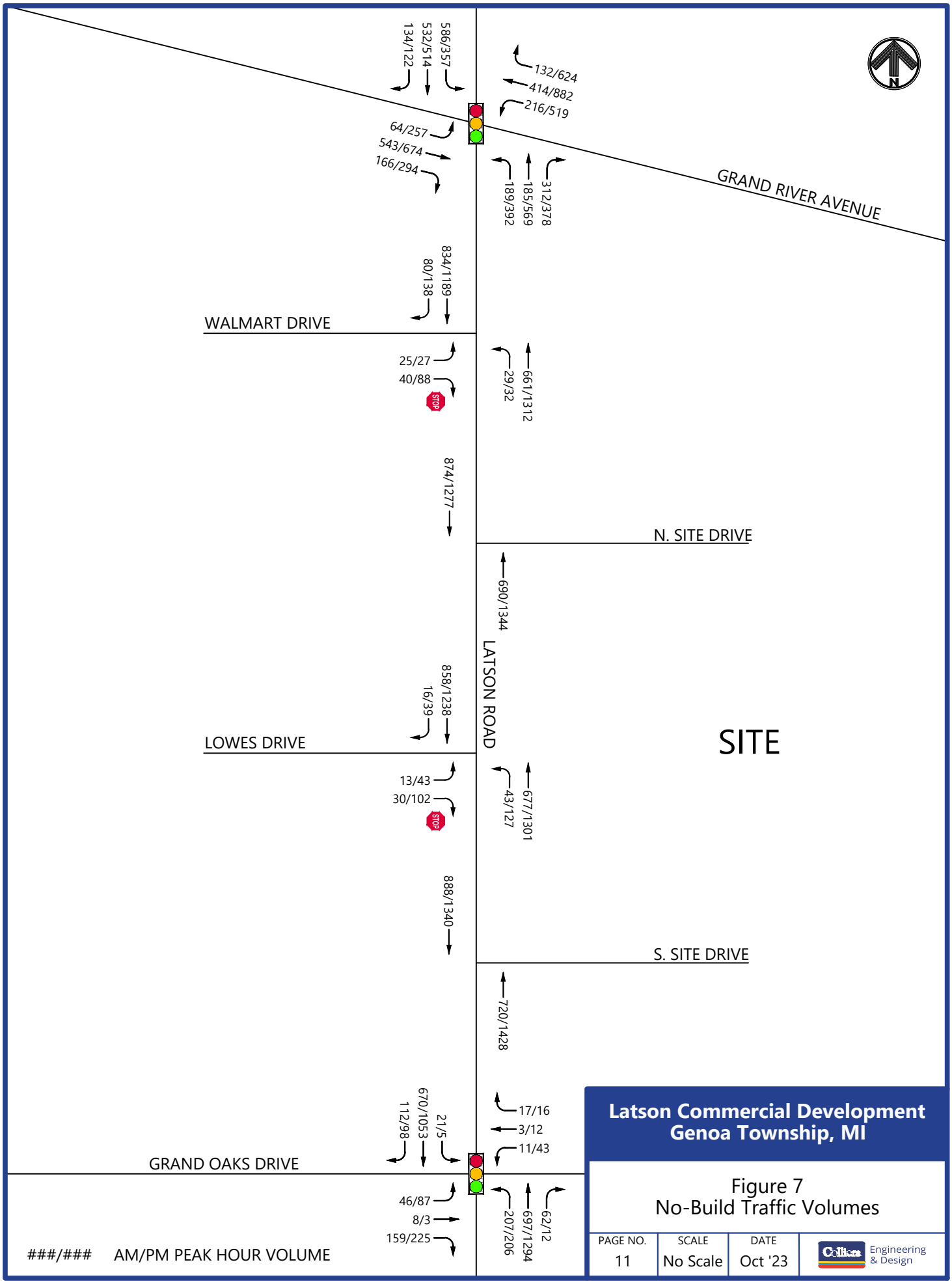
The vehicle trips that would be generated by the background developments were assigned to the study intersections based on the respective traffic study completed for each development. Where a traffic study was not completed for the development or the traffic study did not include the same intersections or time periods as this study, the number of vehicle trips was forecast based on data published by ITE in *Trip Generation, 11th Edition* and assigned to the study road network based on existing traffic patterns.

In addition to background developments, an ambient growth factor is applied to existing traffic volumes to account for future projects in the study area and population increases, as well as growth in regular traffic volumes due to development projects outside the study area. The recent construction of the I-96 & Latson Road interchange has resulted in significant changes in traffic patterns throughout the study area. As a result, historical traffic volumes do not provide an accurate representation of traffic growth in the area. Therefore, publicly available data from the Southeast Michigan Council of Governments (SEMCOG), including population and employment forecasts for Genoa Township were referenced.

The SEMCOG data indicates annual population and employment growths ranging from 0.35% to 1.64% between 2015 and 2045 as shown in **Table 3**. Therefore, an ambient background growth rate of 0.75% per year will be utilized for this study. The ambient growth rate and trips from the background developments were applied to the existing 2023 traffic volumes for a period of two years to forecast the no-build traffic volumes ***without the proposed development.*** The resultant 2025 no-build traffic volumes are summarized on **Figure 7.**

Table 3: Community Annual Growth Rate

Community	Measure	Growth
Genoa Township	Employment	0.38%
	Population	1.54%
Howell	Employment	0.35%
	Population	0.57%
Brighton	Employment	0.47%
	Population	0.69%
Brighton Township	Employment	0.63%
	Population	1.64%
Average		**0.78%**



Latson Commercial Development
Genoa Township, MI

Figure 7
No-Build Traffic Volumes

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Engineering & Design

No-Build Traffic Conditions

No-build peak hour vehicle delays and LOS were calculated at the study intersections based on the existing lane configurations and traffic control shown on **Figure 5**, the no-build traffic volumes shown on **Figure 7**, and the methodologies presented in the HCM. The results of the analysis of no-build conditions are presented in Appendix C, summarized in **Table 4**, and described in further detail below.

Table 4: No-Build Traffic Conditions

Intersection	Control	Approach	Movement	AM Peak Hour				PM Peak Hour			
				Existing		No-Build		Existing		No-Build	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Latson Road & Grand River Avenue (I-96 BL)	Signal	EB	Left	43.5	D	43.5	D	44.7	D	44.9	D
			Thru	32.1	C	32.8	C	42.0	D	45.5	D
			Right	22.2	C	23.0	C	27.9	C	29.8	C
		WB	Left	54.8	D	103.1	F	79.3	F	102.4	F
			Thru	28.1	C	28.7	C	41.7	D	45.6	D
			Right	13.6	B	13.8	B	69.4	F	81.5	F
		NB	Left	44.3	D	43.9	D	75.6	E	131.2	F
			Thru	36.5	D	37.2	D	39.8	D	43.0	D
			Right	67.0	E	82.5	F	29.1	C	33.1	C
		SB	Left	41.8	D	42.1	D	112.4	F	127.6	F
			Thru	30.2	C	31.9	C	40.9	D	42.4	D
			Right	25.0	C	25.3	C	25.3	C	25.1	C
		Overall		**37.2**	**D**	**42.4**	**D**	**53.1**	**D**	**63.0**	**E**
Latson Road & Grand Oaks Drive / Ascension Medical Drive	Signal	EB	Left	30.8	C	30.7	C	27.4	C	27.2	C
			Thru/Right	37.9	D	37.8	D	33.3	C	33.1	C
		WB	Left	37.9	D	37.9	D	37.1	D	37.1	D
			Thru/Right	28.9	C	28.8	C	24.5	C	24.3	C
		NB	Left	8.4	A	9.7	A	15.2	B	17.4	B
			Thru/Right	6.0	A	6.2	A	10.3	B	12.0	B
		SB	Left	10.2	B	10.3	B	12.8	B	15.5	B
			Thru/Right	13.0	B	14.5	B	21.7	C	24.1	C
		Overall		**13.0**	**B**	**13.6**	**B**	**18.3**	**B**	**19.6**	**B**
Latson Road & Wal-Mart Drive	STOP (Minor)	EB	Left/Right	16.0	C	19.4	C	24.6	C	30.2	D
		NB	Left	10.1	B	11.1	B	12.2	B	12.9	B
			Thru	Free		Free		Free		Free	
		SB	Thru/Right	Free		Free		Free		Free	
Latson Road & Lowes Drive	STOP (Minor)	EB	Left/Right	15.0	C	17.5	C	42.2	E	60.0	F
		NB	Left	10.0	B	11.0	B	13.5	B	14.6	B
			Thru	Free		Free		Free		Free	
		SB	Thru/Right	Free		Free		Free		Free	

The results of the no-build conditions analysis indicate that all approaches and movements would continue to operate similar to existing conditions during both peak hours with the exception of the signalized intersection of Grand River Avenue & Latson Road which would be reduced to an overall LOS E during the PM peak hour. Additionally, several approaches and movements would be reduced to a LOS E or F including the WB left-turn movement and NB right-turn movement during the AM peak hour and NB left-turn movement during the PM peak hour.

At all other study intersections, no-build conditions remain acceptable and/or similar to existing conditions. Review of network simulations continue to indicate acceptable traffic operations during the AM peak hour and significant vehicle queues are not observed. During the PM peak hour, long vehicle queues and cycle failures occur with increased frequency at the intersection of Grand River Avenue & Latson Road, as compared to existing conditions. Specifically, a long vehicle queue is observed for the SB left-turn movement and WB right-turn movement which exceeds available storage length throughout the majority of the PM peak hour. It should be noted that these operations reflect modeled prohibition of all right turns on red at this intersection. The dynamic case signs allow for additional right turn demand processing and would result in shorter queues for actual field conditions.

No-Build Improvements

In order to improve traffic operations in the no-build conditions, mitigation measures were investigated. At the intersection of Grand River Avenue & Latson Road, recent improvements were made as part of the I-96 & Latson Road interchange project to provide dual left-turn lanes and right turn overlap phasing on all approaches, as well as additional travel lanes along Latson Road. The intersection of Grand River Avenue & Latson Road is considered to be built out, and additional physical capacity improvements (i.e., additional lanes) at this intersection are constrained by available right-of-way. Therefore, further geometric improvements at the intersection to mitigate all movements to a LOS D or better are considered to be regional and beyond the scope and context of this study.

As a result, improvements at Grand River Avenue & Latson Road are limited to signal timing and traffic control modifications. Signal cycle length and timing changes were therefore evaluated. The results of this analysis indicate that optimized timings with a 90 second cycle length in the AM peak hour and 100 second cycle length during the PM peak hour would result in future traffic operations which are similar to or improved compared to existing conditions; however, several intersection approaches and movements would continue to operate at a LOS E or F during the peak hours (noting modeling constraints for dynamic right turn on red). The results of the no-build conditions analysis with recommended improvements are summarized in **Table 5**.

Although these improvements are needed to help mitigate no-build operations; these improvements are not included in any planned roadway improvements. Therefore, the build conditions analysis for this study evaluates traffic operations with the existing traffic signal timings and geometrics at the intersections.

Table 5: No-Build Traffic Conditions with Improvements

Intersection	Control	Approach	Movement	AM Peak Hour				PM Peak Hour			
				No-Build		No-Build IMP		No-Build		No-Build IMP	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Latson Road & Grand River Avenue (I-96 BL)	Signal	EB	Left	43.5	D	43.5	D	44.9	D	44.9	D
			Thru	32.8	C	34.1	C	45.5	D	51.7	D
			Right	23.0	C	24.5	C	29.8	C	28.5	C
		WB	Left	103.1	F	48.6	D	102.4	F	59.0	E
			Thru	28.7	C	27.6	C	45.6	D	41.1	D
			Right	13.8	B	13.8	B	81.5	F	54.9	D
		NB	Left	43.9	D	47.3	D	131.2	F	66.1	E
			Thru	37.2	D	37.2	D	43.0	D	64.6	E
			Right	82.5	F	59.8	E	33.1	C	35.0	D
		SB	Left	42.1	D	48.6	D	127.6	F	64.6	E
			Thru	31.9	C	32.3	C	42.4	D	61.7	E
			Right	25.3	C	25.6	C	25.1	C	27.8	C
		Overall		**42.4**	**D**	**38.2**	**D**	**63.0**	**E**	**51.8**	**D**

Build Conditions

Site Trip Generation

The number of AM and PM peak hour vehicle trips that will be generated by the proposed development will be forecast based on the rates and equations published by ITE in *Trip Generation, 11th Edition*. The proposed development plans include a 2,950 SF coffee-shop with drive-through, 2,700 SF sit-down restaurant, 4,025 SF of general retail space, and automated car wash.

The proposed uses were matched to the ITE land use category that most closely matches their proposed operation. For this study, ITE *Land Use #822, Strip Retail Plaza* was utilized for the retail space, *Land Use #932, High-Turnover Sit-Down Restaurant,* was utilized for the proposed restaurant, *Land Use #937, Coffee-Shop with Drive-Through* was utilized for the coffee-shop, and *Land Use #948, Automated Car Wash* was utilized for the carwash. For Land Use #948, trip generation data is not available during the AM peak hour as most carwashes are closed during this time frame or generate small amounts of traffic; however, to provide a conservative approach, AM peak hour trips were forecast to be 25% of the PM peak hour trips for this study.

As is typical of most retail and restaurant uses, a portion of the site-generated trips are already present on the adjacent road network and are interrupted to visit the site. These trips are known as 'pass-by' trips, which create turning movements at the site driveways, but do not increase traffic volumes on the adjacent road network or off-site intersections. Similar to pass-by trips, a portion of the site-generated trips are vehicles that are traveling on the adjacent roadway that alter their direction of travel to visit the site then return to their original route. These trips are known as "diverted-link" trips. For the purposes of this study, pass-by trips were assumed to follow existing traffic patterns along Latson Road. Diverted link trips were applied to turning movements patterns at the intersection of Grand River Avenue & Latson Road.

ITE publishes pass-by rates for various commercial land uses in the *Trip Generation Handbook*. For Land Use #822 and #932, 34% and 43% of trips are expected to be pass-by in nature. ITE does not publish pass-by data for Land Use #937 or #948. For Land Use #937, 50% of trips were assumed to be pass-by in nature consistent with other fast-food with drive-through uses. For Land Use #948, 35% of trips were assumed to be pass-by in nature based on data for drive-in banks and other retail uses. The diverted-link trips are assumed to represent a portion of the pass-by trips, not an additional reduction to overall site trip generation. These trips are already present at the intersection of Grand River Avenue & Latson Road but divert to visit the site. The number of pass-by and diverted-link vehicle trips was subtracted from the total number of site-generated trips to determine the number of new peak hour trips for the overall development. The resultant trip generation forecast for the proposed development is shown in **Table 6**.

Table 6: Site Trip Generation

Land Use	ITE Code	Amount	Units	ADT	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Strip Retail Plaza	822	4,025	SF	400	9	6	15	21	20	41
		Pass-By (34% PM)		*136*	*0*	*0*	*0*	*7*	*7*	*14*
		New Trips		264	9	6	15	14	13	27
High-Turnover (Sit-Down) Restaurant	932	2,700	SF	289	14	12	26	15	9	24
		Pass-By (43%)		*124*	*5*	*5*	*10*	*5*	*5*	*10*
		New Trips		165	9	7	16	10	4	14
Coffee Shop with Drive-Through	937	2,950	SF	1,574	129	124	253	58	57	115
		Pass-By (50%)		*787*	*63*	*63*	*126*	*29*	*29*	*58*
		New Trips		787	66	61	127	29	28	57
Automated Car Wash	948	1	Tunnel	0	10	10	20	39	39	78
		Pass-By (35%)		*0*	*3*	*3*	*6*	*13*	*13*	*26*
		New Trips		0	7	7	14	26	26	52
Total		**Total Trips**		**2,263**	**162**	**152**	**314**	**133**	**125**	**258**
		Pass-By Trips		***1,047***	***71***	***71***	***142***	***54***	***54***	***108***
		New Trips		**1,216**	**91**	**81**	**172**	**79**	**71**	**150**

Trip Distribution

The vehicle trips that would be generated by the proposed development were assigned to the study road network based on existing peak hour traffic patterns, local population densities, and ITE methodologies. These methods indicate that pass-by trips enter and exit the development in their original direction of travel and new trips will return to their direction of origin. Peak hour traffic volumes on Grand River Avenue and Latson Road were reviewed together with local population densities to determine the origin and destinations of new site-generated traffic. Pass-by traffic was assumed to follow existing traffic patterns along Latson Road and at the intersection of Grand River Avenue & Latson Road. The resultant site trip distribution is summarized in **Table 7**.

Site-generated trips were assigned to the site driveways based on these trip distribution percentages and the proposed site access plan. The north site driveway is expected to service both the carwash and retail uses while the south site driveway is expected to primarily service the retail /

restaurant uses. Therefore, all retail / restaurant traffic approaching from the south was assumed to utilize the south site driveway while the majority (75%) of retail / restaurant traffic approaching from the north was assumed to utilize the south site driveway. All car wash traffic was assumed to utilize the north site driveway. Traffic was assumed to exit via the same driveway that was entered.

Table 7: Site Trip Distribution

NEW TRIPS			PASS-BY / DIVERTED TRIPS				
To/From	Via	AM/PM	From	To	Via	AM	PM
North	Latson Road	25%	South	North	Latson Road	19%	22%
South	Latson Road	20%	North	South	Latson Road	22%	22%
East	Grand River Avenue	25%	North	East	Grand River Avenue	19%	7%
West	Grand River Avenue	30%	North	West	Grand River / Latson	4%	2%
			West	North	Grand River / Latson	2%	12%
			West	East	Grand River / Latson	17%	17%
			East	North	Grand River / Latson	4%	5%
			East	West	Grand River / Latson	13%	13%
Total		**100%**	**Total**			**100%**	**100%**

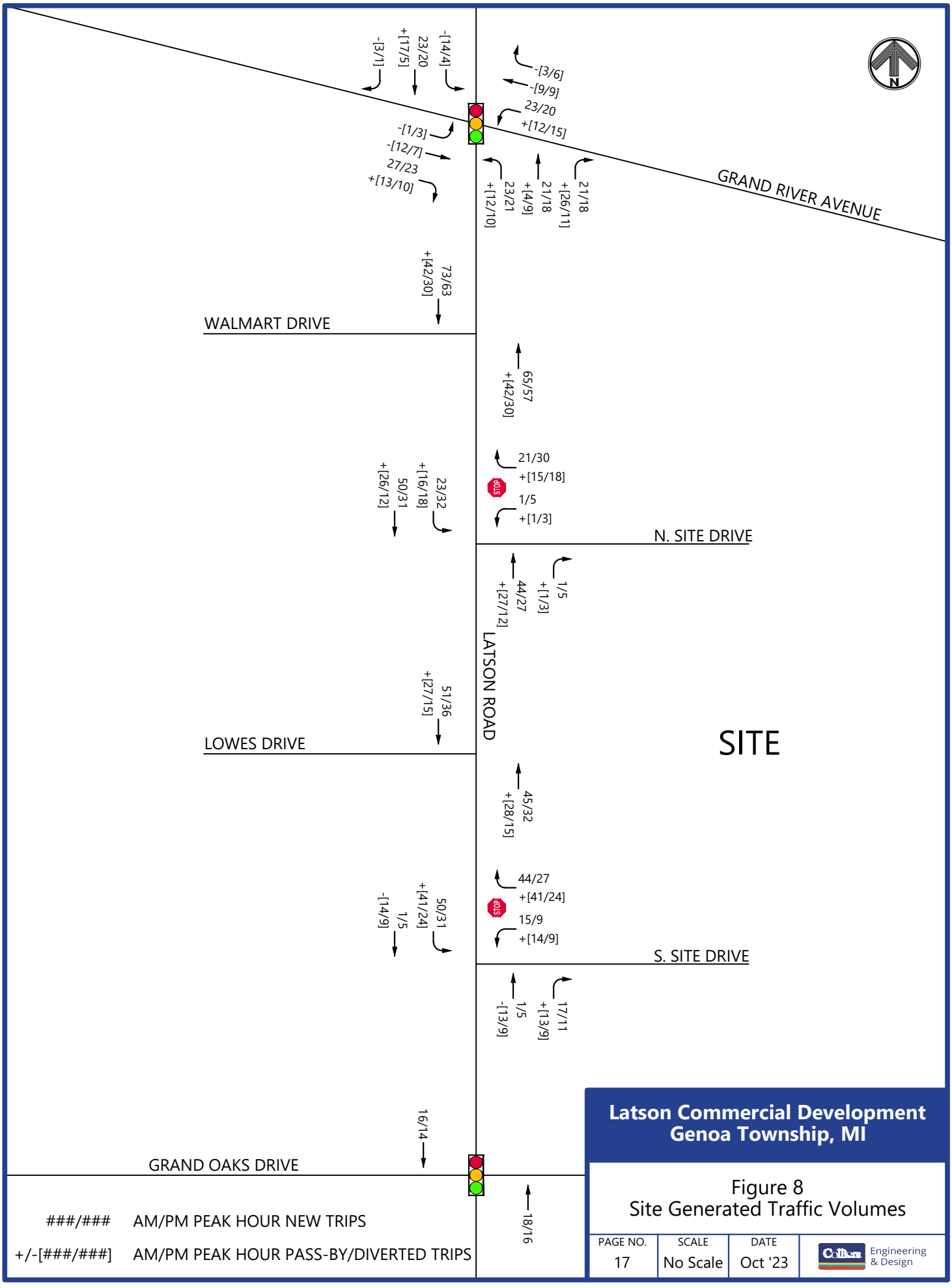
The site-generated vehicle trips were assigned to the study network as shown on **Figure 8**. These trips were added to the 2025 no-build traffic volumes shown on **Figure 7** to calculate the future build traffic volumes shown on **Figure 9**.

Build Conditions

Future build peak hour vehicle delays and LOS with the proposed development were calculated based on existing lane configurations and traffic control shown on **Figure 5**, build traffic volumes shown on **Figure 9**, and HCM methodologies. SimTraffic simulations were also utilized to evaluate traffic flow and vehicle queues throughout the study network. Additionally, per conversations with LCRC, in order to accommodate left-turns at the proposed N. site driveway, the left-turn movement at the Wal-Mart driveway was assumed to be restricted with all existing left-turns reassigned to utilize the Lowes site driveway. The build conditions results are included in Appendix D and summarized in **Table 8**.

The results of the build conditions analysis indicate that the proposed development will not have a significant impact on the adjacent road network. All approaches and movements at the signalized intersections will continue to operate in a manner similar to no-build conditions and LOS for all movements will remain unchanged with the exception of the SB through movement and NB right-turn movements at the intersection of Grand River Avenue & Latson Road which will be reduced from a LOS C to LOS D during the AM and PM peak hours, respectively; however, the delay increase for these movements is less than five seconds per vehicle.

Most approaches will continue to operate acceptably at a LOS D or better during both peak hours. The signalized intersection of Grand River Avenue & Latson Road will continue to worsen with the addition of site-generated traffic if those movements operating at a LOS E or F are not improved under no-build conditions.



Latson Commercial Development
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Figure 8
Site Generated Traffic Volumes

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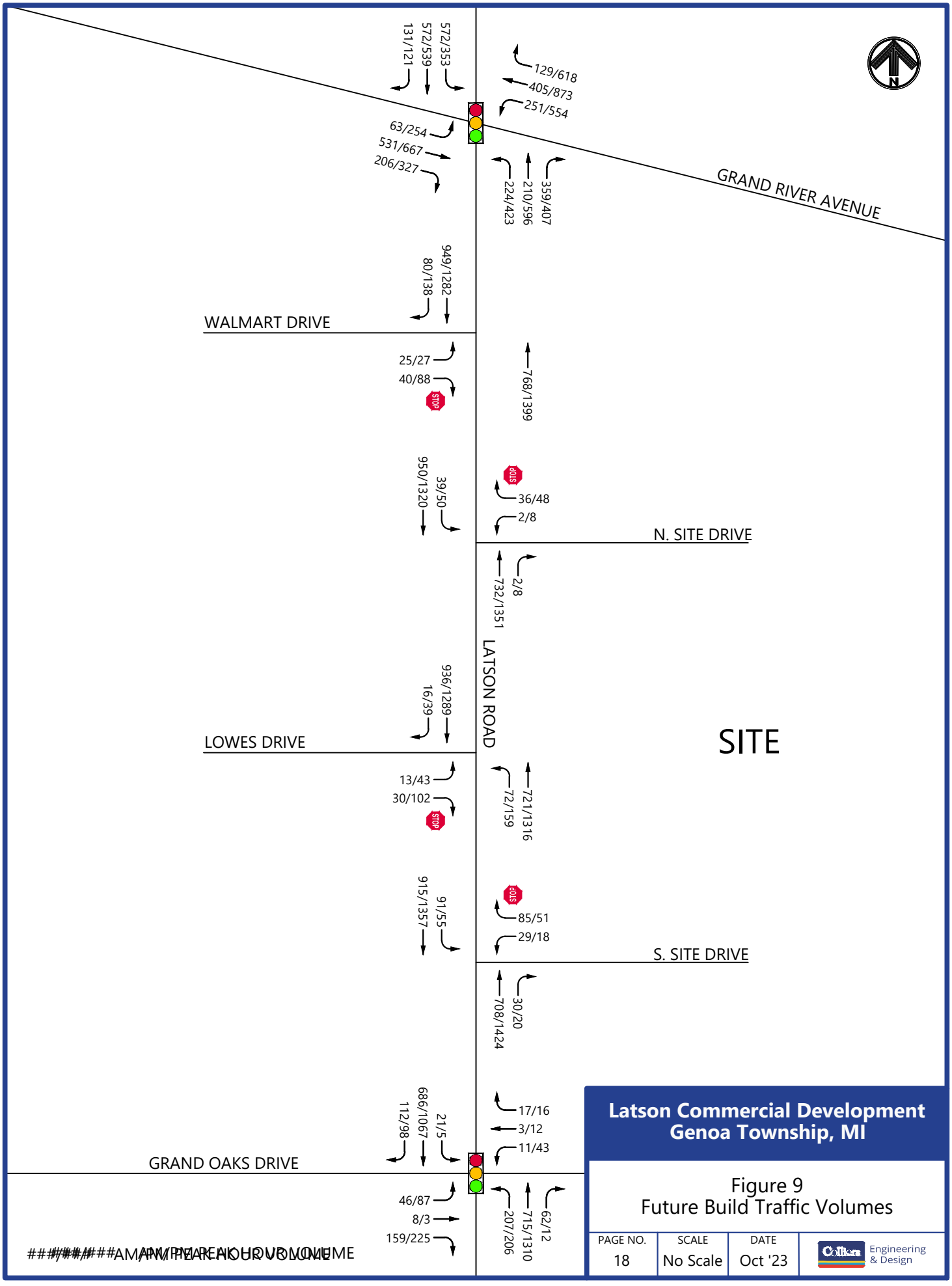

Latson Commercial Development
Genoa Township, MI

Figure 9
Future Build Traffic Volumes

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Table 8: Build Traffic Conditions

Intersection	Control	Approach	Movement	AM Peak Hour				PM Peak Hour			
				No-Build		Build		No-Build		Build	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Latson Road & Grand River Avenue (I-96 BL)	Signal	EB	Left	43.5	D	43.5	D	44.9	D	44.8	D
			Thru	32.8	C	32.1	C	45.5	D	44.7	D
			Right	23.0	C	22.9	C	29.8	C	32.1	C
		WB	Left	103.1	F	157.5	F	102.4	F	128.7	F
			Thru	28.7	C	28.2	C	45.6	D	44.2	D
			Right	13.8	B	13.7	B	81.5	F	77.8	F
		NB	Left	43.9	D	43.1	D	131.2	F	164.9	F
			Thru	37.2	D	38.0	D	43.0	D	45.3	D
			Right	82.5	F	128.6	F	33.1	C	35.7	D
		SB	Left	42.1	D	41.8	D	127.6	F	122.7	F
			Thru	31.9	C	35.0	D	42.4	D	44.5	D
			Right	25.3	C	26.6	C	25.1	C	25.1	C
		Overall		**42.4**	**D**	**52.3**	**D**	**63.0**	**E**	**67.6**	**E**
Latson Road & Grand Oaks Drive / Ascension Medical Drive	Signal	EB	Left	30.7	C	30.7	C	27.2	C	27.2	C
			Thru/Right	37.8	D	37.8	D	33.1	C	33.1	C
		WB	Left	37.9	D	37.9	D	37.1	D	37.1	D
			Thru/Right	28.8	C	28.8	C	24.3	C	24.3	C
		NB	Left	9.7	A	9.8	A	17.4	B	17.7	B
			Thru/Right	6.2	A	6.3	A	12.0	B	12.1	B
		SB	Left	10.3	B	10.4	B	15.5	B	15.7	B
			Thru/Right	14.5	B	14.6	B	24.1	C	24.4	C
		Overall		**13.6**	**B**	**13.6**	**B**	**19.6**	**B**	**19.8**	**B**
Latson Road & Wal-Mart Drive	STOP (Minor)	EB	Left/Right	19.4	C	21.5	C	30.2	D	33.1	D
		NB	Left	11.1	B	Prohibited		12.9	B	Prohibited	
			Thru	Free		Free		Free		Free	
		SB	Thru/Right	Free		Free		Free		Free	
Latson Road & Lowes Drive	STOP (Minor)	EB	Left/Right	17.5	C	19.8	C	60.0	F	81.2	F
		NB	Left	11.0	B	12.0	B	14.6	B	16.3	C
			Thru	Free		Free		Free		Free	
		SB	Thru/Right	Free		Free		Free		Free	
Latson Road & N. Site Drive	STOP (Minor)	WB	Left/Right			12.6	B			20.8	C
		NB	Thru/Right	Free		Free		Free		Free	
		SB	Left			10.1	B			13.7	B
			Thru	Free		Free		Free		Free	
Latson Road & S. Site Drive	STOP (Minor)	WB	Left/Right			36.7	E			153.2	F
		NB	Thru/Right	Free		Free		Free		Free	
		SB	Left			10.4	B			14.3	B
			Thru	Free		Free		Free		Free	

At the proposed site driveways, all approaches and movements will operate acceptably with the exception of the STOP controlled S. site driveway approach with Latson Road which will operate at a LOS E and LOS F during the AM and PM peak hours, respectively.

Review of peak hour simulations also indicate future build traffic operations which are similar to no-build conditions. Acceptable traffic operations are continued to be observed during the AM peak hour with no significant vehicle queues. Long vehicle queues and cycle failures are continued to be observed at the intersection of Grand River Avenue & Latson Road during the PM peak hour with queues for the NB, WB, and SB left-turn movements and WB right-turn movement exceeding available storage length.

Vehicle queue lengths were also calculated and evaluated with respect to the proposed site driveways. On Latson Road, the NB left turn queue length from the Lowes Driveway is critical to the ingress left turn operation of the S. site driveway as both movements will utilize the center left turn lane. Additionally, the NB approach queue from the signalized intersection of Grand River Avenue & Latson Road is critical to ingress and egress operation from the proposed N. Site Drive. The queue length calculations based on SimTraffic simulations are shown in **Table 9**.

Table 9: Build Traffic Conditions Vehicle Queues

Intersection	Control	Approach	Movement	Available Storage	AM Peak		PM Peak	
					Avg	95th	Avg	95th
Grand River Avenue & Latson Road	Signal	NB	Left	500 ft	51	96	490	759
			Through		56	98	137	208
Lowes Drive	Yield	NB	Left	150 ft	30	61	56	86
S. Site Drive		SB	Left		29	57	26	57

The results of the queue evaluation indicate that there will be adequate distance in the center left turn lane on Latson Road to store queued vehicles and facilitate ingress left turns. During the AM peak hour, queues from the intersection of Grand River Avenue & Latson Road will not block the N. Site Driveway; however, the NB left-turn queue will block the intersection during portions of the PM peak hour.

Build Improvements

In order to improve traffic operations in the build conditions, the mitigation measures previously identified under no-build conditions were investigated. The results of the build conditions analysis with these improvements are summarized in **Table 10** below and indicate improved operations at the intersection of Grand River Avenue & Latson Road; however, several approaches and movements will continue to operate at a LOS E or F during the peak hours. As previously discussed, this intersection is considered to be built out, and additional physical capacity improvements (i.e., additional lanes) are constrained by available right-of-way. Therefore, further geometric improvements at the intersection to mitigate all movements to a LOS D or better are considered to be regional and beyond the scope and context of this study.

Review of network simulations also indicates acceptable traffic operations at all study intersections with the exception of the Grand River Avenue & Latson Road intersection where long vehicle queues

are continued to be observed for the WB right-turn movement during portions of the PM peak hour. However, queues along the NB approach are reduced and no longer block the proposed N. Site Drive. Additionally, the simulations indicate that the traffic signals at Grand River Avenue and Grand Oaks Drive provide notable gaps in the traffic stream, allowing egress traffic to enter Latson Road. As a result, average queue lengths for the STOP controlled site drive approaches are calculated to be 68 feet (2-3 vehicles) or less with 95th percentile queue lengths of 106 feet (4 vehicles) or less. This condition is consistent with other STOP controlled full-access driveways on this segment of Latson Road, such as the Lowes driveways.

Table 10: Build Traffic Conditions with Improvements

Intersection	Control	Approach	Movement	AM Peak Hour				PM Peak Hour			
				No-Build		Build IMP		No-Build		Build IMP	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Latson Road & Grand River Avenue (I-96 BL)	Signal	EB	Left	43.5	D	43.5	D	44.9	D	44.8	D
			Thru	32.8	C	34.9	C	45.5	D	50.4	D
			Right	23.0	C	25.7	C	29.8	C	30.5	C
		WB	Left	103.1	F	51.7	D	102.4	F	73.3	E
			Thru	28.7	C	27.2	C	45.6	D	40.2	D
			Right	13.8	B	13.7	B	81.5	F	52.5	D
		NB	Left	43.9	D	48.9	D	131.2	F	82.8	F
			Thru	37.2	D	38.0	D	43.0	D	74.7	E
			Right	82.5	F	76.1	E	33.1	C	38.1	D
		SB	Left	42.1	D	47.7	D	127.6	F	62.7	E
			Thru	31.9	C	35.0	D	42.4	D	70.9	E
			Right	25.3	C	26.6	C	25.1	C	27.8	C
		Overall		**42.4**	**D**	**40.9**	**D**	**63.0**	**E**	**55.9**	**E**

Conclusions

The Conclusions related to this Traffic Impact Study and relative analyses are as follows:

1. Existing weekday AM (7:00 to 9:00) and PM (4:00 to 6:00) peak hour turning movement counts were collected by CED at the study intersections. At the signalized intersections of Latson Road with Grand River Avenue and Grand Oaks Drive, counts were collected on Wednesday, November 13th, 2019. At the unsignalized Lowes and Wal-Mart driveways with Latson Road, counts were collected on Thursday, August 10th, 2023.
2. All study intersection approaches and movements currently operate acceptably at a LOS D or better during both peak hours with the exception of the following:
    a. The NB right-turn movement at the signalized intersection of Grand River Avenue & Latson Road currently operates at a LOS E during the AM peak hour. During the PM peak hour, the NB left-turn movement operates at a LOS E while the WB left, and right-turn movement and SB left-turn movement operate at a LOS F.
    b. The STOP controlled Lowes Drive approach which currently operates at a LOS E during the PM peak hour.
3. Ambient traffic growth of 0.75% was applied to establish 2025 no-build traffic volumes without the proposed development. Several background developments were also identified in the study area and included in this study.
4. No-build conditions analyses indicate that several movements at the intersection of Grand River Avenue & Latson Road will experience degraded operations.
5. Future build conditions analyses indicate that most study intersection approaches and movements will continue to operate acceptably; however, there are several movements with undesirable or failing conditions at the intersection of Grand River Avenue & Latson Road that are expected to worsen in the future if those movements operating at a LOS E or F are not improved under no-build conditions.
6. With the improvements outlined below, all study network intersections and site driveways will operate acceptably, or in a manner similar or improved compared to no-build conditions during the peak hours.

Based on the results of this study, the following should be considered to provide acceptable traffic operations with the proposed development project:

1. Optimize signal timings at the intersection of Grand River Avenue & Latson Road.

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By Amy Ruthig at 3:56 pm, Nov 01, 2023

NOISE IMPACT ANALYSIS

MISTER CAR WASH 1495 LATSON PROJECT

GENOA TOWNSHIP, MICHIGAN

LSA

October 2023

NOISE IMPACT ANALYSIS

MISTER CAR WASH 1495 LATSON PROJECT

GENOA TOWNSHIP, MICHIGAN

Submitted to:

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Project No. 20231136

October 2023

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APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

CNEL	Community Noise Equivalent Level
dB	decibel(s)
dBA	A-weighted decibel(s)
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous noise level
project	Mister Car Wash 1015 Latson Project

INTRODUCTION

This noise impact analysis evaluates the potential noise impacts and noise reduction measures associated with the proposed Mister Car Wash 1495 Latson Project (project) in Genoa Township, Michigan. This report is intended to satisfy the Genoa Township's requirement for a project-specific noise impact analysis by examining the impacts of the proposed uses on the project site and identifies whether any noise reduction measures to reduce project noise impacts would be necessary.

PROJECT LOCATION AND DESCRIPTION

The proposed Mister Carwash is at 1015 South Latson Road in Genoa Township, Michigan. The proposed project is adjacent to South Latson Road to the west, commercial uses to the north and northwest, residential uses to the southeast, and vacant land to the south. The project location map and site plan are presented on Figures 1 and 2, respectively.

EXISTING LAND USES IN THE PROJECT AREA

The project site is primarily surrounded by commercial developments and residential uses. The areas adjacent to the project site include the following uses:

- **North:** Existing commercial uses
- **East:** Existing commercial uses
- **Southeast:** Existing residential uses
- **South:** Existing vacant land
- **West:** South Latson Road followed by existing commercial uses

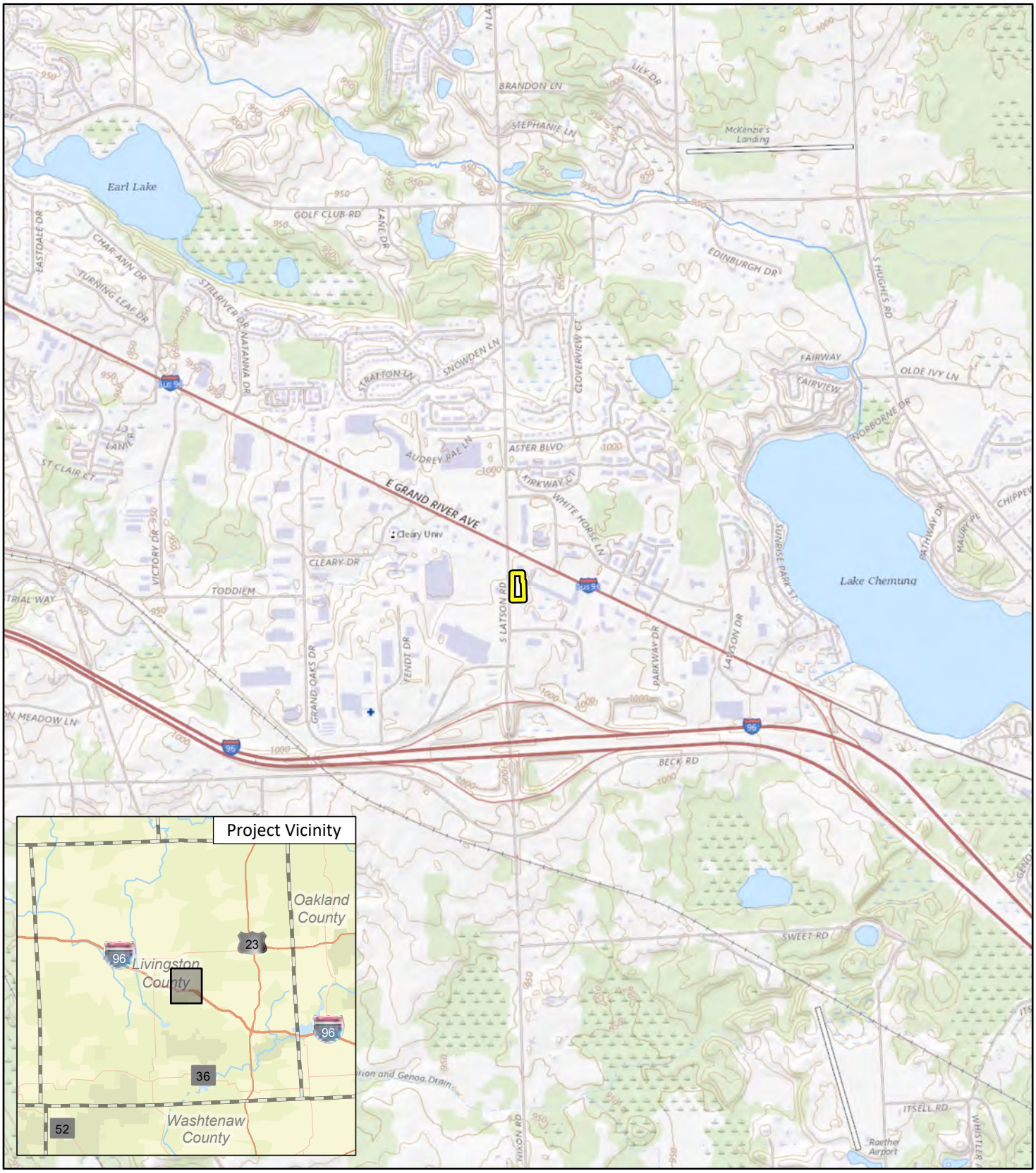


FIGURE 1

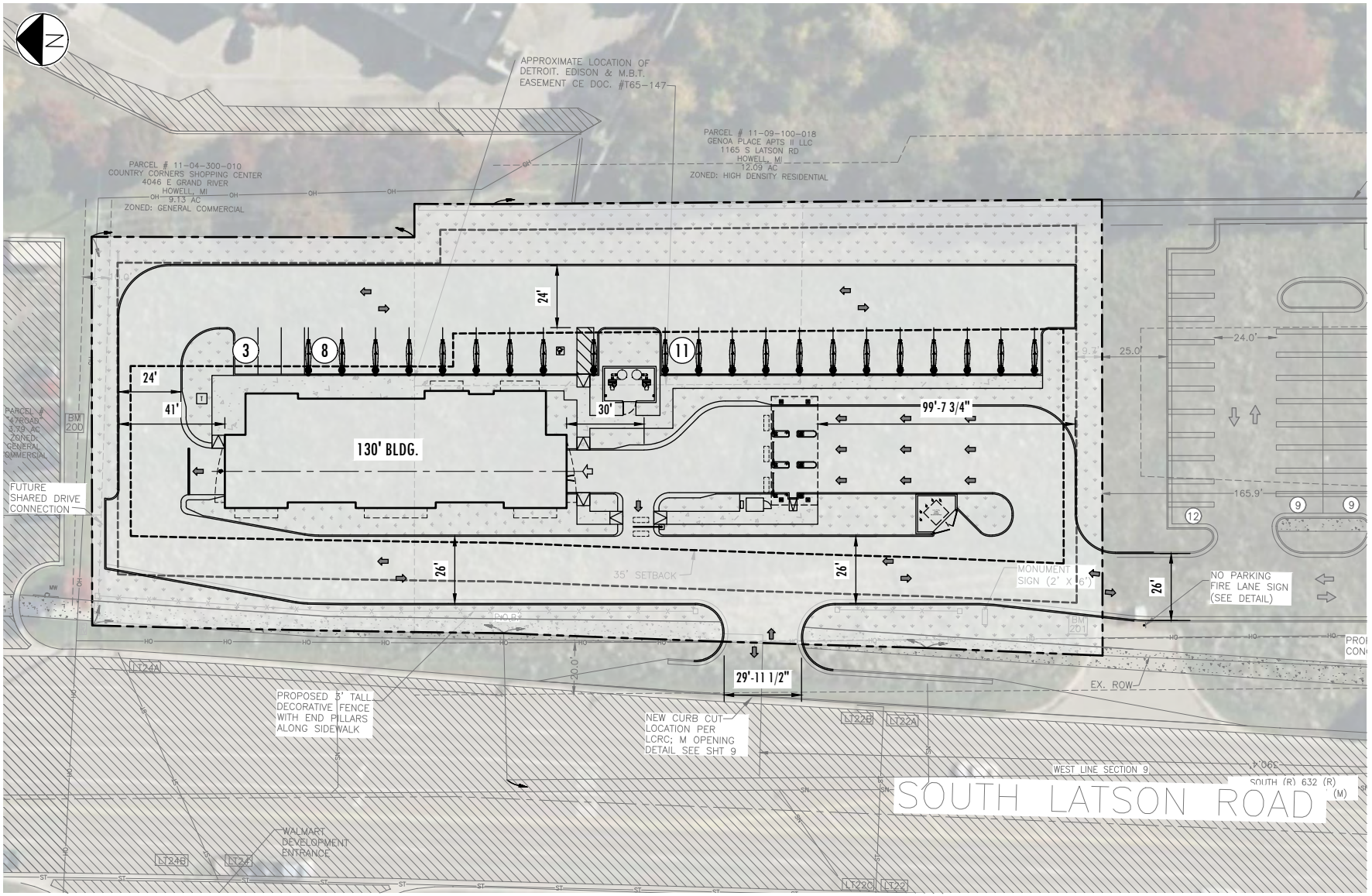
0 1000 2000
FEET

SOURCE: USGS The National Map (2017)

J:\20231136\GIS\Pro\1015 S Latson Rd\1015 S Latson Rd.aprx (10/25/2023)

1050 Latson Mister Car Wash

Project Location



LSA

FIGURE 2

0 28 56
FEET

1050 Latson Mister Car Wash

Site Plan

SOURCE: Mister

I:\20231136\G\Site_Plan.ai (10/24/2023)

NOISE FUNDAMENTALS

CHARACTERISTICS OF SOUND

Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations, or cycles per second, of a sound wave, which results in the tone's range from high to low. Loudness is the strength of a sound, and it describes a noisy or quiet environment; it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound wave combined with the reception characteristics of the human ear. Sound intensity refers to the power carried by sound waves per unit area in a direction perpendicular to that area. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound pressure level and its effect on adjacent sensitive land uses.

Measurement of Sound

Sound pressure level is measured with the A-weighted decibel (dBA) scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound, similar to the human ear's de-emphasis of these frequencies. Decibels (dB), unlike linear units (e.g., inches or pounds), are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 dB is 10 times more intense than 1 dB, 20 dB is 100 times more intense than 1 dB, and 30 dB is 1,000 times more intense than 1 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 1 dB. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the sound's loudness. Ambient sounds generally range from 30 dB (very quiet) to 100 dB (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound levels dissipate exponentially with distance from their noise sources. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source (e.g., highway traffic or railroad operations) the sound decreases 3 dB for each doubling of distance in a hard site environment. Line-source sound levels decrease 4.5 dB for each doubling of distance in a relatively flat environment with absorptive vegetation.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period.

Other noise rating scales of importance when assessing the annoyance factor include the maximum instantaneous noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by L_{max}, which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first category includes audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater because this level has been found to be barely perceptible in exterior environments. Additionally, an increase of more than 5 dBA is typically considered readily perceptible in an exterior environment. The second category, potentially audible, refers to a change in the noise level between 1 dB and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category includes changes in noise levels of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to sound levels higher than 85 dBA. Exposure to high sound levels affects the entire system, with prolonged sound exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of sound exposure above 90 dBA would result in permanent cell damage. When the sound level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of sound is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by a feeling of pain in the ear (i.e., the threshold of pain). A sound level of 160–165 dBA will result in dizziness or a loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less-developed areas.

Table A lists definitions of acoustical terms, and Table B shows common sound levels and their sources.

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of sound level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in 1 second (i.e., the number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. (All sound levels in this report are A-weighted unless reported otherwise.)
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1%, 10%, 50%, and 90% of a stated time period, respectively.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time. It is usually a composite of sound from many sources from many directions, near and far; no particular sound is dominant.

Source 1: *Technical Noise Supplement* (Caltrans 2013)
Source 2: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
Caltrans = California Department of Transportation
FTA = Federal Transit Administration

Table B: Common Sound Levels and Their Noise Sources

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 ft		
	— 100 —	
Gas lawn mower at 3 ft		
	— 90 —	
Diesel truck at 50 ft at 50 mph		Food blender at 3 ft
	— 80 —	Garbage disposal at 3 ft
Noisy urban area, daytime		
Gas lawn mower, 100 ft	— 70 —	Vacuum cleaner at 10 ft
Commercial area		Normal speech at 3 ft
Heavy traffic at 300 ft	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	— 20 —	
		Broadcast/recording studio
	— 10 —	

Source: *Technical Noise Supplement* (Caltrans 2013).
Caltrans = California Department of Transportation
dBA = A-weighted decibels
ft = feet
mph = miles per hour

REGULATORY SETTING

APPLICABLE NOISE STANDARDS

Genoa Township Noise Ordinance

Genoa Township addresses operational noise standards in Ordinance No. #011203: Noise Ordinance.

Section 3 states: *"No person, firm or corporation or other legal entity shall cause or create any unreasonable or unnecessarily loud noise or disturbance, injurious to health, peace, or quiet of the residents and property owners of the Township.*

Specific violations the following noises and disturbances are hereby declared to be a violation of this ordinance; provided however, that the specification of the same is not thereby to be construed to exclude other violations of this ordinance not specifically enumerated:

> *9. The operation of any machinery, equipment or mechanical device so as to emit unreasonably loud noise which is disturbing to the quiet, comfort or repose of any person."*

Section 4 states: *"No person shall conduct or permit any activity, including those specific prohibitions listing in section 3 that produces an OBA at or beyond the property line of the property on which it is conducted which exceeds the levels specified in Table I. Such noise levels shall be measured on the property line or on the adjacent property, which is receiving the noise. Where property is used for both residential and commercial purposes, the limitations set forth below for commercial property shall apply."*

Table I of the Ordinance provides the specific noise levels standards which applicable when a commercial property is producing sound onto a residential property. The established noise level standards are: 80 dBA from 7:00 a.m. to 10:00 p.m. and 50 dBA from 10:00 p.m. to 7:00 a.m.

OVERVIEW OF THE EXISTING NOISE ENVIRONMENT

This section describes the existing noise environment in the project site vicinity. Noise monitoring and traffic noise modeling were used to quantify existing and future noise levels at the project site.

In Genoa Township, vehicle traffic is the primary source of noise. Other significant local noise sources include railroad noise, airport noise, industrial noise, construction noise, and mechanical equipment noise.

EXISTING NOISE LEVEL MEASUREMENTS

To assess existing noise levels, LSA conducted two long-term noise measurements in the vicinity of the project site. The long-term noise measurements were recorded for 24 hours between October 9 and October 10, 2023. The long-term noise measurements captured hourly L_{eq} data. Sources that dominate the existing noise environment include traffic on Latson Road. Noise measurement data collected during long-term noise monitoring are summarized in Table D and shown on Figure 3. Noise measurement sheets are provided in Appendix A.

Table D: Long-Term Noise Level Measurements

Location	Daytime Noise Levels[1] (dBA L_{eq})	Nighttime Noise Levels[2] (dBA L_{eq})
LT-1: On a utility pole north of project site, approximately 160 feet from the Latson Road centerline.	62.5 – 70.4	52.5 – 64.1
LT-2: On a tree near northwest of Prentis Estates Apartments, approximately 250 feet from the Latson Road centerline.	60.0 – 64.6	53.2 – 62.1

Source: Compiled by LSA Associates, Inc. (2023).
[1] Noise levels during the hours from 7:00 a.m. to 10:00 p.m.
[2] Noise levels during the hours from 10:00 p.m. to 7:00 a.m.
L_{dn} = day-night sound Level
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

LSA

FIGURE 3

LEGEND

Project Site Boundary

LT-1 Long-term Noise Monitoring Location

N

0 200 400

FEET

SOURCE: Google Earth 2023

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1050 Latson Mister Car Wash

Noise Monitoring Locations

PROJECT IMPACTS

LONG-TERM OPERATIONAL NOISE IMPACTS

The proposed car wash operations could affect existing off-site sensitive land uses. The two main stationary sources of noise include noise generated by the car wash tunnel and vacuum equipment. Operations of the car wash are expected to take place within the daytime hours between 7:00 a.m. and 10:00 p.m. It is assumed that no operations would occur during nighttime hours. The following provides a detailed noise analysis and discussion of each stationary noise source.

Car Wash Operations

The project would construct a drive-through car wash with a total of 19 vacuum stations that would generate operational noise.

The vacuum stations are powered by equipment east of the project site, as shown on Figure 2. Based on reference noise specifications from noise measurements conducted by LSA at a similar Mister Car Wash (LSA 2023), the turbine used for this project would generate a noise level of 74.9 dBA at 10 feet, and each of the vacuum stations would generate a noise level of 74.3 dBA at 2 feet. For the purposes of this noise analysis, both vacuum equipment locations were assumed to be in operation simultaneously. The vacuum turbine is surrounded by a 6-foot-tall enclosure.

Based on reference noise level measurements gathered at a similar Mister Car Wash, noise levels at the car wash tunnel exit are 78.7 dBA L_{eq} at a distance of 25 feet. Additionally, noise levels at the car wash tunnel entrance are 75.8 dBA L_{eq} at a distance of 25 feet.

To determine the effect of future noise levels generated by the proposed project on noise-sensitive uses, a 3-D noise model (i.e., SoundPLAN) was used to incorporate the site topography, existing property line walls, existing and proposed buildings, and stationary noise sources. Printouts of the SoundPLAN noise model are presented in Appendix B.

Cumulative Unmitigated Impact Assessment

As shown on the SoundPLAN printouts in Appendix B, noise levels generated by the car wash operations would be below 80 dBA L_{eq} at the property line of the closest residential uses to the southeast. Because noise levels would not exceed the applicable criteria of 80 dBA L_{eq}, project operations would comply with the desired noise criteria.

CONCLUSION

The proposed project would not generate on-site stationary noise from car wash operations resulting in noise levels above 80 dBA L_{eq} at the nearest sensitive uses and would comply with the Township's noise standards. Should car wash operations occur outside of the daytime hours of 7:00 a.m. to 10:00 p.m., noise levels may exceed the Township's nighttime standard of 50 dBA L_{eq} or the minimum existing ambient noise levels of approximately 53 dBA L_{eq} at the residential uses to the southeast.

REFERENCES

California Department of Transportation (Caltrans). 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. September.

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual. FTA Report 0123*. Office of Planning and Environment. September.

Genoa Township. 2023. *Code of Ordinances*.

LSA Associates, Inc. (LSA). 2023. *Mister Car Wash Sartell Noise Measurements*. January 11.

APPENDIX A

NOISE MEASUREMENT SHEETS

Noise Measurement Survey – 24 HR

Project Number: 20231136
Project Name: 1050 Latson Rd MCW

Test Personnel: Moe Abushanab
Equipment: Spark 706RC (SN:17815)

Site Number: LT-1 Date: 10/9/23

Time: From 4:00 p.m. To 4:00 p.m.

Site Location: Located on a utility pole north of project site, approximately 160 feet away from the Latson Road centerline.

Primary Noise Sources: Vehicle traffic noise on Latson Road and adjacent commercial uses

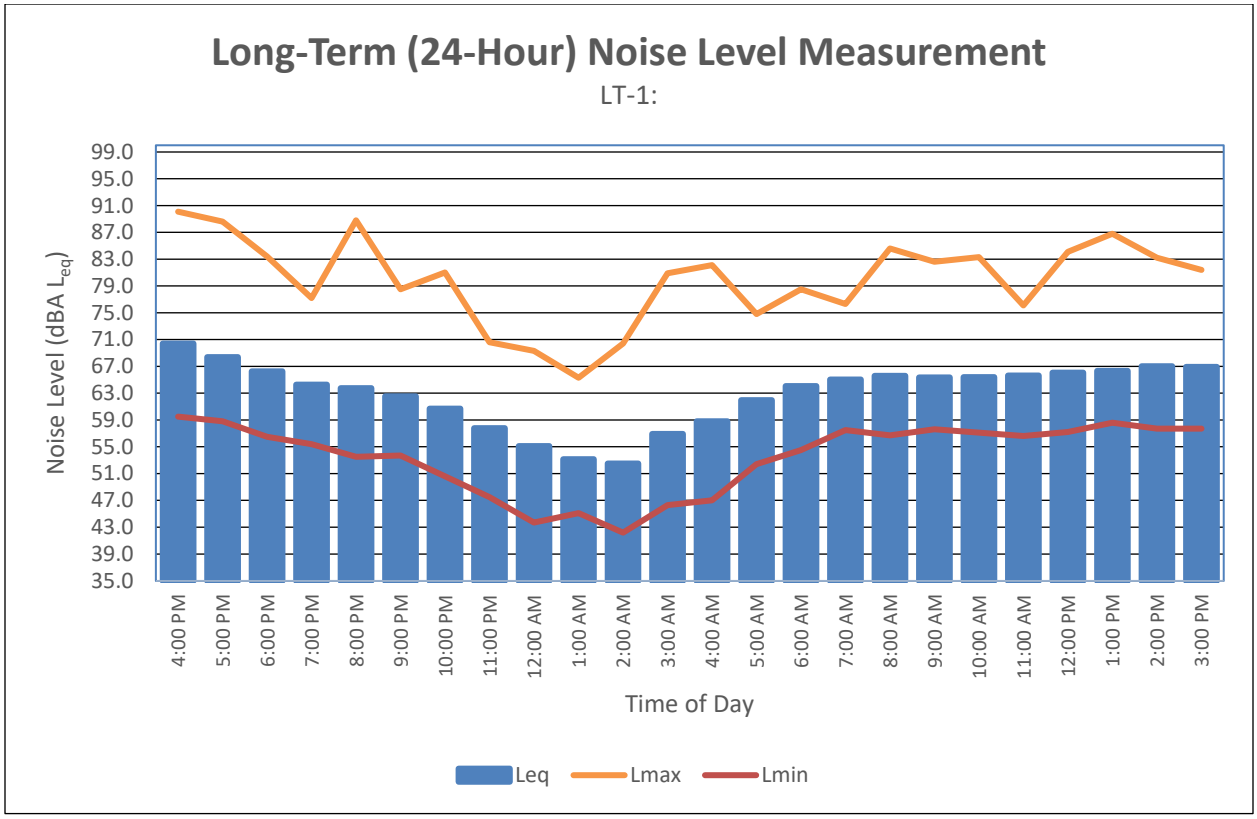
Comments:

Photo:

Long-Term (24-Hour) Noise Level Measurement Results at LT-1

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
4:00 PM	10/9/23	70.4	90.1	59.5
5:00 PM	10/9/23	68.4	88.6	58.8
6:00 PM	10/9/23	66.2	83.4	56.5
7:00 PM	10/9/23	64.3	77.2	55.4
8:00 PM	10/9/23	63.7	88.8	53.5
9:00 PM	10/9/23	62.5	78.5	53.7
10:00 PM	10/9/23	60.7	81.0	50.6
11:00 PM	10/9/23	57.8	70.6	47.5
12:00 AM	10/10/23	55.1	69.3	43.7
1:00 AM	10/10/23	53.1	65.3	45.1
2:00 AM	10/10/23	52.5	70.4	42.2
3:00 AM	10/10/23	56.9	80.9	46.3
4:00 AM	10/10/23	58.8	82.1	47.0
5:00 AM	10/10/23	62.0	74.8	52.4
6:00 AM	10/10/23	64.1	78.5	54.5
7:00 AM	10/10/23	65.0	76.3	57.5
8:00 AM	10/10/23	65.6	84.6	56.7
9:00 AM	10/10/23	65.3	82.6	57.6
10:00 AM	10/10/23	65.4	83.3	57.1
11:00 AM	10/10/23	65.6	76.1	56.6
12:00 PM	10/10/23	66.1	84.1	57.2
1:00 PM	10/10/23	66.3	86.8	58.6
2:00 PM	10/10/23	67.0	83.2	57.7
3:00 PM	10/10/23	66.9	81.4	57.7

Source: Compiled by LSA Associates, Inc. (2023).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level


Long-Term (24-Hour) Noise Level Measurement
LT-1:
Noise Level (dBA Leq)
99.0
95.0
91.0
87.0
83.0
79.0
75.0
71.0
67.0
63.0
59.0
55.0
51.0
47.0
43.0
39.0
35.0
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
Time of Day
Leq
Lmax
Lmin

Noise Measurement Survey – 24 HR

Project Number: 20231136
Project Name: 1050 Latson Rd MCW

Test Personnel: Moe Abushanab
Equipment: Spark 706RC (SN:18571)

Site Number: LT-2 Date: 10/9/23

Time: From 4:00 p.m. To 4:00 p.m.

Site Location: Located on a tree near northwest of Prentis Estates Apartments, approximately 250 feet away from the Latson Road centerline.

Primary Noise Sources: Vehicle traffic noise on Latson Road

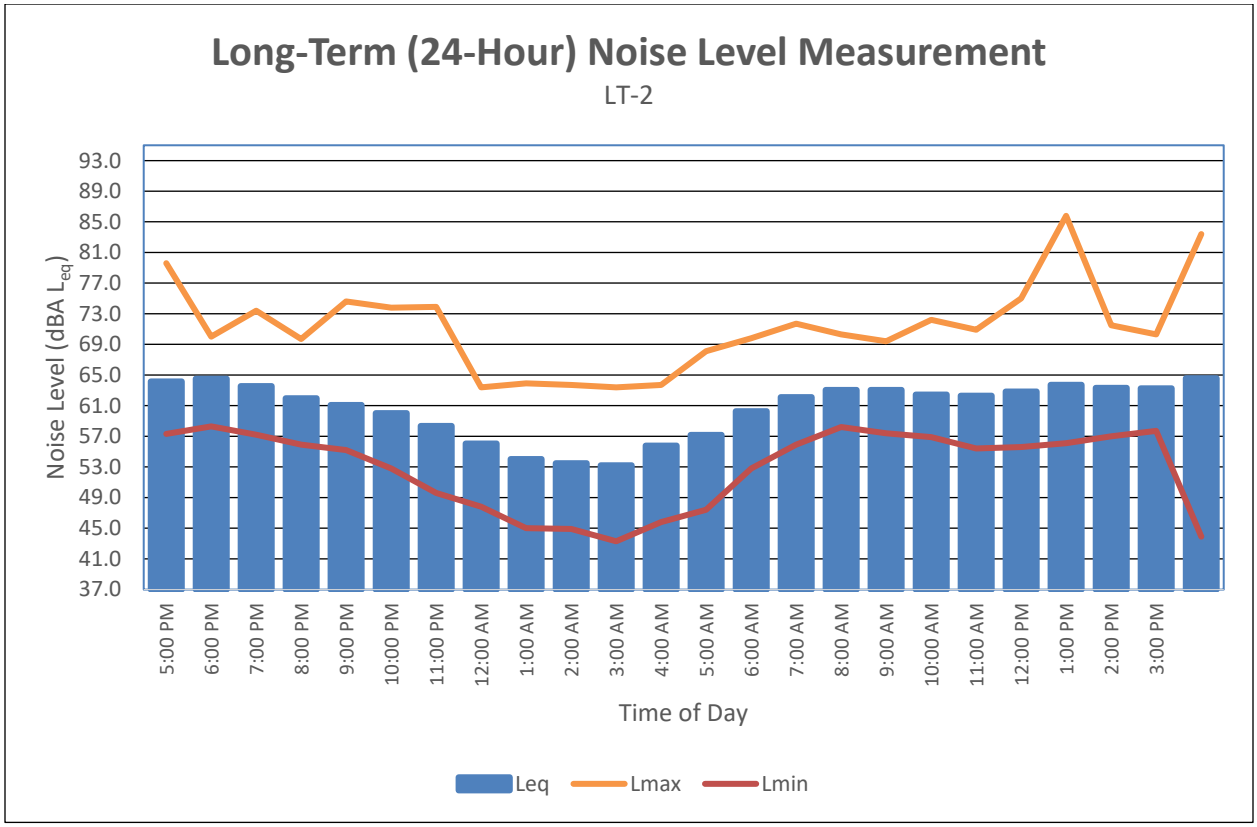
Comments:

Photo:

Long-Term (24-Hour) Noise Level Measurement Results at LT-2

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
4:00 PM	10/9/23	64.2	79.6	57.3
5:00 PM	10/9/23	64.5	70.0	58.3
6:00 PM	10/9/23	63.6	73.4	57.2
7:00 PM	10/9/23	62.0	69.7	55.9
8:00 PM	10/9/23	61.1	74.6	55.2
9:00 PM	10/9/23	60.0	73.8	52.8
10:00 PM	10/9/23	58.4	73.9	49.6
11:00 PM	10/9/23	56.1	63.4	47.8
12:00 AM	10/10/23	54.0	63.9	45.0
1:00 AM	10/10/23	53.5	63.7	44.9
2:00 AM	10/10/23	53.2	63.4	43.3
3:00 AM	10/10/23	55.8	63.7	45.8
4:00 AM	10/10/23	57.2	68.1	47.4
5:00 AM	10/10/23	60.3	69.8	52.8
6:00 AM	10/10/23	62.1	71.7	55.9
7:00 AM	10/10/23	63.1	70.3	58.2
8:00 AM	10/10/23	63.0	69.4	57.4
9:00 AM	10/10/23	62.5	72.2	56.9
10:00 AM	10/10/23	62.3	70.9	55.4
11:00 AM	10/10/23	62.8	75.0	55.6
12:00 PM	10/10/23	63.7	85.8	56.1
1:00 PM	10/10/23	63.3	71.5	57.0
2:00 PM	10/10/23	63.3	70.3	57.7
3:00 PM	10/10/23	64.6	83.4	43.9

Source: Compiled by LSA Associates, Inc. (2023).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level


Long-Term (24-Hour) Noise Level Measurement
LT-2
Noise Level (dBA Leq)
93.0
89.0
85.0
81.0
77.0
73.0
69.0
65.0
61.0
57.0
53.0
49.0
45.0
41.0
37.0
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
Time of Day
Leq
Lmax
Lmin

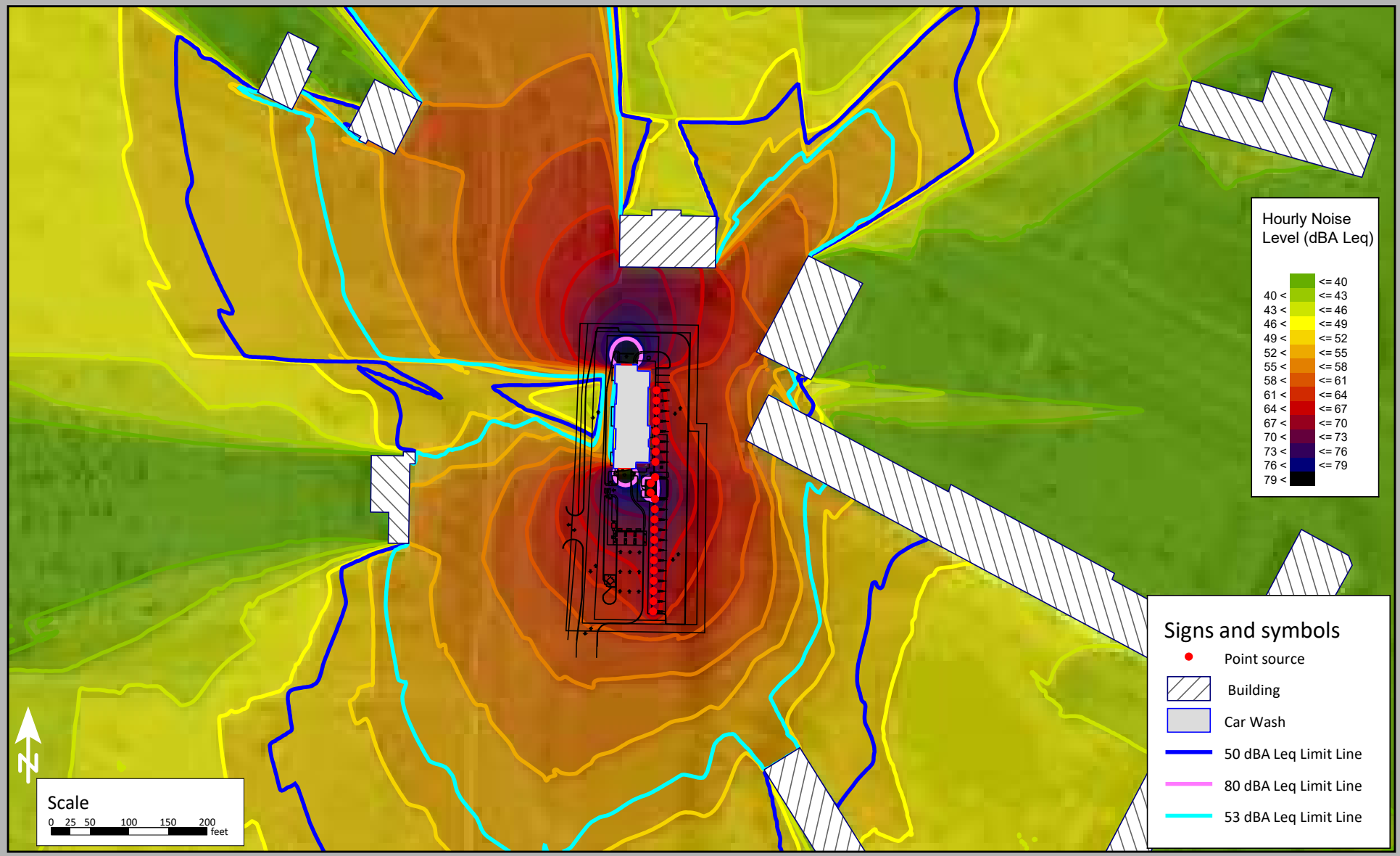
APPENDIX B

SOUNDPLAN NOISE MODEL PRINTOUTS

1495 Laston Rd Howell MCW

Project No. 20231136

Project Operational Noise Levels



C:\Users\JStephens\Desktop\SOUNDPLAN_FILES\20231136 - 1050 Latson Rd Howell MCW\Ops.sgs - last edit 11/1/2023

SITE PLAN
FOR
MISTER CAR WASH
PART OF NW QUARTER, SECTION 4
GENOA CHARTER TOWNSHIP, LIVINGSTON COUNTY, MI

PROPERTY DESCRIPTION:

PROPERTY DESCRIPTION PER METRO CONSULTING ASSOCIATES PROJECT #1037-17-8480 DATED 01-19-18 PARCEL #4711-04-300-017

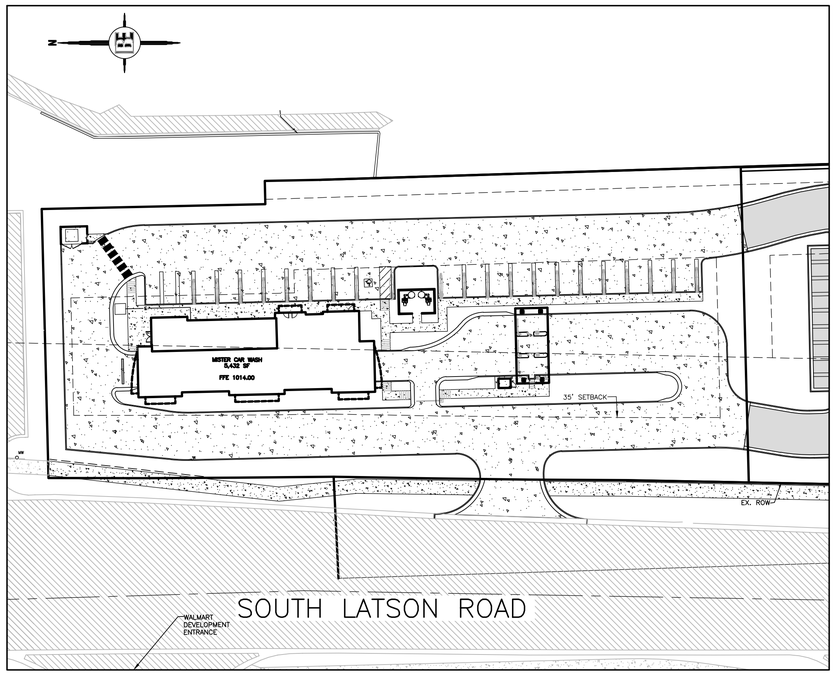
Commencing at the Southwest Corner of Section 4, Town 2 North, Range 5 East, Genoa Township, Livingston County, Michigan, said corner being N01°46'11"W 19.43 feet from a point referenced in Quit Claim Deed dated January 29, 1957, recorded April 4, 1961 in Liber 391, Page 382, Livingston County Records; thence N87°18'40"E 56.81 feet along the North line of said Section 9 and the South line of said Section 4, as established and approved by the Livingston County Remonumentation Peer Group, dated June 6, 2002 and recorded in LSC# 718n, Livingston County Records to the POINT OF BEGINNING; thence 159.36 feet along the arc of a 10,060.00 foot radius non-tangential circular curve to the left, having a central angle of 00°54'27" having a chord which bears N00°15'46"W 159.36 feet along the East line of MDOT Right-of-Way as recorded in Instrument # 2011R-023812, Livingston County Records; thence N88°33'52"E 150.45 feet along the South line of Parcel 3 as described in a Warranty Deed recorded June 6, 2016, in Instrument # 2016R-019264 and the North line of the Consumers Power Company land per Warranty Deed recorded in 539, Page 13, Livingston County Records; thence S01°15'25"E 125.00 feet along said Consumers Power Company land and parallel with the West line of said Section 4; thence the following four (4) courses along the North, East and South line of a Quit-Claim Deed to Consumers Power Company, recorded in Liber 391, Page 382, Livingston County Records: (1) N88°33'52"E 12.94 feet (recorded as 13.00 feet), (2) S01°14'18"E 30.69 feet to the South line of said Section 4, (3) S01°46'21"E 557.91 feet and (4) S66°08'19"W 223.00 feet along the North line of the South 97.67 feet as stated in Warranty Deed recorded in Liber 232, Page 199, Livingston County Records; thence N01°46'11"W 61.11 feet along the West line of said Section 9 and within the Right-of-Way of Latson Road (variable width); thence S88°52'35"E 33.10 feet along the South line of MDOT Right-of-Way as recorded in Instrument # 2011R-023812; thence the following two (2) courses along said Right-of-Way: (1) N01°07'25"E 333.02 feet and (2) 163.72 feet along the arc of a 10,060.00 foot radius circular curve to the left, with a central angle of 00°55'57", having a chord which bears N00°39'26"E 163.71 feet to the POINT OF BEGINNING. Containing 2.09 acres of land, more or less. Being part of the SW. 1/4 of the SW. 1/4 of Section 4 and part of the NW. 1/4 of Section 9, Town 2 North, Range 5 East, Genoa Township, Livingston County, Michigan. Subject to the right of the Public over the West 33.00 feet thereof, as occupied by Latson Road (Variable Width), being subject to any other Easement and restrictions of record, if any.

RESULTANT PARCEL

PROPOSED PARCEL 1 (NORTH):

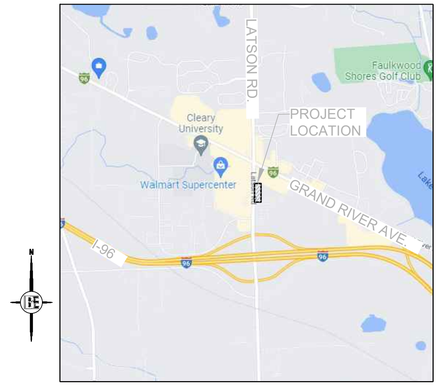
Part of the Northwest 1/4 of Section 9 and Part of the Southwest 1/4 of Section 4, T2N-R5E, Genoa Township, Livingston County, Michigan, more particularly described as follows: Commencing at the Northwest Corner of Section 9, also being the Southwest 1/4 of Section 4, said corner being North 01 degree 46 minutes 11 seconds West, 19.43 feet from a point referenced in Quit Claim Deed, dated January 29, 1957, recorded April 4, 1961 in Liber 391, Page 382, Livingston County Records; thence along the North line of Section 9 and the South line of Section 4, N 87°18'40" E, 56.81 feet, to the POINT OF BEGINNING of the Parcel to be described; thence along the East line of MDOT Right-of-Way for Latson Road, as recorded in Instrument # 2011R-023812, Livingston County Records, Northerly along an arc right, having a length of 159.36 feet, a radius of 10,060.00 feet, a central angle of 00°54'27", and a long chord which bears N 00°15'46" W, 159.36 feet; thence N 88°33'52" E, 150.45 feet; thence S 01°15'25" E, 125.00 feet; thence N 88°33'52" E, 12.94 feet; thence S 01°14'18" E, 30.69 feet, to a point on the South line of Section 4 and the North line of Section 9; thence S 01°46'21" E, 235.49 feet; thence S 88°33'38" W, 176.57 feet; thence along the East line of MDOT Right-of-Way for Latson Road, as recorded in Instrument #2011R-023812, Livingston County Records, the following two (2) courses: 1) N 01°07'25" E, 68.33 feet; 2) Northerly along an arc right, having a length of 163.71 feet, a radius of 10,060.00 feet, a central angle of 00°55'57", and a long chord which bears N 00°39'26" E, 163.71 feet, to the POINT OF BEGINNING, containing 1.48 acres, more or less, and including the use of Latson Road. Also subject to any other easements or restrictions of record.

Bearings are based on Michigan State Plane Coordinate System, South Zone and legal description per Chicago Title Insurance Company, File No.: 21040145- C, Policy No.: 7430600-224063018, dated 6-4-21:



OVERALL SITE MAP

NO SCALE



LOCATION MAP

NO SCALE

SHEET INDEX

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3	EXISTING CONDITIONS, DEMOLITION, & NATURAL FEATURES PLAN
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PLANS BY OTHERS

PRE-01	PRELIMINARY DUMPSTER ENCLOSURE PLAN & ELEVATIONS
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PXP	ELECTRICAL SITE PLAN - PHOTOMETRIC

PERMITS & APPROVALS

AGENCY	DATE SUBMITTED	DATE APPROVED
· TOWNSHIP ENGINEERING APPROVAL	-	-
· LCRC	-	-
· LCDC SESC	-	-
· EGLE - ACT 399	-	-

APPLICANT:
CWP WEST LLC
222 E 5TH AVE
TUCSON, AZ 85705
CONTACT: NICOLE KASTERN
PHONE: 206.664.1303
EMAIL: NKASTERN@MISTERCARWASH.COM

OWNER:
1015 LATSON ROAD LLC
29592 BECK RD
WIXOM, MI 48393
CONTACT: KEVIN BAHNAM
PHONE: 248.767.5337
EMAIL: KBAHNAM@USA2GOQUICKSTORES.COM

PREPARED BY:
BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670
CONTACT: SCOTT TOUSIGNANT, P.E.
EMAIL: SCOTTT@BOSSENG.COM

STATE OF MICHIGAN - LICENSED - SCOTT T. TOUSIGNANT - ENGINEER - No. 6201041872 - PROFESSIONAL ENGINEER

INDEMNIFICATION STATEMENT

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

FOR SITE PLAN APPROVAL ONLY!
NOT FOR CONSTRUCTION

NO	BY	CK	REVISION	DATE	JOB NO: 21-519
1	ST	ST	PER TOWNSHIP COMMENTS	10-25-23	ISSUE DATE: 10/04/23

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GENERAL NOTES

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

INDEMNIFICATION STATEMENT

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

CONTRACTOR TO FOLLOW MANUFACTURER SPECS/RECOMMENDATIONS THAT SUPERCEDE PLANS

GENERAL GRADING & SESC NOTES

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

GENERAL LANDSCAPE NOTES

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

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

    SEED MIXTURE SHALL BE AS FOLLOWS:

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

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

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

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

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

GENERAL UTILITY NOTES

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

GENERAL STORM NOTES

1. ALL STORM PIPE LENGTHS ARE SHOWN FROM C/L TO C/L OF STRUCTURE OR FROM C/L OF STRUCTURE TO DISCHARGE END OF FLARED END SECTION.
2. STORM PIPE MATERIALS SHALL BE AS FOLLOWS:
   2.1. RCP(REINFORCED CONCRETE PIPE): SHALL MEET THE REQUIREMENTS OF ASTM C76 WITH MODIFIED GROOVED TONGUE AND RUBBER GASKETS MEETING THE REQUIREMENTS OF ASTM C443. RCP TO BE EITHER CLASS IV OR V AS CALLED OUT ON THE PLANS.
   2.2. HDPE(HIGH DENSITY POLYETHYLENE): SHALL MEET THE REQUIREMENTS OF ASTM F2648.
   2.3. PP(POLYPROPYLENE): SHALL MEET THE REQUIREMENTS OF ASTM F2881.
   2.4. PVC(POLYVINYL CHLORIDE): SHALL MEET THE REQUIREMENTS OF ASTM D3034.
3. STORM PIPE JOINTS SHALL MEET THE REQUIREMENTS OF ASTM D3212. HDPE AND PP PIPE GASKETS SHALL MEET THE REQUIREMENTS OF ASTM F477.
4. ALL STORM PIPE TO HAVE WATERTIGHT PREMIUM JOINTS, UNLESS OTHERWISE NOTED ON THE PLANS.
5. STORM DRAINAGE STRUCTURES SHALL BE FURNISHED WITH STEPS WHICH SHALL BE STEEL ENCASED WITH POLYPROPYLENE PLASTIC OR EQUIVALENT. STEPS SHALL BE SET AT 16" CENTER TO CENTER.
6. ALL FLARED END SECTIONS 15" AND LARGER SHALL BE FURNISHED WITH AN ANIMAL GRATE.
7. FLARED END SECTIONS DISCHARGING STORM WATER SHALL RECEIVE A MINIMUM OF 10 SQ YDS OF PLAIN COBBLESTONE RIP RAP WITH A MINIMUM STONE SIZE OF 6" AND SHALL BE PLACED ON A GEOTEXTILE FABRIC WRAP.
8. ALL CATCH BASINS WITHIN THE ROADWAY SHALL INCLUDE INSTALLATION OF 6" DIAMETER PERFORATED PIPE SUBDRAIN.
9. STORM DRAINAGE STRUCTURE COVERS SHALL BE OF THE FOLLOWING (OR APPROVED EQUAL):

TYPE	LOCATIION	FRAME	COVER/INLET
'MH'	ALL	1040	SANITARY–SOLID SELF–SEALING STORM–VENTED
'CB'	TYPE A CURB	7000–T1–M1	FLAT GRATE WITH VERT. OPEN BACK
'CB'	TYPE B CURB	7065–T1–M1	FLAT GRATE WITH ROLL BACK
'CB'	PAVEMENT/SHOULDER	1020–M1	FLAT GRATE
'CB'	OPEN AREA	1020–01	BEEHIVE GRATE 4" HIGH
'CB'	GUTTER	5100	CONCAVE INLET

GENERAL SANITARY NOTES

1. ALL SANITARY PIPE LENGTHS ARE SHOWN FROM C/L OF STRUCTURE TO C/L OF STRUCTURE.
2. SANITARY PIPE MATERIALS SHALL BE AS FOLLOWS:
   2.1. PVC SDR–26 (SANITARY MAIN)
   2.2. PVC SDR–23.5 (SANITARY LEADS)
   2.3. HDPE DR–11 (SANITARY FORCEMAIN)
3. ALL PVC SDR SANITARY SEWER PIPE SHALL MEET THE REQUIREMENTS OF ASTM D3034 AND D2241. PVC SCHD 40 PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785. GASKET JOINTS FOR SANITARY PIPE SHALL MEET THE REQUIREMENTS OF ASTM D3139 AND D3212.
4. SANITARY STRUCTURES SHALL BE FURNISHED WITH STEPS WHICH SHALL BE STEEL ENCASED WITH POLYPROPYLENE PLASTIC OR EQUIVALENT. STEPS SHALL BE SET AT 16" CENTER TO CENTER.
5. ALL NEW MANHOLES SHALL BE MINIMUM 4' DIAMETER, PRECAST MANHOLE SECTIONS AND AN ECCENTRIC CONE. PRECAST MANHOLE JOINTS SHALL BE INSTALLED WITH BUTYL ROPE MEETING THE REQUIREMENTS OF ASTM C990.
6. MANHOLES SHALL BE CONSTRUCTED WITH FLOW CHANNEL WALLS THAT ARE FORMER, AT A MINIMUM, TO THE SPRINGLINE OF THE PIPE.
7. ALL NEW MANHOLES SHALL HAVE AN APPROVED FLEXIBLE, WATERTIGHT SEALS WHERE PIPES PASS THROUGH MANHOLE WALLS.
8. WHEREVER AN EXISTING MANHOLE IS TO BE TAPPED, THE STRUCTURE SHALL BE CORED AND A KOR–N–SEAL BOOT UTILIZED FOR THE PIPE CONNECTION.
9. ALL MANHOLES SHALL BE PROVIDED WITH WATERTIGHT COVERS. COVERS TO BE EJCO 1040 TYPE 'A' SOLID COVER.
10. A MAXIMUM OF 12" OF GRADE ADJUSTMENT RINGS SHALL BE USED TO ADJUST THE FRAME ELEVATION. BUTYL ROPE SHALL BE USED BETWEEN EACH ADJUSTMENT RING.
11. SANITARY SEWER LATERALS SHALL HAVE A MINIMUM SLOPE OF 1.0%.
12. CLEANOUTS SHALL BE INSTALLED EVERY 100', AT ALL BENDS AND STUBS.
13. PUBLIC SANITARY SEWER SHALL BE CENTERED WITHIN A 20 FOOT WIDE SANITARY SEWER EASEMENT.

GENERAL WATERMAIN NOTES

1. WATERMAIN PIPE MATERIALS SHALL BE AS FOLLOWS:
   1.1. D.I.P. CL.52 (WATERMAIN)
   1.2. TYPE 'K' COPPER (WATER LATERAL – MAIN TO CURB STOP)
   1.3. HDPE DR–9 (WATER LATERAL – CURB STOP TO STUB)
2. WATERMAIN FITTINGS SHALL BE OF DUCTILE IRON WITH CEMENT MORTAR LINING AND MECHANICAL JOINTS CONFORMING TO AWWA C110.
3. WATERMAINS SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C651. BAC–T SAMPLES SHALL BE TAKEN IN ACCORDANCE WITH R235.11110 OF THE ADMINISTRATIVE RULES PROMULGATED UNDER MICHIGAN SAFE DRINKING WATER ACT, 1976 PA 399, AS AMENDED.
4. ALLOWABLE LEAKAGE OR HYDROSTATIC PRESSURE TESTING SHALL BE IN ACCORDANCE WITH AWWA C600 AND C605.
5. MAXIMUM DEFLECTION AT PIPE JOINTS SHALL BE IN ACCORDANCE WITH PIPE MANUFACTURERS CURRENT RECOMMENDATIONS AND AWWA SPECIFICATIONS.
6. A FULL STICK OF PIPE SHALL BE LAID CENTERED AT A PIPE CROSSING IN ORDER TO MAINTAIN THE MAXIMUM SEPARATION OF WATERMAIN JOINT TO THE CROSSING PIPE.
7. WATERMAIN SHALL BE INSTALLED WITH A MINIMUM OF 5.5' OF COVER FROM FINISHED GRADE TO TOP OF PIPE AND NO MORE THAN 8' OF COVER, UNLESS SPECIAL CONDITIONS WARRANT.
8. WATERMAIN VALVES SHALL BE IRON BODY RESILIENT WEDGE GATE VALVES, NON–RISING STEMS, COUNTERCLOCKWISE OPEN, AWWA C509.
9. FIRE HYDRANTS SHALL BE INSTALLED WITH AN AUXILIARY VALVE WITH CAST IRON VALVE BOX. THE HYDRANT PUMPER HOSE CONNECTION SHALL FACE THE ROADWAY.
10. THE BREAKAWAY FLANGE AND ALL BELOW GRADE FITTINGS SHALL HAVE STAINLESS STEEL NUTS AND BOLTS.
11. PUBLIC WATERMAIN SHALL BE CENTERED WITHIN A 25 FOOT WIDE WATERMAIN EASEMENT.

LINES & HATCHES LEGEND

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

LIGHTING LEGEND

PROPOSED (PR)	EXISTING (EX)	
		DOUBLE FIXTURE LIGHT POLE
		SINGLE FIXTURE LIGHT FIXTURE
		WALL MOUNTED LIGHT FIXTURE
		GROUND LIGHT FIXTURE
.0.1		FOOT CANDLES ON SITE
.2.5		FOOT CANDLES OFF SITE
5		FOOT CANDLES CONTOURS
		CANOPY MOUNTED LIGHT FIXTURE

LANDSCAPE LEGEND

- EXISTING CONIFER TREE
- EXISTING DECIDUOUS TREE
- PROPOSED CONIFER TREE
- PROPOSED DECIDUOUS TREE
- PROPOSED TREE PROTECTION
- PROPOSED ORNAMENTAL TREE
- PROPOSED DECIDUOUS SHRUBS
- SOD
- PROPOSED GRASSES & PERENNIALS
- SEED
- PROPOSED LANDSCAPE BOULDER
- MULCH

SYMBOL LEGEND

- STORM DRAINAGE FLOW
- GUY WIRE
- POWER POLE
- TRANSFORMER PAD
- ELECTRICAL RISER
- U.G. ELECTRIC MARKER
- ELECTRICAL METER
- AIR CONDITIONING UNIT
- TELEPHONE RISER
- U.G. TELEPHONE MARKER
- GAS RISER
- U.G. GAS MARKER
- GAS METER
- CABLE TV RISER
- U.G. CABLE TV MARKER
- MAILBOX
- WELL
- WATER MANHOLE
- GATE VALVE (EXISTING)
- GATE VALVE (PROPOSED)
- HYDRANT (EXISTING)
- HYDRANT (PROPOSED)
- CATCH BASIN (EXISTING)
- YARD CATCH BASIN (EXISTING)
- CATCH BASIN (PROPOSED)
- STORM MANHOLE (EXISTING)
- STORM MANHOLE (PROPOSED)
- END SECTION (EXISTING)
- END SECTION (PROPOSED)
- SANITARY MANHOLE (EXISTING)
- SANITARY MANHOLE (PROPOSED)
- PUMP CHAMBER
- TRAFFIC SIGN
- SIGN (EXISTING)
- SIGN (PROPOSED)
- SOIL BORING
- STEEL ROD SET
- STEEL ROD OR PIPE FOUND
- WOOD LATH SET
- HUB SET
- MONUMENT FOUND
- SECTION CORNER
- GAS PUMP
- ANTENNA
- SATELLITE DISH
- NEWSPAPER BOX
- PARKING METER
- PHONE BOOTH
- HANDICAP SYMBOL
- BENCHMARK
- LIGHT POLE

ABBREVIATIONS

FFE	FINISHED FLOOR ELEVATION
BFE	BASEMENT FLOOR ELEVATION
GFE	GARAGE FLOOR ELEVATION
FG	FINISHED GRADE
T/A	TOP OF ASPHALT
T/C	TOP OF CONCRETE/CURB
T/W	TOP OF WALK
T/P	TOP OF PIPE
B/P	BOTTOM OF PIPE
F/L	FLOW LINE
RIM	RIM ELEVATION (AT FLOW LINE)
INV	INVERT ELEVATION
MH	MANHOLE
CB	CATCH BASIN
RY	REAR YARD
YD	YARD DRAIN
RD	ROOF DRAIN
FES	FLARED END SECTION
CMP	CORRUGATED METAL PIPE
CPP	CORRUGATED PLASTIC PIPE
RCP	REINFORCED CONCRETE PIPE
HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL

SANITARY SEWER INVENTORY:

SAN MH1: RIM=1009.24; INV. N=1002.04 (8"); INV. S=1002.14 (8")

SAN MH2: RIM=1011.15; INV. N=1004.05 (8"); INV. S=1004.15 (8")

SAN MH3: RIM=1012.06; INV. N=1005.11 (8"); INV. S=1005.16 (8")

SAN MH4: RIM=1013.91; INV. N=1006.81 (8"); INV. S=1006.91 (8"); INV. E=1008.91 (6")

STORM SEWER INVENTORY:

LT23: RIM=1009.05 M; RIM=1009.35 R; INV. S=1003.27 R (15")

LT24: RIM=1009.36 M; RIM=1009.91 R; INV. S=1002.75 R (18"); INV. N=1002.85 R (15"); INV. E=1006.00 R (12"); INV. N=1006.90 R (12")

LT24A: RIM=1009.12 M; RIM=1009.51 R; INV. W=1006.50 (12")

LT24B: RIM=1009.64 M; RIM=1009.88 R; INV. S=1007.00 R (12")

LT21: RIM=1011.78 M; RIM=1012.20 R; INV. S=1001.10 R (24"); INV. N=1001.10 R (24")

LT21A: RIM=1011.61 M; RIM=1011.90 R; INV. S=1008.20 R (12")

LT20: RIM=1012.23 M; RIM=1012.25 R; INV. S=1000.90 R (24"); INV. N=1000.90 R (24"); INV. E=1007.00 R (12")

LT20A: RIM=1011.93 M; RIM=1012.25 R; INV. W=1008.00 R (12"); INV. N=1008.00 R (12")

STORM SEWER INVENTORY:

LT22: RIM=1010.55 M; RIM=1010.87 R; INV. S=1001.55 R (24"); INV. N=1001.65 R (18"); INV. E=1006.78 R (12"); INV. N=1006.90 R (12")

LT22A: RIM=1010.48 M; RIM=1010.85 R; INV. W=1007.10 R (12"); INV. N=1007.20 R (12")

LT22B: RIM=1010.40 M; RIM=1010.79 R; INV. S=1007.30 R (12")

LT22C: RIM=1010.46 M; RIM=1010.83 R; INV. S=1007.00 R (12")

LT19: RIM=1012.86 M; RIM=1013.18 R; INV. S=1000.70 R (24"); INV. N=1000.70 R (24"); INV. E=1008.00 R (12")

LT19A: RIM=1012.62 M; RIM=1012.94 R; INV. W=1009.00 R (12")

LT18: RIM=1013.17 M; RIM=1013.50 R; INV. S=1000.00 R (30"); INV. N=1000.50 R (24"); INV. E=1008.50 R (12")

LT18A: RIM=1013.07 M; RIM=1013.30 R; INV. W=1009.50 R (12")

GENERAL SURVEY NOTES:

1. BEARINGS WERE ESTABLISHED FROM METRO CONSULTING ASSOCIATES, JOB NO. SG-19193, DATED 01/19/2018.
2. SUBSURFACE UTILITIES NOT LOCATED FOR THIS SURVEY MAY EXIST. IT IS THE RESPONSIBILITY OF THE OWNER OF THE RESPECTIVE UTILITY TO ACCURATELY LOCATE SUCH UTILITIES.
3. EASEMENTS OR RESTRICTIONS OF RECORD NOT DEPICTED ON THIS DRAWING MAY EXIST.
4. ELEVATIONS WERE ESTABLISHED WITH GPS USING OPUS GPS POST-PROCESSING. (NAVD88 DATUM)
5. CONTOURS ARE SHOWN AT 1 FOOT INTERVALS.
6. THE LOCATIONS OF STORM SEWER, SANITARY SEWER & WATERMAIN, AS SHOWN ON THIS DRAWING ARE APPROXIMATE. THE LOCATIONS ARE BASED ON PHYSICAL FIELD LOCATIONS OF STRUCTURES ALONG WITH DRAWINGS SUPPLIED BY MDOT AND MHOG.
7. ALL WORK SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY, THE COUNTY, AND THE STATE OF MICHIGAN.
8. ALLOW THREE WORKING DAYS BEFORE YOU DIG, CALL MISS DIG TOLL FREE 1-800-482-7171.
9. THERE WAS SNOW ON THE GROUND AT THE TIME OF FIELDWORK FOR THIS SURVEY.

SOIL NOTES:

THE PROJECT SITE IS COMPRISED OF THE FOLLOWING SOIL TYPE ACCORDING TO THE USDA NATURAL RESOURCES CONSERVATION SERVICE:

CvraaB -- CONOVER LOAM, 0 TO 4 % SLOPES
MoB -- MIAMI LOAM, 2 TO 6 % SLOPES
Wh -- WASHTENAW SILT LOAM

SITE BENCHMARKS (NAVD88):

-BM #200 = NAIL/TAG S/S POWER POLE
ELEV.=1013.34
-BM #201 = NAIL/TAG NE/S POWER POLE
ELEV.=1014.28
-BM #202 = NAIL/TAG NE/S POWER POLE
ELEV.=1013.57
-BM #203 = NORTH EAST CORNER TRANS-PAD
ELEV.=1011.58

NATURAL FEATURES NARRATIVE:

NATURAL FEATURES WERE IDENTIFIED DURING AN ON-SITE VISIT TO THE PROPERTY ON SEPTEMBER 28, 2023. SITE IS VACANT AND PRIMARILY CAN BE DESCRIBED AS UNMANICURED TALL GRASS.

ENTIRE SITE IS RELATIVELY FLAT, WITH A LOWER ELEVATION AT LATSON ROAD. SITE SLOPES WESTERLY TO LATSON ROAD AT SLOPES OF 2-4%. SOILS ARE ALSO UNIFORM PER USDA NRCS SOILS DATA CONSISTING OF MIAMI LOAM FOR ABOUT 80% OF THE SITE. THE REMAINDER IS STATED AS WASHTENAW SILT LOAM AT THE EAST SIDE OF THE SITE AND A SMALL AREA OF CONOVER LOAM AT THE NORTHWEST CORNER OF THE SUBJECT SITE.

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

N

SCALE: 1 INCH = 20 FEET

651	Pinus resinosa	Red Pine	11", 15"	fair
652	Pinus resinosa	Red Pine	15"	fair
653	Pinus resinosa	Red Pine	10", 15", 17"	good
654	Pinus resinosa	Red Pine	10", 11"	good
Tag #	**Botanical Name**	**Common Name**	**Size**	**Condition**
655	Pinus resinosa	Red Pine	24"	good
656	Pinus sylvestris	Scotch Pine	20"	good
657	Pinus resinosa	Red Pine	21"	good
658	Pinus resinosa	Red Pine	16"	good
659	Pinus resinosa	Red Pine	11", 11"	good
660	Pinus resinosa	Red Pine	16"	good
661	Pinus resinosa	Red Pine	16"	good
662	Pinus resinosa	Red Pine	16"	poor
663	Pinus resinosa	Red Pine	16"	poor
664	Pinus resinosa	Red Pine	16"	poor
665	Pinus resinosa	Red Pine	16"	fair
666	Pinus resinosa	Red Pine	16"	fair
667	Pinus resinosa	Red Pine	16"	poor
668	Acer rubrum	Red Maple	6"	good
669	Acer rubrum	Red Maple	6.5"	good
670	Pyrus calleryana	Calley Pear	12"	good
671	Pyrus calleryana	Calley Pear	8"	good
672	Pyrus calleryana	Calley Pear	12"	good
673	Prunus avium	Sweet Cherry	12",6",6.5"	good
674	Prunus avium	Sweet Cherry	8",11"	good
675	Acer rubrum	Red Maple	7.5"	good
676	Acer rubrum	Red Maple	11"	good
677	Acer rubrum	Red Maple	5.5"	good
678	Acer saccharinum	Silver Maple	7.5"	good

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AND STRUCTURES AS SHOWN ON THIS PLAN ARE APPROXIMATE AND NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS PRIOR TO CONSTRUCTION AND SHALL NOTIFY THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND TO EXIST BETWEEN THE LOCATION OR DEPTH OF UTILITIES AS SHOWN ON THE PLANS AND FIELD CONDITIONS. IF ANY CONFLICTS ARE FOUND TO EXIST OR IF THE PROPOSED UTILITY CROSSINGS APPEAR TO BE IMPOSSIBLE DUE TO CONFLICTS OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY.

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171 IT'S THE LAW!! (MI PUBLIC ACT 53 OF 1974, AS AMENDED) FOR MEMBERS OF MICHIGAN UTILITIES NOTIFICATION CENTER

PARCEL # 11-04-300-010
COUNTRY CORNERS SHOPPING CENTER
4046 E GRAND RIVER
HOWELL, MI
9.13 AC
ZONED: GENERAL COMMERCIAL

RETAINING WALL

DETROIT. EDISON & M.B.T. EASEMENT CE DOC. #T65-147

PARCEL # 11-09-100-018
GENOA PLACE APTS II LLC
1165 S LATSON RD
HOWELL, MI
12.09 AC
ZONED: HIGH DENSITY RESIDENTIAL

S01°14'18"E 30.69'

S01°15'25"E 125.00'

N88°33'52"E 12.94'

S01°46'21"E 557.91'

10.0'

APPROXIMATE LOCATION OF DETROIT EDISON & SBC COMMUNICATION EASEMENT (RIGHT OF WAY) L. 4733, P. 578 (LCR).

PARCEL # "47ROAD" 3.79 AC ZONED: GENERAL COMMERCIAL

N88°33'52"E 150.45'

PARCEL # 11-04-300-017
1015 S LATSON RD
HOWELL, MI
2.89 AC +/-
ZONED: GENERAL COMMERCIAL

APPROXIMATE LOCATION OF AT&T TELEPHONE LINES IN THIS AREA.

APPROXIMATE LOCATION OF DETROIT. EDISON & M.B.T. EASEMENT CE DOC. #T65-147

P.O.B.

EXISTING CURB CUT DRIVEWAY APPROACH TBR PER LCRC

EXISTING CURB CUT, TBR

L=159.36'
R=10060.00'
D=0°54'27"
CH=N00°15'46"W
159.36'

L=163.71'
R=10060.00'
D=0°55'57"
CH=S00°39'26"W
163.71'

20.0'

79.6'

SAWCUT & REMOVE EXISTING CURB FOR PROPOSED M-OPENING

Sign TURN ONLY

Sign BL96

N87°18'40"E 56.81'

NW COR. SEC. 09 T2N-R5E (E-03)

WEST LINE SECTION 9

SOUTH S01°46'1

SOUTH LATSON ROAD

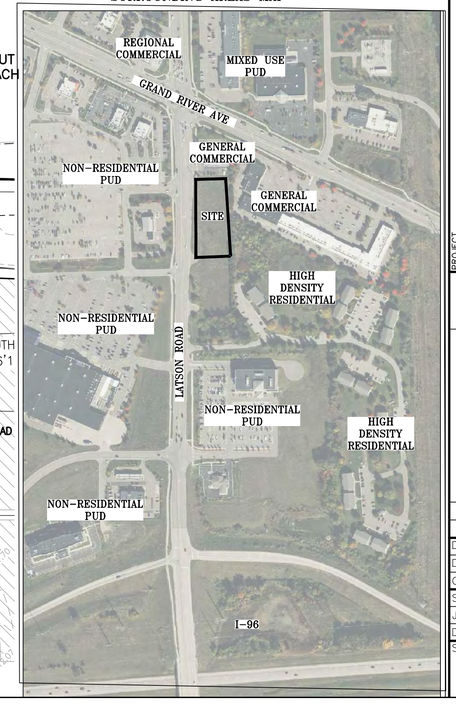
LATSON ROAD

WALMART DEVELOPMENT ENTRANCE

PARCEL # 11-05-400-049
3850 E GRAND RIVER
HOWELL, MI
22.30 AC
ZONED: PUD

PARCEL # 11-05-400-048
1050 S LATSON RD
HOWELL, MI
1.82 AC
ZONED: PUD

SURROUNDING AREAS MAP



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

PROJECT: MISTER CAR WASH

PREPARED FOR: CWP WEST LLC
221 E 5TH AVE
TACOMA, WA 98405
206.664.1393

TITLE: EXISTING CONDITIONS, DEMO & NATURAL FEATURES PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 3

BOSS Engineering

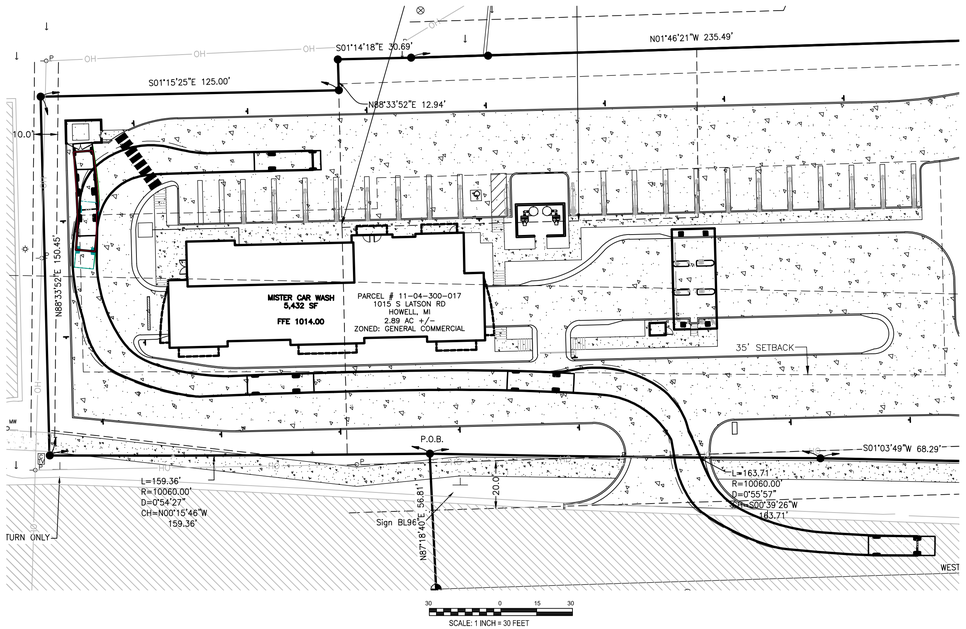
SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

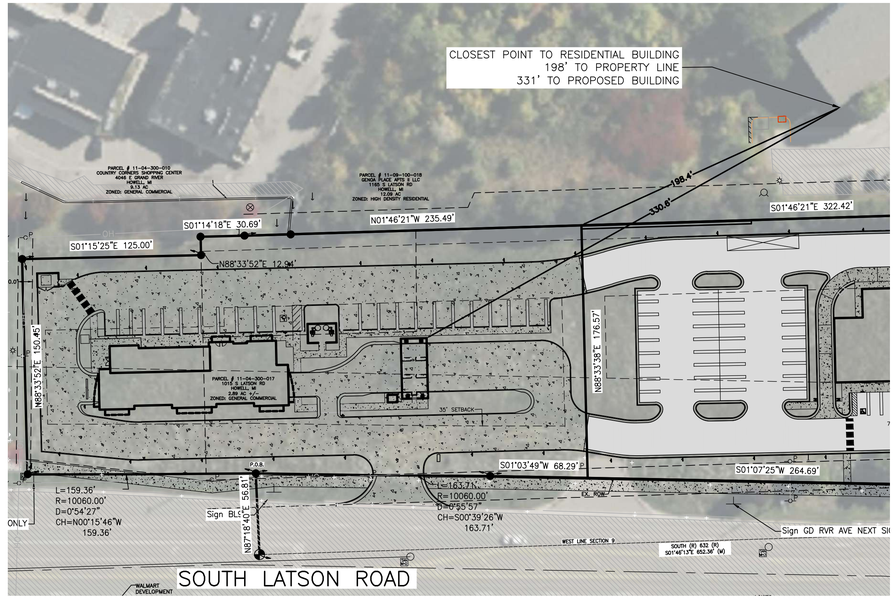
Hino 338 M + Wayne Royal GT14 Refuse Truck

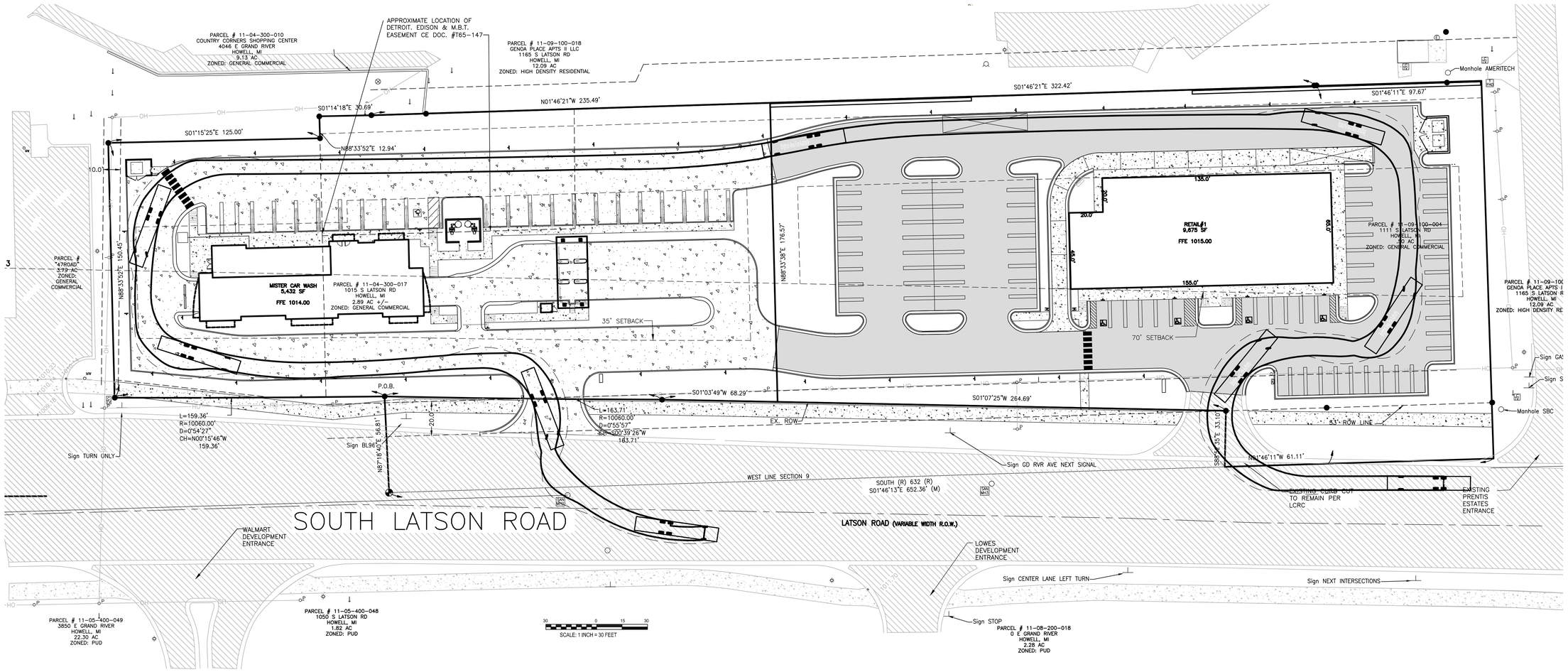
Overall Length	27.883ft
Overall Width	8.042ft
Overall Body Height	10.488ft
Min Body Ground Clearance	1.318ft
Track Width	8.042ft
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	27.400ft

Brighton Area Fire Authority

Overall Length	49.083ft
Overall Width	8.167ft
Overall Body Height	7.500ft
Min Body Ground Clearance	0.750ft
Track Width	8.167ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°







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3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
IT'S THE LAW!!!
PA 53 OF 1974 AS AMENDED

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

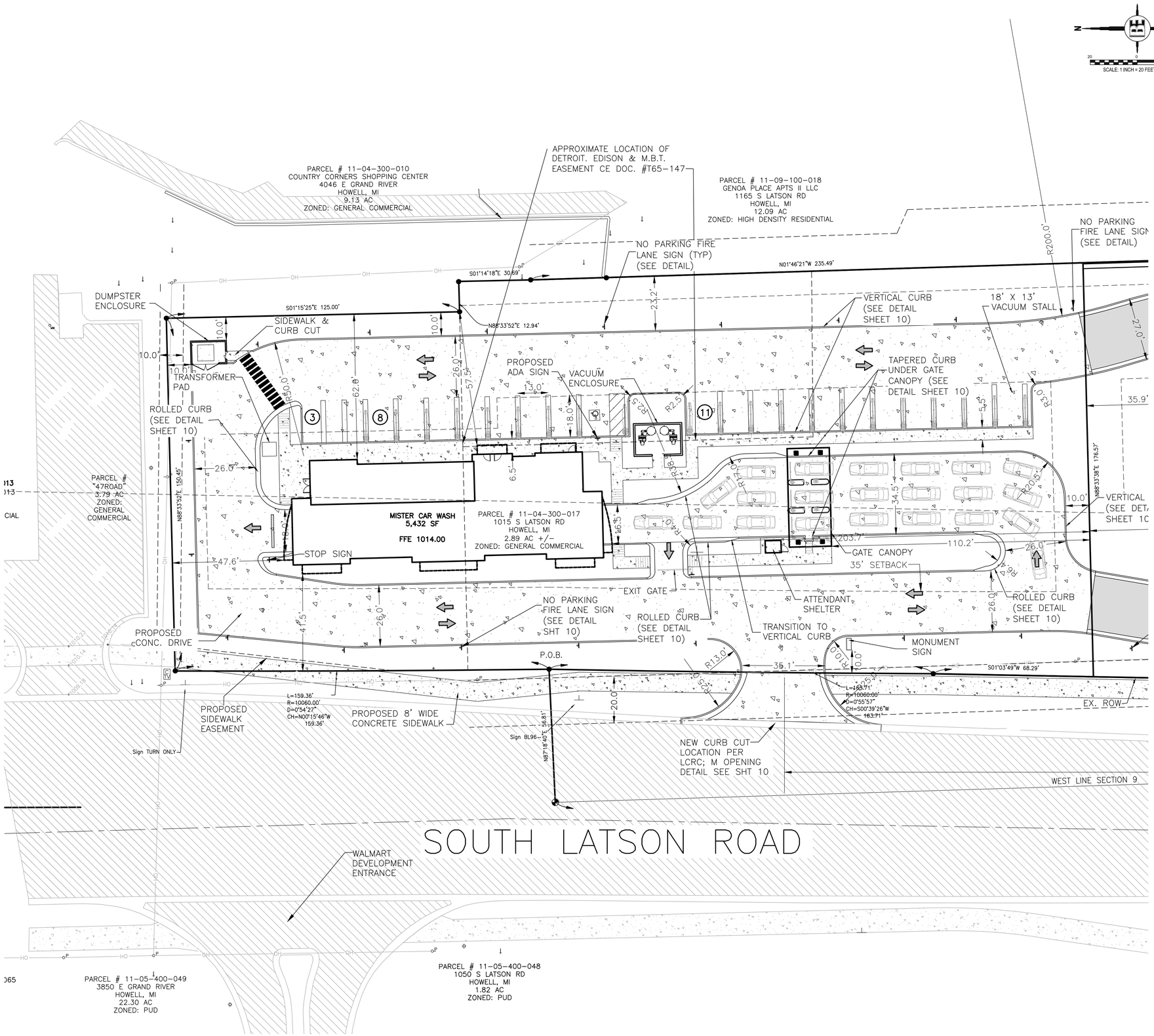
PROJECT
MISTER CAR WASH

PREPARED FOR
CWP WEST LLC
1222 E 5TH AVE
TUCSON, AZ 85705
206.664.1393

TITLE
OVERALL SITE PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE: VARIES
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 4



SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

SITE DATA
PARCEL # 4711-04-300-017
1015 S. LATSON RD
HOWELL, MI
GENOA TOWNSHIP
3.40 AC
ZONING: GENERAL COMMERCIAL DISTRICT (GCD)
CURRENT USE: VACANT

GENERAL COMMERCIAL DISTRICT
- MIN. LOT AREA: 1 ACRE
- MIN. LOT WIDTH: 150 FT
- BUILDING SETBACK: PROVIDED
  FRONT: 35 FT (IF NO PARKING IN FRONT YARD) 41.5 FT
  SIDE: 15 FT 47.6 FT
  REAR: 50 FT 57.5 FT

-PARKING SETBACK: PROVIDED
  FRONT: 20 FT 96.6 FT
  SIDE: 10 FT 10.0 FT
  REAR: 10 FT 10.0 FT

-MAX LOT COVERAGE: PROVIDED
  PARCEL AREA: 64,363 SFT (1.48 AC)
  BUILDING: 35% 6,616 SFT (10.3%)
  IMPERVIOUS: 75% 46,263 SFT (71.9%)

-MAX BUILDING HEIGHT: 35 FT (2 STORIES) 35.0 FT

PARKING CALCULATIONS:

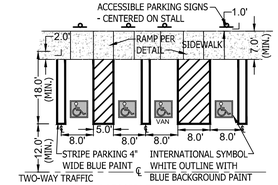
-AUTOMOBILE WASH: 2 SPACES PLUS 1 PER EMPLOYEE PER PEAK SHIFT
2 + 3 EMPLOYEES (PEAK SHIFT)

REQUIRED: 5 SPACES
PROVIDED: 22 SPACES (INCLUDES VACUUM SPACES WHICH ARE UTILIZED AS ADDITIONAL PARKING SPACES DURING TIMES OF EMPLOYEE SHIFT CHANGES)

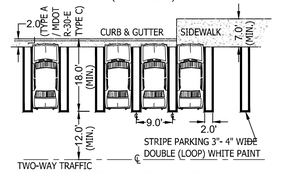
LOADING/UNLOADING SPACES: 10' x 50'
WAIVER REQUESTED: LOADING ZONE N/A FOR PROPOSED USE

GENERAL NOTES

1. ALL OUTDOOR LIGHTS SHALL BE SHIELDED TO REDUCE GLARE AND SHALL BE ARRANGED TO NOT INTERFERE WITH THE VISION OF PERSONS ON ADJACENT ROADWAYS OR ADJACENT PROPERTY.
2. ALL SIGNS SHALL MEET LOCAL MUNICIPALITY ORDINANCE REQUIREMENTS.
3. THE BUILDING ADDRESS SHALL BE A MINIMUM 6" HIGH LETTERS OF CONTRASTING COLORS AND BE CLEARLY VISIBLE FROM THE STREET. THE LOCATION AND SIZE SHALL BE VERIFIED PRIOR TO INSTALLATION.
4. A KEY BOX/KNOX BOX SHALL BE LOCATED NEAR THE FRONT ENTRY (FINAL LOCATION TO BE DETERMINED BETWEEN THE OWNER & FIRE MARSHALL).
5. ONE SIDE OF THE STREET SHALL BE MARKED AS A FIRE LANE AND SHALL HAVE APPROPRIATE SIGNAGE AT 50' INTERVALS.
6. ACCESS ROADS TO THE SITE SHALL BE PROVIDED AND MAINTAINED DURING CONSTRUCTION.
7. ACCESS ROADS SHALL BE CONSTRUCTED TO BE CAPABLE OF SUPPORTING THE IMPOSED LOAD OF FIRE APPARATUS WEIGHING AT LEAST 84,000 LBS.
8. A MINIMUM VERTICAL CLEARANCE OF 13.5 FEET SHALL BE MAINTAINED THROUGHOUT THE SITE. THIS INCLUDES ENCROACHMENTS FROM LARGE TREE CANOPIES, LIGHTING, ETC.
9. DURING THE CONSTRUCTION PROCESS, THE BUILDING WILL BE EVALUATED FOR EMERGENCY RESPONDER RADIO SIGNAL STRENGTH. IF COVERAGE IS FOUND TO BE QUESTIONABLE OR INADEQUATE; AN APPROVED CONTRACTOR SHALL BE HIRED TO PERFORM A GRID TEST OF THE FACILITY. IF THE SIGNAL STRENGTH COVERAGE IS FOUND TO BE NON-COMPLIANT, AN APPROVED EMERGENCY RESPONDER RADIO COVERAGE SYSTEM SHALL BE PROVIDED IN THE BUILDING.
10. SITE LIGHTING SHALL BE PLACED ON TIMERS TO BE OFF DURING NON-USE HOURS TO THE EXTENT POSSIBLE WHILE MAINTAINING SITE SAFETY. SITE LIGHTING SHALL BE PROGRAMMED TO TURN OFF AT NIGHT WHEN ACTIVITIES ARE NO LONGER OCCURRING ON THE PROPERTY.



TYPICAL ACCESSIBLE PARKING SPACE
(NOT TO SCALE)



TYPICAL PARKING SPACE
(NOT TO SCALE)

FOR SITE PLAN APPROVAL ONLY!
NOT FOR CONSTRUCTION

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN HEREON IS BASED ON RECORDS AVAILABLE AND IS NOT GUARANTEED AS TO ACCURACY OR COMPLETENESS. BY THE EXECUTION OF A CONTRACT, THE CONTRACTOR SHALL EXPRESSLY ACKNOWLEDGE THAT HE HAS SATISFIED HIMSELF AS TO THE LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITIES ACROSS, ALONG AND ADJACENT TO THE SITE PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE DISCOVERED FROM THE PLANS AS TO THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

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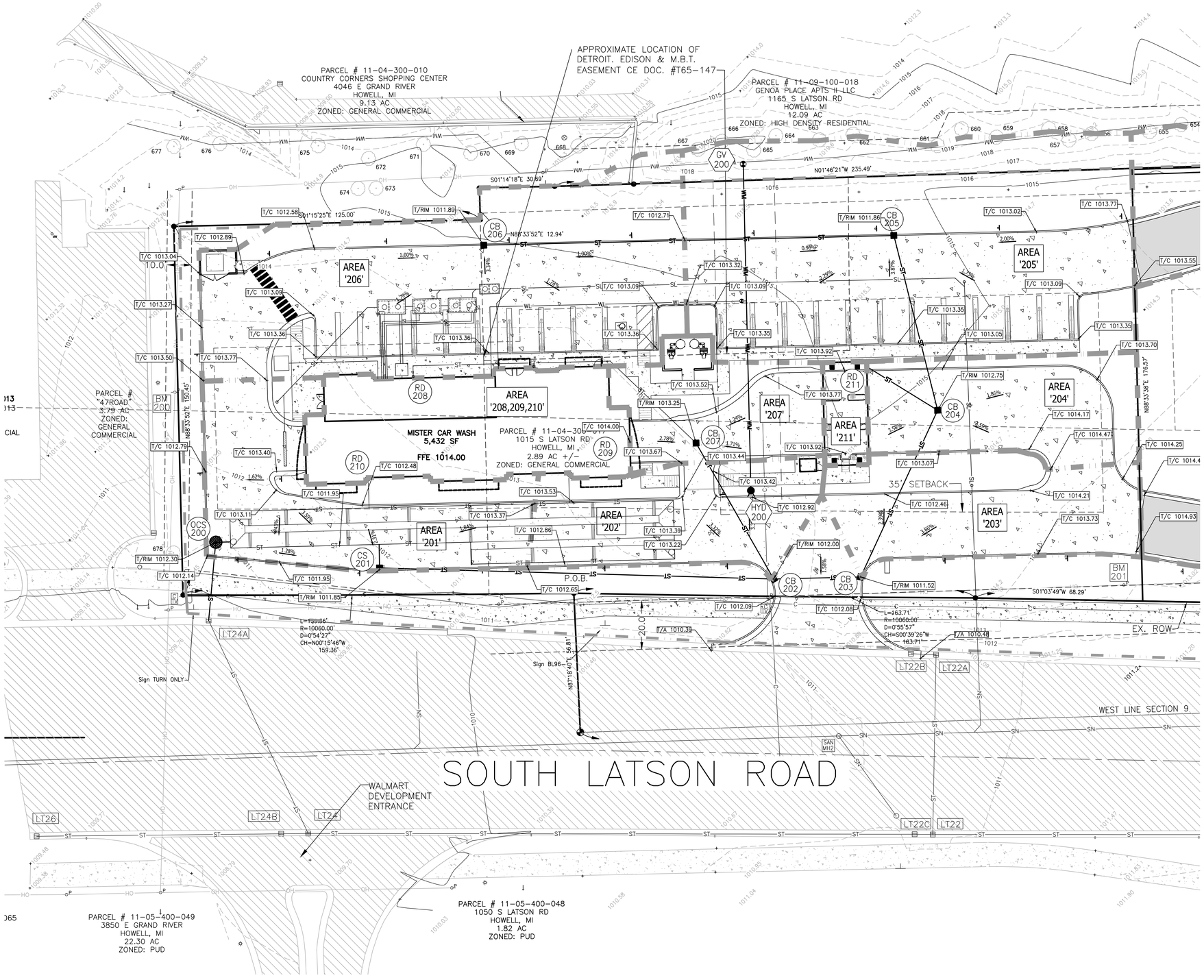
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT: MISTER CAR WASH
PREPARED FOR: CWP WEST LLC
222 E 5TH AVE
TUCSON, AZ 85705
206.664.1393
TITLE: SITE PLAN

NO	BY	DATE
1	ST	10-25-23
		PER TOWNSHIP COMMENTS REVISION PER

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 5



SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

DRAINAGE AREA TABLE				
DRAINAGE AREA	TOTAL AREA (AC)	IMP. AREA (AC)	C VALUE	A*C
200	-	-	-	-
201	0.15	0.13	0.81	0.12
202	0.10	0.09	0.78	0.08
203	0.12	0.09	0.73	0.08
204	0.10	0.08	0.76	0.08
205	0.37	0.20	0.57	0.21
206	0.31	0.22	0.71	0.22
207	0.08	0.06	0.75	0.06
208	0.05	0.05	0.90	0.04
209	0.04	0.04	0.90	0.03
210	0.04	0.04	0.90	0.03
211	0.02	0.02	0.90	0.02
TOTALS	1.38	1.01	0.71	0.99

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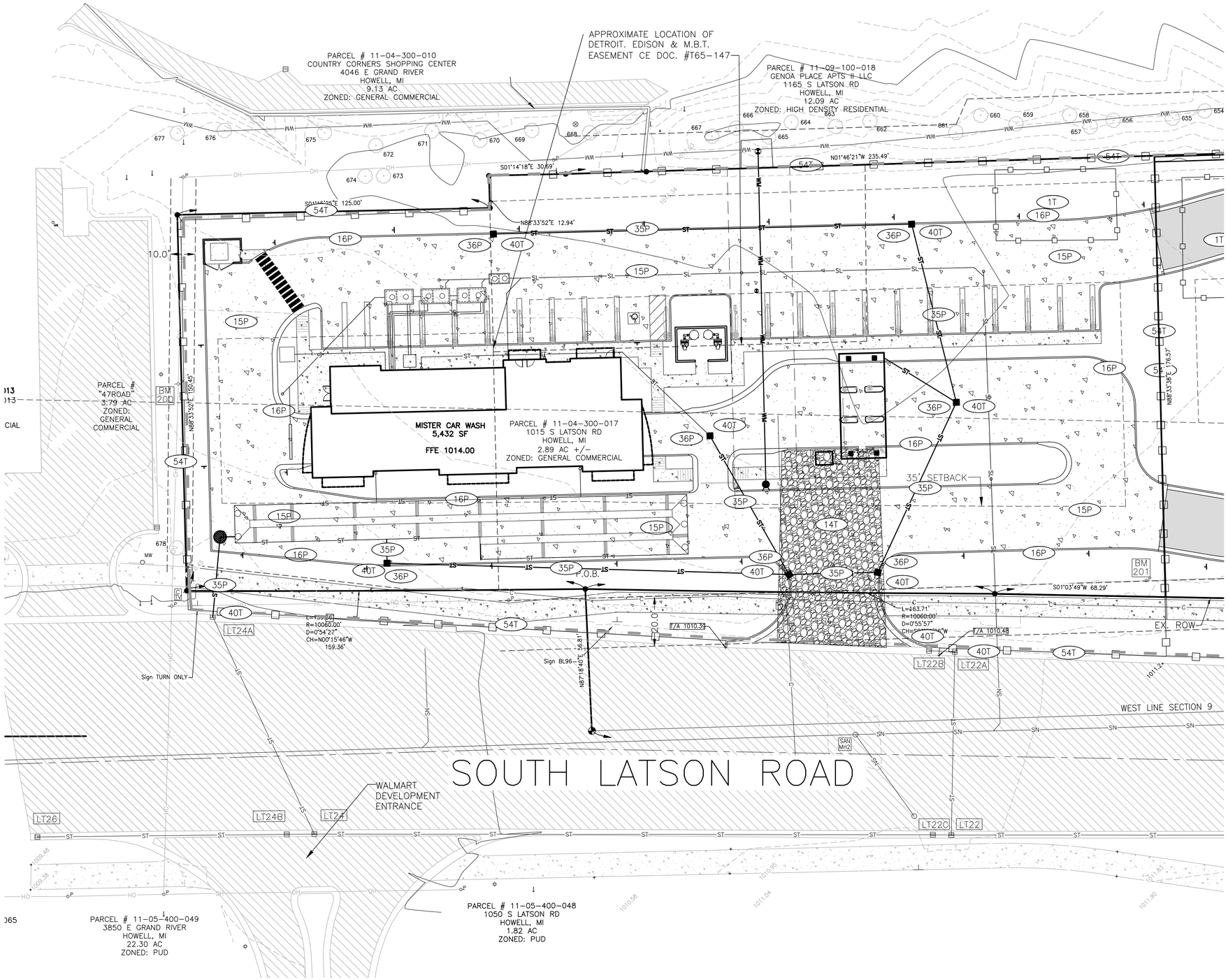
PROJECT
MISTER CAR WASH

PREPARED FOR
CWP WEST LLC
222 S 5TH AVE
TUCSON, AZ 85705
206.664.1303

TITLE
GRADING & DRAINAGE PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: DH
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 6



SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

SCALE: 1 INCH = 20 FEET

SOIL EROSION CONTROL MEASURES

1	STRIPPING & STOCKPILING TOPSOIL	TOPSOIL MAY BE STOCKPILED ABOVE BORROW AREAS TO ACT AS A DIVERSION STOCKPILE SHOULD BE TEMPORARILY SEEDED
6	SEEDING WITH MULCH AND/OR MATTING	FACILITATES ESTABLISHMENT OF VEGETATIVE COVER EFFECTIVE FOR DRAINAGEWAYS WITH LOW VELOCITY EASILY PLACED IN SMALL QUANTITIES BY INEXPERIENCED PERSONNEL SHOULD INCLUDE PREPARED TOPSOIL BED
14	AGGREGATE COVER	STABILIZES SOIL SURFACE, THUS MINIMIZING EROSION PERMITS CONSTRUCTION TRAFFIC IN ADVERSE WEATHER MAY BE USED AS PART OF PERMANENT BASE CONSTRUCTION OF PAVED AREAS
15	PAVING	PROTECTS AREAS WHICH CANNOT OTHERWISE BE PROTECTED, BUT INCREASES RUNOFF VELOCITY IRREGULAR SURFACE WILL HELP SLOW VELOCITY
16	CURB & GUTTER	KEEPS HIGH VELOCITY RUNOFF ON PAVED AREAS FROM LEAVING PAVED SURFACE COLLECTS AND CONDUCTS RUNOFF TO ENCLOSED DRAINAGE SYSTEM OR PREPARED DRAINAGEWAY
35	STORM SEWER	SYSTEM REMOVES COLLECTED RUNOFF FROM SITE, PARTICULARLY FROM PAVED AREAS CAN ACCEPT LARGE CONCENTRATIONS OF RUNOFF CONDUCTS RUNOFF TO MUNICIPAL SEWER SYSTEM OR STABILIZED OUTFALL LOCATION USE CATCH BASINS TO COLLECT SEDIMENT
36	CATCH BASIN, DRAIN INLET	COLLECTS HIGH VELOCITY CONCENTRATED RUNOFF MAY USE FILTER CLOTH OVER INLET
40	INLET SEDIMENT FILTER	EASY TO SHAPE COLLECTS SEDIMENT MAY BE CLEANED AND EXPANDED AS NEEDED
51	RETAINING WALL	REDUCES GRADIENT WHERE SLOPES ARE EXTREMELY STEEP PERMITS RETENTION OF EXISTING VEGETATION, KEEPING SOIL STABLE IN CRITICAL AREAS MINIMIZES MAINTENANCE
54	SILT FENCE	USES GEOTEXTILE FABRIC AND POST OR POLES. EASY TO CONSTRUCT AND LOCATE AS NECESSARY. (SEE DETAIL THIS SHEET)

T= TEMPORARY, P= PERMANENT
TOTAL DISTURBED AREA= 1.50 AC.

SURFACE WATER & COUNTY DRAINS
WETLAND – APPROXIMATELY 200 FT SOUTHEAST BEHIND PLATINUM CONTRACTING
LAKES – APPROXIMATELY 4000 FT NORTHEAST TO LAKE CHEMUNG
STREAMS – APPROXIMATELY 1000 FT NORTHWEST TO LIVINGSTON COMMONS SHOPPING CENTER
BASINS – APPROXIMATELY 900 FT NORTHWEST TO SLEEPCHEK MATTRESS STORE
DRAINS – APPROXIMATELY 650 FT NORTHWEST TO LATSON ROAD DRAIN
PONDS – APPROXIMATELY 200 FT EAST BEHIND PLATINUM CONTRACTING

CONSTRUCTION SEQUENCE

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

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

CONTROLS & MEASURES POST CONSTRUCTION SEQUENCE

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

CONTROLS & MEASURES NARRATIVE

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

PROPOSED CONST. SCHEDULE FOR THE YEAR 2024

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

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Engineers Surveyors Planners Landscape Architects
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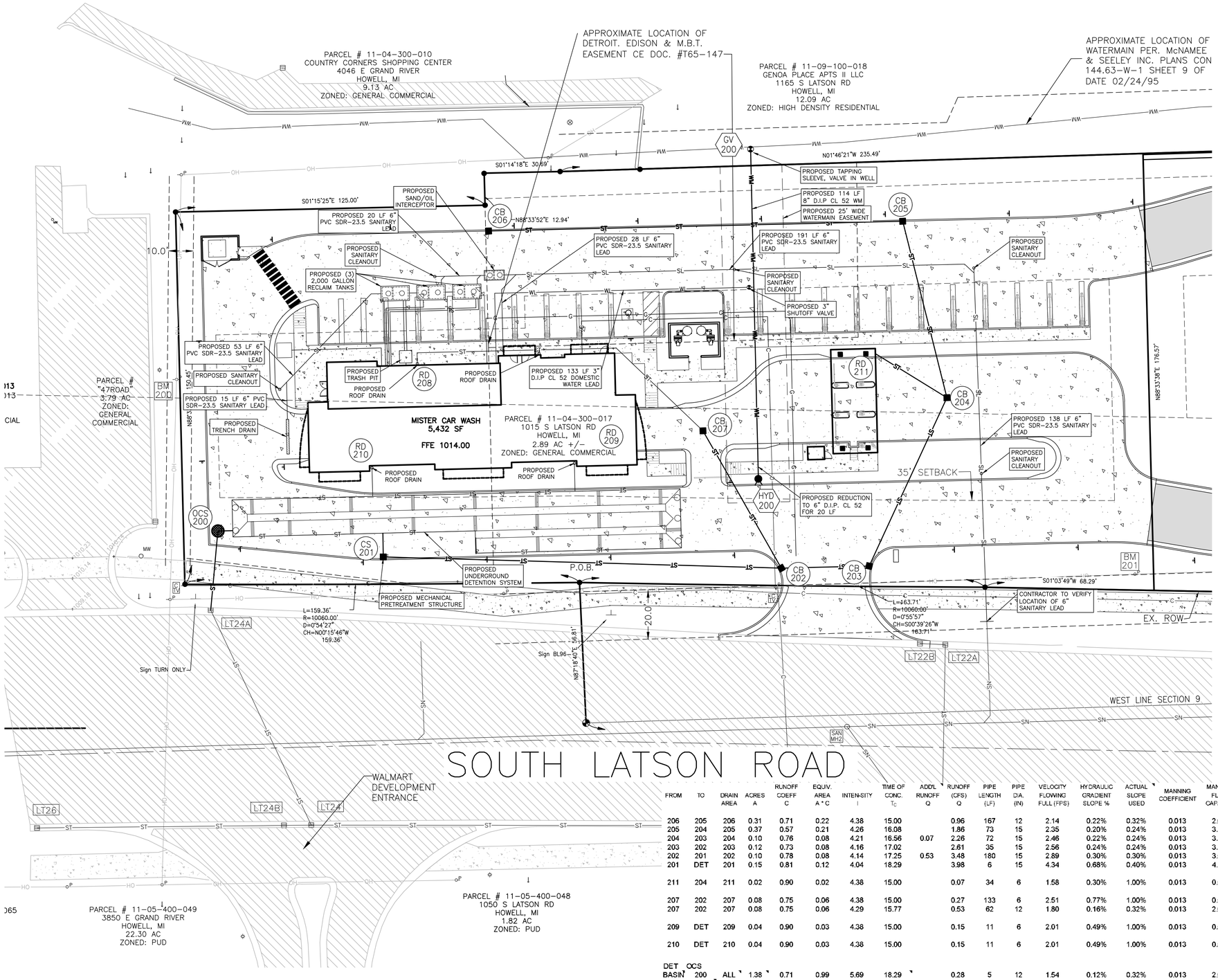
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT: MISTER CAR WASH
PREPARED FOR: CWP WEST LLC
222 E 5TH AVE
TUCSON, AZ 85705
206.664.1393
TITLE: SOIL EROSION & SEDIMENTATION CONTROL PLAN

NO	BY	DATE	REVISION PER
1	ST	10-25-23	PER TOWNSHIP COMMENTS

DESIGNED BY: ST
DRAWN BY: JS
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 7



SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

SCALE: 1 INCH = 20 FEET

FROM	TO	DRAIN AREA	ACRES A	RUNOFF COEFF C	EQUIV. AREA A * C	INTEN-SITY I	TIME OF CONC. T_C	ADDL RUNOFF Q	RUNOFF (CFS) Q	PIPE LENGTH (LF)	PIPE DIA. (IN)	VELOCITY FLOWING FULL (FPS)	HYDRAULIC GRADIENT SLOPE %	ACTUAL SLOPE USED	MANNING COEFFICIENT	MANNING FLOW CAPACITY	MANNING'S VELOCITY (FT/SEC)	TIME (MIN)	HG ELEV UPPER END	HG ELEV LOWER END	RIM ELEV UPPER END	RIM ELEV LOWER END	INVERT UPPER END	INVERT LOWER END	DROP DISTANCE (FT)
206	205	206	0.31	0.71	0.22	4.38	15.00		0.96	167	12	2.14	0.22%	0.32%	0.013	2.02	2.57	1.08	1009.16	1008.63	1011.89	1011.86	1008.36	1007.83	
205	204	205	0.37	0.57	0.21	4.26	16.08		1.86	73	15	2.35	0.20%	0.24%	0.013	3.17	2.59	0.47	1008.63	1008.45	1011.86	1012.75	1007.63	1007.45	
204	203	204	0.10	0.76	0.08	4.21	16.56	0.07	2.26	72	15	2.46	0.22%	0.24%	0.013	3.17	2.59	0.46	1008.45	1008.29	1012.75	1011.55	1007.45	1007.28	
203	202	203	0.12	0.73	0.08	4.16	17.02		2.61	35	15	2.56	0.24%	0.24%	0.013	3.17	2.59	0.23	1008.29	1008.21	1011.55	1011.52	1007.28	1007.19	
202	201	202	0.10	0.78	0.08	4.14	17.25	0.53	3.48	180	15	2.89	0.30%	0.30%	0.013	3.55	2.89	1.04	1008.21	1007.67	1011.52	1011.68	1007.19	1006.65	
201	DET	201	0.15	0.81	0.12	4.04	18.29		3.98	6	15	4.34	0.68%	0.40%	0.013	4.10	3.34	0.03	1007.67	1007.63	1011.68	-	1006.65	1006.63	
211	204	211	0.02	0.90	0.02	4.38	15.00		0.07	34	6	1.58	0.30%	1.00%	0.013	0.56	2.87	0.20	1008.79	1008.45	1013.89	1012.75	1008.39	1008.05	
207	202	207	0.08	0.75	0.06	4.38	15.00		0.27	133	6	2.51	0.77%	1.00%	0.013	0.56	2.87	0.77	1009.72	1008.39	1013.25	1011.52	1009.32	1007.99	
207	202	207	0.08	0.75	0.06	4.29	15.77		0.53	62	12	1.80	0.16%	0.32%	0.013	2.02	2.57	0.40	1008.39	1008.21	1013.25	1011.52	1007.59	1007.39	
209	DET	209	0.04	0.90	0.03	4.38	15.00		0.15	11	6	2.01	0.49%	1.00%	0.013	0.56	2.87	0.07	1009.77	1009.65	1014.00	-	1009.37	1009.25	2.00
210	DET	210	0.04	0.90	0.03	4.38	15.00		0.15	11	6	2.01	0.49%	1.00%	0.013	0.56	2.87	0.07	1009.77	1009.65	1014.00	-	1009.37	1009.25	2.00
DET	OCS																								
BASIN	200	ALL	1.38	0.71	0.99	5.69	18.29		0.28	5	12	1.54	0.12%	0.32%	0.013	2.02	2.57	0.03	1007.43	1007.41	1012.10	1012.00	1006.63	1006.61	
200	EX	200	-	-	-	-	18.32		0.28	35	12	1.54	0.12%	0.32%	0.013	2.02	2.57	0.23	1007.41	1007.30	1012.00	-	1006.61	1006.50	

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PROJECT: MISTER CAR WASH
PREPARED FOR: CMP WEST LLC
222 E. 5TH AVE
TRAVERSE CITY, MICH. 49685
206.664.1393
TITLE: UTILITY PLAN

NO	BY	DATE
1	ST	10-25-23
		PER TOWNSHIP COMMENTS
		REVISION PER

DESIGNED BY: ST
DRAWN BY: DH
CHECKED BY:
SCALE: 1" = 20'
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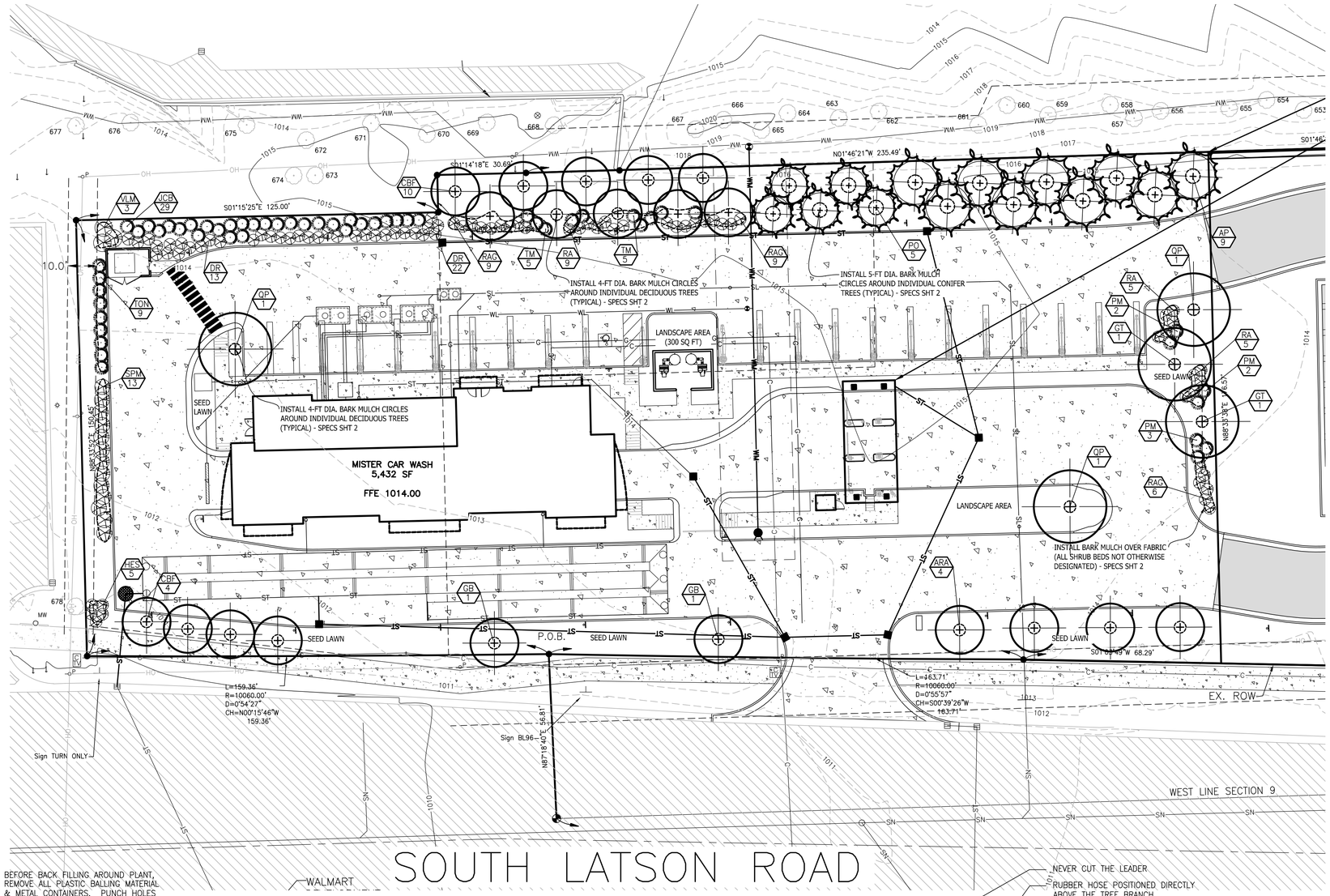
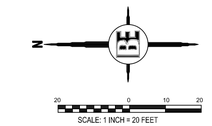




SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

LANDSCAPE CALCULATIONS GCD ZONING:

REQUIRED:

GREENBELT - PUBLIC R.O.W. :	1 CANOPY TREE / 40 LFT FRONTAGE, MIN 20 FT WIDTH
BUFFER - NORTH	
ADJ. TO COMMERCIAL - TYPE C:	1 CANOPY OR CONIFER TREE OR 4 SHRUBS / 20 LFT MIN. 10 FT WIDTH
BUFFER - SOUTH	
ADJ. TO COMMERCIAL - TYPE C:	1 CANOPY OR CONIFER TREE OR 4 SHRUBS / 20 LFT MIN. 10 FT WIDTH
BUFFER - EAST	
PARTIAL (108.04 LFT)	
ADJ. TO COMMERCIAL - TYPE C:	1 CANOPY OR CONIFER TREE OR 4 SHRUBS / 20 LFT MIN. 10 FT WIDTH
PARTIAL (283.36 LFT)	
ADJ. TO MULTI-FAMILY - TYPE B:	6-FT HGT CONTINUOUS WALL + 1 CANOPY TREE + 1 CONIFER TREE + 4 SHRUBS / 30 LFT
PARKING AREA (>10 SPACES):	1 CANOPY TREE & 100 SF OF LANDSCAPE AREA / 10 SPACES. 1/3 OF TREES MUST BE ON THE INTERIOR OF THE PARKING
DETENTION / RETENTION BASIN:	N/A - UNDERGROUND SYSTEM

PROVIDED:

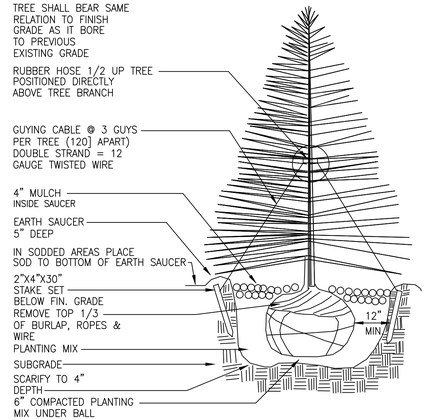
GREENBELT - PUBLIC R.O.W. :	391.40 LFT FRONTAGE / 40 = 10 CANOPY TREES PROVIDED
BUFFER - NORTH PROP. LINE:	
ADJ. TO COMMERCIAL - TYPE C:	(150.45 + 12.94) = 163.39 LFT NET = 163.39 / 20 = 8 TREES OR 30 SHRUBS OR COMBINATION 30 CONIFER & DECIDUOUS SHRUBS PROVIDED
BUFFER - SOUTH PROP. LINE	
ADJ. TO COMMERCIAL - TYPE C:	176.57 = 176.57 LFT NET = 176.57 / 20 = 9 TREES OR 35 SHRUBS OR COMBINATION 3 TREES + 23 SHRUBS PROVIDED
BUFFER - EAST	
ADJ. TO COMMERCIAL - TYPE C:	108.04 / 20 = 6 TREES OR 24 SHRUBS
ADJ. TO MULTI-FAMILY - TYPE B:	283.36 / 30 = 10 CANOPY + 10 CONIFER TREES + 40 SHRUBS EX. BERM & MATURE CONIFER TREE SCREEN EXISTING ON ADJ. SITE & FURTHER SCREENS EX. WETLAND AREA WITH NO DEVELOPMENT (& UNLIKELY TO CHANGE) PROPOSE 22 CONIFER TREES + 64 CONIFER & DECIDUOUS SHRUBS FOR CONTINUOUS SCREEN IN LIEU OF WALL OR BERM
PARKING AREA (>10 SPACES):	= 22 (SPACES PROVIDED) - 10 / 10 = 2 TREES + 300+ SQFT OF LANDSCAPE AREA 2 TREES & 200 SQFT OF LANDSCAPE AREA PROVIDED

PLANT LIST

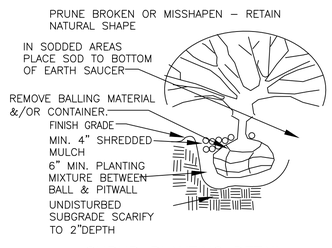
KEY	QUAN.	BOTANICAL NAME	COMMON NAME	SIZE	REMARK
DECIDUOUS TREES					
CBF	14	Carpinus betulus 'Frans Fontaine'	Frans Fontaine European Hornbeam	2-1/2" cal.	B-B
ARA	4	Acer ruburm 'jfs KW 78'	Armstrong Gold Red Maple	2-1/2" cal.	B-B
GB	2	Ginkgo biloba 'Princeton Sentry'	Princeton Sentry Columnar Ginkgo	2-1/2" cal.	B-B
GT	2	Gleditsia triacanthos var inermis 'Skycole'	Skyline Honeylocust	2-1/2" cal.	B-B
QP	3	Quercus plalustris	Northern Pin Oak	2-1/2" cal.	B-B
CONIFER TREES					
AP	9	Abies phanerolepis	Canaan Fir	6-ft hgt.	B-B
PO	5	Picea omorika	Serbian Spruce	6-ft hgt.	B-B
CONIFER SHRUBS					
JCB	29	Juniperus chinensis 'Blue Point'	Blue Point Juniper	48" ht./#5	Cont.
PM	7	Pinus mugo var Pumilo	Dwarf Mugo Pine	36" ht./#5	Cont.
TON	9	Thuja occidentalis nigra	Dark Green Arborvitae	48" ht./#5	Cont.
TM	10	Taxus x media 'densiformis'	Densiformis Yew	36" ht./#5	Cont.
DECIDUOUS SHRUBS					
DR	35	Diervilla rivularis 'diwibru01'	Honeybee Diervilla	24" ht./#3	Cont.
HES	5	Hydrangea macrophylla 'Bailmer'	Endless Summer Hydrangea	36" ht./#5	Cont.
RA	19	Ribes Alpinum 'Greenmound'	Greenmound Currant	18" ht./#3	Cont.
RAG	24	Rhus aromatica 'Gro-Low'	Gro-Low Fragrant Sumac	24" ht./#3	Cont.
SPM	13	Syringa patula 'Miss Kim'	Miss Kim Lilac	24" ht./#3	Cont.
VLM	3	Viburnum lantana Mohican	Mohican Wayfaring Tree Viburnum	36" ht./#5	Cont.

SUPPLEMENTAL LANDSCAPE NOTES

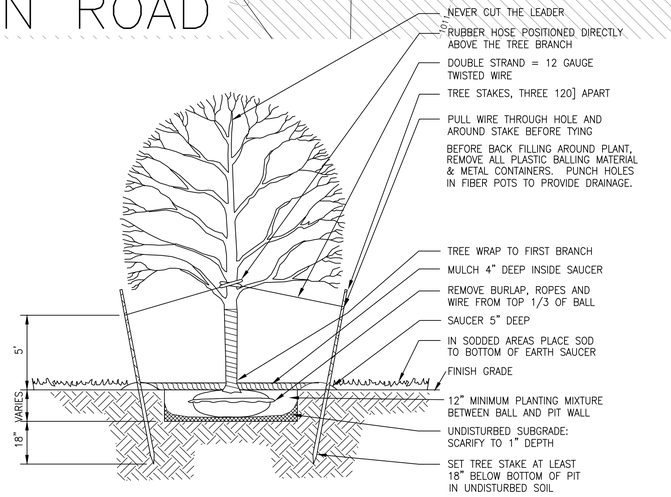
1. ANY SUBSTITUTIONS OF PLANT MATERIAL FROM THE APPROVED SITE PLAN WILL BE APPROVED BY THE TOWNSHIP PRIOR TO INSTALLATION.



EVERGREEN TREE PLANTING DETAIL
(NO SCALE)



SHRUB PLANTING DETAIL
(NO SCALE)



DECIDUOUS TREE PLANTING DETAIL
(NO SCALE)

FOR SITE PLAN APPROVAL ONLY!
NOT FOR CONSTRUCTION

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN HEREON ARE APPROXIMATE AND NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CONNECTIONS PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND BETWEEN THE PLANS AND THE LOCATION OR DEPTH OF UTILITIES.

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171 OR 811
IT'S THE LAW!!! MEMBERS OF MISS DIG

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

PROJECT
MISTER CAR WASH

PREPARED FOR
CWP WEST LLC
1222 E. 6TH AVE.
TRAVERSE CITY, MI 49685
206.664.1393

TITLE
LANDSCAPE PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: PC
DRAWN BY: PC
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 21-519
DATE: 10/03/2023
SHEET NO. 9

BOSS Engineering

LIVINGSTON COUNTY SOIL EROSION PERMIT TEMPLATE
TEMPORARY CONTROLS AND SEQUENCE

1. NOTIFY LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE 24 HOURS PRIOR TO START OF GRADE WORK.

2. IN ACCORDANCE WITH PUBLIC ACT NO. 53, OF 1974 THE PERMIT HOLDER SHALL CALL MISS DIG FOR STAKING AND LOCATING OF UTILITIES, AT LEAST 72 HOURS IN ADVANCE OF THE START OF ANY WORK.

PERMITTING STANDARDS

3. (IMPORTANT NOTICE) RETENTION/DETENTION PONDS SHALL BE EXCAVATED, TOPSOILED, SEEDED, MULCHED AND TACKED PRIOR TO THE START OF MASSIVE EARTH DISRUPTION. INGRESS/EGRESS MUST HAVE LARGE CRUSHED ROCK TO REDUCE THE TRACKING OF SOIL ONTO THE PUBLIC TRAFFIC AREAS. SEE DETAIL ITEMS BELOW.

4. 36" M.D.O.T SPECIFICATION TYPE SILT FABRIC FENCE AS SHOWN ON PLANS SHALL BE PLACED AND MAINTAINED ALONG PERIMETER ON ALL LOW LYING AREAS OF THE CONSTRUCTION SITE TO FILTER RUNOFF BEFORE LEAVING PROJECT SITE.

5. ALL TEMPORARY EROSION CONTROL DEVICES AS NOTED ON PLANS SHALL BE INSTALLED PRIOR TO THE START OF MASSIVE EARTH DISTRIBUTION.

6. PLAN DOES DENOTE A DETAILED EROSION CONTROL DEVICE TO RESTRICT TRACKING OF MATERIAL ONTO THE HIGHWAY. STONE DIAPERS SHALL BE INSTALLED AT ALL INGRESS/EGRESS AREAS OF THE SITE PRIOR TO THE START OF MASSIVE EARTH DISRUPTION. DIAPERS SHALL BE OF CRUSHED STONE AND SHALL HAVE A MINIMUM LENGTH OF 100' LINEAL FEET.

RETENTION PONDS

7. RETENTION/DETENTION/SEDIMENTATION PONDS SHALL BE EXCAVATED, TOPSOILED, SEEDED, MULCHED AND TACKED PRIOR TO THE START OF MASSIVE EARTH DISRUPTION.

8. DETENTION POND OUTLETS SHALL BE OF THE STANDPIPE AND STONE FILTER SYSTEM, WITH TRASH SCREEN. OUTLET FLOW SHALL NOT EXCEED 0.20 CUBIC FEET OF WATER PER SECOND/PER ACRE. POND DIKES SHALL HAVE A MINIMUM OF ONE (1) FOOT OF FREEBOARD. AN EMERGENCY SPILLWAY SHALL BE CONSTRUCTED WITHIN THE FREEBOARD LEVEL.

9. THE EMERGENCY SPILLWAY FROM THE DETENTION POND SHALL BE SODDED AND PEGGED, OR RIP RAPPED, 15 FEET PAST THE TOE OF THE SLOPE OF THE BERM.

10. DIKES AND BERMS SHALL BE FREE OF ALL ORGANIC MATTER.

11. RETENTION/DETENTION PONDS SHALL BE FENCED WITH A 4' CHAIN LINK FENCE, INCLUDING A 12' ACCESS GATE FOR MAINTENANCE UNLESS MINIMUM 5 FT. HORIZONTAL TO 1 FT. VERTICAL SIDE SLOPES ARE PROVIDED. THE FENCE SHALL BE INSTALLED AT THE OUTER PORTION OF THE BERM, TO ALLOW FOR MAINTENANCE WORK TO BE DONE INSIDE THE FENCE.

12. ALL UNIMPROVED DISTURBED AREAS SHALL BE STRIPPED OF TOPSOIL WHICH WILL BE STORED ONSITE DURING THE EXCAVATING STAGE. TOPSOIL PILES SHALL BE SEEDED AND MULCHED, OR MATTED WITH STRAW IN THE NON-GROWING SEASON, IMMEDIATELY AFTER THE STRIPPING PROCESS IS COMPLETED, TO PREVENT WIND AND WATER EROSION.

13. SOIL EROSION CONTROLS SHALL BE MONITORED DAILY BY THE ON-SITE ENGINEER, OR CONTRACTOR, WHICHEVER CASE APPLIES.

SLOPES AND DITCHES

14. ON SITE DITCHES SHALL BE OF THE FLAT BOTTOM TYPE MINIMUM WIDTH OF 2' WITH A MINIMUM OF 3 HORIZONTAL TO 1 VERTICAL SIDE SLOPES, 3:1.

15. DITCHES WITH STEEP SLOPES WILL NEED FLOW CHECKS TO PREVENT SCOURING OF THE DITCH BOTTOM. THESE SHALL BE INSTALLED AS DIRECTED BY THE ENGINEER OR INSPECTOR.

16. SLOPES IN EXCESS OF 3 HORIZONTAL TO 1 VERTICAL SHALL NOT BE USED EXCEPT WITH A MECHANICAL DEVICE SUCH AS A RETAINING WALL, TERRACING, OR OTHER PRIOR APPROVED DEVICE.

STORM DRAINS

17. ALL STORM WATER STRUCTURES, CATCH BASINS AND/OR MANHOLES, IF BLOCK, SHALL BE PLASTERED ON BOTH THE INSIDE AND OUTSIDE OF THE STRUCTURES. GROUTING AND POINTING WILL BE NECESSARY AT THE CASTING AND STRUCTURE JOINT TO PREVENT LEAKAGE AND THE RESULTING SOIL MOVEMENT, AROUND THE STRUCTURE.

18. STORM WATER INLETS SHALL HAVE AS A TEMPORARY CONTROL A STRAW BALE BARRIER AND STONE FILTER INSTALLED AROUND THE INLET DURING CONSTRUCTION. AS AN ALTERNATIVE TO THE STRAW BALE BARRIER, A BURLAP AND PEA STONE FILTER MAY BE USED. THREE LAYERS OF BURLAP FIBER AND A FILTER OF PEA STONE MINIMUM 1 FT. IN DEPTH CAN BE USED. DUE TO THE POROSITY OF THE BURLAP FILTER THE MINIMUM OF 1 FT. OF STONE IS VERY IMPORTANT. THE CONTROL SHALL BE INSTALLED AS SOON AS THE STRUCTURE IS BUILT AND INSPECTED DAILY.

19. BURLAP AND PEA STONE FILTERS WILL NEED TO BE CHANGED AFTER EACH RAINFALL.

20. COUNTY CODE REQUIRES A MINIMUM PIPE SIZE OF 12" IN DIAMETER. IF SMALLER PIPE IS NEEDED FOR OUTLET PURPOSES THE 12" CAN BE BAFFLED TO THE CORRECT SIZE. ALL PIPE SHALL MEET THE 12" DIAMETER CODE SIZE.

21. ALL STORM DRAIN OUTLETS 15" IN DIAMETER OR LARGER SHALL HAVE ANIMAL GUARDS INSTALLED TO PREVENT ENTRANCE TO THE SYSTEM.

22. ALL STORM DRAINAGE PIPE 30" IN DIAMETER OR LARGER SHALL BE POINTED, AT THE JOINTS ON THE INSIDE WITH MORTAR, AFTER BACKFILLING.

23. ALL STORM DRAIN OUTLETS THAT DO NOT EMPTY INTO THE RETENTION/DETENTION POND SHALL HAVE A TEMPORARY 5'X10'X3' SUMP INSTALLED AT THE TERMINATION OF THE STORM SEWER. UPON COMPLETION OF THE STABILIZATION WORK THE SUMP AREA SHALL BE FILLED AND RIP RAPPED WITH COBBLE STONE. SILT TRAPS SHALL BE INSPECTED AFTER EACH STORM.

24. STORM WATER OUTLETS DO DENOTE RIP RAP. ALL OUTLETS SHALL BE RIP RAPPED OVER KEYED FILTER FABRIC WITH A MINIMUM OF 15 SQ. YARDS OF 6" OR LARGER COBBLE STONE.

25. RIP RAP AS NOTED ON THE PLAN SHALL BE OF A FUNNEL SHAPE CONSTRUCTION, WIDTH SHALL INCREASE AS DISTANCE FROM THE OUTLET POINT INCREASES AT A 3:1 RATIO.

26. RIP RAP SHALL BE OF COBBLE STONE, 6" IN DIAMETER OR LARGER. GROUTING MAY BE NECESSARY, AND SHALL BE A MINIMUM OF 6" IN DEPTH WITH THE COBBLE SET IN THE CEMENT SLURRY.

27. STORM WATER OUTLET IS IN NEED OF A SPLASH BLOCK WHICH IS NOT NOTED ON THE PLAN. INSTALL SPLASH BLOCK IF SLOPE OF THE PIPE IS 4% OR GREATER.

28. IT WILL BE NECESSARY FOR THE DEVELOPER TO HAVE THE STORM DRAINAGE LINES CLEANED PRIOR TO FINAL INSPECTION BY THE LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE. IF REQUIRED, THIS WORK SHALL BE DONE BY A PROFESSIONAL SEWER CLEANING FIRM AND CERTIFIED IN WRITING BY THE PROJECT ENGINEER. ALL SUMPS AND TEMPORARY SILT TRAPS SHALL ALSO BE CLEANED AT THIS TIME.

STABILIZATION

29. ALL UNIMPROVED DISTURBED AREAS SHALL BE RE-TOP SOILED, WITH A MINIMUM OF 3" OF MATERIAL, SEEDED, MULCHED AND TACKED WITHIN 15 DAYS OF THE COMPLETION OF THE MASSIVE EARTH DISRUPTION. IN THE NON-GROWING SEASON STRAW MATTING WILL SUFFICE. HYDROSEEDING WILL BE AN ACCEPTABLE ALTERNATE FOR MULCHING. EXTREME CARE SHOULD BE EXERCISED IN SPRING AND FALL PERIODS AS A FROST WILL BREAK THE BIND OF THE HYDROSEEDING, WHICH WILL AFFECT THE EFFECTIVENESS OF THIS PROCEDURE.

30. IN THE NON-GROWING SEASON, TEMPORARY STABILIZATION OF MASSIVELY EXPOSED AREAS FOR WINTER STABILIZATION SHALL BE DONE WITH STRAW MATTING.

31. PERIODIC INSPECTIONS WILL BE MADE THROUGHOUT THE COURSE OF THE PROJECT. IT WILL BE THE RESPONSIBILITY OF THE MANAGERS OF THE PROJECT TO CONTACT THIS OFFICE FOR THE FINAL INSPECTION AT THE END OF THE PROJECT.

32. THIS COMMERCIAL PERMIT IS VALID FOR THE MASS EARTH MOVEMENT, THE INSTALLATION OF ROADS, DRAINS, AND UTILITIES AND IS NOT FOR ANY SINGLE FAMILY RESIDENCE. ALL RESIDENTIAL BUILDERS WILL NEED TO SECURE WAIVERS AND OR PERMITS AS NECESSARY FOR EACH LOT IN THIS DEVELOPMENT AT THE TIME APPLICATION FOR SINGLE FAMILY RESIDENCE IS MADE.

33. THE ISSUING BUILDING DEPARTMENT SHALL NOT ISSUE THE CERTIFICATE OF OCCUPANCY UNTIL THE FINAL INSPECTION LETTER FROM THE LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE HAS BEEN OBTAINED.

34. PER THE LIVINGSTON COUNTY DRAIN COMMISSIONER THE SEEDING, FERTILIZER AND MULCH MINIMUM QUANTITIES SHALL BE AS FOLLOWS:

TOP-SOIL	3" IN DEPTH
GRASS SEED	218 LBS. PER ACRE
FERTILIZER	150 LBS. PER ACRE
STRAW MULCH	3" IN DEPTH 1.5 TO 2 TONS PER ACRE (ALL MULCHING MUST HAVE A TIE DOWN, SUCH AS TACKIFIER, NET BINDING, ETC.)
HYDRO-SEEDING	HYDRO-SEEDING IS NOT ACCEPTABLE FOR SLOPES EXCEEDING 1%, IN SUCH CASES STABILIZATION SHALL BE DONE WITH SEED AND STRAW MULCH WITH A TACKIFIER.

MAINTENANCE SCHEDULE FOR SOIL EROSION CONTROLS

1. SILT FENCE SHALL BE INSPECTED WEEKLY AND AFTER EACH MAJOR STORM EVENT. MAINTENANCE SHALL INCLUDE REMOVAL OF ACCUMULATED SILT AND REPLACEMENT OF TORN SECTIONS. SILT FENCE SHALL BE REMOVED WHEN ALL CONTRIBUTING AREAS HAVE BEEN STABILIZED.

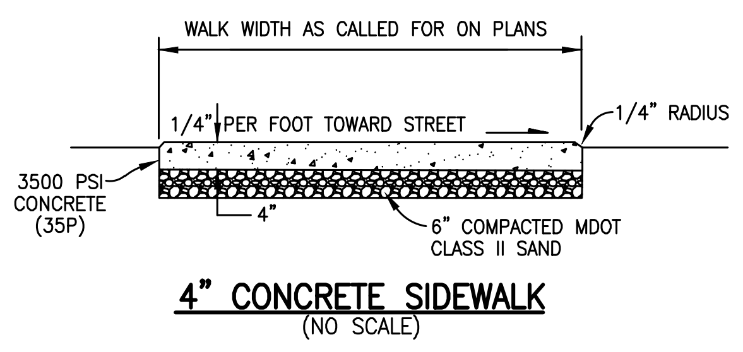
2. TRACKING PAD SHALL BE INSPECTED MONTHLY FOR ACCUMULATED DIRT. TRACKING PAD SHALL BE REPLACED WHEN THE STONES ARE CHOKED WITH DIRT. TRACKING PAD SHALL BE REMOVED IMMEDIATELY PRIOR TO THE FIRST COURSE OF ASPHALT BEING LAID.

3. DETENTION/RETENTION POND SHALL BE INSPECTED QUARTERLY ON A PERMANENT BASIS. MAINTENANCE SHALL INCLUDE SEDIMENT REMOVAL, EMBANKMENT STABILIZATION AND MAINTAINING THE OUTLET STRUCTURE IN GOOD CONDITION. NO TREES SHALL BE ALLOWED TO GROW ON THE EMBANKMENT.

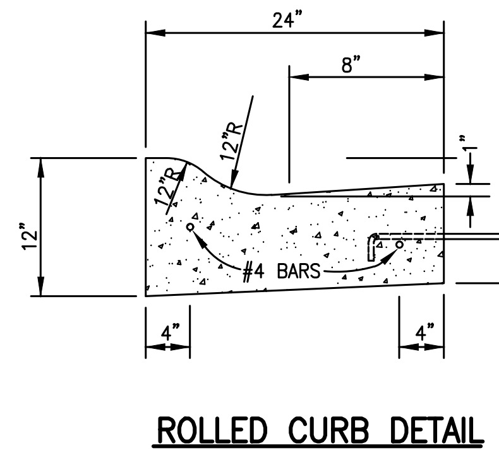
4. CATCH BASINS SHALL BE INSPECTED ANNUALLY FOR ACCUMULATION OF SEDIMENT. ALL SEDIMENT MUST BE REMOVED AND DISPOSED OF PROPERLY WHEN THE SUMP IS FULL.

5. COMMON AREAS SHALL BE STABILIZED NO LATER THAN 15 DAYS AFTER GRADE WORK, PURSUANT TO RULE 1709 (5).

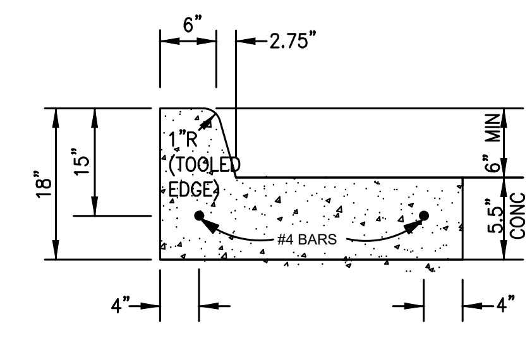
SILT FENCE SHALL BE A MINIMUM 36".



4" CONCRETE SIDEWALK
(NO SCALE)



ROLLED CURB DETAIL
(NO SCALE)



TAPERED CURB DETAIL
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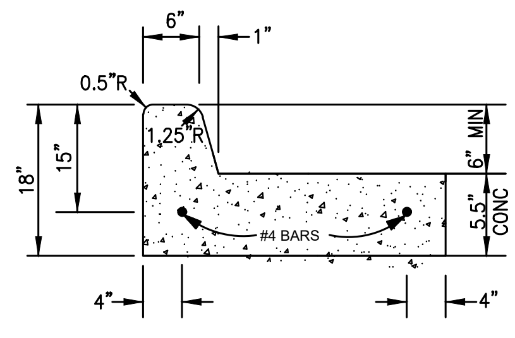

VERTICAL CURB DETAIL
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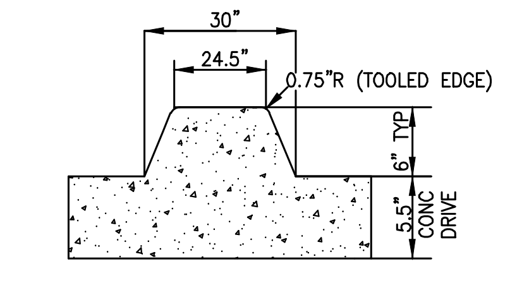
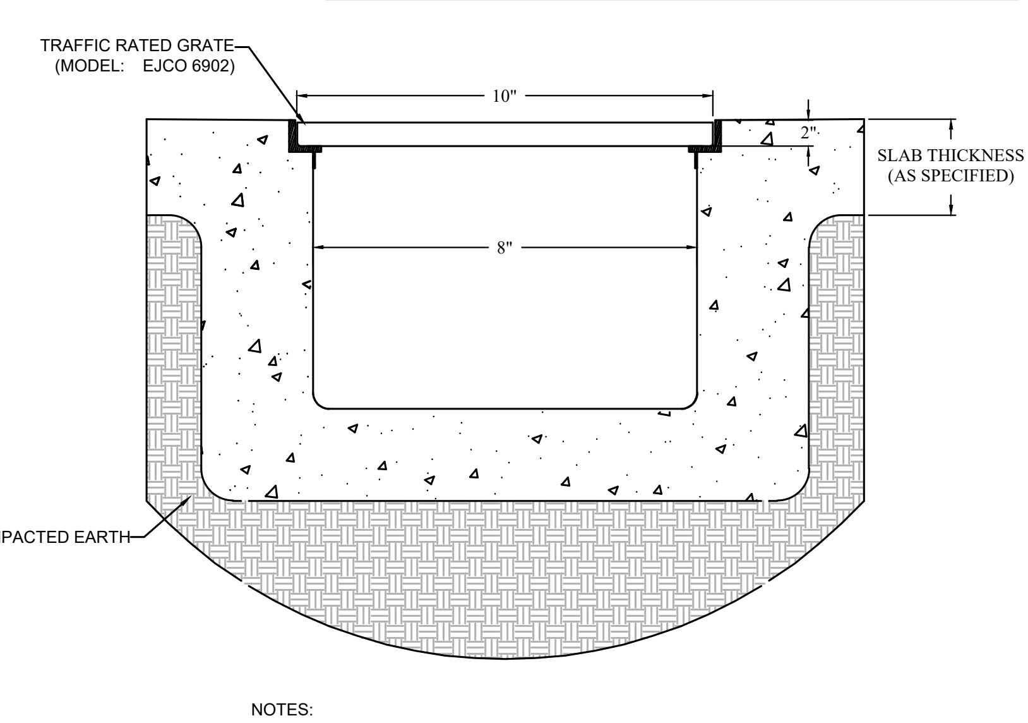


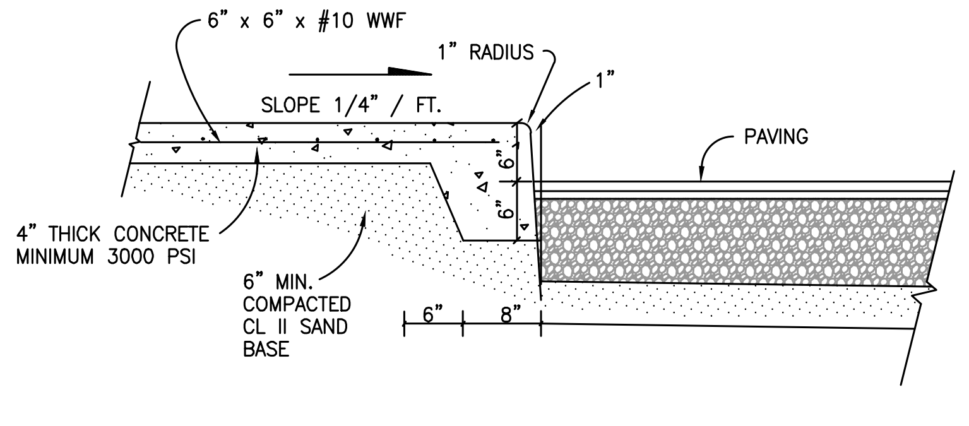
POS CURB DETAIL
(NO SCALE)

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

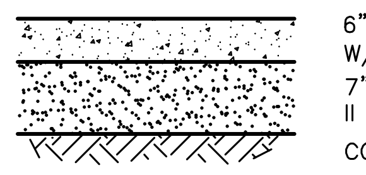


NOTES:
1. STANDARD SLOPE IS 1.0% UNLESS OTHERWISE SPECIFIED

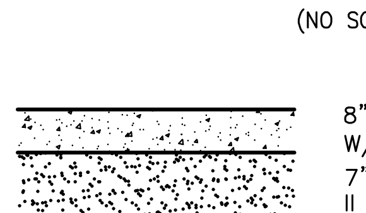
TYPICAL TRENCH SECTION
NO SCALE



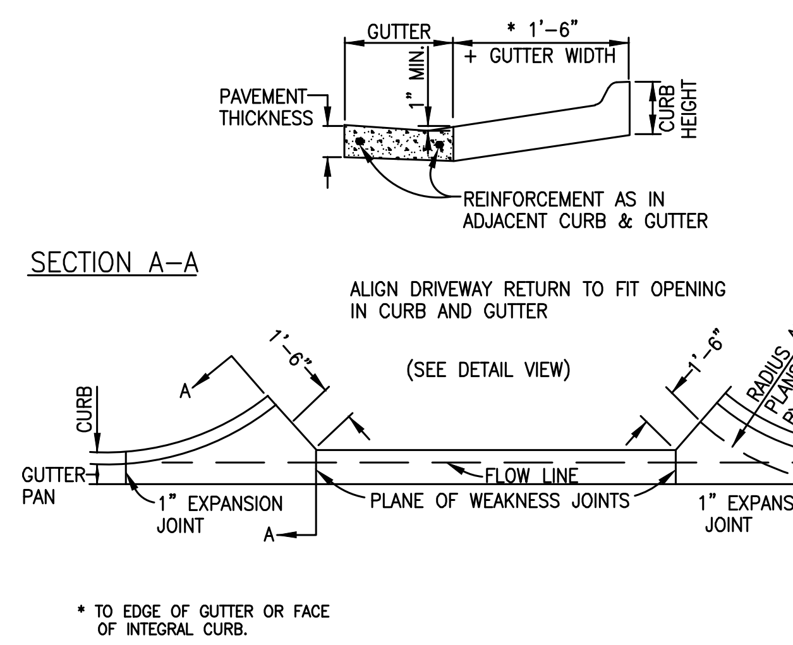
INTEGRAL CONCRETE WALK / CURB DETAIL
(NO SCALE)



CONCRETE PAVEMENT CROSS SECTION
(NO SCALE)

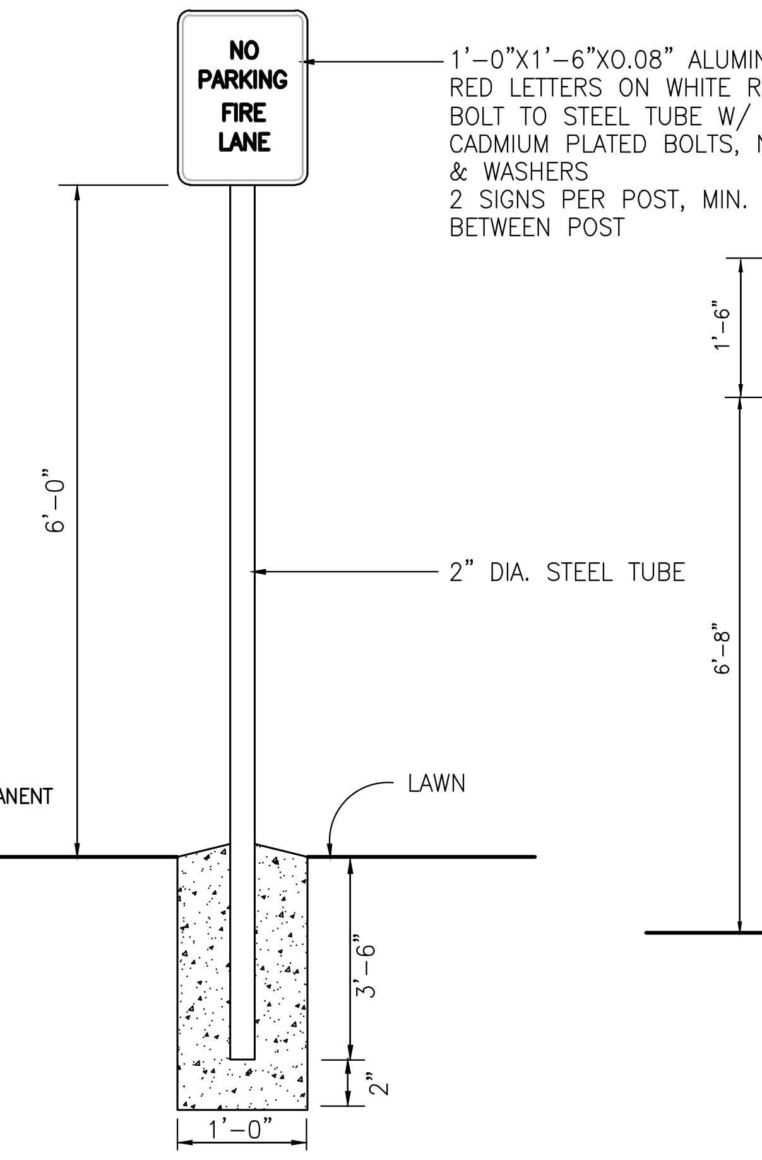


DUMPSTER PAD CONCRETE PAVEMENT CROSS SECTION
(NO SCALE)



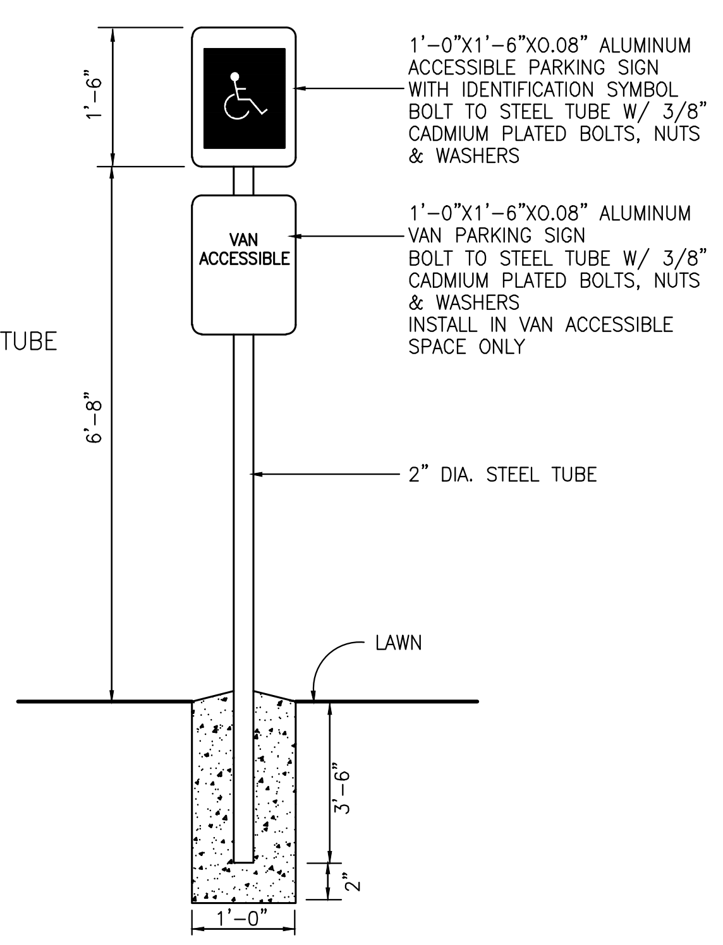
* TO EDGE OF GUTTER OR FACE OF INTEGRAL CURB.

CONCRETE DRIVEWAY OPENING – MDOT STANDARD II-42, DETAIL |M"
(NO SCALE)



1'-0"X1'-6"X0.08" ALUMINUM
RED LETTERS ON WHITE REFLECTIVE BACKGROUND
BOLT TO STEEL TUBE W/ 3/8"
CADMIUM PLATED BOLTS, NUTS & WASHERS
2 SIGNS PER POST, MIN. 50' SPACING BETWEEN POST

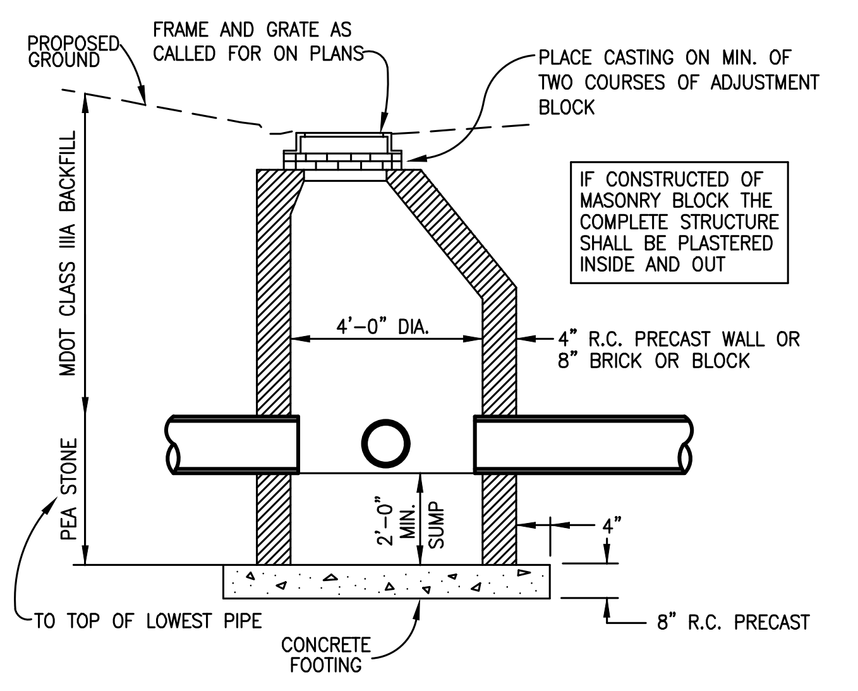
NO PARKING SIGN DETAIL
(NO SCALE)



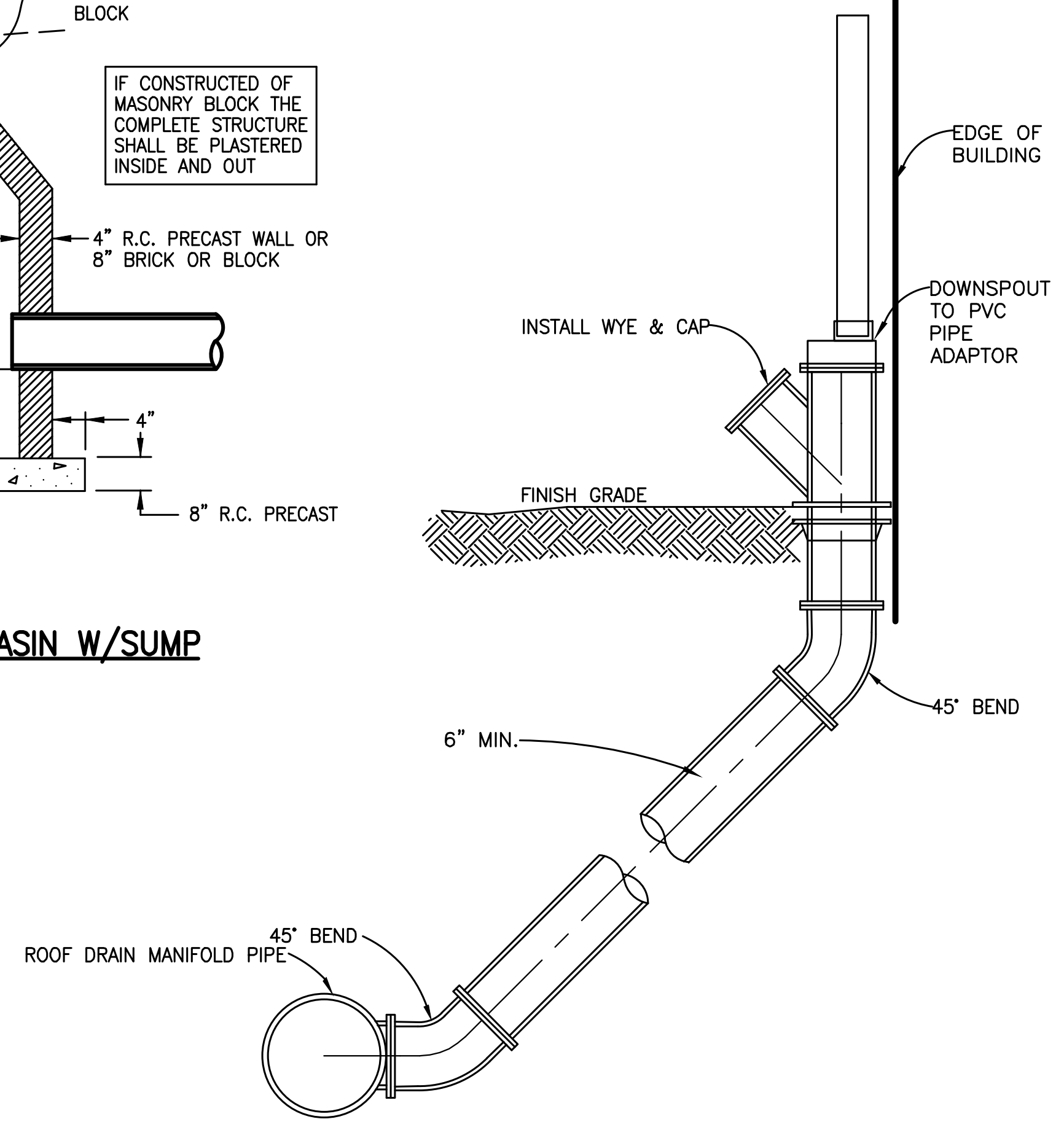
1'-0"X1'-6"X0.08" ALUMINUM ACCESSIBLE PARKING SIGN WITH IDENTIFICATION SYMBOL BOLT TO STEEL TUBE W/ 3/8" CADMIUM PLATED BOLTS, NUTS & WASHERS

1'-0"X1'-6"X0.08" ALUMINUM VAN PARKING SIGN BOLT TO STEEL TUBE W/ 3/8" CADMIUM PLATED BOLTS, NUTS & WASHERS INSTALL IN VAN ACCESSIBLE SPACE ONLY

HANDICAP PARKING SIGN DETAIL
(NO SCALE)



4 FT. DIA. CATCH BASIN W/SUMP
NO SCALE

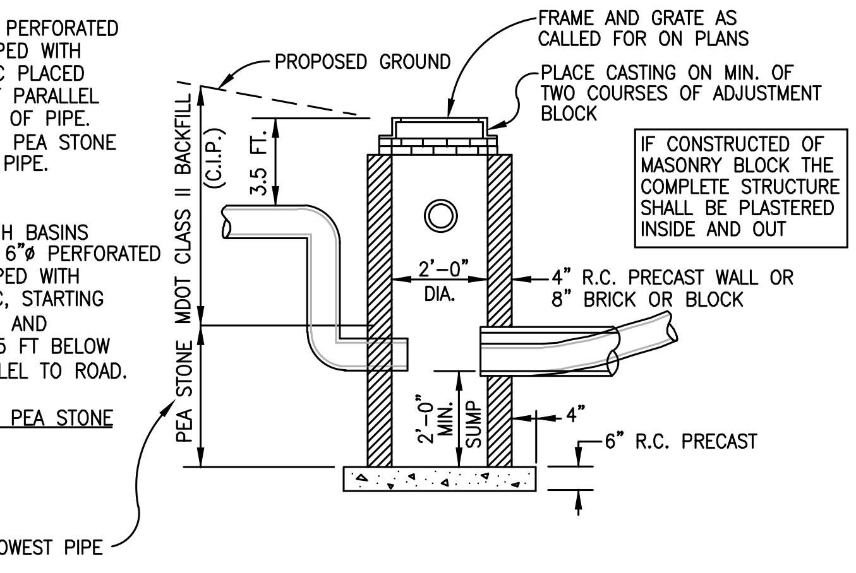


ROOF DRAIN CLEANOUT DETAIL
NO SCALE

INSTALL SUBDRAINS AT ALL CATCH BASINS LOCATED WITHIN ROADWAY

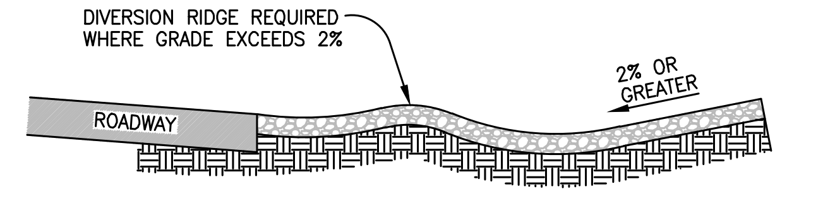
(1) 4 L.F. (MIN.) 6"ø PERFORATED P.V.C. PIPE WRAPPED WITH GEOTEXTILE FABRIC PLACED AT LOWEST INVERT PARALLEL TO ROAD OR LINE OF PIPE. BACK-FILLED WITH PEA STONE ONE FOOT ABOVE PIPE.

(2) AT LOWPOINT CATCH BASINS 20 L.F. (MIN.) OF 6"ø PERFORATED P.V.C. PIPE WRAPPED WITH GEOTEXTILE FABRIC, STARTING AT LOWEST INVERT AND CONTINUING AT 3.5 FT BELOW ROAD-WAY, PARALLEL TO ROAD. (BOTH DIRCTIONS) BACK-FILLED WITH PEA STONE TO THE SUBBASE.

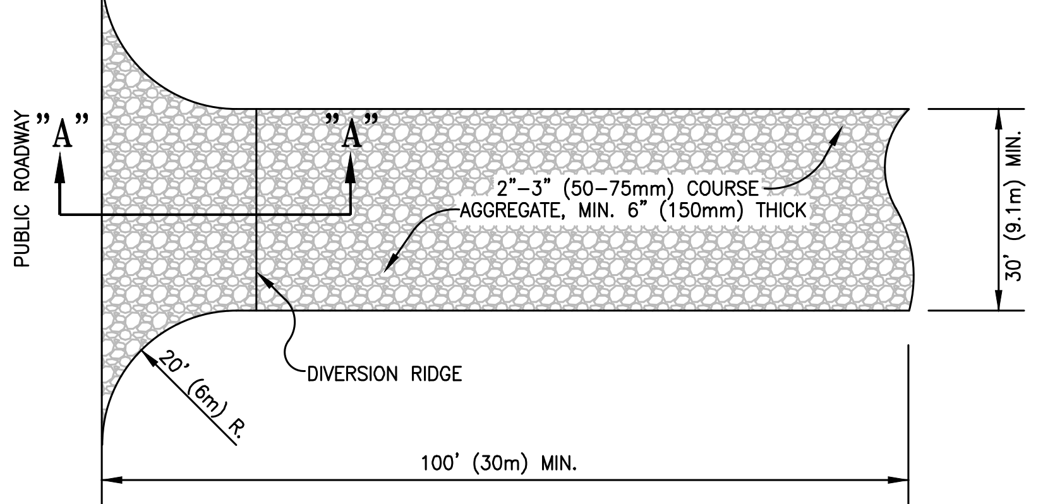


2 FT. DIA. CATCH BASIN W/SUMP
NO SCALE

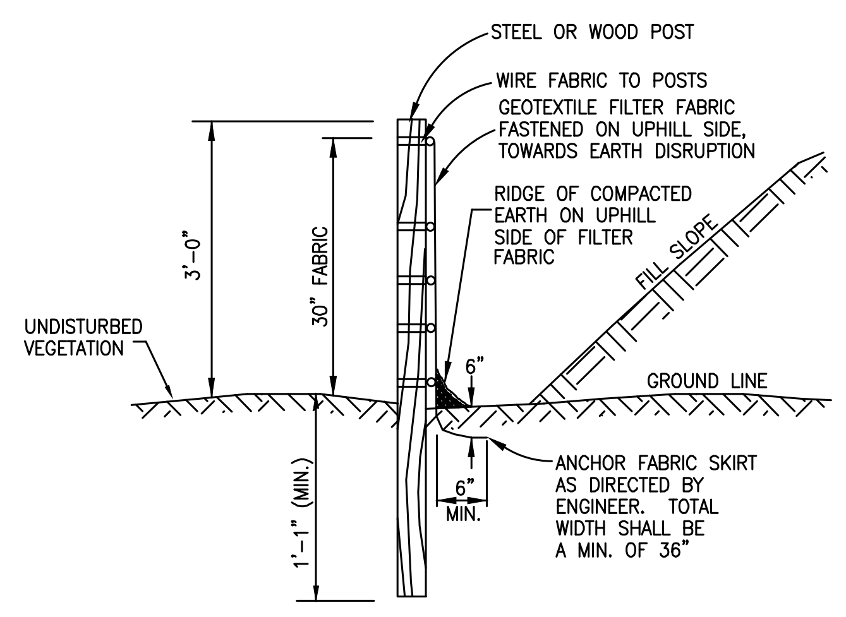
MANHOLE FRAME & COVER & CATCH BASIN INLETS					
TYPE	LOCATION	MANUFACTURER OR EQUAL		TYPE OF COVER OR INLET	MAXIMUM DRAINAGE AREA (ACRES)
		EAST JORDAN	NEENAH		
MH	ALL	1040	R-1916 F1	SANITARY-SOLID SELF-SEALING STORM-VENTED	N/A
CB	TYPE A CURB	7000-T1-M1	R-3070	FLAT GRATE WITH VERT. OPEN BACK	0.71
CB	TYPE B CURB	7065-T1-M1	R-3034-B	FLAT GRATE WITH ROLL BACK	0.87
CB	PAVEMENT/ SHOULDER	1020-M1	R-2060-D	FLAT GRATE	0.66
CB	OPEN AREA	1020-01	R-2560-D	BEEHIVE GRATE 4" HIGH	0.63
CB	GUTTER	5100	R-3238	CONCAVE INLET	0.96



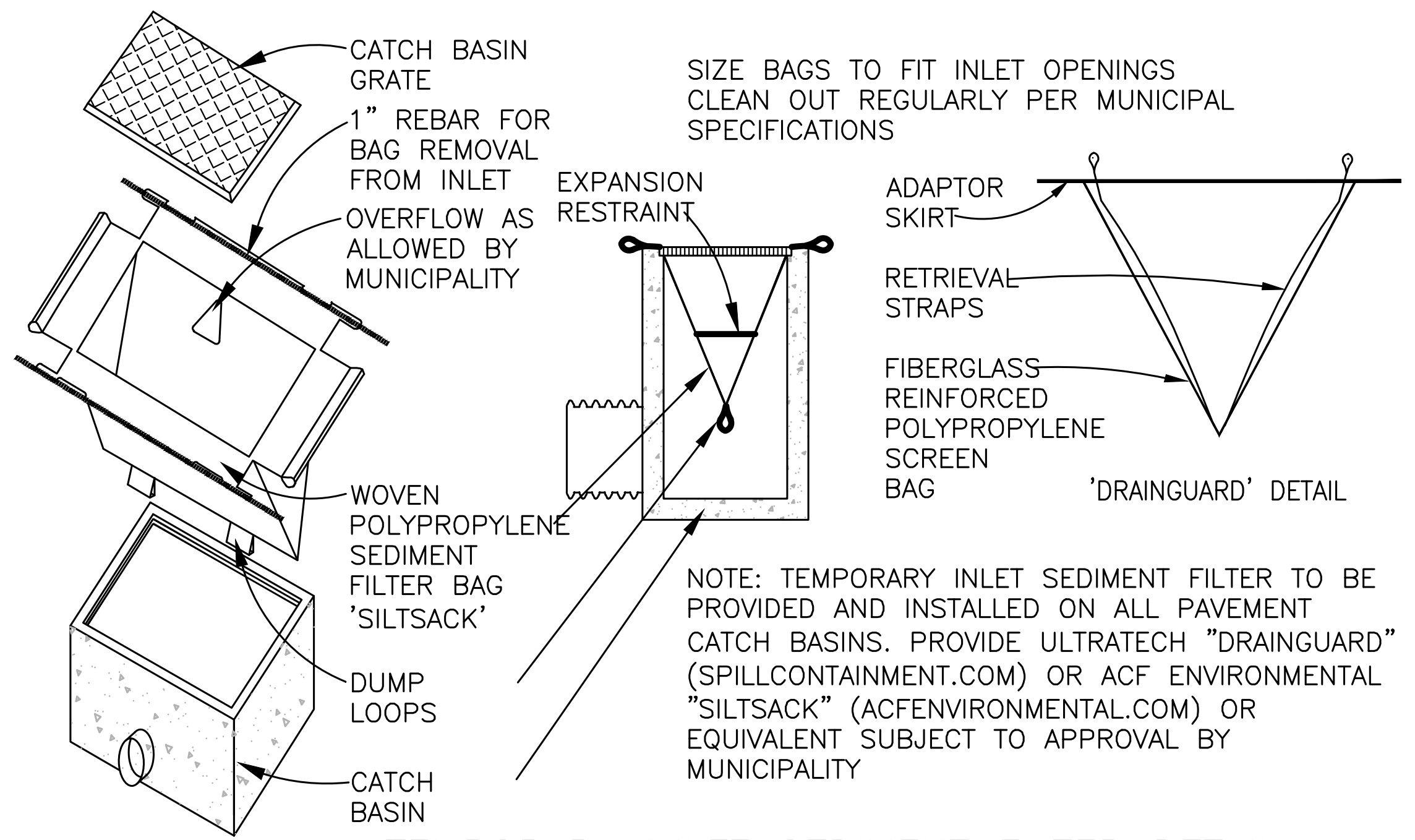
SECTION "A"-"A"



TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT
NO SCALE



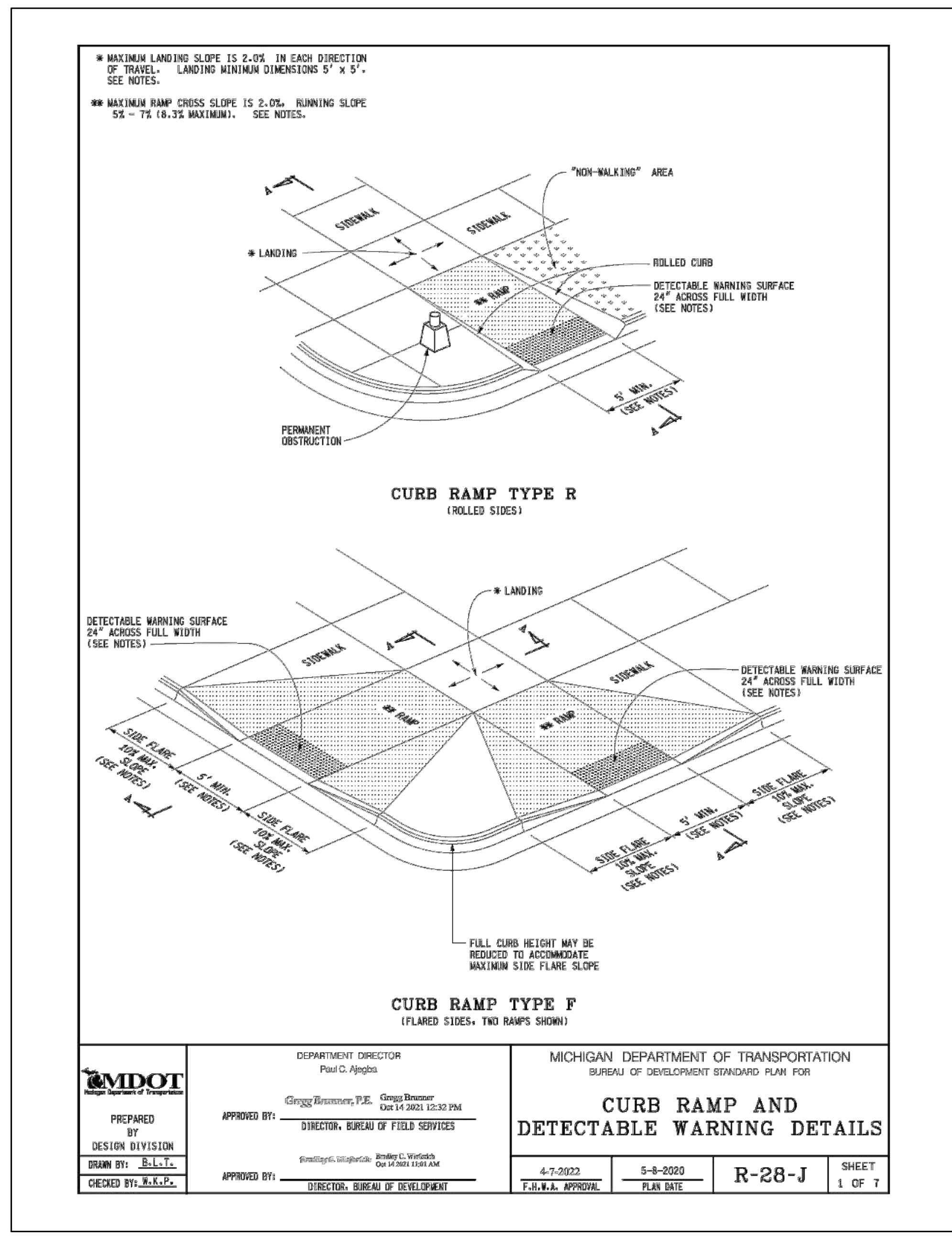
SILT FENCE DETAIL
NO SCALE

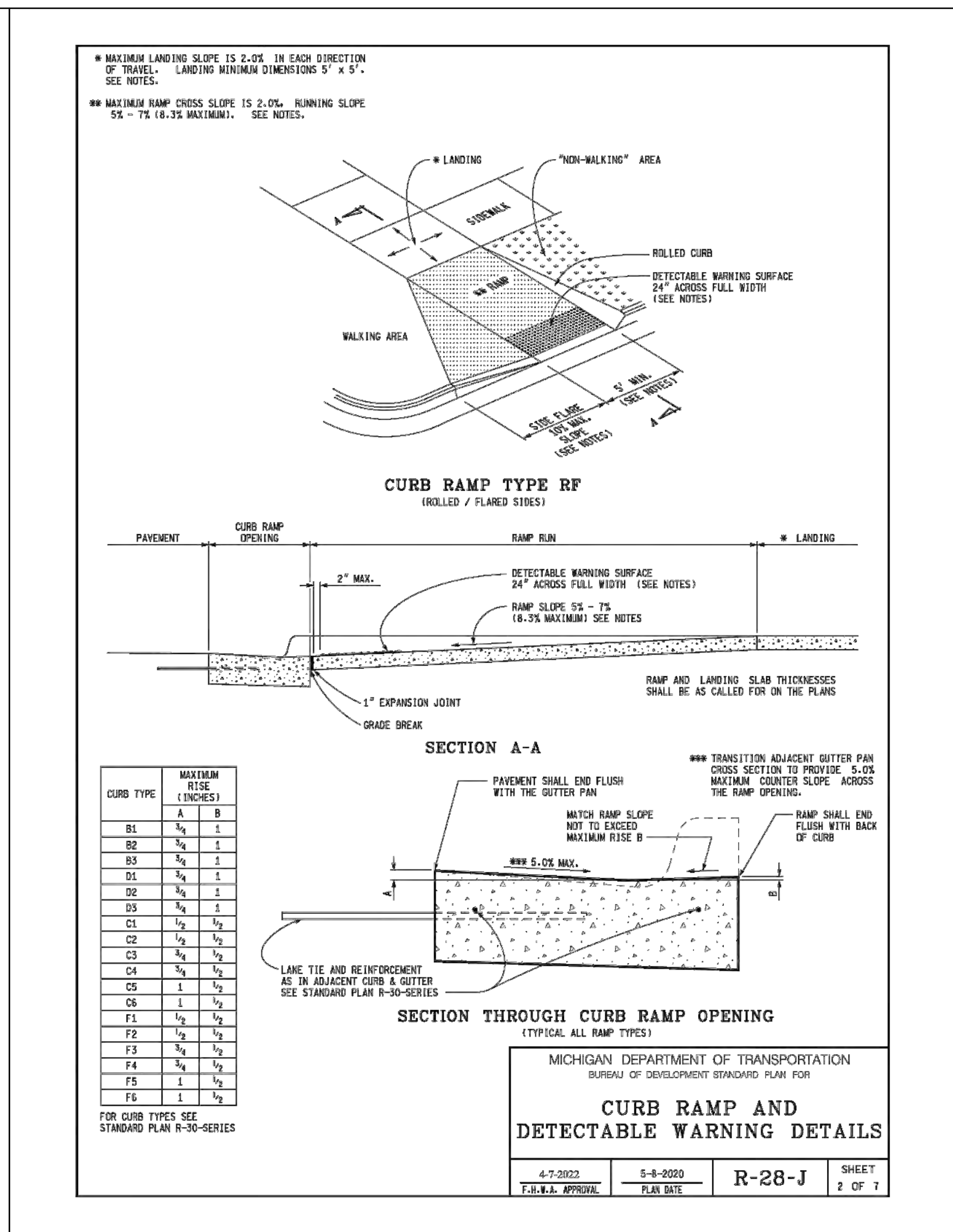


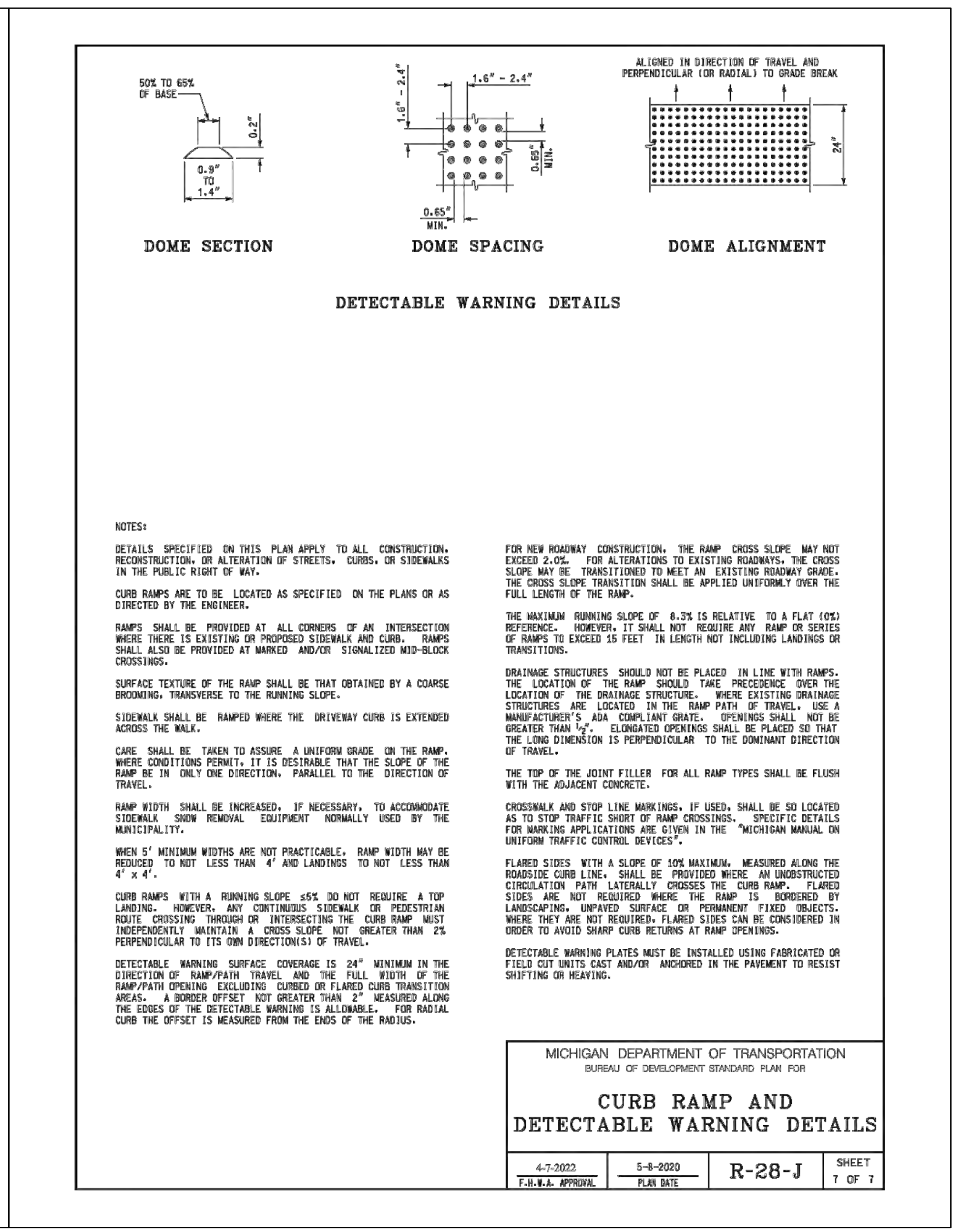
SIZE BAGS TO FIT INLET OPENINGS
CLEAN OUT REGULARLY PER MUNICIPAL SPECIFICATIONS

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

TEMPORARY INLET SEDIMENT FILTER DETAIL
(NO SCALE)







THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE APPARENT OR IF THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

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

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

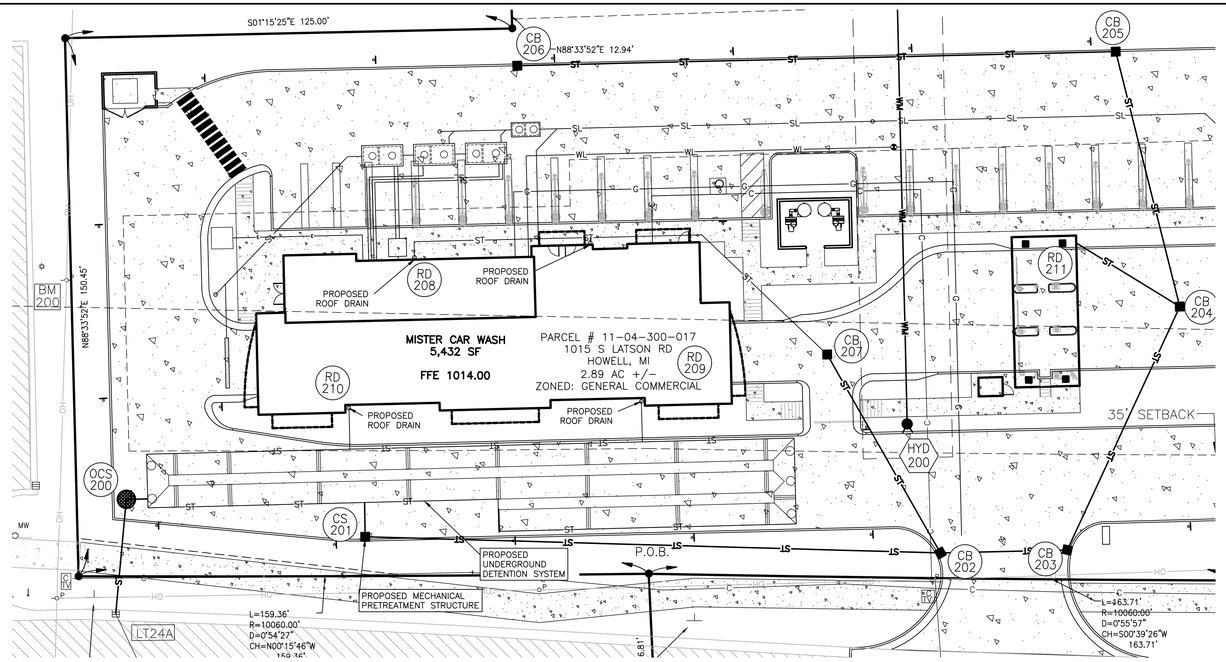
PROJECT
MISTER CAR WASH

PREPARED FOR
CWP WEST LLC
222 E 5TH AVE
TUCSON, AZ 85705
206.664.1303

TITLE
CONSTRUCTION DETAILS

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: DH/JS
CHECKED BY:
SCALE: NO SCALE
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 10



SCALE: 1 INCH = 20 FEET

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

STORM WATER MANAGEMENT NARRATIVE

PRE-DEVELOPMENT:
THE SITE CURRENTLY SITS VACANT AND SHEET FLOWS FROM EAST TO WEST TO THE LATSON ROAD STORM SEWER SYSTEM.

POST DEVELOPMENT:
THE SITE WILL BE DEVELOPED AND PAVED FOR USE AS A CAR WASH. THE SITE WILL CONTAIN A STORM SEWER COLLECTION SYSTEM WHICH WILL COLLECT ALL ON-SITE (AND SOME TRIBUTARY OFF-SITE) STORM WATER AND ROUTE IT TO A MECHANICAL PRETREATMENT UNIT. THE MECHANICAL PRETREATMENT UNIT IS PROPOSED AND DESIGNED TO MEET THE REQUIRED WATER QUALITY STANDARDS PRIOR TO DISCHARGE INTO THE PROPOSED ON-SITE UNDERGROUND DETENTION SYSTEM. INFILTRATION TESTING HAS BEEN COMPLETED THAT INDICATE THAT ON-SITE SOILS IN THE AREA OF THE PROPOSED BASIN ARE APPROXIMATELY 1.5 IN/HR. APPLYING A FACTOR OF SAFETY OF 2, THE SITE IS UTILIZING A SOILS INFILTRATIVE CAPACITY OF 0.75 IN/HR.

ONE OF THE MAIN GOALS OF THE CURRENT LIVINGSTON COUNTY DRAIN COMMISSIONER STORM WATER STANDARDS IS TO PROMOTE ON-SITE INFILTRATION IF SUITABLE SOILS EXIST. IF SITE SOILS EXCEED 0.25 IN/HR, INFILTRATION IS EXPECTED TO BE IMPLEMENTED, AND WITH ON-SITE SOILS WITH INFILTRATIVE RATES GREATER THAN 0.50 IN/HR, THE SOILS DO NOT NEED ANY AMENDMENT TO FURTHER PROMOTE INFILTRATION. DUE TO THE GEOMETRICS OF THE SUBJECT SITE (BEING SHALLOW AND A SMALLER COMMERCIAL PARCEL), THERE ARE MINIMAL OPPORTUNITY TO PROMOTE INFILTRATION OTHER THAN AT THE LOCATION OF THE UNDERGROUND DETENTION SYSTEM. IN ORDER TO PROMOTE INFILTRATION AT THE BASIN FOOTPRINT PRIOR TO STORM WATER DISCHARGE TO THE LATSON ROAD STORM SEWER SYSTEM OCCURRING, THE UNDERGROUND DETENTION SYSTEM PIPE INVERT IS SET BELOW THE OUTLET CONTROL ORIFICE ELEVATION BY 2.5'. SO 2.5' OF THE 6' DIAMETER UNDERGROUND SYSTEM PIPE WILL BE BELOW THE OUTLET ELEVATION. A PERFORATED PIPE AND THE SURROUNDING STRUCTURAL BACKFILL AROUND THE UNDERGROUND DETENTION SYSTEM WILL AID IN PROMOTION OF THE INFILTRATION OF STORM WATER IN THE ON-SITE 0.75 IN/HR SOILS. THE VOLUME WITHIN THE UNDERGROUND SYSTEM THAT IS BELOW THE OUTLET ELEVATION IS 5,062 CFT:

454 LFT PIPE X 11.1511 CFT/LFT OF PIPE (BOTTOM 2.5' OF 6' DIA PIPE) = 5,063 CFT

THE 5,063 CFT PROVIDED BELOW THE INVERT IS INTENDED TO MEET OR EXCEED THE REQUIRED CHANNEL PROTECTION VOLUME 4,689 CFT. THIS DESIGN MEETS THAT VOLUME REQUIREMENT.

PER THE LCDC STANDARDS, VOLUME PROVIDED FOR THE CHANNEL PROTECTION VOLUME CAN BE CREDITED TOWARDS THE REQUIRED 100-YR DETENTION VOLUME, SO LONG AS THE REMAINING DETENTION VOLUME REQUIRED IS NOT LESS THAN THE EXTENDED DETENTION VOLUME. WITH THIS, A REMAINING 7,377 CFT OF VOLUME IS NEEDED:

12,440 CFT - 5,063 CFT = 7,377 CFT (REMAINING VOLUME NEEDED ABOVE OUTLET)
7,377 CFT > 6,853 CFT (EXTENDED DETENTION VOLUME)

A VOLUME OF 7,774 CFT IS PROVIDED ABOVE THE OUTLET CONTROL ELEVATION.

454 LFT PIPE X 17.1232 CFT/LFT OF PIPE (TOP 3.5' OF 6' DIA PIPE) = 7,774 CFT

THE TOTAL STORAGE VOLUME PROVIDED IN THE SYSTEM IS 12,837 CFT
(5,063 CFT BELOW OUTLET FOR CPVC INFILTRATION VOLUME + 7,774 CFT ABOVE OUTLET)

IN ORDER FOR INFILTRATION TO OCCUR IN THE BASIN FOOTPRINT, AN ADEQUATE FOOTPRINT FOR INFILTRATION MUST BE PROVIDED. PER THE LCDC STANDARDS AND WITH AN INFILTRATION RATE OF 0.75 IN/HR, A MINIMUM BASIN FOOTPRINT OF 2,679 SFT IS REQUIRED. A BASIN FOOTPRINT OF THE PROPOSED SYSTEM IS 3,462 SFT. WITH THIS FOOTPRINT AREA AND ON-SITE INFILTRATION RATE, THE PROVIDED RATE OF INFILTRATION IS 216.4 CFT/HR WHICH RESULTS IN FULL INFILTRATION WITHIN 23.4 HOURS.

3,462 SFT X (0.75 IN/HR X 1FT/12IN) = 216.4 CFT/HR
5,063 CFT / 216.4 CFT/HR = 23.4 HRS TO INFILTRATE THE PROVIDED CPVC STORAGE VOLUME BELOW THE OUTLET INVERT.

LIVINGSTON COUNTY DETENTION BASIN CALCULATIONS

AREA (ACRES)	IMPERVIOUS FACTOR	ACRE IMPERVIOUS
1.01	0.9	0.91
0.00	0.7	0.00
0.37	0.2	0.07

COMPOUND C: 0.72
TOTAL DRAINAGE AREA: 1.38 ACRES

WATER QUALITY VOLUME V_{WQ}
V_{WQ}= 3,630(C)(A) = 3607 FT^3
Are upstream infiltration BMP's provided? NO (infiltration promoted at Basin)
V_F = 0.15(V_{WQ}) = 541 FT^3

WATER QUALITY RATE FOR MECHANICAL STRUCTURE
T_C = MAX TIME OF CONCENTRATION = 18.20 MIN
Q_{WQ}= (C)(A)30.2(T_C+9.17)$^{.81}$ = 2.06 CFS

CHANNEL PROTECTION VOLUME CONTROL - REQUIRED
V_{CP-R} = 4,719(C)(A) = 4689 FT^3

CHANNEL PROTECTION VOLUME CONTROL - PROVIDED
In-Situ Infiltration rate = 0.75 IN/HR (INCLUDES FACTOR OF SAFETY OF 2)
Are upstream infiltration BMP's provided? NO INFILTRATION
Basin Footprint Infiltration Area Required = 2679 FT^2
V_{CP-P} = 5063 FT^3

CHANNEL PROTECTION RATE CONTROL (EXTENDED DETENTION VOLUME)
V_{ED} = 6,897(C)(A) = 6853 FT^3

EXTENDED DETENTION OUTLET RATE
Q_{ED} = V_{ED}/(48hr) = 0.040 CFS
H_{ED} = V_{ED}/4,800 (H)$^{1/2}$ = 1.0 1" HOLES
H = 2.77 FT
$ELEV_{ED}$ = 1009.39 FT

100-YEAR ALLOWABLE OUTLET RATE
Q_{DRAIN} = Restricted Drain Rate = 0.2 CFS/ACRE
Q_{VRR} = 1.1055 - 0.209LN(A) = 1.000 CFS/ACRE
Q_{100P} = (LESSER OF Q_{DRAIN} & Q_{VRR})*A = 0.276 CFS

100-YEAR DETENTION VOLUME
V_{100R} = 18985 (C)(A) = 18863 FT^3
Q_{100IN} = (C)(A)83.3(T_C+9.17)$^{0.61}$ = 5.67 CFS
R = 0.209 - 15(ln(Q_{100P}/Q_{100IN})) = 0.6594
V_{100D} = V_{100R}*R-V_{CP-P} = 7377 FT^3
Is V_{100D} ≥ V_{ED} ? YES
V_{100D} = 7377 FT^3

VARIABLE RELEASE RATE	
1 CFS/ACRE	< 2 ACRES
0.15 CFS/ACRE	> 100 ACRES

BASIN STORAGE PROVIDED
Lineal Footage of Pipe in system: 454 lft

ELEVATION	INCREMENTAL VOLUME / LFT	VOLUME (FT^3)	TOTAL VOLUME (FT^3)	
1010.12	1.1254	510.9	7,774	
1009.62	1.9721	895.3	7,263	
1009.12	2.4302	1103.3	6,368	
1008.62	2.7225	1236.0	5,264	
1008.12	2.9009	1317.0	4,028	
1007.62	2.9861	1355.7	2,711	
1007.12	2.9861	1355.7	1,356	
1006.62		0.0	0	**BOTTOM OF STORAGE**
1006.62	2.9009	1317.0	5,063	**VOLUME BELOW OUTLET**
1006.12	2.7225	1236.0	3,746	**(FOR CPVC VOLUME)**
1005.62	2.4302	1103.3	2,510	
1005.12	1.9721	895.3	1,406	
1004.62	1.1254	510.9	511	
1004.12	0	0	0	

PROVIDED FOOTPRINT OF BASIN BOTTOM AREA 3,462 FT^2

OUTLET CONTROL STRUCTURE
Q_{ED} ACTUAL
H_{ED} = 1 (1" HOLES)
A_{ED} = 0.0055 FT^2
$Q_{ED\text{-}ACTUAL}$ = (A_{ED})(0.62 x (2 x 32.2 x h)$^{.5}$) 0.045 CFS

Q_{100ALL} OUTLET
$Q_{100\text{-}ACTUAL}$ = Q_{100P} - $Q_{ED\text{-}ACTUAL}$ = 0.231 CFS
A_{100} = $Q_{100\text{-}ACTUAL}$ / (0.62 * (2 *32.2 * ($ELEV_{DI\,WL}$ - $ELEV_{ED}$))$^{0.5}$) = 0.054 FT^2
AREA OF 2 INCH DIAMETER ORIFICE = 0.022 FT^2
ORIFICES = A_{100} / 0.005 = 2.0 ORIFICES

OVERFLOW SPILLWAY DESIGN
Design Flow Rate: Q_{100IN} = 5.67 CFS
Depth of Spillway: D_{SPILL} = 6 INCHES
Width of Spillway: W_{SPILL} = Q_{100IN}/3.33$D_{SPILL}^{3/2}$ = 4.8 FT

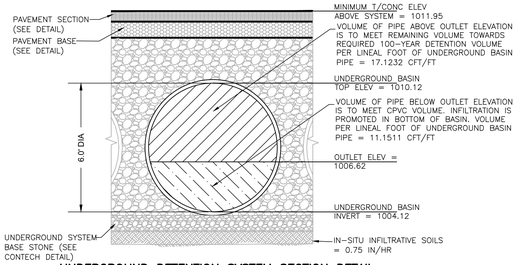
BASIN DESIGN SUMMARY

BASIN SIZE REQUIRED =	7377 FT^3
BASIN SIZE PROVIDED =	7,774 FT^3

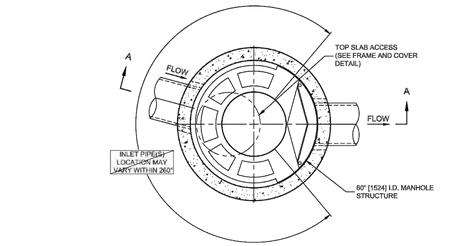
ORIFICE DESIGN SUMMARY

ELEVATION	# OF HOLES	DIAMETER OF HOLES
1006.62	1.0	1 -INCH
1009.39	2.0	2 -INCH

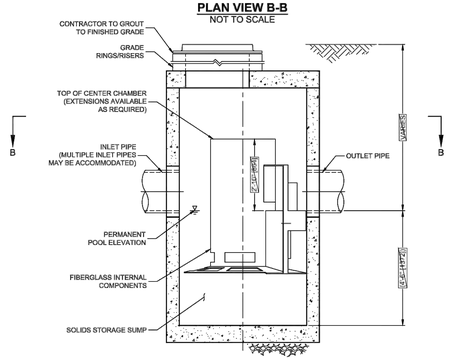
OVERFLOW SPILLWAY SUMMARY
WIDTH OF OVERFLOW SPILLWAY = 5 FT



UNDERGROUND DETENTION SYSTEM SECTION DETAIL
NO SCALE



PLAN VIEW B-B
NOT TO SCALE



ELEVATION A-A
NOT TO SCALE

CASCADE separator™

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-5 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

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

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (cfs [L/s])			
PEAK FLOW RATE (cfs [L/s])			
RETURN PERIOD OF PEAK FLOW (yrs)			
RIM ELEVATION			
PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
NOTES / SPECIAL REQUIREMENTS:			

FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

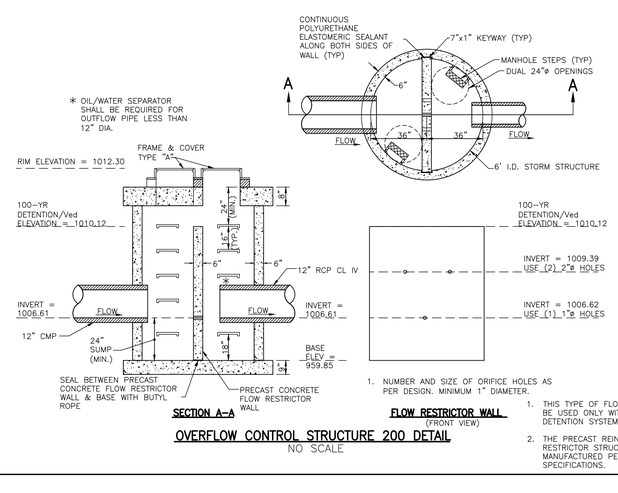
GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ConvanceES.com
3. CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. CASCADE SEPARATOR STRUCTURE SHALL MEET AASHTO H520 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

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

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

CS-5
CASCADE SEPARATOR
STANDARD DETAIL

MECHANICAL PRETREATMENT STRUCTURE 201 DETAIL



1. NUMBER AND SIZE OF ORIFICE HOLES AS PER DESIGN. MINIMUM 1" DIAMETER.

FLOW RESTRICTOR WALL
(FRONT VIEW)

OVERFLOW CONTROL STRUCTURE 200 DETAIL
NO SCALE

1. THIS TYPE OF FLOW RESTRICTOR TO BE USED ONLY WITH UNDERGROUND DETENTION SYSTEMS.
2. THE PRECAST REINFORCED FLOW RESTRICTOR STRUCTURE SHALL BE MANUFACTURED PER ASTM C-478 SPECIFICATIONS.

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE PLANS ARE NOT GUARANTEED TO BE ACCURATE OR COMPLETE. IT IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITIES WHICH MAY BE CONSTRUCTED BY OTHERS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND TO EXIST BETWEEN THE PROPOSED CONSTRUCTION AND EXISTING UTILITIES FROM THE PLANS. THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171
IT'S THE LAW!!! (P.A. 53 OF 1974, AS AMENDED)
MEMBER OF MISS DIG SYSTEM, INC.

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

PROJECT: MISTER CAR WASH
PREPARED FOR: CWP WEST LLC
2225 E 5TH AVE
TUCSON, AZ 85705
206.664.1303
TITLE: BASIN DETAILS

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: DH
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 11

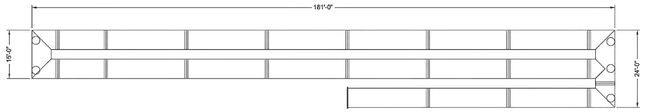
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 464 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 12,432 CF
- PIPE STORAGE VOLUME = 12,837 CF
- BACKFILL STORAGE VOLUME = 0 CF
- TOTAL STORAGE PROVIDED = 12,837 CF

PIPE DETAILS
- DIAMETER = 72"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

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



ASSEMBLY
SCALE: 1" = 20'

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

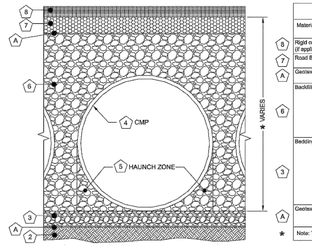
DATE	REVISION DESCRIPTION	BY

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

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO38636 MCW - Latson
North System
Howell, MI
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
20324	39536	10/25/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.:	1	



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

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

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

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

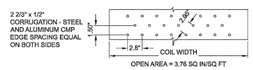
3 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

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

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

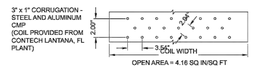
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

2 2/3" x 1/2" CORRUGATION - STEEL AND ALUMINUM CMP - EDGE SPACING EQUAL ON BOTH SIDES



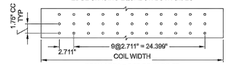
OPEN AREA = 3.76 SQ IN/SQ FT

3" x 1" CORRUGATION - STEEL AND ALUMINUM CMP - (COIL PROVIDED FROM CONTECH LANTANA, FL PLANT)



OPEN AREA = 4.16 SQ IN/SQ FT

5" x 1" CORRUGATION - STEEL ONLY EDGE SPACING EQUAL ON BOTH SIDES

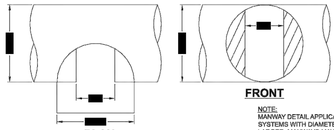


OPEN AREA = 3.33 SQ IN/SQ FT

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

TYPICAL PERFORATION DETAIL

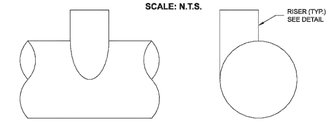
SCALE: N.T.S.



TYPICAL MANWAY DETAIL

SCALE: N.T.S.

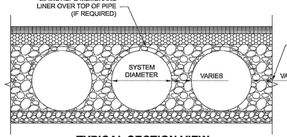
NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.



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

TYPICAL RISER DETAIL

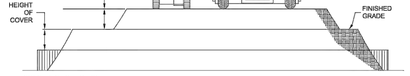
SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

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



CONSTRUCTION LOADS

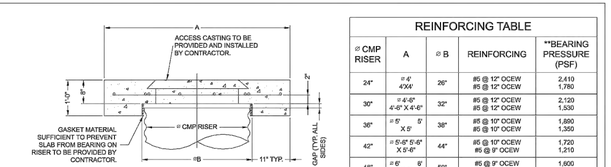
FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE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

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	16-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.5
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

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

CONSTRUCTION LOADING DIAGRAM

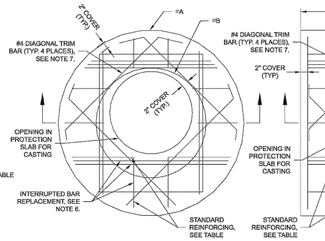
SCALE: N.T.S.



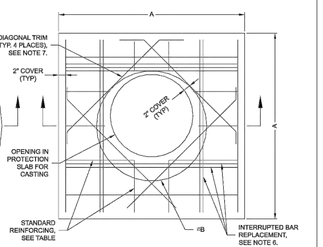
SECTION VIEW

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

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

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

MANHOLE CAP DETAIL

SCALE: N.T.S.

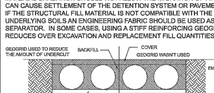
CMP DETENTION INSTALLATION GUIDE

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

FOUNDATION

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

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

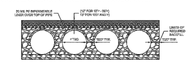


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING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

GEOMEMBRANE BARRIER

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

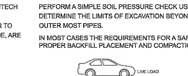
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE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



IN-SITU TRENCH WALL

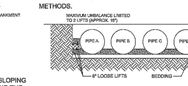
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION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

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



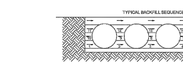
BACKFILL PLACEMENT

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

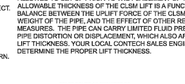


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE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

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



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



CONSTRUCTION LOADING

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

ADDITIONAL CONSIDERATIONS

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

CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

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

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

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

MAINTENANCE

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

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

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

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

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

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

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

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

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-62.

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

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

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

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

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

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

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

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-742

ALUMINUM: AASHTO M-196 OR ASTM B-745

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

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

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

DYO38636 MCW - Latson
North System
Howell, MI
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
20324	39536	10/25/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.:	1	

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

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS AND IS NOT GUARANTEED AS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. IT SHALL BE THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITIES CROSSINGS PRIOR TO CONSTRUCTION. IT SHALL ALSO BE THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND BETWEEN THE PLANS AND THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
IT'S THE LAW!!!
(MI ACT 53 OF 1974, AS AMENDED)
FOR NE MEMBERS INCLUDE

PROJECT:

PIPE RESTRAINT SCHEDULE

GROUND BURIED PRESSURE PIPE - POLYETHYLENE ENCASED DUCTILE IRON PIPE

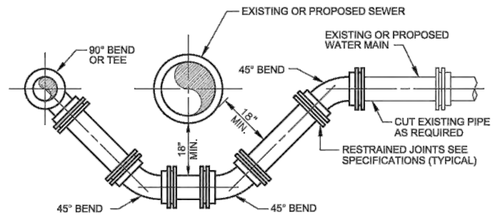
PIPE DIAMETER	TEES, 90° BENDS	45° BENDS	22-1/2° BENDS	11-1/4° BENDS	DEAD ENDS	REDUCERS (ONE SIZE REDUCTION)*	REDUCERS (TWO SIZE REDUCTIION)*
4	13	5	3	1	40	--	--
6	19	8	4	2	58	31	--
8	24	10	5	2	75	30	70
12	34	14	7	3	107	57	116
16	43	18	9	4	139	59	137
20	52	22	10	5	169	59	134
24	61	25	12	6	199	60	132
30	73	30	15	7	242	85	168
36	84	35	17	8	281	84	168

1. LENGTHS OF PIPE RESTRAINT ARE GIVEN IN FEET.
2. IF REQUIRED PIPE DIAMETER IS NOT LISTED IN THIS TABLE, THE NEXT LARGEST PIPE DIAMETER SHALL BE USED.
3. THIS TABLE IS BASED ON A TEST PRESSURE OF 180 PSI (OPERATING PRESSURE PLUS WATER HAMMER. FOR OTHER TEST PRESSURES, ALL VALUES TO BE INCREASED OR DECREASED PROPORTIONALLY.
4. THE VALUES PROVIDED OF RESTRAINT LENGTH ARE IN EACH DIRECTION FROM THE POINT OF DEFLECTION OR TERMINATION EXCEPT FOR TEES, AT WHICH ONLY THE BRANCH IN THE DIRECTION OF THE STEM.
5. IF TIE RODS ARE USED, USE FOUR RODS MINIMUM AND ADD 1/8-INCH TO BAR DIAMETER AS CORROSION ALLOWANCE.

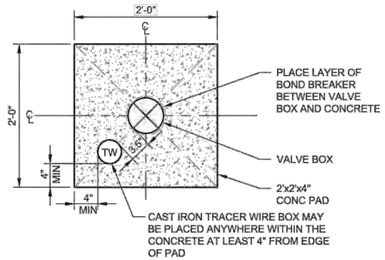
* SIZE REDUCTION IS BASED UPON THE PIPE DIAMETER SHOWN IN THIS TABLE.

BASED UPON:

INTERNAL PRESSURE:	180
PIPE DEPTH:	5
BEDDING CLASS:	TYPE 4
SOIL TYPE:	GOOD SAND
SAFETY FACTOR:	2

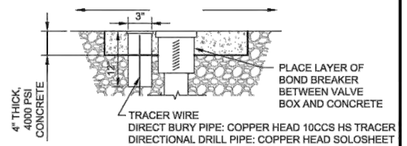


WATER MAIN UTILITY OFFSET



NOTE: ALL BOXES & ADJOINING TW BOXES SHALL BE ENCASED IN A CONC. PAD UNLESS OTHERWISE DETERMINED BY MHOG.

PLAN

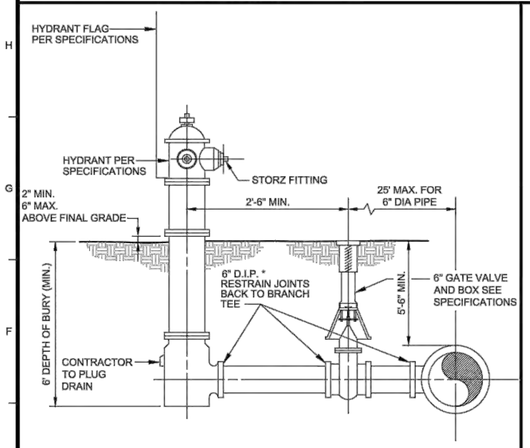


NOTE:
1. TRACER WIRE BOXES LOCATED WITHOUT A VALVE BOX ONLY REQUIRE AN 18" X 18" CONCRETE PAD.
2. TRACER WIRE BOX SHALL HAVE A LOCKING LID W/STANDARD AWWA PENTAGON KEY.
3. TRACER WIRE BOX SHALL BE COPPERHEAD RB14"TP IN ASPHALT INSTALLATIONS AND CD14"TP FOR ALL OTHER INSTALLATIONS.

SECTION

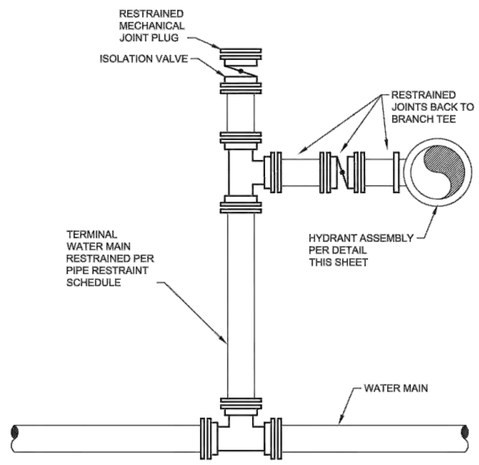
VALVE/TRACER WIRE BOX IN CONCRETE DETAIL

NO SCALE

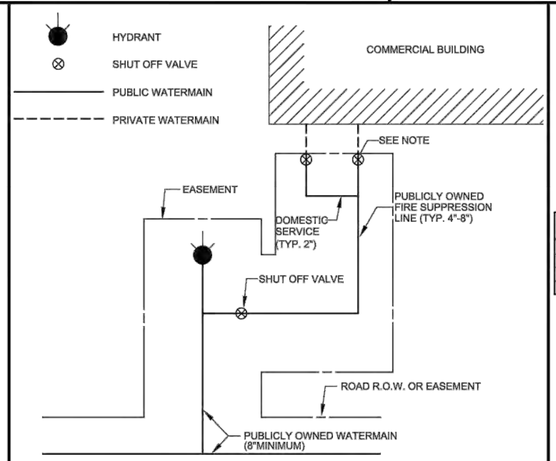


* THE LENGTH OF 6" PIPE FROM THE MAIN TO THE HYDRANT ASSEMBLY CANNOT EXCEED 25'. ANY PIPE OVER 25 FEET SHALL BE 8" DIAMETER MINIMUM AND DESIGNED PER MHOG SPECIFICATIONS.

FIRE HYDRANT ASSEMBLY

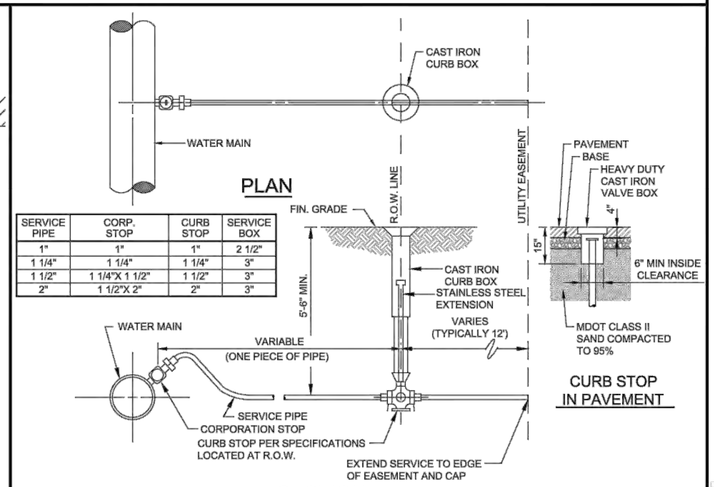


TERMINAL HYDRANT DETAIL



NOTE: FIRE SUPPRESSION LINE AND DOMESTIC SERVICE TO BE LOCATED WITHIN EASEMENT UP TO SHUTOFF VALVES OUTSIDE OF BUILDING.

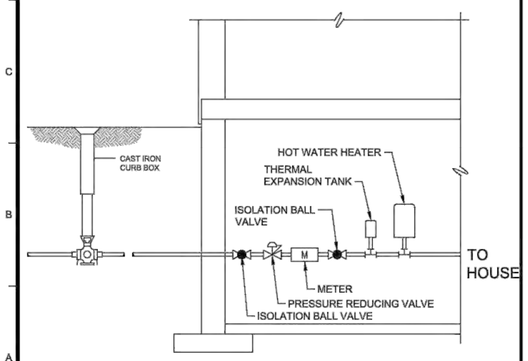
COMMERCIAL BUILDING WATER SERVICE LAYOUT



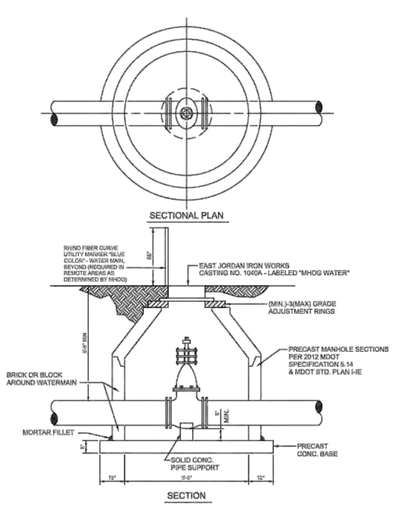
SERVICE PIPE	CORP. STOP	CURB STOP	SERVICE BOX
1"	1"	1"	2 1/2"
1 1/4"	1 1/4"	1 1/4"	3"
1 1/2"	1 1/4"X 1 1/2"	1 1/2"	3"
2"	1 1/2"X 2"	2"	3"

CURB STOP IN PAVEMENT

SECTION
WATER SERVICE LATERAL

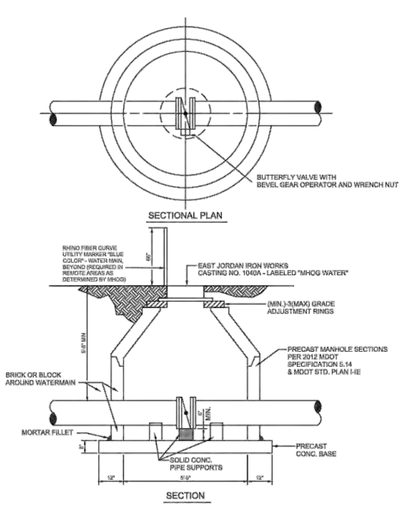


PRIVATE RESIDENCE
PRESSURE REDUCING VALVE (PRV)



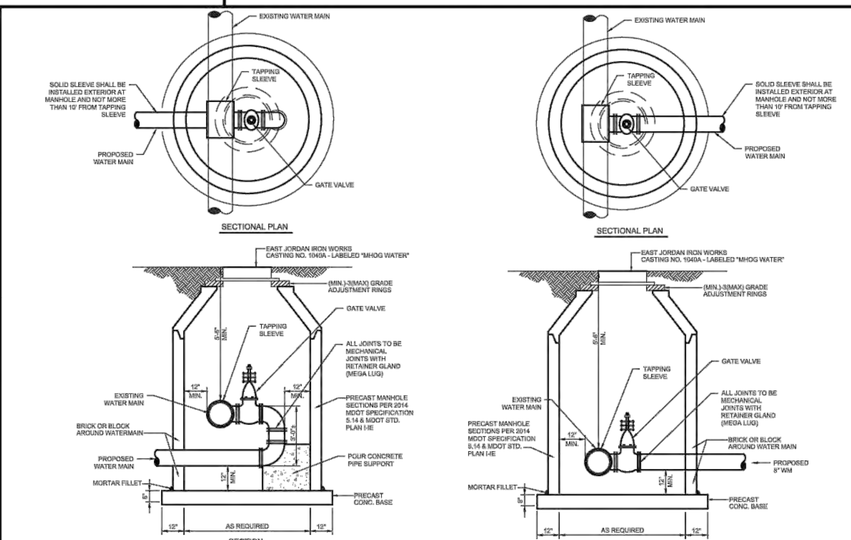
NOTES:
1. ALL LIFT HOLES AND JOINTS SHALL BE MORTARED BOTH INSIDE AND OUTSIDE.
2. BLOCK MANHOLES TO BE USED ONLY WITH ENGINEERS PERMISSION.
3. NO STEPS PERMITTED.

VALVE AND GATE WELL



NOTES:
1. ALL LIFT HOLES AND JOINTS SHALL BE MORTARED BOTH INSIDE AND OUTSIDE.
2. BLOCK MANHOLES TO BE USED ONLY WITH ENGINEERS PERMISSION.
3. NO STEPS PERMITTED.

BUTTERFLY VALVE AND WELL



NOTES:
1. ALL LIFT HOLES AND JOINTS SHALL BE MORTARED BOTH INSIDE AND OUTSIDE.
2. BLOCK MANHOLES TO BE USED ONLY WITH ENGINEERS PERMISSION.
3. TAPPING SLEEVES ONLY PERMITTED FOR CONNECTIONS SMALLER THAN MAIN LINE.
4. NO STEPS PERMITTED.

REVERSE TAP GATE WELL

REGULAR TAP GATE WELL

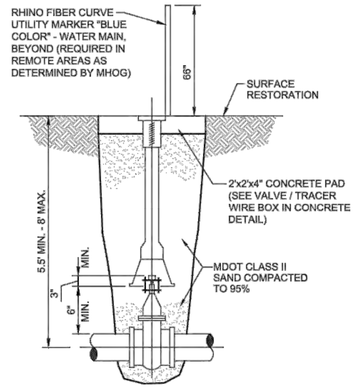
MARION HOWELL OCEOLA GENOA
Sewer and Water Authority

STANDARD DETAILS

Scale: NONE

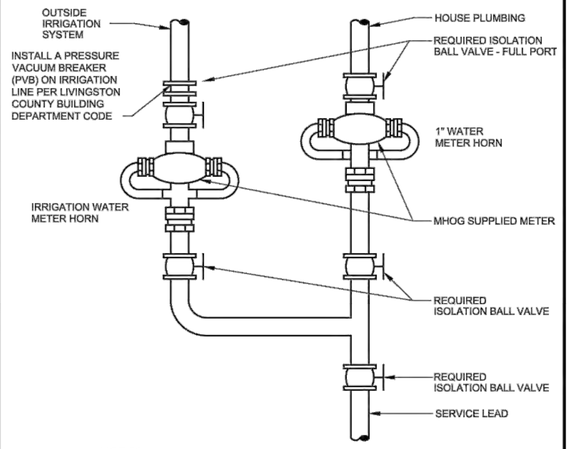
Issued Date JANUARY - 2014

UPDATED: MAY 2015
UPDATED: FEBRUARY 2016
UPDATED: APRIL 2016
UPDATED: OCTOBER 2017
UPDATED: FEBRUARY 2019
UPDATED: NOVEMBER 2022



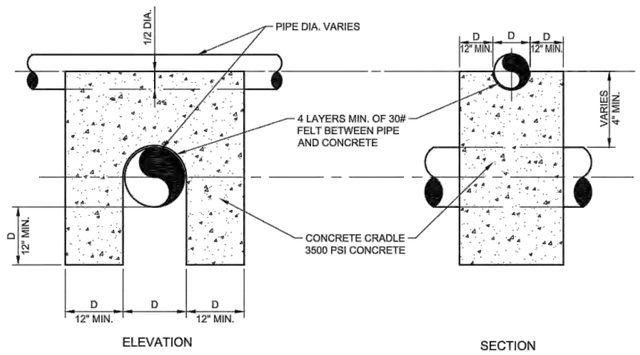
NOTES:
1. VALVE BOX SHALL NOT REST ON VALVE OR MAIN LINE PIPE.
2. A VALVE STEM EXTENSION WITH CENTERING RING IS REQUIRED FOR VALVES BURIED DEEPER THAN 6'.

GATE VALVE AND BOX



NOTES:
1. ALL METERS ARE TO BE INSTALLED HORIZONTALLY IN A DRY, CLEAN, SANITARY LOCATION THAT IS READILY ACCESSIBLE. THIS DRAWING IS NOT TO SCALE & IS ONLY A REPRESENTATION OF HOW THE VALVES AND METERS SHOULD BE INSTALLED. THE SECOND METER IS OPTIONAL FOR IRRIGATION USAGE. METERS SHOULD NOT BE INSTALLED IN LINE (ONE RIGHT AFTER THE OTHER).
2. PROPERTIES DESIGNATED "HIGH HAZARD" PER THE MHOG CROSS CONNECTION RULES MANUAL WILL REQUIRE THE INSTALLATION OF A REDUCED PRESSURE ZONE (RPZ) BACK FLOW PREVENTION DEVICE.

TYPICAL METER HORN INSTALLATION



CONCRETE CRADLE DETAIL

SCALE: NONE

MHOG CASTING DETAIL

NO SCALE

MARION HOWELL OCEOLA GENOA
Sewer and Water Authority

STANDARD DETAILS

Scale: NONE

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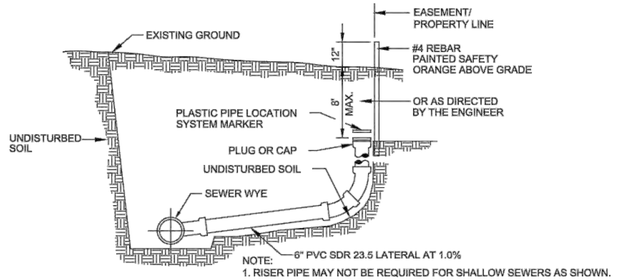
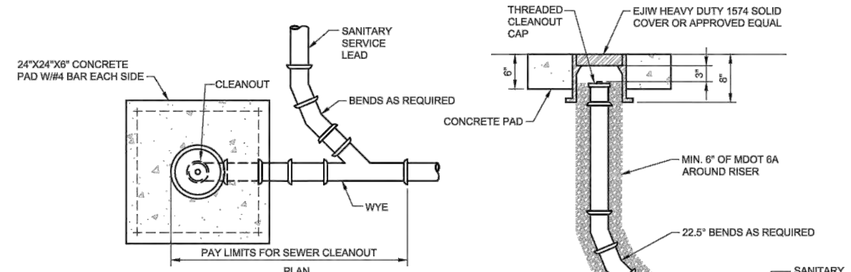


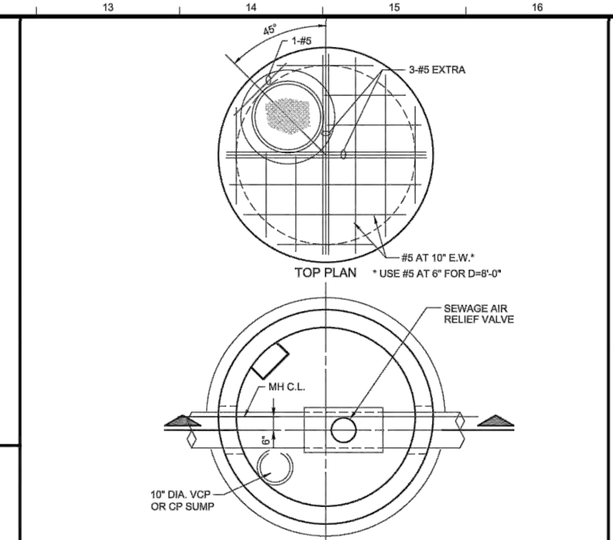
NOTE:
1. RISER PIPE MAY NOT BE REQUIRED FOR SHALLOW SEWERS AS SHOWN.
2. WHEN CONNECTING TO AN EXISTING SEWER THE AUTHORITY MAY REQUIRE CORING OF THE EXISTING PIPE AND INSTALLATION OF A SEWER SADDLE. SADDLE SHALL BE ROMAC "CB" SEWER SADDLE OR APPROVED EQUAL.

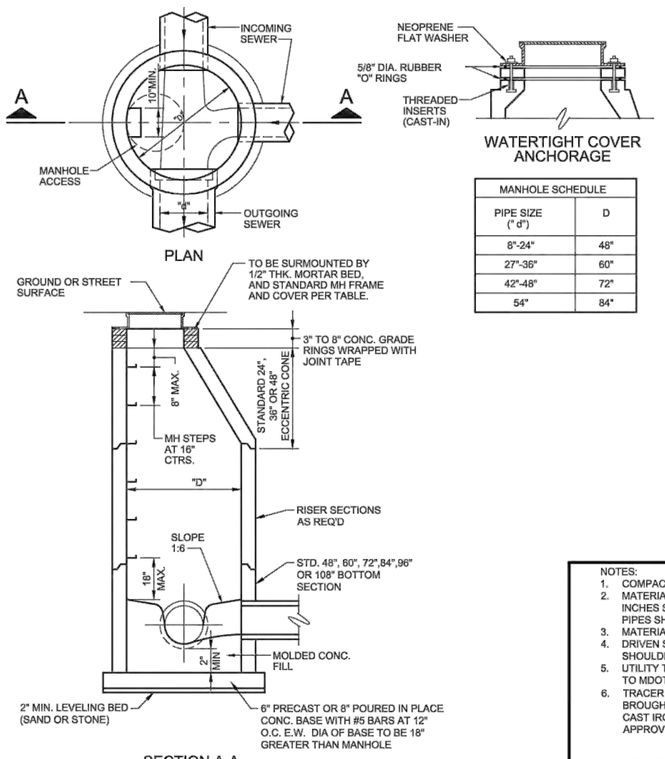
SANITARY SEWER LATERAL



NOTES:
1. ALL CONNECTION SHALL BE BELL AND SPIGOT TYPE.
2. CLEANOUT IS TO BE SAME DIAMETER AS SERVICE LEAD.
3. CONCRETE PAD REQUIRED UNLESS OTHERWISE DETERMINED BY MHOG.
4. THERE MUST BE A 3" GAP FROM THE BOTTOM OF THE CLEAN OUT LID TO THE TOP OF THE THREADED CAP.

SEWER CLEANOUT DETAIL



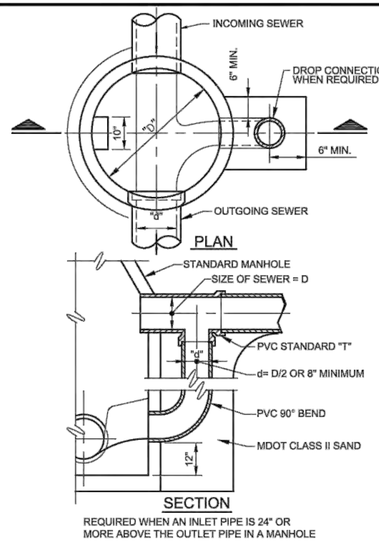


MANHOLE SCHEDULE	
PIPE SIZE (" d")	D
8"-24"	48"
27"-36"	60"
42"-48"	72"
54"	84"

NOTES:
1. ALL SANITARY MANHOLES TO BE PRECAST REINFORCED CONCRETE WITH PREMIUM JOINTS. SEE SPECIFICATIONS FOR BASE SLAB AND PIPE OPENINGS AND CONNECTIONS.
2. MANHOLE CONES SHALL BE THE ECCENTRIC TYPE.
3. PROVIDE 6" OF COMPACTED GRANULAR MATERIAL UNDER ALL PRECAST CONCRETE BASE SLPVC.
4. FORCE MAINS CONNECT DIRECTLY TO A MANHOLE SHALL BE INSTALLED SO THAT THE ELEVATION OF THE PIPE CROWNS MATCH. THE FORCE MAIN SHALL BE DIRECTED DOWNWARD INTO THE FLOW CHANNEL.
5. FOR SANITARY SEWERS ALL PIPES SHALL ENTER MANHOLE THROUGH RUBBER BOOTED CONNECTION.

FRAME & COVER FOR SANITARY SEWER MANHOLES			
		MANUFACTURER OR EQUAL	
TYPE	TYPE OF COVER	EAST JORDAN	NEENAH
MH	SANITARY - SOLID SELF-SEALING	1040.0000	R-1642
MH	SANITARY - SOLID WATERTIGHT	1040-APT	R-1916-F
CO	SOLID	1574A	R-1973-A

STANDARD MANHOLE



REQUIRED WHEN AN INLET PIPE IS 24" OR MORE ABOVE THE OUTLET PIPE IN A MANHOLE

DROP CONNECTION

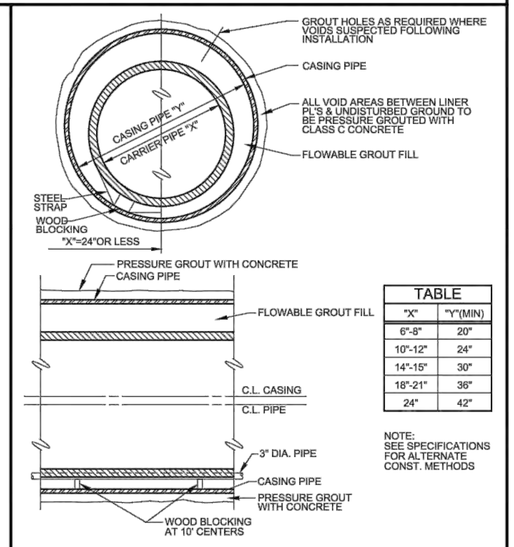
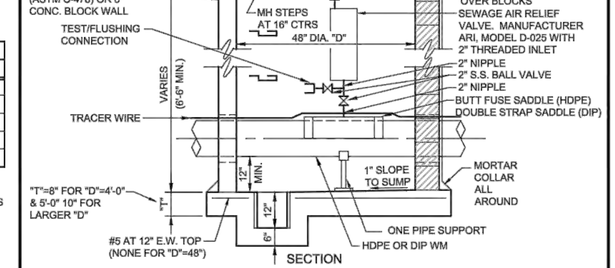


TABLE	
"X"	"Y"(MIN)
6"-8"	20"
10"-12"	24"
14"-15"	30"
18"-21"	36"
24"	42"

NOTE:
SEE SPECIFICATIONS FOR ALTERNATE CONST. METHODS

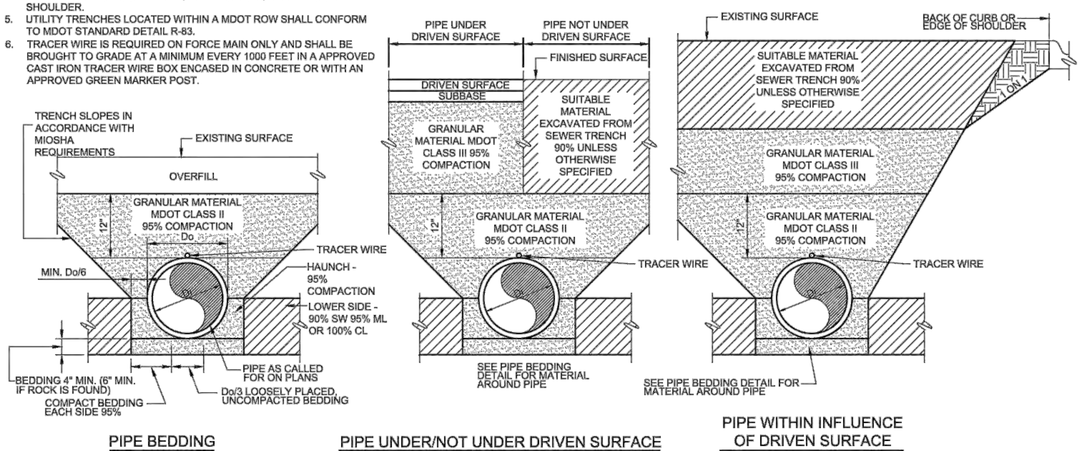
CASING PIPE



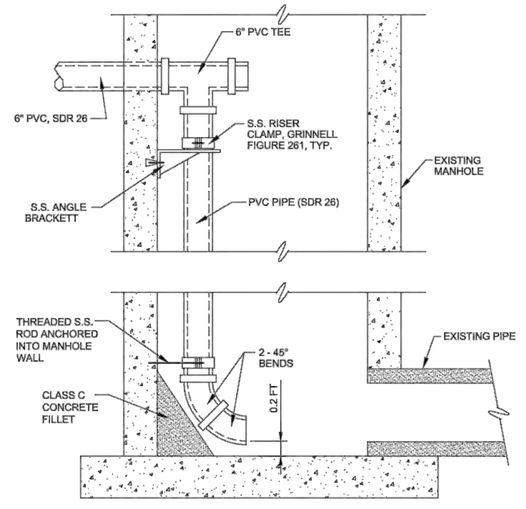
NOTE: ALL PLUMBING MATERIALS TO BE NON-CORROSIVE, ALL FITTINGS SHALL BE STAINLESS STEEL.

AIR RELIEF STRUCTURE

NOTES:
1. COMPACTION PRESENTED AS MINIMUM STANDARD PROCTOR VALUES.
2. MATERIALS AROUND THERMOPLASTIC PIPE WITH DIAMETER < 6 INCHES SHALL PASS 0.5 INCH SIEVE, MATERIALS AROUND OTHER PIPES SHALL PASS 1.5 INCH SIEVE.
3. MATERIALS AROUND HDPE PIPE TO BE MDOT 6A OR 21AA.
4. DRIVEN SURFACE IS DRIVEWAY, PARKING AREA, ROAD BED OR SHOULDER.
5. UTILITY TRENCHES LOCATED WITHIN A MDOT ROW SHALL CONFORM TO MDOT STANDARD DETAIL R-83.
6. TRACER WIRE IS REQUIRED ON FORCE MAIN ONLY AND SHALL BE BROUGHT TO GRADE AT A MINIMUM EVERY 1000 FEET IN A APPROVED CAST IRON TRACER WIRE BOX ENCASED IN CONCRETE OR WITH AN APPROVED GREEN MARKER POST.



TRENCH EXCAVATION & PIPE BEDDING



INTERIOR SEWER LATERAL DROP CONNECTION

MARION HOWELL OCEOLA GENOA
Sewer and Water Authority

STANDARD DETAILS

Scale: NONE
Issued Date JANUARY - 2014

UPDATED: MAY 2015
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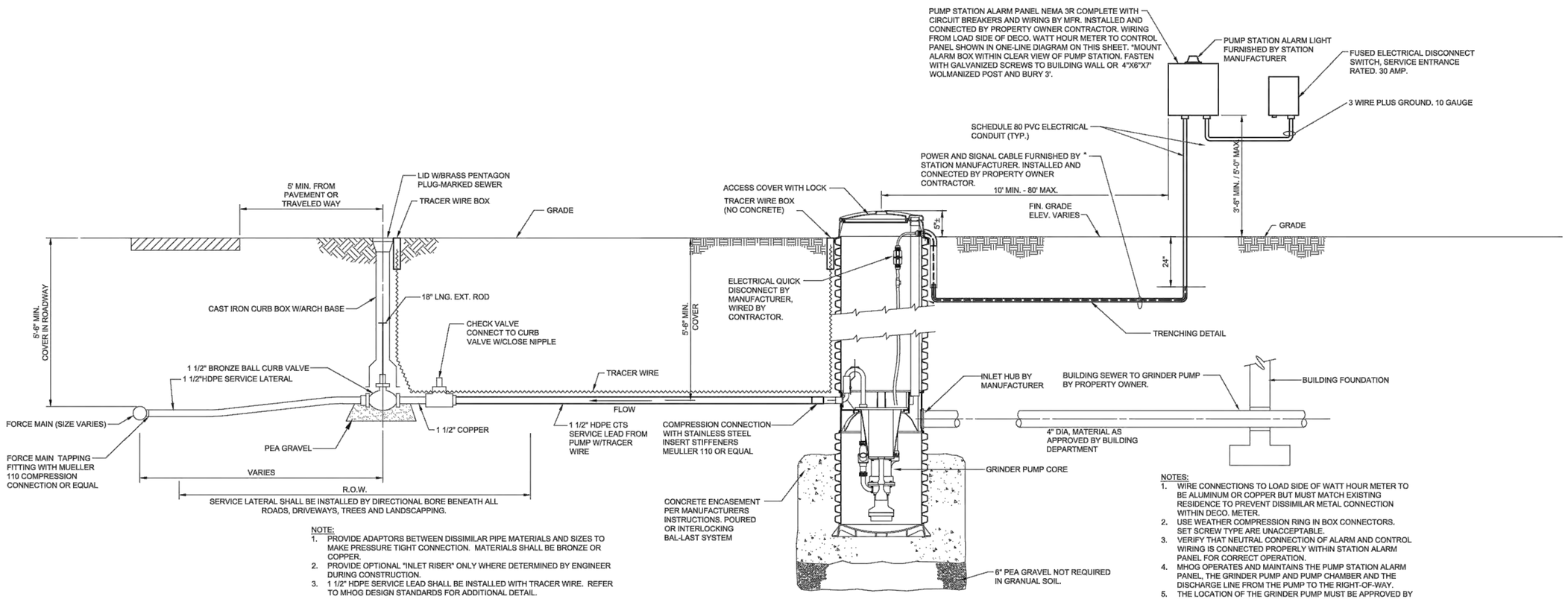
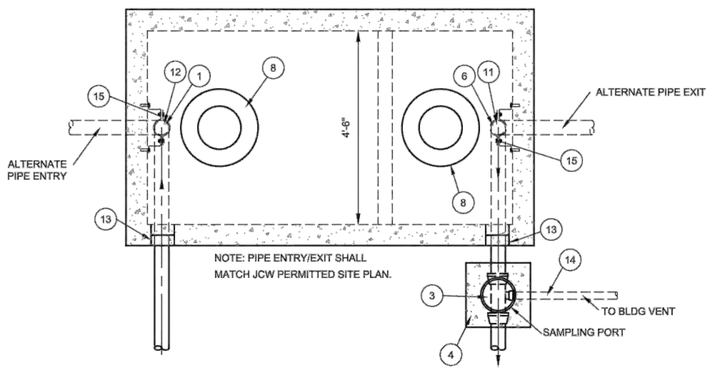


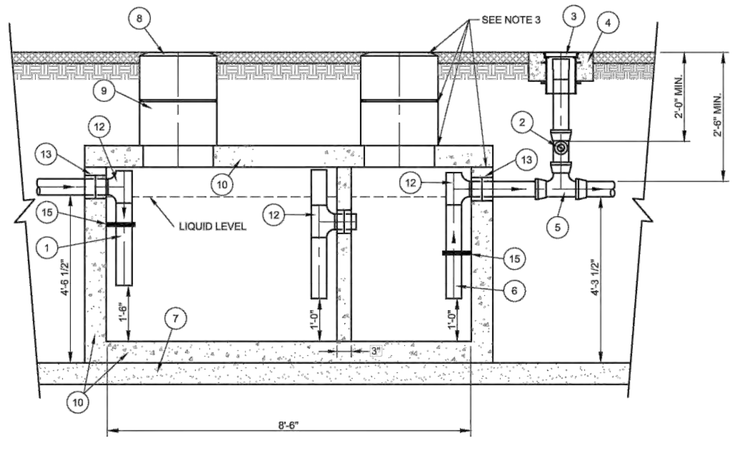
NOTE:
1. PROVIDE ADAPTORS BETWEEN DISSIMILAR PIPE MATERIALS AND SIZES TO MAKE PRESSURE TIGHT CONNECTION. MATERIALS SHALL BE BRONZE OR COPPER.
2. PROVIDE OPTIONAL "INLET RISER" ONLY WHERE DETERMINED BY ENGINEER DURING CONSTRUCTION.
3. 1 1/2" HDPE SERVICE LEAD SHALL BE INSTALLED WITH TRACER WIRE. REFER TO MHOG DESIGN STANDARDS FOR ADDITIONAL DETAIL.

NOTES:
1. WIRE CONNECTIONS TO LOAD SIDE OF WATT HOUR METER TO BE ALUMINUM OR COPPER BUT MUST MATCH EXISTING RESIDENCE TO PREVENT DISSIMILAR METAL CONNECTION WITHIN DECO. METER.
2. USE WEATHER COMPRESSION RING IN BOX CONNECTORS. SET SCREW TYPE ARE UNACCEPTABLE.
3. VERIFY THAT NEUTRAL CONNECTION OF ALARM AND CONTROL WIRING IS CONNECTED PROPERLY WITHIN STATION ALARM PANEL FOR CORRECT OPERATION.
4. MHOG OPERATES AND MAINTAINS THE PUMP STATION ALARM PANEL, THE GRINDER PUMP AND PUMP CHAMBER AND THE DISCHARGE LINE FROM THE PUMP TO THE RIGHT-OF-WAY.
5. THE LOCATION OF THE GRINDER PUMP MUST BE APPROVED BY MHOG PRIOR TO INSTALLATION. THE GRINDER PUMP MUST BE SERVICEABLE (ACCESSIBLE BY TRUCK) AND FREE FROM OBSTRUCTION.
6. MHOG MUST BE ONSITE FOR STARTUP OF ALL NEW GRINDER PUMPS.

SIMPLEX/DUPLEX GRINDER PUMPING STATION

NO SCALE





ITEM	DESCRIPTION
1	4" PVC INLET PIPE*
2	4"x4"x2" TEE WITH 2" PIPE TO BUILDING VENT*
3	THREADED C/O CAP JOSAM 58860 OR APP EQUAL**
4	CONCRETE PAD
5	4"x4"x4" TWO-WAY CLEANOUT TEE*
6	4" PVC OUTLET*
7	4" - 6" GRAVEL BEDDING
8	HEAVY-DUTY CAST IRON FRAME AND COVER ***
9	CONCRETE ADJUSTMENT RINGS
10	REINFORCE AS REQUIRED FOR SERVICE CONDITIONS
11	4" PVC 90° ELBOW*
12	4" PVC TEE*
13	A-LOK OR PRESS SEAL PSX PIPE/WALL CONNECTOR
14	2" VENT PIPE (IDENTIFY PIPE TYPE, CLASS & JOINT AS REQUIRED FOR PROJECT)
15	STAINLESS STEEL PIPE SUPPORT CLAMP ****

* 6" PIPE MAY BE SUBSTITUDED TO MATCH UPSTREAM PIPE DIAMETER.
** REFER TO CLEAN OUT DETAIL(S) ON STANDARD DETAIL SHEET.
*** CLAY & BAILEY 2008 BV OR EQUAL (FROST PROOF COVERS OPTIONAL)
**** FM STAINLESS FASTNERS #63 OR EQUAL. 1/2"x2-1/2" SS BRACKET W/ 1/2"x1-1/2" FULLY THREADED SS HEX BOLT WITH 1/2" SS WASHER AND 1/2"X1-3/4" SS ANCHORS. CLAMP TO BE FACTORY INSTALLED.

NOTES:
1. THREE COVERS AND RISERS SHOWN. TWO COVERS AND RISERS CENTERED OVER UPPER TWO BAFFLES ARE OPTIONAL.
2. INTERCEPTOR SIZE - 1000 GAL MINIMUM (REVISE THE SIZE DIMENSIONS, AS NEEDED, FOR LARGER CAPACITY INTERCEPTORS)
3. ALL JOINTS AT THE FRAME & COVER*, CONCRETE ADJUSTMENT RINGS AND THE LID OF THE INTERCEPTOR SHALL BE SEALED WITH A MINIMUM OF TWO (2) ROWS OF 3/4 TO 1 INCH PREFORMED BUTYL JOINT SEALER AND A 6" BUTYL JOINT WRAP AROUND SLEEVE (EZ WRAP). THE ENDS OF THE 6" EZ WRAP SHALL OVERLAP BY 12".
4. PIPING ON THE INTERIOR OF THE INTERCEPTOR SHALL BE PVC WITH SOLVENT-CEMENTED JOINTS.
5. GREASE INTERCEPTOR INCLUDING ADJUSTMENT RINGS AND CASTINGS SHALL BE WATER TESTED FOR WATER TIGHTNESS AFTER THE BACKFILL OPERATIONS HAVE BEEN COMPLETED. WATER TESTING SHALL CONSIST OF THE FOLLOWING: 1. SEAL THE TANK, 2. FILL WITH WATER, 3. LET STAND FOR 24 HOURS, 4. REFILL TANK, 5. TANK IS APPROVED IS WATER LEVEL IS HELD FOR 1 HOUR.
6. ONLY KITCHEN WASTE SHALL BE DIVERTED TO THE GREASE TRAP.

GREASE INTERCEPTOR 1000 GALLON

NO SCALE

MARION HOWELL OCEOLA GENOA
Sewer and Water Authority

STANDARD DETAILS

Scale: NONE
Issued Date JANUARY - 2014

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GENERAL NOTES

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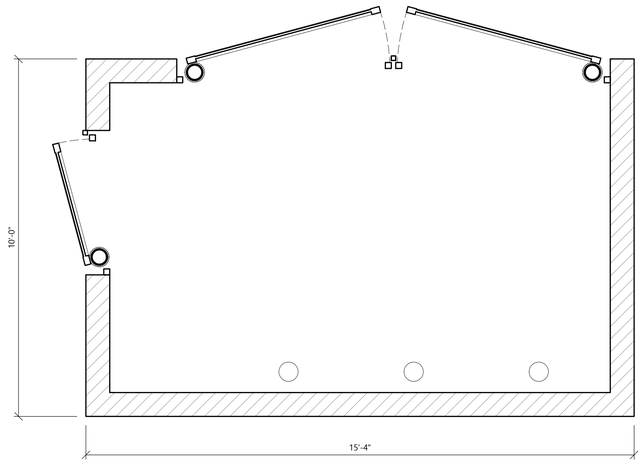
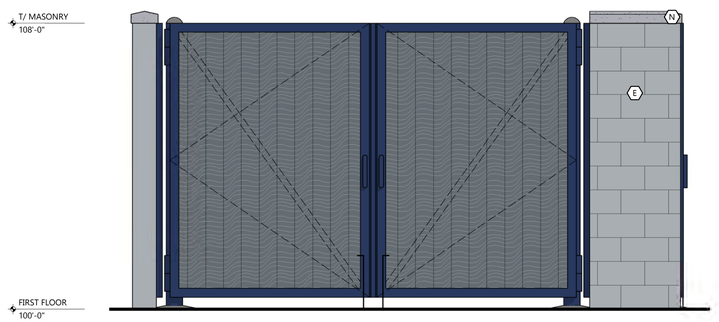


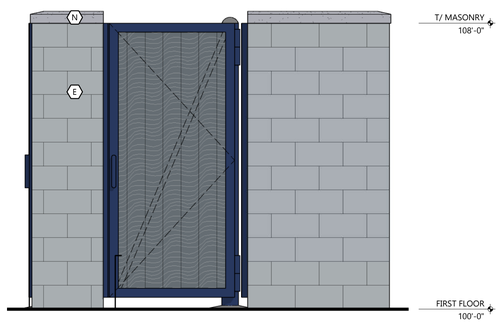
1 PRE-01 PLAN - DUMPSTER & VACUUM ENCLOSURE
SCALE: 1/2" = 1'-0"

EXTERIOR MATERIAL KEY

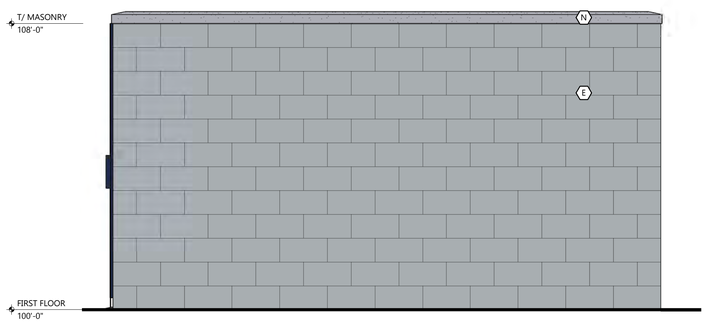
- A — CONCRETE CURB
  TEXTURE: HAND RUB
  COLOR TO MATCH PT-3
- B — STONE VENEER
  MFR: EL DORADO STONE
  COLOR: CREAMY w/ MATCHING MORTOR JOINT
  STYLE: 6" SPLIT LIMESTONE
  TYPE/SIZE: PLANK STONE (6"H x 30"L x 1"D)
- C — EIFS
  COLOR: PT-6 (MORNING FOG)
  TEXTURE: SAND
- D — EIFS
  COLOR: PT-3 (WALL STREET)
  TEXTURE: SAND
- E — SINGLE WYTHE CMU
  COLOR: PT-6 (MORNING FOG)
  TEXTURE: SMOOTH FACE
- F — SINGLE WYTHE CMU
  COLOR: PT-3 (WALLSTREET)
  TEXTURE: SPLIT FACE
- G — METAL PANEL
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
  STYLE: PRIMED AND PAINTED
  TYPE: ALUMINUM - PREFINISHED R PANEL
- H — PREFINISHED METAL TRIM AND ACCESSORIES
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
- J — METAL PANEL
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
  STYLE: LARGE BATTEN 24 GA
  TYPE: STANDING SEAM METAL ROOF
- K — METAL PANEL
  MFR: ROLLFAB METAL PRODUCTS
  COLOR: HAZELNUT BROWN
  STYLE: 1x6 PREFINISHED ALUMINUM BATTENS
  TYPE: LONGBOARD ALUMABOARD
- L — EIFS
  COLOR: PT-9 (IN THE NAVY)
  TEXTURE : SAND
- M — GLAZED ALUMINUM STOREFRONT SYSTEM
  THERMALLY BROKEN CLEAR ANODIZED
  FRAME w/ CLEAR INSULATED GLAZING
- N — PRECAST STONE
  COLOR: LIMESTONE



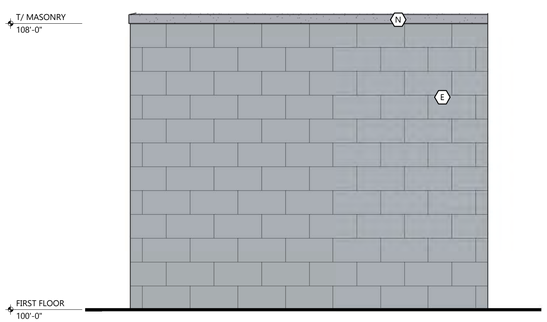
3 PRE-01 ELEVATION - GATE
SCALE: 1/2" = 1'-0"



2 PRE-01 ELEVATION - RIGHT
SCALE: 1/2" = 1'-0"



05 PRE-01 ELEVATION - REAR
SCALE: 1/2" = 1'-0"



4 PRE-01 ELEVATION - LEFT
SCALE: 1/2" = 1'-0"

PRELIMINARY DUMPSTER ENCLOSURE PLAN & ELEVATIONS

EXCEL
Always a Better Plan
100 Camelot Drive
Fond du Lac, WI 54935
920-926-9800
excelengineer.com

COLLABORATION

Mister

PROJECT INFORMATION

PROPOSED CAR WASH FOR:
MISTER CAR WASH #1495 (LATSON)
1015 S. LATSON RD. • HOWELL, MI 48843

PROFESSIONAL SEAL

PRELIMINARY DATES
OCT. 2, 2023

NOT FOR CONSTRUCTION

JOB NUMBER
230069200

SHEET NUMBER
PRE-01

GENERAL NOTES

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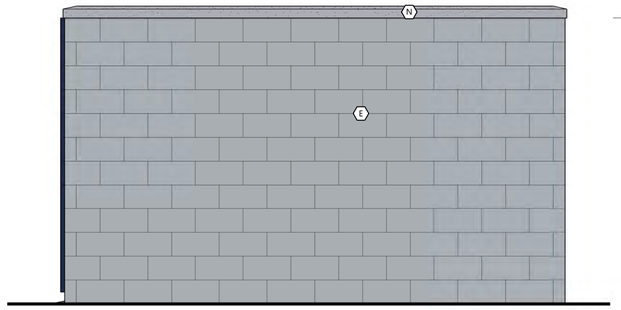
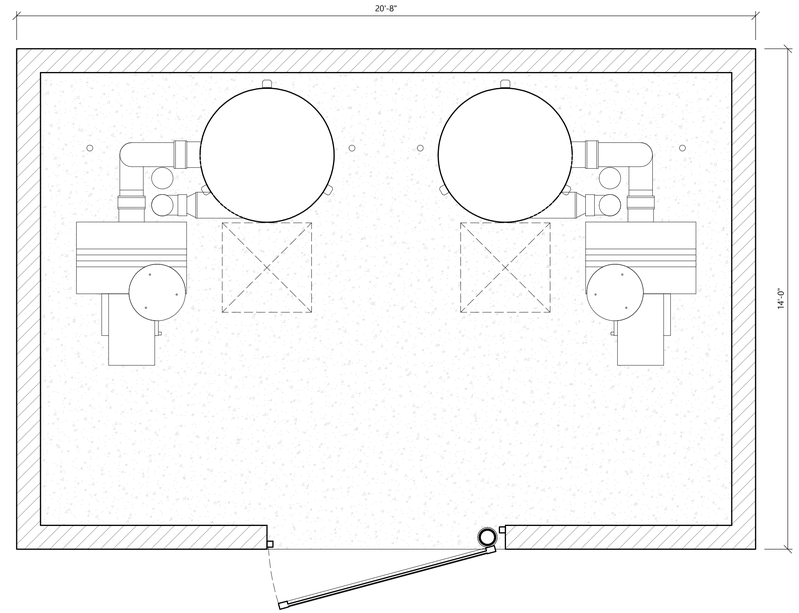
EXTERIOR MATERIAL KEY

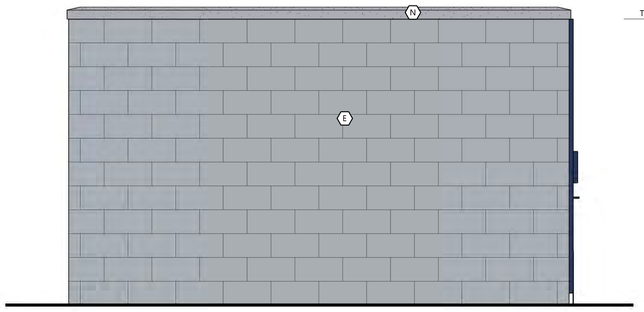
- A — CONCRETE CURB
  TEXTURE: HAND RUB
  COLOR TO MATCH PT-3
- B — STONE VENEER
  MFR: EL DORADO STONE
  COLOR: CREAMY w/ MATCHING MORTOR JOINT
  STYLE: 6" SPLIT LIMESTONE
  TYPE/SIZE: PLANK STONE (6"H x 30"L x 1"D)
- C — EIFS
  COLOR: PT-6 (MORNING FOG)
  TEXTURE: SAND
- D — EIFS
  COLOR: PT-3 (WALL STREET)
  TEXTURE: SAND
- E — SINGLE WYTHE CMU
  COLOR: PT-6 (MORNING FOG)
  TEXTURE: SMOOTH FACE
- F — SINGLE WYTHE CMU
  COLOR: PT-3 (WALLSTREET)
  TEXTURE: SPLIT FACE
- G — METAL PANEL
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
  STYLE: PRIMED AND PAINTED
  TYPE: ALUMINUM - PREFINISHED R PANEL
- H — PREFINISHED METAL TRIM AND ACCESSORIES
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
- J — METAL PANEL
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
  STYLE: LARGE BATTEN 24 GA
  TYPE: STANDING SEAM METAL ROOF
- K — METAL PANEL
  MFR: ROLLFAB METAL PRODUCTS
  COLOR: HAZELNUT BROWN
  STYLE: 1x6 PREFINISHED ALUMINUM BATTENS
  TYPE: LONGBOARD ALUMABOARD
- L — EIFS
  COLOR: PT-9 (IN THE NAVY)
  TEXTURE : SAND
- M — GLAZED ALUMINUM STOREFRONT SYSTEM
  THERMALLY BROKEN CLEAR ANODIZED
  FRAME w/ CLEAR INSULATED GLAZING
- N — PRECAST STONE
  COLOR: LIMESTONE



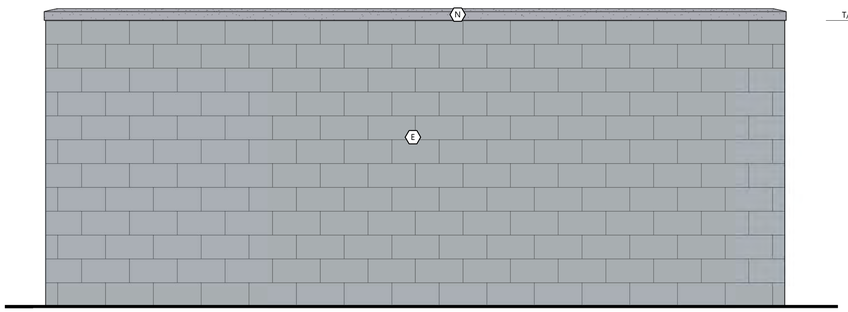
2 PRE-02 RIGHT ELEVATION
SCALE: 1/2" = 1'-0"



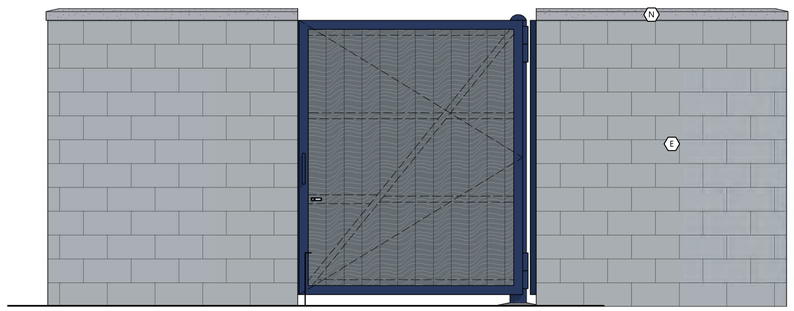
1 PRE-02 PLAN - VACUUM EQUIPMENT ENCLOSURE
SCALE: 1/2" = 1'-0"



3 PRE-02 LEFT ELEVATION
SCALE: 1/2" = 1'-0"



5 PRE-02 REAL ELEVATION
SCALE: 1/2" = 1'-0"



4 PRE-02 FRONT ELEVATION
SCALE: 1/2" = 1'-0"

PRELIMINARY VACUUM EQUIPMENT ENCLOSURE PLAN & ELEVATIONS

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COLLABORATION

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PROJECT INFORMATION

PROPOSED CAR WASH FOR:
MISTER CAR WASH #1495 (LATSON)
1015 S. LATSON RD. • HOWELL, MI 48843

PROFESSIONAL SEAL

PRELIMINARY DATES
OCT. 2, 2023

NOT FOR CONSTRUCTION

JOB NUMBER
230069200

SHEET NUMBER
PRE-02

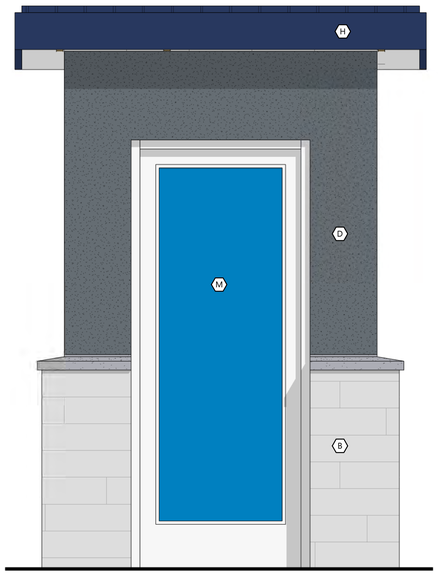
GENERAL NOTES

- ALL SIGNAGE SHOWN FOR INFORMATIONAL PURPOSES ONLY. ALL ADVERTISING SIGNAGE SUBJECT TO SEPARATE SIGN PERMIT SUBMITTAL AND APPROVAL.

EXTERIOR MATERIAL KEY

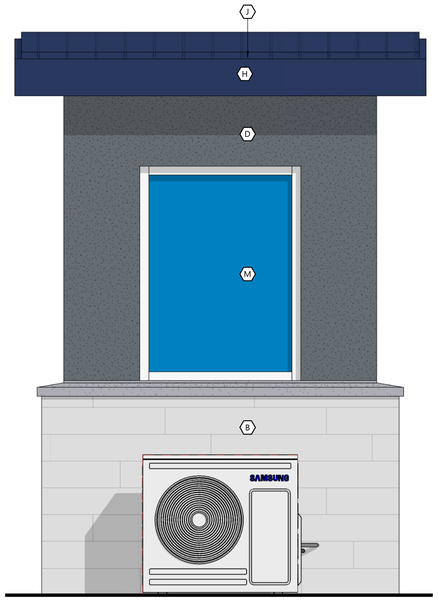
- A — CONCRETE CURB
  TEXTURE: HAND RUB
  COLOR TO MATCH PT-3
- B — STONE VENEER
  MFR: EL DORADO STONE
  COLOR: CREAMY w/ MATCHING MORTOR JOINT
  STYLE: 6" SPLIT LIMESTONE
  TYPE/SIZE: PLANK STONE (6"H x 30"L x 1"D)
- C — EIFS
  COLOR: PT-6 (MORNING FOG)
  TEXTURE: SAND
- D — EIFS
  COLOR: PT-3 (WALL STREET)
  TEXTURE: SAND
- E — SINGLE WYTHE CMU
  COLOR: PT-6 (MORNING FOG)
  TEXTURE: SMOOTH FACE
- F — SINGLE WYTHE CMU
  COLOR: PT-3 (WALLSTREET)
  TEXTURE: SPLIT FACE
- G — METAL PANEL
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
  STYLE: PRIMED AND PAINTED
  TYPE: ALUMINUM - PREFINISHED R PANEL
- H — PREFINISHED METAL TRIM AND ACCESSORIES
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
- J — METAL PANEL
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
  STYLE: LARGE BATTEN 24 GA
  TYPE: STANDING SEAM METAL ROOF
- K — METAL PANEL
  MFR: ROLLFAB METAL PRODUCTS
  COLOR: HAZELNUT BROWN
  STYLE: 1x6 PREFINISHED ALUMINUM BATTENS
  TYPE: LONGBOARD ALUMABOARD
- L — EIFS
  COLOR: PT-9 (IN THE NAVY)
  TEXTURE : SAND
- M — GLAZED ALUMINUM STOREFRONT SYSTEM
  THERMALLY BROKEN CLEAR ANODIZED
  FRAME w/ CLEAR INSULATED GLAZING
- N — PRECAST STONE
  COLOR: LIMESTONE

6 PRE-03 LEFT ELEVATION
SCALE: 3/4" = 1'-0"

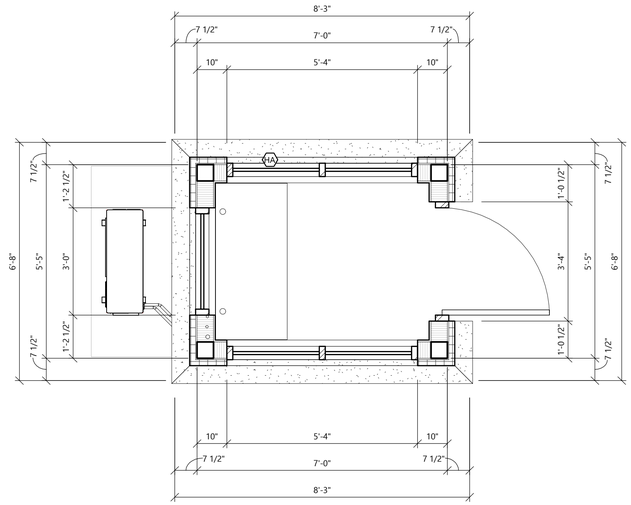


5 PRE-03 FRONT ELEVATION
SCALE: 3/4" = 1'-0"

8 PRE-03 RIGHT ELEVATION
SCALE: 3/4" = 1'-0"



7 PRE-03 REAR ELEVATION
SCALE: 3/4" = 1'-0"



1 PRE-03 SHELTER PLAN
SCALE: 1/2" = 1'-0"

PRELIMINARY ATTENDANT SHELTER PLANS AND DETAILS

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PROJECT INFORMATION

PROPOSED CAR WASH FOR:

MISTER CAR WASH #1495 (LATSON)

1015 S. LATSON RD. • HOWELL, MI 48843

PROFESSIONAL SEAL

PRELIMINARY DATES

OCT. 2, 2023

NOT FOR CONSTRUCTION

JOB NUMBER

230069200

SHEET NUMBER

PRE-03

GENERAL NOTES

- ALL SIGNAGE SHOWN FOR INFORMATIONAL PURPOSES ONLY. ALL ADVERTISING SIGNAGE SUBJECT TO SEPARATE SIGN PERMIT SUBMITTAL AND APPROVAL.

EXTERIOR MATERIAL KEY

A — CONCRETE CURB
TEXTURE: HAND RUB
COLOR TO MATCH PT-3

B — STONE VENEER
MFR: EL DORADO STONE
COLOR: CREAMY w/ MATCHING MORTOR JOINT
STYLE: 6" SPLIT LIMESTONE
TYPE/SIZE: PLANK STONE (6"H x 30"L x 1"D)

C — EIFS
COLOR: PT-6 (MORNING FOG)
TEXTURE: SAND

D — EIFS
COLOR: PT-3 (WALL STREET)
TEXTURE: SAND

E — SINGLE WYTHE CMU
COLOR: PT-6 (MORNING FOG)
TEXTURE: SMOOTH FACE

F — SINGLE WYTHE CMU
COLOR: PT-3 (WALLSTREET)
TEXTURE: SPLIT FACE

G — METAL PANEL
MFR: CTMRS (OR EQUAL)
COLOR: PT-9 (IN THE NAVY)
STYLE: PRIMED AND PAINTED
TYPE: ALUMINUM - PREFINISHED R PANEL

H — PREFINISHED METAL TRIM AND ACCESSORIES
MFR: CTMRS (OR EQUAL)
COLOR: PT-9 (IN THE NAVY)

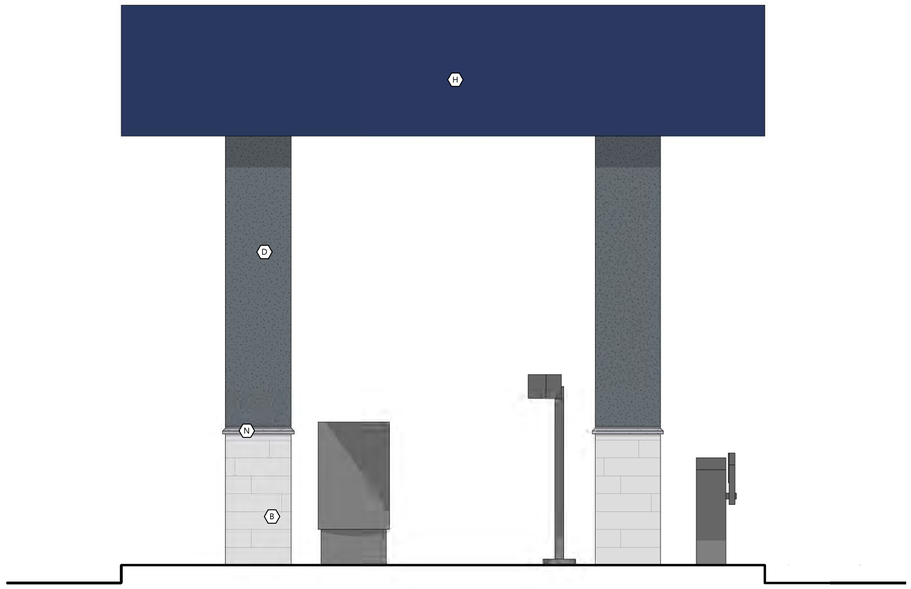
J — METAL PANEL
MFR: CTMRS (OR EQUAL)
COLOR: PT-9 (IN THE NAVY)
STYLE: LARGE BATTEN 24 GA
TYPE: STANDING SEAM METAL ROOF

K — METAL PANEL
MFR: ROLLFAB METAL PRODUCTS
COLOR: HAZELNUT BROWN
STYLE: 1x6 PREFINISHED ALUMINUM BATTENS
TYPE: LONGBOARD ALUMABOARD

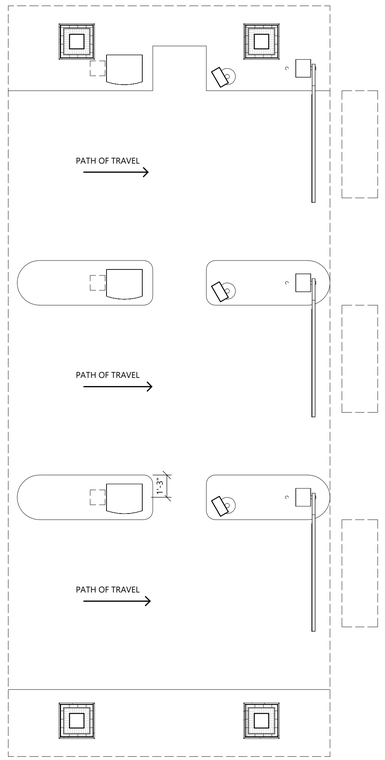
L — EIFS
COLOR: PT-9 (IN THE NAVY)
TEXTURE : SAND

M — GLAZED ALUMINUM STOREFRONT SYSTEM
THERMALLY BROKEN CLEAR ANODIZED
FRAME w/ CLEAR INSULATED GLAZING

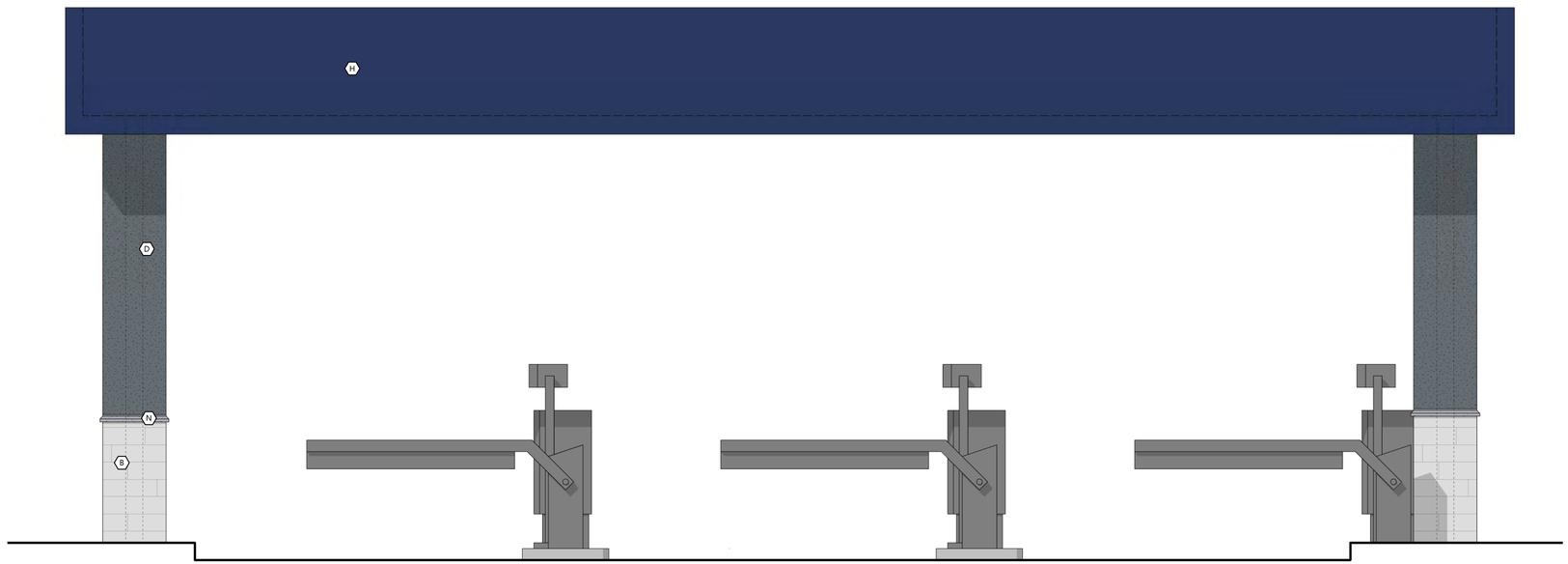
N — PRECAST STONE
COLOR: LIMESTONE



1 PRE-04 CANOPY ELEVATION
SCALE: 1/2" = 1'-0"



3 PRE-04 CANOPY PLAN
SCALE: 1/4" = 1'-0"



2 PRE-04 CANOPY ELEVATION
SCALE: 1/2" = 1'-0"

PRELIMINARY CANOPY PLANS AND DETAILS

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PROJECT INFORMATION

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1015 S. LATSON RD. • HOWELL, MI 48843

PROFESSIONAL SEAL

PRELIMINARY DATES
OCT. 2, 2023

NOT FOR CONSTRUCTION

JOB NUMBER
230069200

SHEET NUMBER
PRE-04

GENERAL NOTES

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EXTERIOR MATERIAL KEY

- A — CONCRETE CURB
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  COLOR TO MATCH PT-3
- B — STONE VENEER
  MFR: EL DORADO STONE
  COLOR: CREAMY w/ MATCHING MORTOR JOINT
  STYLE: 6" SPLIT LIMESTONE
  TYPE/SIZE: PLANK STONE (6"H x 30"L x 1"D)
- C — BRICK
  MFR: BELDEN
  STYLE: MODULAR MADRID BLEND VELOUR
- D — METAL PANEL
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
  STYLE: PRIMED AND PAINTED
  TYPE: ALUMINUM - PREFINISHED R PANEL
- E — PREFINISHED METAL TRIM AND ACCESSORIES
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
- F — METAL PANEL
  MFR: CTMRS (OR EQUAL)
  COLOR: PT-9 (IN THE NAVY)
  STYLE: LARGE BATTEN 24 GA
  TYPE: STANDING SEAM METAL ROOF
- G — METAL PANEL
  MFR: ROLLFAB METAL PRODUCTS
  COLOR: HAZELNUT BROWN
  STYLE: 1x6 PREFINISHED ALUMINUM BATTENS
  TYPE: LONGBOARD ALUMABOARD
- H — EIFS
  COLOR: PT-9 (IN THE NAVY)
  TEXTURE : SAND
- J — GLAZED ALUMINUM STOREFRONT SYSTEM
  THERMALLY BROKEN CLEAR ANODIZED
  FRAME w/ CLEAR INSULATED GLAZING
- K — PRECAST STONE
  COLOR: LIMESTONE

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PROJECT INFORMATION

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MISTER CAR WASH #1495 (LATSON)

1015 S. LATSON RD. • HOWELL, MI 48843

PROFESSIONAL SEAL

PRELIMINARY DATES

OCT. 2, 2023
OCT. 26, 2023
OCT. 31, 2023

NOT FOR CONSTRUCTION

JOB NUMBER

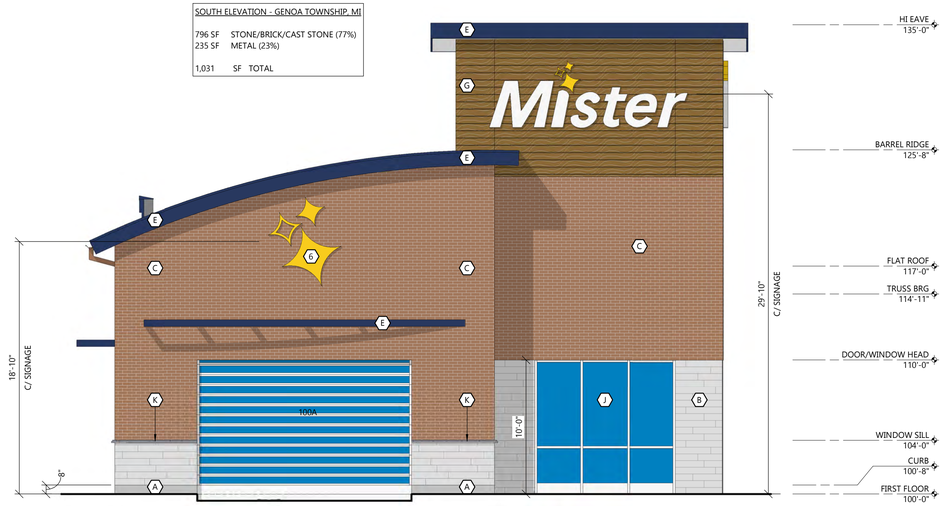
230069200

SHEET NUMBER

PRE-10R

SOUTH ELEVATION - GENOA TOWNSHIP, MI

796 SF	STONE/BRICK/CAST STONE	(77%)
235 SF	METAL	(23%)
1,031	SF TOTAL	

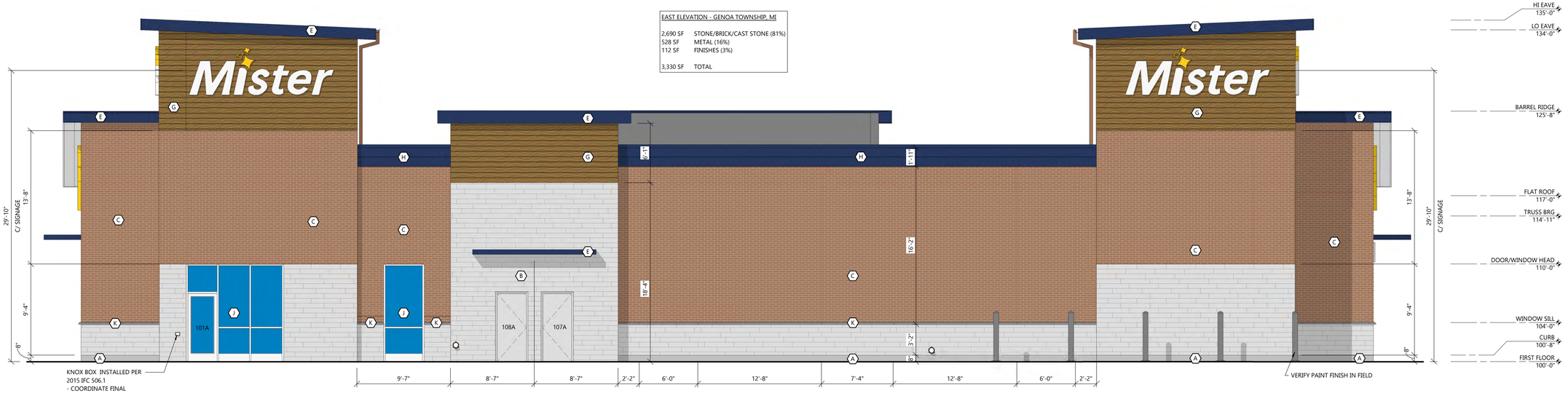


SOUTH ELEVATION

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

EAST ELEVATION - GENOA TOWNSHIP, MI

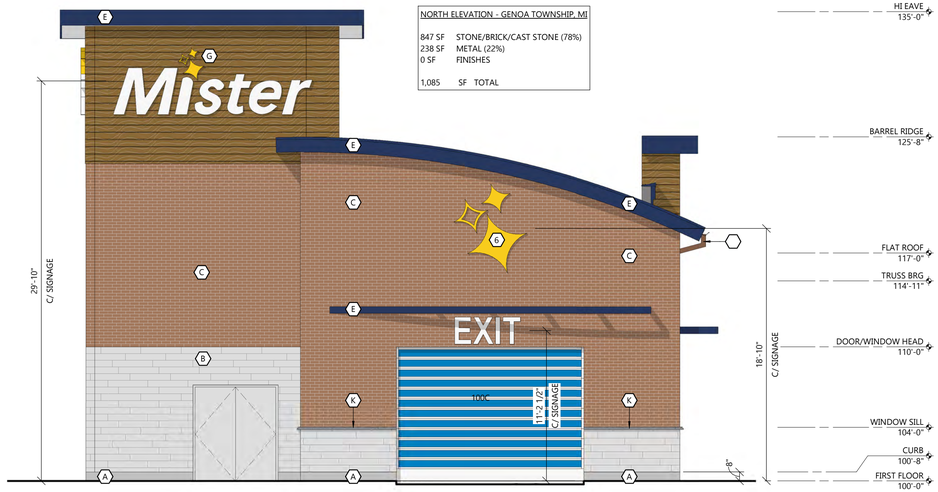
2,690 SF	STONE/BRICK/CAST STONE	(81%)
528 SF	METAL	(16%)
112 SF	FINISHES	(3%)
3,330 SF	TOTAL	



EAST ELEVATION

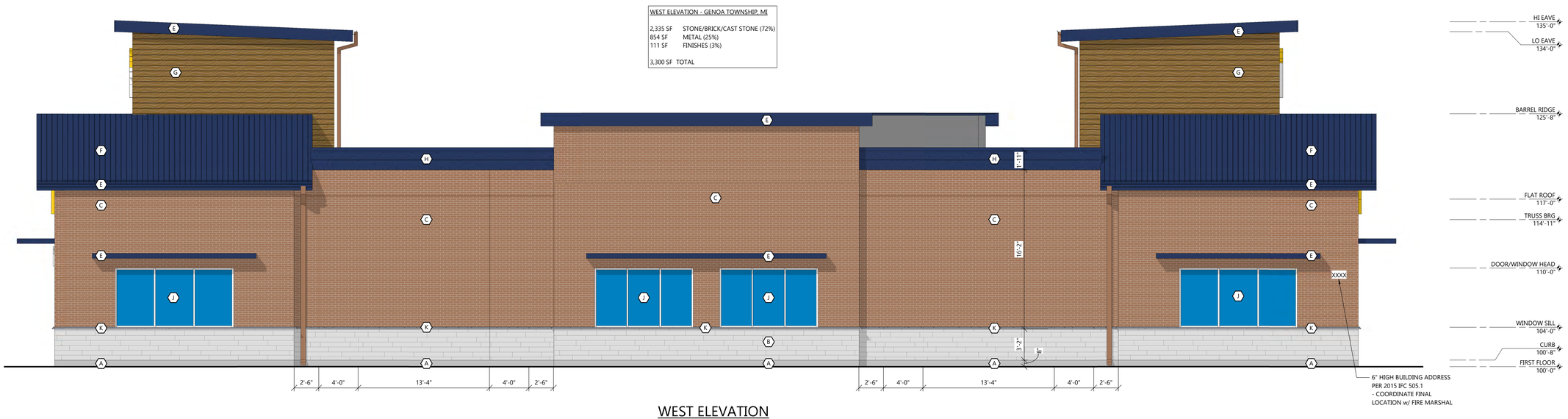
SCALE: 3/16" = 1'-0"

PRELIMINARY EXTERIOR ELEVATIONS - 130' TUNNEL (RH)



NORTH ELEVATION

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



WEST ELEVATION

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

GENERAL NOTES

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EXTERIOR MATERIAL KEY

A — CONCRETE CURB
TEXTURE: HAND RUB
COLOR TO MATCH PT-3

B — STONE VENEER
MFR: EL DORADO STONE
COLOR: CREAMY w/ MATCHING MORTOR JOINT
STYLE: 6" SPLIT LIMESTONE
TYPE/SIZE: PLANK STONE (6"H x 30"L x 1"D)

C — BRICK
MFR: BELDEN
STYLE: MODULAR MADRID BLEND VELOUR

D — METAL PANEL
MFR: CTMRS (OR EQUAL)
COLOR: PT-9 (IN THE NAVY)
STYLE: PRIMED AND PAINTED
TYPE: ALUMINUM - PREFINISHED R PANEL

E — PREFINISHED METAL TRIM AND ACCESSORIES
MFR: CTMRS (OR EQUAL)
COLOR: PT-9 (IN THE NAVY)

F — METAL PANEL
MFR: CTMRS (OR EQUAL)
COLOR: PT-9 (IN THE NAVY)
STYLE: LARGE BATTEN 24 GA
TYPE: STANDING SEAM METAL ROOF

G — METAL PANEL
MFR: ROLLFAB METAL PRODUCTS
COLOR: HAZELNUT BROWN
STYLE: 1x6 PREFINISHED ALUMINUM BATTENS
TYPE: LONGBOARD ALUMABOARD

H — EIFS
COLOR: PT-9 (IN THE NAVY)
TEXTURE : SAND

J — GLAZED ALUMINUM STOREFRONT SYSTEM
THERMALLY BROKEN CLEAR ANODIZED
FRAME w/ CLEAR INSULATED GLAZING

K — PRECAST STONE
COLOR: LIMESTONE

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COLLABORATION

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PROJECT INFORMATION

PROPOSED CAR WASH FOR:

MISTER CAR WASH #1495 (LATSON)

1015 S. LATSON RD. • HOWELL, MI 48843

PROFESSIONAL SEAL

PRELIMINARY DATES

OCT. 2, 2023
OCT. 26, 2023
OCT. 31, 2023

NOT FOR CONSTRUCTION

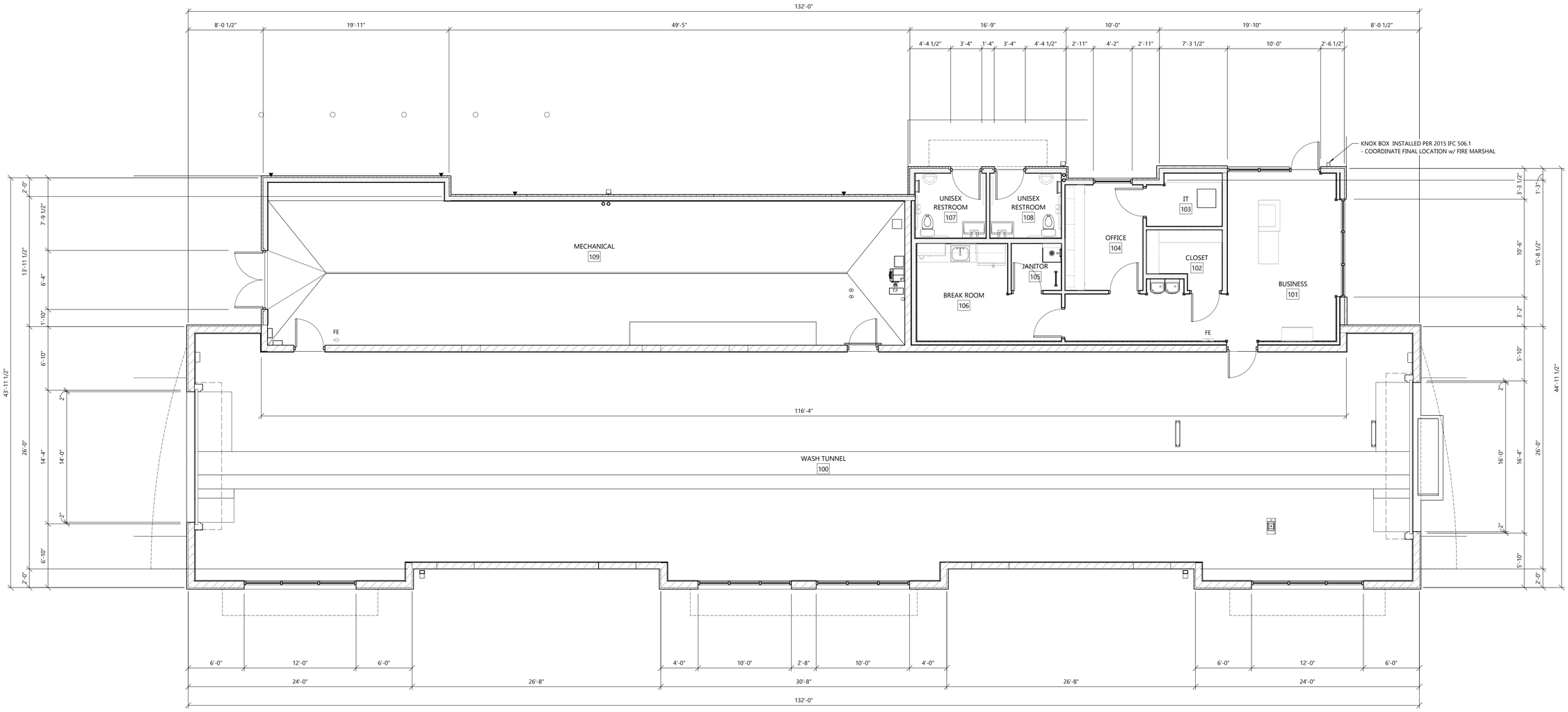
JOB NUMBER

230069200

SHEET NUMBER

PRE-11R

PRELIMINARY EXTERIOR ELEVATIONS - 130' TUNNEL (RH)



NORTH

FLOOR PLAN

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

0' 5' 10'

PRELIMINARY FLOOR PLAN

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COLLABORATION

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PROJECT INFORMATION

PROPOSED CAR WASH FOR:

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PROFESSIONAL SEAL

PRELIMINARY DATES

OCT. 2, 2023
OCT. 26, 2023

NOT FOR CONSTRUCTION

JOB NUMBER

230069200

SHEET NUMBER

PRE-50R

Catalog #: _____ Project: _____

Prepared By: _____ Date: _____ Type: _____

Mirada Medium (MRM)

Outdoor LED Area Light

IP66 IK08

OVERVIEW	
Lumen Package	7,000 - 48,000
Wattage Range	48 - 491
Efficacy Range (LPW)	117 - 160
Weight lbs(kg)	50 (13.6)

QUICK LINKS

Ordering Guide | Performance | Photometrics | Dimensions

FEATURES & SPECIFICATIONS

Construction

- Rugged die-cast aluminum housing contains factory prewired driver and optical unit. Cast aluminum wiring access door located underneath.
- Designed to mount to square or round poles.
- Fixtures are finished with LSI's DuraGrip® polyester powder coat finishing process. The DuraGrip finish withstands extreme weather changes without cracking or peeling. Other standard LSI finishes available. Consult factory.
- Shipping weight: 37 lbs in carton.

Optical System

- State-of-the-Art one piece silicone optic sheet delivers industry leading optical control with an integrated gasket to provide IP66 rated sealed optical chamber in 1 component.
- Proprietary silicone refractor optics provide exceptional coverage and uniformity in IES Types 2, 3, 4 T, FTA and AM.
- Silicone optical material does not yellow or crack with age and provides a typical light transmittance of 93%.
- Zero uplight.
- Available in 5000K, 4000K, and 3000K color temperatures per ANSI C78.377. Also Available in Phosphor Converted Amber with Peak intensity at 610nm.
- Minimum CRI of 70.
- Integral louver (IL) and house-side shield (HS) accessories for improved backlight control without sacrificing street side performance. See page 3 for more details.

Electrical

- High-performance programmable driver features over-voltage, under-voltage, short-circuit and over temperature protection. Custom lumen and wattage packages available.
- 0-10V dimming (10% - 100%) standard.
- Standard Universal Voltage (120-277 Vac) Input 50/60 Hz or optional High Voltage (347-480 Vac).
- L80 Calculated Life: >100k Hours (See Lumen Maintenance on Page 5)
- Total harmonic distortion: <20%.
- Operating temperature: -40°C to +50°C (-40°F to +122°F). 42L and 48L lumen packages rated to +40°C.
- Power factor: > 90
- Input power stays constant over life.
- Field replaceable 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).
- High-efficacy LEDs mounted to metal-core circuit board to maximize heat dissipation
- Components are fully encased in potting material for moisture resistance. Driver complies with FCC standards. Driver and electrical components can easily be accessed via hinged door.
- Optional integral passive infrared Bluetooth® motion and photocell sensor options. Fixtures operate independently and can be commissioned via an iOS or Android configuration app. Updates and modifications to the control strategy are easily implemented via an intuitive app.
- LSI's AirLink™ Blue lighting control system is a simple feature rich wireless Bluetooth mesh network. The integrated fixture sensor module provides wireless control of grouped fixtures based on motion sensors, daylight or a fully customizable schedule.

Installation

- Designed to mount to square or round poles.
- A single fastener secures the hinged door, underneath the housing and provides quick & easy access to the electrical compartment.
- Included terminal block accepts up to 12 ga. wire.
- Utilizes LSI's traditional 3" drill pattern B3 for easy fastening of LSI products. (See drawing on page 9)

Warranty

- LSI LED Fixtures carry a 5-year warranty.

Listings

- Listed to UL 1598 and UL 8750.
- Meets Buy American Act requirements.
- IDA compliant, with 3000K or lower color temperature selection.
- Title 24 Compliant; see local ordinance for qualification information.
- Suitable for wet Locations.
- IP66 rated Luminaire per IEC 60598.
- 3G rated for ANSI C136.31 high vibration applications (optional).
- DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.
- Meets Buy American Act requirements.
- IDA compliant with 3000K or lower color temperature.

LSI Industries Inc. 10000 Alliance Rd. Cincinnati, OH 45242 | www.lsicorp.com
(513) 793-3200 | (513) 891-7469

Issue Eff. Rev. 05/18/22
MRM-LEDA-MRM

Catalog #: _____ Project: _____

Prepared By: _____ Date: _____ Type: _____

Scottsdale® Legacy (CRUS)

LED Canopy Luminaire

IP66

OVERVIEW	
Lumen Package (lm)	5,000 - 22,000
Wattage Range (W)	38 - 152
Efficacy Range (LPW)	114 -156
Weight lbs (kg)	23 (10.4)

QUICK LINKS

Ordering Guide | Performance | Photometrics | Dimensions

FEATURES & SPECIFICATIONS

Construction

- Features a ultra-slim T1/16" profile die-cast housing, with flat clear or diffused tempered glass lens. Lens is mounted in a silicone seal and IP66 rated. Integral designed heat sink does not trap dirt and grime, ensuring cool running performance over the life of the fixture.
- Standard color is white and is finished with LSI's DuraGrip® polyester powder coat process. DuraGrip withstands extreme weather changes without cracking or peeling.
- Luminaire assembly incorporates a pressure stabilizing vent breather to prevent seal fatigue and failure.

Optical System

- Features an array of select, mid-power, high brightness, high efficiency LED: 3000K, 4000K, 5000K color temperature, 80 CRI (nominal).
- Choice of Symmetric or Asymmetric distribution. Asymmetric provides a wider distribution pattern. Optional symmetric with diffuse lens available.
- Forward Throw distribution provides an industry leading unique distribution pattern that illuminates the area under the gas canopy and beyond. The forward through optic directs the light to the forecourt from the gas canopy eliminating the need for supplemental floodlights and extensive perimeter lighting.
- Diffuse lens available as an option to soften brightness of the luminaire.
- Six Lumen Packages: 5,000, 8,000, 10,000, 13,000, 18,000 and 22,000 Lumens.

Electrical

- High performance factory programmable driver features over-voltage, under-voltage, short-circuit and over temperature protection with integral 6kV surge protection that meets IEEE C62.41.2 and ANSI C82.77.5 Location Category C Low standards. Additional field replaceable 10kV surge protection device meets a minimum Category C Low operation (per ANSI/ IEEE C62.41.2). Custom lumen and wattage packages available.
- Driver components are fully encased in potting for moisture resistance. Complies with FCC and FCC standards, 0-10V dimming supplied standard with all drive options.
- Die-cast aluminum, wet location rated driver/electrical enclosure is elevated above canopy deck to prevent water entry, provide easy "knock-out" connection of primary wiring and acts as the primary heatsink ensuring cool operation of internal components for longer life. Seals to optical housing via one-piece molded silicone gasket.
- Universal voltage power supply, 120-277 VAC, 50/60 HZ and 347-480 VAC, 50/60 HZ input.
- -40°C to 55°C (-40°F to 131°F) ambient operating temperature. (Varies based on lumen package and mounting style see performance data for specifics.)
- Minimum 60,000 to 100,000 hours depending upon the ambient temperature of the installation location (see performance data for specifics.)

Hazardous Location

- Designed for tighter than air fuel applications. Product is suitable for Class I Division 2 Hazardous Locations when installed per LSI installation guidelines. See lsicorp.com for specific guidelines. Not available on SLW.

Installation

- One-person installation.
- installs in a 12" or 16" deck pan. Deck penetration consists of a 4" hole, simplifying installation and water sealing. Unit is mounted directly to deck with four mounting Scottsdales (4") hole as well as openings for Encore and Encore Top Access and to reconnect wiring for the SLC/ETN without having to relocate the conduit.
- Retro panels are available for existing Encores as well as kits for recessed and 2x2 installations (see separate spec sheets). Support brackets are provided standard, to prevent sagging of deck.

Warranty

- LSI luminaires carry a 5-year limited warranty. Refer to https://www.lsicorp.com/resources/terms-conditions-warranty/ for more information.

Listings

- UL and ETL listed to UL 1598, UL 8750 and other U.S. and International safety standards. Suitable for wet locations.
- DesignLights Consortium® (DLC) Premium qualified product. Not all versions of this product may be DLC Premium qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.
- Meets Buy American Act requirements.
- IDA compliant with 3000K or lower color temperature.

LSI Industries Inc. 10000 Alliance Rd. Cincinnati, OH 45242 | (513) 793-3200 | www.lsicorp.com

Issue Eff. Rev. 11/16/22
SCRUS-LEDA-CRUS

Catalog #: _____ Project: _____

Prepared By: _____ Date: _____ Type: _____

Mirada Medium Wall Sconce (XWM)

Outdoor Wall Sconce

IK08

OVERVIEW	
Lumen Range	3,000 - 21,000
Wattage Range	23 - 175
Efficacy Range (LPW)	125 - 158
Weight lbs(kg)	30 (13.6)

QUICK LINKS

Ordering Guide | Performance | Photometrics | Dimensions

FEATURES & SPECIFICATIONS

Construction

- Rugged die-cast aluminum housing contains factory prewired driver and optical unit. Hinged die-cast aluminum wiring access door located underneath.
- Galvanized-steel universal wall mount bracket comes standard with hinging mechanism to easily access the junction box wire connections without removing the fixture.
- Optional pole-mounting bracket (XPMA) permits mounting to standard poles.
- Fixtures are finished with LSI's DuraGrip® polyester powder coat finishing process. The DuraGrip finish withstands extreme weather changes without cracking or peeling. Other standard LSI finishes available. Consult factory.
- Shipping weight: 30 lbs in carton.

Optical System

- State-of-the-Art one piece silicone optic sheet delivers industry leading optical control with an integrated gasket to provide IP65 rated sealed optical chamber in 1 component.
- Proprietary silicone refractor optics provide exceptional coverage and uniformity in Types 2, 3, and Forward Throw (FT) distributions.
- Silicone optical material does not yellow or crack with age and provides a typical light transmittance of 93%.
- Zero uplight.
- Available in 5000K, 4000K and 3000K color temperatures per ANSI C78.377. Also Available in Phosphor Converted Amber with Peak intensity at 610nm.
- Minimum CRI of 70.

Electrical

- High-performance programmable driver features over-voltage, under-voltage, short-circuit and over temperature protection. Custom lumen and wattage packages available.
- 0-10V dimming (10% - 100%) standard.
- Standard Universal Voltage (120-277 Vac) Input 50/60 Hz or optional High Voltage (347-480 Vac).
- L80 Calculated Life: >100k Hours
- Total harmonic distortion: <20%.
- JL to TJL operating temperature: -40°C to +50°C (-40°F to +122°F).
- 15L operating temperature: -40°C to +45°C (-40°F to +113°F).
- 18L operating temperature: -40°C to +40°C (-40°F to +104°F).
- 21L operating temperature: -40°C to +35°C (-40°F to +95°F).
- Power factor: > 90
- Input power stays constant over life.
- Optional 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).
- High efficacy LEDs mounted to metal-core circuit board to maximize heat dissipation
- Components are fully encased in potting material for moisture resistance. Driver complies with FCC standards. Driver and electrical components can easily be accessed via hinged door.
- Optional integral emergency battery pack provides 90-minutes of constant power to the LED system, ensuring code compliance. A test switch/indicator button is installed on the housing for ease of maintenance. The fixture delivers 1500 lumens during emergency mode.

Controls

- Integral passive infrared Bluetooth™ motion and photocell sensor options. Fixtures operate independently and can be commissioned via an iOS or Android configuration app. Updates and modifications to the control strategy are easily implemented via an intuitive app.
- LSI's AirLink™ Blue lighting control system is a simple feature rich wireless Bluetooth mesh network. The integrated fixture sensor module provides wireless control of grouped fixtures based on motion sensors, daylight or a fully customizable schedule.

Installation

- Universal wall mounting plate easily mounts directly to 4" octagonal or square junction box.
- 2 fasteners secure the hinged door underneath the housing and provide quick & easy access to the electrical compartment for installing/servicing.
- Optional terminal block accepts up to 12 ga. wire.

Warranty

- LSI LED Fixtures carry a 5-year warranty.
- 1 Year warranty on Battery Back-up option

Listings

- Listed to UL 1598 and UL 8750
- Meets Buy American Act requirements
- IDA compliant, with 3000K or lower color temperature selection
- Title 24 Compliant; see local ordinance for qualification information.
- Suitable for wet Locations.
- IP65 rated luminaire per IEC 60598.
- 3G rated for ANSI C136.31 high vibration applications when pole mounted (using optional XPMA bracket) or wall mounted.
- IK08 rated luminaire per IEC 62262 mechanical impact code
- DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

LSI Industries Inc. 10000 Alliance Rd. Cincinnati, OH 45242 | www.lsicorp.com
(800) 436-7800 | (513) 793-3200

Issue Eff. Rev. 05/18/22
SWG-LEDA-XWM

STRONG. SIMPLE. COMPACT.

Class: _____

Project: _____

G&G INDUSTRIAL LIGHTING
T 800.285.6190 E sales@ggled.net
www.ggled.net

c UL us LISTED DIRECT AC DRIVERLESS

GPX DRIVERLESS LINEAR

Low-Profile, Driverless Linkable IP67 LED Linear Luminaire

Product Features

Maintenance-Free Driverless Design
Connects directly to AC line voltage without an LED driver or electronic components, for extreme reliability and lifetime. Requires zero maintenance.

Easy to Install Quick-Connect Cabling
Convenient push-and-click connectors and cabling make GPX Series fixtures easy to install and daisy chain.

Coextruded Copolyester/Aluminum Housing
Our patented process combines copolyester and aluminum together, with no seals or gaskets. The result is a single-piece enclosure with excellent heatsinking characteristics for long lifetime.

Superior Chemical & UV Resistance
Seamless polymeric outer shell provides IP67 ingress protection and is specialized for superior chemical resistance. An additional protective coating is available which integrates a UV inhibitor and UV blocker for outdoor applications.

Performance Summary

Delivered Light Output: Up to 8,900 Lumens

Efficacy: 130 LPW

CRI: Typical 80 CRI

CCT: 5,000 K 4000

Lifetime: Designed to last 100,000 Hours @ 25°C

Warranty: 5 Years (See guide) not for Tetrick

Mounting: Surface, Cove, or Wall

Protection Class: IP67

Voltage: 120 VAC or 277 VAC Input

Maximum Run Length: Refer to the Table on Page 7

Ambient Temperature: -40°C to 50°C

Ordering Information

Product	Length	Lumen Output	Color Temp.	Lens Diffusion	UV Protection	Through Wired	Voltage
GPX	2 (2 ft.) 4 (4 ft.) 6 (6 ft.) 8 (8 ft.)	SO (Standard Output) HO* (High Output) *Available in 2', 4' & 8' only	50K (Standard 5000K) 40K* (4000K) *Available in 2', 4' & 8' only	Blank (Standard Frosted Diffusion) GC (Gasketed Clear Diffusion with Added Diffusion Zone)	Blank (Standard, Not Recommended for Outdoor Use) UVO (Outdoor Rated, with UV Blocking Coating)	Blank (Standard, Unterminated Tape & Cable for Field Termination) SE (Unpolished Connector for Deep, Dry, No-Tool Feed Pre-Terminated Wire)*	120V (120 VAC Input) 277V (277 VAC Input)

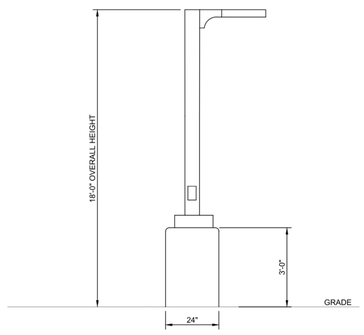
Power & Connection Accessories

Cable	Type	Length	Wire
*No Jumper Cable Required on End-to-End Connection			
GPX-JMP-1	Jumper	1ft	18 AWG SJTW
GPX-JMP-2	Jumper	2ft	18 AWG SJTW
GPX-JMP-4	Jumper	4ft	18 AWG SJTW
GPX-JMP-8	Jumper	8ft	18 AWG SJTW
GPX-LDR-10	Leader Cable	10ft	18 AWG SJTW
GPX-LDR-15	Leader Cable	15ft	18 AWG SJTW

Mounting Hardware	Description
GPX-KNT-1MF	Non-Metallic Quick Latch
GPX-KNTSS	Stainless Steel Bolt Latch

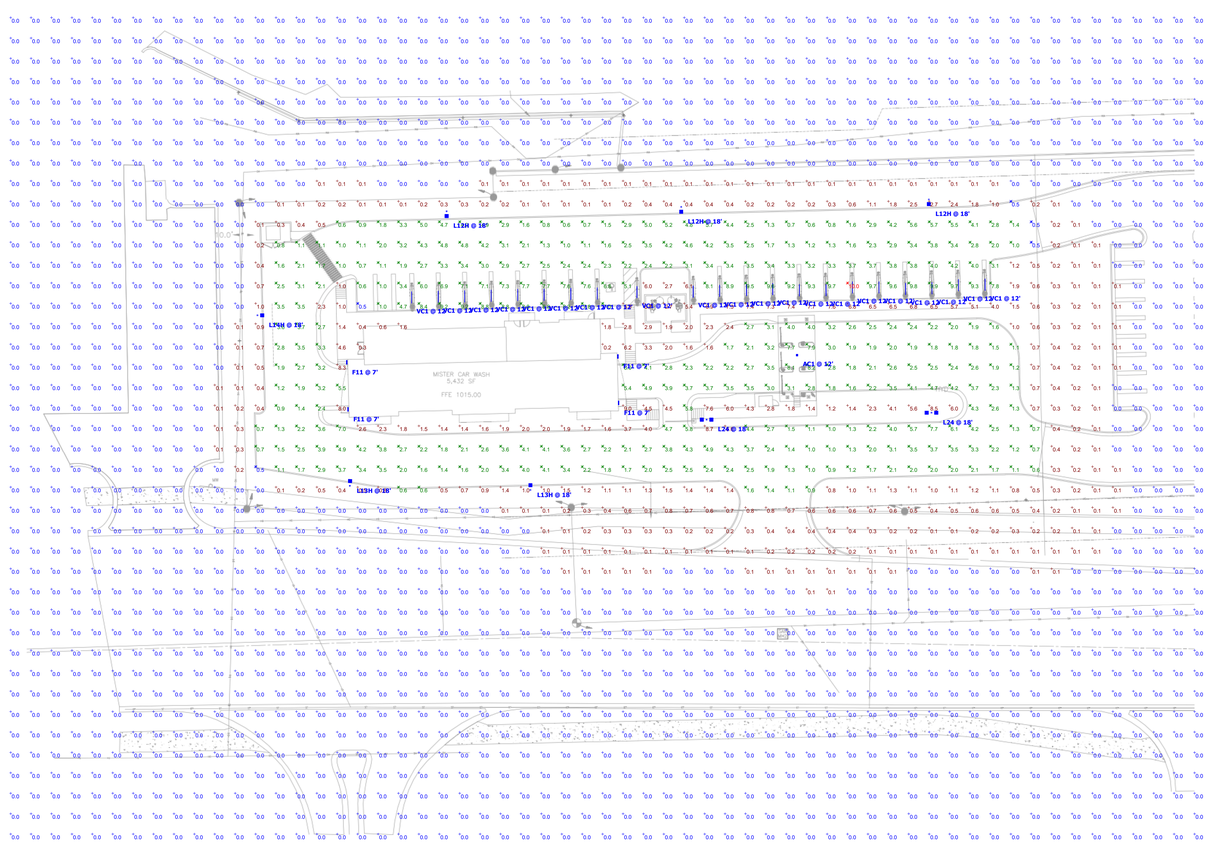
*For accessibility, will require disconnection immediately to the number of luminaires connected and to not exceed the unsupported limit of 4 luminaires (2 ft.).

Rev. Date 22 1108



LIGHT POLE DETAIL

NO SCALE



NORTH

SITE PLAN - PHOTOMETRIC

SCALE: 1" = 30'

30' 0 30' 60'

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Calc Zone #1	+	0.7 fc	10.0 fc	0.0 fc	N/A	N/A
Stat Zone # 1	X	3.3 fc	10.0 fc	0.5 fc	20.0:1	6.6:1

Schedule

Symbol	Label	Quantity	Manufacturer	Catalog Number	Description	Number Lamps	Lumens Per Lamp	Light Loss Factor	Wattage	Wattage
	F11	4	LSI INDUSTRIES, INC.	XWM-FT-LED-3L-40-UE-BRZ	WALL MOUNTED LED WALL SCONCE: DARK BRONZE FINISH	1	3351	0.85	23	
	L12H	3	LSI INDUSTRIES, INC.	MRM-LED-12L-SIL-2-40--70CRI-IL		1	7985	0.85	85	
	L14H	1	LSI INDUSTRIES, INC.	MRM-LED-12L-SIL-FT-40-70CRI-IL		1	8434	0.85	85	
	AC1	1	LSI INDUSTRIES, INC.	CRUS-SC-SLW-50		1	5954	0.85	38	
	VC1	21	G&G Industrial Lighting	GPX6-SO-40K-GC	VACUUM CANOPY ARCH LIGHT	1	3600	0.85	27	
	L13H	2	LSI INDUSTRIES, INC.	MRM-LED-12L-SIL-3-40--70CRI-IL		1	9143	0.85	85	
	L24	2	LSI INDUSTRIES, INC.	MRM-LED-12L-SIL-FT-40-70CRI		1	13143	0.85	170	
	L15	0	LSI INDUSTRIES, INC.	MRM-LED-12L-SIL-5W-40-70CRI		1	12672	0.85	85	

CAUTION: IF THIS SHEET IS NOT 30"x42" IT IS A REDUCED PRINT.

ELECTRICAL SITE PLAN - PHOTOMETRIC

EXCEL
Always a Better Plan
100 Camolot Drive
Fond du Lac, WI 54935
920-926-9800
excelengineer.com

PROJECT INFORMATION

PROPOSED CARWASH

MISTER CAR WASH

1015 S. LATSON RD. • HOWELL, MI 48843

PROFESSIONAL SEAL

PRELIMINARY DATES

OCT. 2, 2023

OCT. 26, 2023

NOT FOR CONSTRUCTION

JOB NUMBER

230105800

SHEET NUMBER

PXP

GENOA CHARTER TOWNSHIP
Application for Site Plan Review

GENOA TOWNSHIP
OCT 04 2023
RECEIVED

TO THE GENOA TOWNSHIP PLANNING COMMISSION AND TOWNSHIP BOARD:

APPLICANT NAME & ADDRESS: KEVIN BAHNAM, 1015 LATSON ROAD LLC
If applicant is not the owner, a letter of Authorization from Property Owner is needed.

OWNER'S NAME & ADDRESS: 1015 LATSON ROAD LLC, 29592 BECK RD, WIXOM, MI 48393

SITE ADDRESS: 1111 S. LATSON RD PARCEL #(s): 4711-09-100-004 4711-04-300-017

APPLICANT PHONE: (248) 767-5337 OWNER PHONE: (248) 767-5337

OWNER EMAIL: Kbahnam@usa2goquickstores.com

LOCATION AND BRIEF DESCRIPTION OF SITE: SITE IS LOCATED ON EAST SIDE OF LATSON AND IS A VACANT SITE. SITE IS JUST SOUTH OF GRAND RIVER AVE.

BRIEF STATEMENT OF PROPOSED USE: COMMERCIAL BUILDING WITH MULTIPLE LEASABLE TENANT SPACES FOR GENERAL COMMERCIAL USE. BUILDING IS 9,675 SFT AND HAS SOME OUTDOOR SEATING SPACE.

THE FOLLOWING BUILDINGS ARE PROPOSED: 9675 SFT COMMERCIAL BUILDING WITH LEASABLE TENANT SPACES INCLUDING DRIVE-THRU COFFEE SHOP ON NORTH END OF BUILDING.

I HEREBY CERTIFY THAT ALL INFORMATION AND DATA ATTACHED TO AND MADE PART OF THIS APPLICATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: [signature]

ADDRESS: 29592 Beck Rd, Wixom MI 48393

Contact Information - Review Letters and Correspondence shall be forwarded to the following:

1.) Scott Toussaint of Boss Engineering at scott@bosseng.com
Name | Business Affiliation | E-mail Address

FEE EXCEEDANCE AGREEMENT

As stated on the site plan review fee schedule, all site plans are allocated two (2) consultant reviews and one (1) Planning Commission meeting. If additional reviews or meetings are necessary, the applicant will be required to pay the actual incurred costs for the additional reviews. If applicable, additional review fee payment will be required concurrent with submittal to the Township Board. By signing below, applicant indicates agreement and full understanding of this policy.

SIGNATURE: _____ DATE: 10-2-23

PRINT NAME: Karam Behram PHONE: 248-767-5337

ADDRESS: 29592 Beck Rd, Wixom MI 48393

GENOA CHARTER TOWNSHIP
Special Land Use Application

GENOA TOWNSHIP
OCT 04 2023
RECEIVED

This application **must** be accompanied by a site plan review application and the associated submittal requirements. (The Zoning Official may allow a less detailed sketch plan for a change in use.)

APPLICANT NAME & ADDRESS: Kevin Bahnam, 1015 Latson Road LLC, 29592 Beck Road, Wixom, MI 48393
Submit a letter of Authorization from Property Owner if application is signed by Acting Agent.

APPLICANT PHONE: (248) 767-5337 EMAIL: kbahnam@usa2goquickstores.com

OWNER NAME & ADDRESS: Same as above

SITE ADDRESS: 1111 S Latson Rd PARCEL #(s): 4711-09-100-004, 471-04-300-017

OWNER PHONE: ( ) EMAIL:

Location and brief description of site and surroundings:
Site is located on the East side of South Latson road, just south of Grand River Ave. The site is currently vacant and zoned GCD with HDR and GCD zoning to the east, GCD to the north, and NRPUD to the south and west. Site is immediately south of the existing O-Reilly Auto Parts on the south side of the Latson and Grand River Ave intersection. The site is currently vacant with tall grasses.

Proposed Use:
The proposed use will be a commercial building with multiple leasable tenant spaces. A coffee shop with drive thru is proposed on the north side of the building and outdoor seating is provided on the south side for a restaurant use.

Describe how your request meets the Zoning Ordinance General Review Standards (section 19.03):

a. Describe how the use will be compatible and in accordance with the goals, objectives, and policies of the Genoa Township Comprehensive Plan and subarea plans, and will promote the Statement of Purpose of the zoning district in which the use is proposed.

The proposed use will still have commercial identity and promote internal revenue and jobs within the township. The site is currently vacant and the propsoed development will provide a nice landscaped corridor along the east side of Latson Road as the site is currently vacant and generally cleared land with a few trees.

b. Describe how the use will be designed, constructed, operated, and maintained to be compatible with, and not significantly alter, the existing or intended character of the general vicinity.

The proposed drive thru and multiple other tenant spaces will provide a variety of mixed uses that fit within the GCD zoning. The surrounding parcels are all commercial in use with the exception of the HDR zoning behind the property. So this proposed use will be consistent with the types of developments surrounding it.

c. How will the use be served adequately by essential public facilities and services such as highways, streets, police and fire protection, drainage structures, water and sewage facilities, refuse disposal and schools?

The site has access from Latson Road via an existing commercial drive approach and will have proposed cross access with the adjacent development to the north. Public water is available at the rear of the property and an existing sanitary lead is stubbed at the property. The site will be designed to accommodate fire truck circulation and will have adequate signing to promote vehicular and pedestrian safety. Continuation of a 8' sidewalk will be along the Latson Rd frontage.

d. Will the use involve any uses, activities, processes, or materials potentially detrimental to the natural environment, public health, safety, or welfare by reason of excessive production of traffic, noise, vibration, smoke, fumes, odors, glare, or other such nuisance? If so, how will the impacts be mitigated?

The proposed use will provide adequate stacking spaces for the drive thru to ensure no impact on traffic on Latson Road. The use will contain a 6' screen wall at the rear of the property where it is adjacent to I IDR zoning. The site lighting will be designed in compliance with Twp Ordinaince to ensure no excess lighting. The site will not generate odors, smoke, fumes, or vibration.

e. Does the use have specific criteria as listed in the Zoning Ordinance (sections 3.03.02, 7.02.02, & 8.02.02)? If so, describe how the criteria are met.

7.02.02 (j) 1) The building will be setback 50 feet from any adjacent right-of-way or property line. 2) Proposed use is a drive thru coffee shop not a drive through restaurant. 3) A single point of access to Latson Rd is provided. 4) A cross access with the adjacent development to the north is being proposed.

I HEREBY CERTIFY THAT ALL INFORMATION AND DATA ATTACHED TO AND MADE PART OF THIS APPLICATION ARE TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I AGREE TO DESIGN, CONSTRUCT AND OPERATE, AND MAINTAIN THESE PREMISES AND THE BUILDINGS, STRUCTURES, AND FACILITIES WHICH ARE GOVERNED BY THIS PERMIT IN ACCORDANCE WITH THE STATED REQUIREMENTS OF THE GENOA TOWNSHIP ZONING ORDINANCE, AND SUCH ADDITIONAL LIMITS AND SAFEGUARDS AS MAY BE MADE A PART OF THIS PERMIT.

THE UNDERSIGNED Kevin Bahnam, 1015 Latson Road LLC STATES THAT THEY ARE THE FREE OWNER OF THE PROPERTY OF PROPERTIES DESCRIBED ABOVE AND MAKES APPLICATION FOR THIS SPECIAL LAND USE PERMIT.

BY: _____

ADDRESS: 29592 Beck Rd, Wixom MI 48393

Contact Information - Review Letters and Correspondence shall be forwarded to the following:

Scott Tousignant	of Boss Engineering	at scottt@bosseng.com
Name	Business Affiliation	Email

FEE EXCEEDANCE AGREEMENT

As stated on the site plan review fee schedule, all site plans are allocated two (2) consultant reviews and one (1) Planning Commission meeting. If additional reviews or meetings are necessary, the applicant will be required to pay the actual incurred costs for the additional reviews. If applicable, additional review fee payment will be required concurrent with submittal to the Township Board. By signing below, applicant indicates agreement and full understanding of this policy.

SIGNATURE: _____ DATE: 10-2-23

PRINT NAME: Karam Bahnam PHONE: 248-767-5337

Revised 08-15-13, kasp

2911 Dorr Road
Brighton, MI 48116
810.227.5225
810.227.3420 fax
genoa.org

NOTICE OF PUBLIC HEARING – NOVEMBER 13, 2023
(SPECIAL USE)

October 27, 2023

To Whom It May Concern:

Please be advised that the Planning Commission of Genoa Charter Township will conduct a public hearing on **Monday, November 13, 2023 commencing at 6:30 p.m**. As required by state law, you are receiving this notice because you have been identified as an owner or occupant of real property within 300 feet of the subject parcels.

The property in question is located on vacant parcels# 4711-04-300-017 and 4711-09-100-004 Latson Road, east side of Latson Road, just south of Grand River Avenue. **The applicant is requesting a special use permit to allow for a proposed automatic car wash and a multi-tenant commercial building with a drive through coffee shop and restaurant with outdoor seating. This request is petitioned by CWP West, LLC and Kevin Bahnam, 1015 Latson Road LLC.**

You are invited to attend this hearing. Members of the public will be able to speak during the public hearing portions of the meeting. If, prior to the meeting, members of the public have certain questions or wish to provide input on any business that will be addressed at the meeting then such persons may contact the Planning Commissioners through email to amy@genoa.org, or by mail at 2911 Dorr Road, Brighton, Michigan 48116.

Genoa Charter Township will provide necessary reasonable auxiliary aids and services to individuals with disabilities at the meeting/hearing upon seven (7) days' notice to the Township. Individuals with disabilities requiring auxiliary aids or services should contact the Township in writing or by calling at (810) 227-5225.

Sincerely,

Amy Ruthig,
Planning Director

November 8, 2023

Planning Commission
Genoa Township
2911 Dorr Road
Brighton, Michigan 48116

Attention:	Amy Ruthig, Planning Director
Subject:	S. Latson Commercial Development – Special Land Use and Site Plan Review #2
Location:	1015 Latson Road – east side of Latson Road, south side of Grand River Avenue
Zoning:	GCD General Commercial District

Dear Commissioners:

At the Township's request, we have reviewed the revised submittal for development of a multi-tenant commercial center, including a coffee shop with a drive-through (plans dated 10/25/23).

A. Summary

1. **Special Land Uses (Section 19.03):**
   a. The special land use standards of Section 19.03 are generally met.
   b. In order to make favorable findings related to compatibility and impacts, the conditions of Sections 7.02.02(i) and (j) and the buffer zone requirements of Section 12.02.03 must be met to the Commission's satisfaction.
   c. If a favorable recommendation is made, the Commission may wish to include a condition that a sound study be provided for the drive-through speaker system when the tenant is known.
   d. The applicant must address any comments provided by the Township Engineer or Brighton Area Fire Authority regarding public facilities and services.
2. **Drive-Through Use Conditions (Section 7.02.02(j)):**
   a. The 500-foot spacing between drive-throughs is not met (approximately 120 feet). The applicant states that they will seek a variance from ZBA.
3. **Site Plan Review:**
   a. The applicant will seek a variance from ZBA for the deficient front yard parking setback.
   b. The applicant could provide some vertical elements to help break up the overall building length of the rear façade.
   c. Building materials and color scheme are subject to review and approval by the Planning Commission.
   d. The proposed driveway does not meet the spacing requirements of Section 15.06.02.
   e. The lighting plan must be revised to match the currently proposed site plan (and not the initial plan with the outdoor seating details).
   f. The landscape plan is deficient in width for the Latson Road greenbelt and width and screen wall for the easterly buffer zone.
   g. There are minor discrepancies between the landscape plan and table that need to be corrected.

Aerial view of site and surroundings (looking east)

B. Proposal/Process

The applicant proposes development of a 9,675 square foot multi-tenant commercial building with space for up to 6 tenants. The plan includes a coffee shop with a drive-through on the vacant 3.4 acre site.

Table 7.02 allows retail uses with up to 30,000 square feet of area as principal permitted uses; however, coffee shops with drive-throughs require special land use approval in the GCD. As such, the request is also subject to the use conditions of Section 7.02.02(j).

Procedurally, the Planning Commission is to review the special land use, site plan, and Environmental Impact Assessment, and put forth recommendations to the Township Board following a public hearing.

C. Special Land Use Review

Section 19.03 of the Zoning Ordinance identifies the review criteria for Special Land Use applications as follows:

1. **Master Plan.** The Township Master Plan identifies the subject site as Mixed Use – West Grand River. This classification is states that "regional commercial uses, such as auto-oriented uses (including fast-food) are only intended at interchange uses and where otherwise currently existing along Grand River Avenue."

   The subject site is located near a major roadway intersection and within close proximity to an interchange. Furthermore, there are other auto-oriented uses (gas stations and another drive-through coffee shop) in the immediate area.

   As such, the Commission may find that the proposal is consistent with the Master Plan and Future Land Use Map.

2. **Compatibility.** Surrounding properties are primarily commercial/service in nature, though the site also abuts residential zoning and land use along the east side lot line.

   The primary concerns under this criterion are related to potential impacts (noise, light, overall intensity of uses) upon the adjacent residential property.

   The use conditions of Section 7.02.02(j) and buffer zone requirements of Section 12.02.03 are intended to help mitigate potential off-site impacts.

   In order to make a favorable finding under this criterion, the above standards must be met to the Commission's satisfaction.

The revised submittal also notes that the drive-through will be available from 6AM to 9PM and that a sound study can be provided once a tenant is known. The Commission may wish to include this as a condition if a favorable recommendation is made.

3. **Public Facilities and Services.** Given that the site fronts Latson Road near Grand River Avenue and was previously developed, we anticipate that necessary public facilities and services are in place.

   However, the applicant must address any comments provided by the Township Engineer and/or Brighton Area Fire Authority related to this criterion.

4. **Impacts.** Similar to previous comments, use conditions and buffering requirements must be met to help ensure that the adjacent residential use is not adversely impacted by the proposed development.

5. **Mitigation.** If further concerns arise as part of the review process, the Township may require additional efforts to mitigate potential adverse impacts.

D. Use Conditions (Drive-Through Coffee Shop)

Drive-through coffee shops are subject to the use requirements of Section 7.02.02(j), as follows:

1. **Principal and accessory buildings shall be setback fifty (50) feet from any adjacent public right of way line or property line.**

   The proposed building provides setbacks of at least 50 feet from each lot line.

2. **The establishment of a new drive-through restaurant shall require the lot be separated a minimum of five hundred (500) feet from any other lot containing a drive-through restaurant.**

Based on staff research, the subject site is approximately 120 feet from the property across Latson Road, which contains a drive-through restaurant. As such, this condition is not met. The revised submittal notes that the applicant will seek a variance from ZBA.

3. **Only one (1) access shall be provided onto any street.**

The site plan depicts a single driveway to/from Latson Road.

4. **Such restaurants constructed adjacent to other commercial developments shall have a direct vehicular access connection where possible.**

The site plan provides for cross-access with the adjacent commercial development to the north.

E. Site Plan Review

1. **Dimensional Requirements.** The site plan has been reviewed for compliance with the dimensional requirements of the GCD, as follows:

	Min. Lot Req.		Minimum Yard Setbacks (feet)				Max. Lot Coverage (%)	Max. Height
	Area (acres)	Width (feet)	Front Yard	Side Yard	Rear Yard	Parking Lot		
GCD	1	150	70	15	50	20 front 10 side/rear	35% building 75% impervious	35’ 2 stories
Proposed	3.4	420	70	174 (N) 90 (S)	50.5	6 front 20 side (S) 10 rear	11.6% building 72.9% impervious	20’ 1 story

The revised submittal notes that the applicant will seek a variance from ZBA for the deficient front yard parking setback.

2. **Building Design and Materials.** The primary building materials are brick and stone, with relatively small amounts of wood paneling and metal accents.

   The revised submittal includes material calculations demonstrating compliance with the material standards of Section 12.01.

   There are material and color differences that may suffice, but the applicant could provide some vertical elements to help break up the overall building length of the rear façade.

   Building materials and colors are subject to review and approval by the Planning Commission.

3. **Pedestrian Circulation.** The site plan proposes an 8-foot wide concrete sidewalk along S. Latson.

   The plan also provides internal pedestrian circulation between the parking areas and building entrances, as well as a connection to the public sidewalk along Latson Road.

4. **Vehicular Circulation.** The site plan proposes 1 curb cut for a full turning movement driveway along S. Latson. Cross-access is also provided with the proposed development to the north.

   Drive aisles are of sufficient width for two-way traffic around the site.

   The proposed driveway is approximately 200 feet from the existing driveway to the south (on the same side of Latson Road) and is offset by approximately 180 feet from the existing driveway to the north (across Latson Road).

   Neither meets the spacing requirements of Section 15.06.02; however, we defer to the Township Engineer for technical review of the proposed driveway.

   The proposed un/loading area is situated outside of travel areas; however, when occupied, it will make access to the drive-through lane difficult. As such, the revised plan includes a note that deliveries will be scheduled for off peak hours to avoid potential conflicts.

   The applicant must address any comments provided by the Township Engineer and/or the Brighton Area Fire Authority with respect to vehicular circulation.

5. **Parking.** Based on information contained in the submittal, the project requires 79 parking spaces, which are provided.

   The design and dimensions of parking spaces and drive aisles comply with Ordinance standards. The number of stacking spaces and barrier-free spaces is also compliant.

6. **Exterior Lighting.** The lighting plan identifies 10 light poles and 12 wall mounted fixtures (6 of which are ornamental/architectural).

   Based on the detail sheets, aside from the ornamental/architectural fixtures, the proposed fixtures are downward direct LEDs, as required.

   Pole heights and photometric readings (both on-site and along property lines) comply with Ordinance standards.

   While the lighting details comply with the requirements of Section 12.03, the plan must be revised to match the currently proposed site plan (and not the initial plan with the outdoor seating details).

7. Landscaping. The landscape plan has been reviewed for compliance with the standards of Section 12.02, as follows:

Standard	Required	Proposed	Comments
Front yard greenbelt	20' width 11 canopy trees	6' to 20' width 11 canopy trees	Partially deficient width
Buffer Zone C (N)	10' width 9 canopy trees OR 9 evergreen trees OR 36 shrubs	35' width 5 canopy trees 16 shrubs	In compliance
Buffer Zone B (S)	20' width 6' wall OR 3' berm 7 canopy trees 7 evergreen trees 26 shrubs	10' width 3' berm 7 canopy trees 7 evergreen trees 27 shrubs	In compliance
Buffer Zone B (E)	20' width 6' wall OR 3' berm 14 canopy trees 14 evergreen trees 56 shrubs	10' width Partial wall 14 canopy trees 14 evergreen trees 56 shrubs	Deficient width and full length wall. Applicant must provide wall detail (height and materials).
Parking lot	8 canopy trees 790 SF landscaped area	8 canopy trees 1,630 SF landscaped area	In compliance

There are minor inconsistencies between the landscape plan and plant list with respect to quantities, as follows:

- TM – 4 depicted/3 noted
- RA – 28 depicted/10 noted

The Commission has the authority to modify landscaping requirements, per Section 12.02.13.

8. Waste Receptacle. The proposed waste receptacle has been reviewed for compliance with the standards of Section 12.04, as follows:

	Requirement	Proposed	Comments
Location	Rear yard or non-required side yard AND not less than 20' from residential	Rear yard 20' from residential	Requirements met
Access	Clear access w/ out damaging buildings/vehicles	Turning template demonstrates sufficient maneuvering area	Requirements met
Base design	9' x 15' concrete pad	Approximately 20' x 25' concrete pad	Requirement met
Enclosure	3-sided enclosure w/ gate Masonry walls 6' height/taller than receptacle	3 sides w/ gate across 4th Masonry walls 6' height	Requirements met

Should you have any questions concerning this matter, please do not hesitate to contact our office.

Respectfully,
SAFEBUILT

Brian V. Borden, AICP
Michigan Planning Manager

November 8, 2023

Ms. Amy Ruthig
Genoa Township
2911 Dorr Road
Brighton, MI 48116

Re: South Latson Commercial Development
Site Plan Review No. 2

Dear Ms. Ruthig:

Tetra Tech conducted a second review of the proposed South Latson Commercial Development site plan last dated October 25, 2023. The plan was prepared by Boss Engineering on behalf of 1015 Latson Road, LLC. The development is located on two parcels with a total of 3.38 acres on the east side of Latson Road, approximately 350 feet south of the Latson Road and Grand River Avenue intersection. The Petitioner is proposing to split the site into two parcels that are being reviewed separately, and this review includes a proposed 9,675 square foot general commercial building on the proposed south parcel. The proposed improvements include a new parking lot, storm sewer, and underground detention. We offer the following comments for your consideration:

GENERAL

1. The Petitioner should obtain approval from the Livingston County Road Commission (LCRC) for the proposed site driveway prior to final site plan approval.

DRAINAGE AND GRADING

1. The Petitioner is proposing a closed pipe type underground detention basin comprised of five 42-inch diameter pipes to provide 16,890 cubic feet of storage. The proposed building, site drive, and parking improvements do not allow enough space for any at-grade storm water detention or retention.
2. Soil borings and infiltration testing should be provided within the proposed detention basin footprint and should show the documented high ground water elevation. Soil borings shall be provided to a depth of at least 20 feet. The Petitioner has noted that no geotechnical work has been completed for the site yet, but the geotechnical from the northern parcel was used for the current design. The infiltration rate and soil borings being used for the current design should be confirmed prior to construction of the storm system.
3. The proposed underground detention basin will tie into the existing storm sewer on Latson Road. The Petitioner will need to obtain approval from the LCRC to connect to their storm sewer and said approval should be provided to the Township prior to final site plan approval. In the past the LCRC has not allowed any increase in storm volume into their storm sewer. The underground detention design has been revised since the last submittal to allow for additional infiltration to limit the storm volume that would outlet into the LCRC sewer.

TRAFFIC AND PAVEMENT

1. The Petitioner has provided a traffic impact study for the proposed development. The study included expected traffic volumes from other proposed developments in the area in the no-build condition and recommended signal timing and length be modified at the Grand River Avenue and Latson Road for both

Tetra Tech
3497 Coolidge Road, East Lansing, MI 48823
Tel 517.316.3930 Fax 517.484.8140 www.tetratech.com

the no-build and build condition. The Livingston County Road Commission will review the traffic impact study as part of their approval for the proposed site driveways and they will need to review the recommendation of optimized signal timings at the Grand River Avenue and Latson Road intersection.

We recommend the petitioner address the above comments prior to Township. Please call or email if you have any questions.

Sincerely,

Shelby Byrne

Shelby Byrne, P.E.
Project Engineer

BRIGHTON AREA FIRE AUTHORITY
615 W. Grand River Ave.
Brighton, MI 48116
o: 810-229-6640 f: 810-229-1619

November 3, 2023

Amy Ruthig
Genoa Township
2911 Dorr Road
Brighton, MI 48116

RE: South Latson Commercial Development
1111 S. Latson Rd.
Genoa Twp., MI

Dear Amy,

The Brighton Area Fire Department has reviewed the above-mentioned site plan. The plans were received for review on October 12, 2023, and resubmitted with revisions on October 27, 2023, and the revised drawings are dated October 25, 2023. The project is based on proposed redevelopment of an existing vacant parcel for a new 9,675 square foot multi-tenant commercial retail development. The plan review is based on the requirements of the International Fire Code (IFC) 2021 edition.

1. The water main location on the submittal is at the rear of the property along with the proposed new HYD100; however, this is not conducive for firefighting operations and fire department connection location. Relocate the hydrant 125-feet West and 75-feet South adjacent ot the driveway entrance and monument sign. The hydrant shall be located within 100' of the fire department connection. **(HYD 100 was not able to be relocated as directed, however, the new proposed location is acceptable to the fire authority.)**

   IFC 912.8

2. The building shall be provided with an automatic sprinkler system in accordance with NFPA 13, *Standard for the Installation of Automatic Sprinkler Systems*.

   IFC 903

   A. The FDC shall be located on the front of the building (Latson Rd.). **(FDC is shown on the East side as directed.)**

   B. The location, size, gate valve, and connection of the fire protection lead shall be indicated on the utility site plan. **(Suppression line is proposed a a 6" with valves shown on the Utility Plan)**

3. The building address shall be a **minimum of 6"** high letters of contrasting colors and be clearly visible from the street. The location and size shall be verified prior to installation. Provide clarification on building addressing. It is recommended that each tenant space have an individual address. **(Noted on Sheet 5 General Note 3)**

   IFC 505.1

4. Two-way emergency vehicle access roads shall be a minimum of 26-feet wide. With a width of 26-feet, one side (building side) of the drive shall be marked as a fire lane. Include additional signage along curblines at least every 50-feet. Access roads to the site shall be provided and maintained during construction. Access roads shall be constructed to be capable of supporting the imposed load of fire apparatus weighing at least 84,000 pounds, this includes over the underground retention. **(Noted on Sheet 5 General Note 6 & 7))**

   IFC D 103.6

IFC D 103.1
IFC D 102.1
IFC D 103.3

5. Access around the building shall provide emergency vehicles with a turning radius of 50-feet outside and 30-feet inside. Vehicle circulation shall account for non-emergency traffic and maintain the vehicle within the boundary of lanes of travel. The entry drive radius into the parking lot must be softened to allow for proper vehicle turning and circulation. Additionally, the SW and SE corners of the development do not properly accommodate turning radius. Turning must be wall to wall as it relates to lane boundary and curblines and vehicles. This may require an increase in drive width to 32-feet to accommodate. **(Circulation has been modified as much as possible to accommodate emergency vehicle access. The access provided is sufficient for emergency vehicle operations as required.)**

   IFC 503.2.4

6. A minimum vertical clearance of 13½ feet shall be maintained along the length of all apparatus access drives. This includes but is not limited to porte-cochere's, lighting, and large canopy trees. The entire East side of the drive and on multiple landscape islands are proposed with large canopy trees that overhang the access drives. The species must be revised and approved by the township or the drive widths increased to 32-feet to allow for large canopy trees. **(Note regarding tree canopies acknowledged and symbols modified to be more accurate.)**

   IFC 503.2.1

7. A Knox box shall be installed adjacent to the main entrance of each tenant space of the structure, in a location coordinated with the fire authority; or a common Knox Vault installed for the entire development located at the center unit of the strip. **(Knox noted on Sheet 5 General Note 4. It must be noted that by using a single box, a Knox Vault shall be used not a standard box.)**

   IFC 506.1

8. During the construction process, the building will be evaluated for emergency responder radio signal strength. If coverage is found to be questionable or inadequate; the contractor or the building owner shall hire an approved contractor to conduct a grid test of the facility. If the signal strength coverage is found to be non-compliant, an approved emergency responder radio coverage system shall be provided in the building. **(Noted on Sheet 5 General Note 9)**

   IFC 510

9. Provide names, addresses, phone numbers, emails of owner or owner's agent, contractor, architect, on-site project supervisor. **(Provided on the Cover Sheet.)**

Additional comments will be given during the building plan review process (specific to the building plans and occupancy). The applicant is reminded that the fire authority must review the fire protection systems submittals (sprinkler & alarm) prior to permit issuance by the Building Department and that the authority will also review the building plans for life safety requirements in conjunction with the Building Department.

If you have any questions about the comments on this plan review please contact me at 810-229-6640.

Cordially,

Rick Boisvert, CFPS
Fire Marshal

cc: Kelly VanMarter, keely@genoa.org

GENOA TOWNSHIP IMPACT ASSESSMENT
South Latson Commercial Development

Prepared for:

Owner / Applicant
1015 Latson Road LLC
Kevin Bahnam

Prepared by:

Scott Tousignant, P.E.

BOSS Engineering

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

October 4, 2023
Revised: October 26, 2023

DISCUSSION ITEMS

A. Name(s) and address(es) of person(s) responsible for preparation of the Impact Assessment and a brief statement of their qualifications.

Prepared by:

Scott Tousignant, P.E.
Professional Engineer/Project Manager
Boss Engineering
3121 E Grand River
Howell, MI 48843

Prepared for:

Owner/Applicant:
1015 Latson Road LLC / Kevin Bahnam
29592 Beck Road
Wixom, MI 48393

B. Description of the site, including existing structures, man-made facilities, and natural features, all-inclusive to within 10' of the property boundary.

The project site is on parcels # 4711-04-300-017 and # 4711-09-100-004 in Sections 4 & 9, Genoa Township, Livingston County, MI.

The subject site is bordered:

- On the north by the 1.14 acre +/- parcel zoned General Commercial (GCD) with an existing O'Reilly Auto Parts store.
- On the east by the 9.13 acre +/- parcel zoned General Commercial (GCD) with the Country Corners Shopping center.
- On the east and south by the 12.09 acre +/- parcel zoned High Density Residential (HDR) with the Prentis Estates Apartments. An approximately 4' tall berm is directly along the property line here on the adjacent HDR parcel and is planted with large Red and Scotch Pines ranging in size from 11" d.b.h. to 24" d.b.h. There is an additional evergreen screen just south of the berm along the east property line planted with White Cedar.
- On the west by S. Latson Road and the Non-Residential PUD shopping center with Walmart, PetSmart, Lowe's and various fast-food restaurants.
- The north side of the proposed project will be immediately adjacent to another proposed development project within the GCD zoning.

MHOG sanitary runs along the west property line and South Latson Road. MHOG water runs along the east property line in the adjacent parcel. See the Existing Conditions for locations.

The subject site is a vacant parcel of land consisting of tall, unmaintained grasses and minimal trees. There are currently two existing commercial drive approaches accessing the 2 subject properties. One will be maintained and the other will be removed and relocated to an LCRC approved location.

C. Impact on natural features: A written description of the environmental characteristics of the site prior to development, i.e., topography, soils, vegetative cover, drainage, streams, creeks or ponds.

These currently vacant parcels are flat (2-6% slopes) and covered by grass and weeds. The 0.50 acre parcel at the south does feature a woodland with small trees and shrubs below 6" d.b.h. unless otherwise noted on the tree survey. Species within the woodland include Pyrus spp. (Pear), Acer saccharinum (Silver Maple), Populus deltoides (Eastern Cottonwood), Prunus serotina (Black Cherry), and Pinus sylvestris (Scotch Pine.)

The soils are largely Wawasee Loam with 2 to 6% slopes. Other soils on site are Conover Loam and Washtenaw Silt Loam. The site drains via surface flow from east to west to the South Latson Road storm sewer system. No wetlands/streams/creeks or other water bodies are located on site.

D. Impact on storm water management: description of soil erosion control measures during construction.

Storm water will be managed on site and installed before any building construction. Underground storm water detention is planned with a discharge to the South Latson Road storm system and ultimately to the regional detention basin to the south by I-96. Detailed construction plans will be reviewed by the Township Engineer and the Soil Erosion Control plans will be reviewed and permit issued by the Livingston County Drain Commissioners office prior to construction commencing. Ongoing/periodic soil erosion inspections will occur per County requirements to ensure soil erosion is managed proactively.

E. Impact on surrounding land use: Description of proposed usage and other man-made facilities; how it conforms to existing and potential development patterns. Effects of added lighting, noise or air pollution which could negatively impact adjacent properties.

Proposed uses on this General Commercial site include a Coffee Shop with Drive-Through and a variety of retail spaces. The proposed uses conform to existing and potential development patterns and will not negatively impact adjacent properties with added lighting, noise or air pollution. The site development will comply with Township Ordinances for lighting levels as well as noise levels. The uses proposed do not impact adjacent properties with noise, light or air pollution.

An existing berm and evergreen screening in the adjacent parcel to the north along the High-Density Residential (HDR) property line screens that use from these proposed commercial uses. In addition, a 6-foot-tall screening wall is proposed for the southern portion and northern portion of the east property line to screen the HDR use. An existing tree screen is on the property line and installing a screen wall would jeopardize and/or require removal of some of the mature trees currently screening the parcel. On the northern half of the east property line, there are no living units, so providing additional plantings to be a continuation of the landscaped screen to the adjacent HDR zoning is being proposed. A wall is proposed there as well given the reduction in landscape buffer width that is being sought. Proposed uses on this site are compatible with existing zoning and adjacent zoning on S. Latson Road.

F. Impact on public facilities and services: Description of number of residents, employees, patrons, and impact on general services, i.e., schools, police, fire.

The proposed commercial development does not add additional burden on the fire and police services as the site is surrounded by similar development that already receives coverage. The uses do not add population that impacts schools. The commercial retail will add to Township tax revenue as the site currently sits vacant. The commercial retail will add approximately 60 jobs which has a positive impact on the community.

G. Impact on public utilities: description of public utilities serving the project, i.e., water, sanitary sewer, and storm drainage system. Expected flows projected in residential units.

Storm water will be detained on-site via the use of an underground detention system. The storm water will be discharge at pre-development rates to the South Latson Road storm sewer system as the site currently sheet flows into this road storm system. Detailed construction plans would be reviewed by the Township Engineer and the Soil Erosion Control permit would be reviewed and issued by the Livingston County Drain Commissioner. MHOG sanitary sewer runs along the west property line and South Latson Road. It is expected that the site will be connected to MHOG sanitary sewer along South Latson Road and MHOG water along the east property line in the adjacent parcel. The commercial development, being supported by these public utilities is not anticipated to have a negative impact. The development is projected to be approximately 6 REU's (projecting possible end users of the commercial leasable space) which equates to approximately a peak flow usage of 7,000 gpd.

H. Storage or handling of any hazardous materials: Description of any hazardous materials used, stored, or disposed of on-site.

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

I. Impact on traffic and pedestrians: Description of traffic volumes to be generated and their effect on the area.

A traffic study has been performed. It is prepared under separate cover and submitted to the Township and Livingston County Road Commission. In summary of the Traffic Impact Study performed by Colliers Engineering & Design, *"With the improvements outlined below, all study network intersection and site driveways will operate acceptably, or in a manner similar or improved compared to no-build conditions during the peak hours. Optimize signal timings at the intersection of Grand River Avenue and Latson Road."*

The Livingston County Road Commission will be required to review and approve the commercial driveway approaches on South Latson Road.

J. Special provisions: Deed restrictions, protective covenants, etc.

None of record.

K. Description of all sources:

- Genoa Township Zoning Ordinance
- "Soil Survey of Livingston County Michigan" Soil Conservation Services, USDA
- Traffic Impact Study by Colliers Engineering & Design dated September 15, 2023

CONTECH®
ENGINEERED SOLUTIONS

Cascade Separator® Inspection and Maintenance Guide

CASCADE
separator®

Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

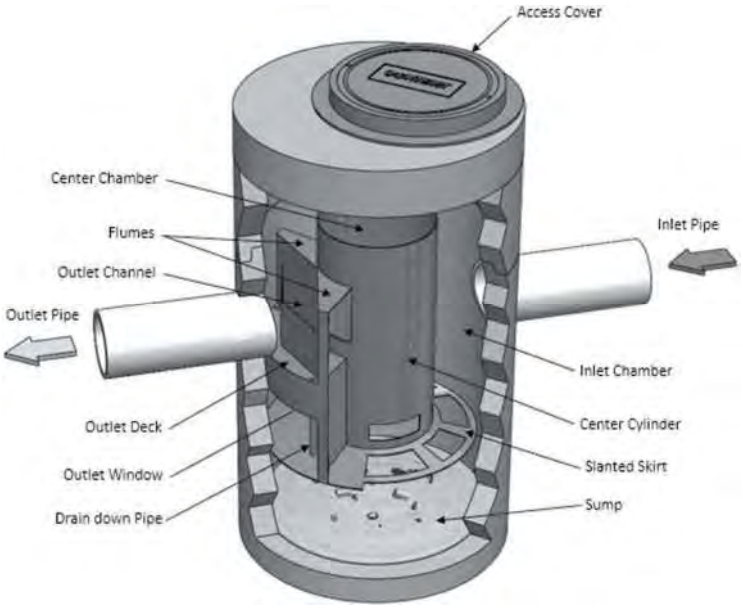
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	2.5	0.8	0.7	0.5
CS-5	5	1.3	3	0.9	1.1	0.8
CS-6	6	1.8	3.5	1	1.6	1.2
CS-8	8	2.4	4.8	1.4	2.8	2.1
CS-10	10	3.0	6.2	1.9	4.4	3.3
CS-12	12	3.6	7.5	2.3	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.

A Cascade Separator unit can be easily cleaned in less than 30 minutes.

A vacuum truck excavates pollutants from the systems.

Cascade Separator® Inspection & Maintenance Log

Cascade Model:			Location:		
Date	Depth Below Invert to Top of Sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- **Drawings and specifications are available at www.ContechES.com.**
- **Site-specific design support is available from our engineers.**

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, and earth stabilization products. For information, visit www.ContechES.com or call 800.338.1122

CONTECH ENGINEERED SOLUTIONS
800-925-5240
www.ContechES.com

Contech® CMP Detention Inspection and Maintenance Guide

Underground stormwater detention and infiltration systems must be inspected and maintained at regular intervals for purposes of performance and longevity.

Inspection

Inspection is the key to effective maintenance of CMP detention systems and is easily performed. Contech recommends ongoing, annual inspections. Sites with high trash load or small outlet control orifices may need more frequent inspections. The rate at which the system collects pollutants will depend more on-site specific activities rather than the size or configuration of the system.

Inspections should be performed more often in equipment washdown areas, in climates where sanding and/or salting operations take place, and in other various instances in which one would expect higher accumulations of sediment or abrasive/corrosive conditions. A record of each inspection is to be maintained for the life of the system.

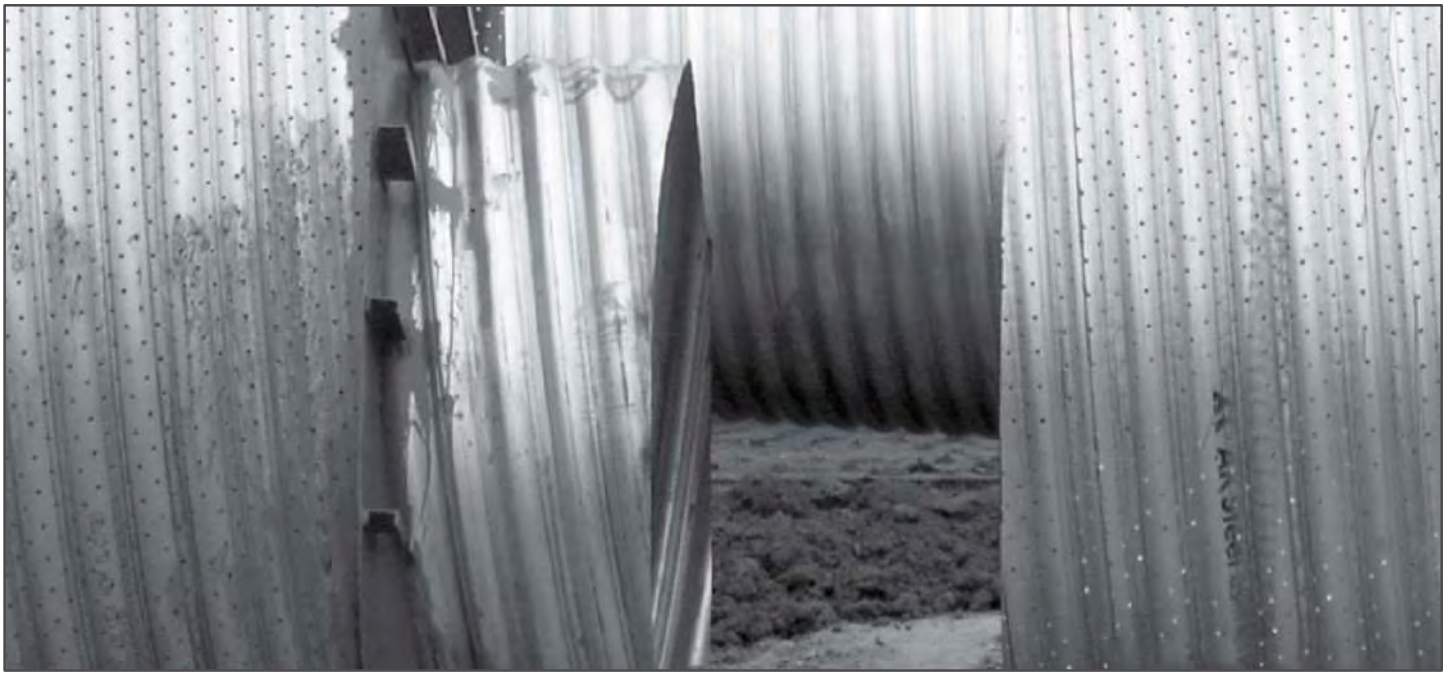
Maintenance

CMP detention systems should be cleaned when an inspection reveals accumulated sediment or trash is clogging the discharge orifice. Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities. Contech suggests that all systems be designed with an access/inspection manhole situated at or near the inlet and the outlet orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

Annual inspections are best practice for all underground systems. During this inspection if evidence of salting/de-icing agents is observed within the system, it is best practice for the system to be rinsed, including above the spring line soon after the spring thaw as part of the maintenance program for the system.

Maintaining an underground detention or infiltration system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather.

The foregoing inspection and maintenance efforts help ensure underground pipe systems used for stormwater storage continue to function as intended by identifying recommended regular inspection and maintenance practices. Inspection and maintenance related to the structural integrity of the pipe or the soundness of pipe joint connections is beyond the scope of this guide.



CMP MAINTENANCE GUIDE 10/19 PDF

CONTECH® CMP DETENTION SYSTEMS

CONTECH® ENGINEERED SOLUTIONS

Colliers
Engineering
& Design

Traffic Impact Study

October 4, 2023

Latson Road Commercial Development
Genoa Township, Livingston County, Michigan

Prepared for:

Mr. Karam Bahnam
1015 Latson Road, LLC
29592 Beck Road
Wixom, MI 48393

Colliers Engineering & Design
20700 Civic Center Drive, Suite 170
Southfield, MI 48076
Main: 877 627 3772
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Colliers Engineering & Design

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Appendix

Colliers
Engineering & Design

Introduction

This report presents the methodologies, analyses, results, and recommendations of a Traffic Impact Study (TIS) for the proposed commercial development project in Genoa Township, Livingston County, Michigan. The project site is located on the east side of Latson Road approximately 500 feet south of Grand River Avenue (I-96 BL) as shown on **Figure 1** and is currently vacant. The proposed development plans include construction of a 2,950 SF coffee-shop with drive-through, 2,700, SF sit-down restaurant, 4,025 SF of general retail space, and automated car wash. Access for the development is proposed via two driveways to Latson Road. A representation of the site plan is shown on **Figure 2**.

Latson Road is under jurisdiction of the Livingston County Road Commission (LCRC); whereby access permitting will be subject to LCRC review and standards. In accordance with LCRC standards a Traffic Impact Study (TIS) is required for site access permitting and project approvals. Additionally, the project is subject to Township review and approval as part of the site plan review process.

The purpose of this study is to identify the traffic related impacts, if any, of the proposed project on the adjacent road network. This study therefore includes analysis of the site access points as well as key off-site intersections surrounding the site. Analysis of the site access points will determine appropriate lane configurations as well as traffic control to process site traffic safely and efficiently. Key off-site intersections are analyzed to determine if new site-generated traffic passing through these locations would require improvements to mitigate any impacted traffic operations.

The scope of this study was developed based on Colliers Engineering & Design (CED) knowledge of the study area, understanding of the development program, accepted traffic engineering practice, and information published by the Institute of Transportation Engineers (ITE). Additionally, CED solicited input regarding the proposed scope of work from LCRC. The study analyses were completed using Synchro and SimTraffic, Version 11 traffic analysis software and in accordance with the methodologies and practices published by ITE and the applicable requirements of LCRC and the Township. This report is intended for use by LCRC and the Township to guide decisions related to development project approvals, access permitting, and identifying future roadway improvement needs.

Latson Commercial Development
Genoa Township, MI

Figure 1
Study Area Map

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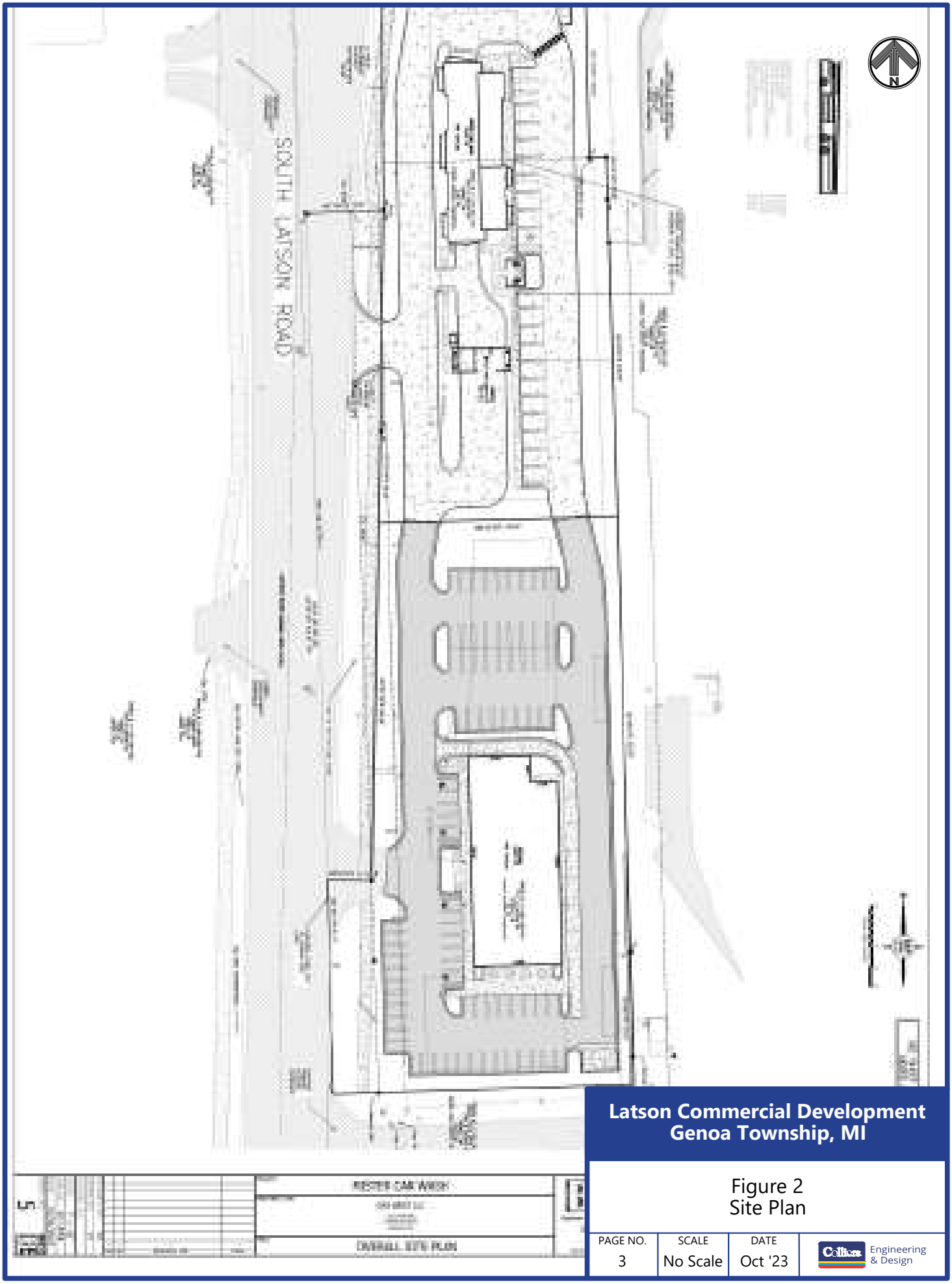

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Figure 2
Site Plan

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Roadway Data

Road Network

Vehicle transportation for the proposed development will be provided primarily via Latson Road and Grand River Avenue. The study intersections are identified below, and further details on the study roadways are summarized in **Table 1**.

Table 1: Roadway Summary

Roadway Data	Grand River Avenue	Latson Road
Functional Class	Principal Arterial	Minor Arterial
Direction	E-W	N-S
Speed Limit (mph)	45	55
Jurisdiction	MDOT	LCRC
Cross Section	5-Lane	5-Lane
AADT	31,000	22,000
AM Peak Hour Volume	2,075	1,380
PM Peak Hour Volume	3,250	2,370

Study Intersections

Grand River Avenue & Latson Road

At the intersection of Grand River Avenue & Latson Road, all approaches have dual left-turn lanes, two through lanes, and an exclusive right-turn lane. The intersection is traffic signal controlled with leading protected only left-turn phasing, and right-turn overlap phasing provided for all approaches. Dynamic "No Turn on Red" signs are also provided for all approaches to prohibit right-turns during the opposing approaches protected left-turn phase. Vehicle and pedestrian actuation are provided for all approaches and movements and marked crosswalks are provided for crossing all legs.

Figure 3: Grand River Avenue & Latson Road Intersection

Latson Road & Grand Oaks Drive

At the intersection of Latson Road & Grand Oaks Drive, the NB and SB approaches have an exclusive left-turn lane, through lane, and shared through/right-turn lane while the EB and WB approaches have an exclusive left-turn lane and shared through/right-turn lane. The intersection is traffic signal controlled with a leading permitted-protected left-turn phasing for the NB approach. Vehicle actuation is provided for all approaches and movements and marked crosswalks are provided for crossing the east, west, and north legs of the intersection with pedestrian actuation provided for the north crossing.

Figure 4: Latson Road & Grand Oaks Drive Intersection

Existing Traffic Data

Existing weekday AM (7:00 to 9:00) and PM (4:00 to 6:00) peak hour turning movement counts were collected by CED at the study intersections. At the signalized intersections of Latson Road with Grand River Avenue and Grand Oaks Drive, counts were collected on Wednesday, November 13th, 2019. At the unsignalized Lowes and Wal-Mart driveways with Latson Road, counts were collected on Thursday, August 10th, 2023.

Data were collected in 15-minute intervals to establish the current peak hour traffic volumes. Major weather events, holidays, and other local special events were avoided. During collection of the manual intersection turning movement count, pedestrian data and commercial truck percentages were also recorded and used in the traffic analysis. Peak hour factors (PHFs) and commercial truck percentages were calculated by approach based on the requirements of MDOT's *Electronic Traffic Control Device Guidelines*. Traffic volumes along Latson Road were balanced upward between the Wal-Mart driveway and Grand River Avenue. Between Grand Oaks Drive and the north Lowes driveway, a dummy node was utilized to account for the large amount of traffic that turns in and out of the south Lowes driveway. All relevant traffic volume data are included in Appendix A and the resulting 2023 baseline peak hour volumes utilized for this study are summarized on **Figure 6.**

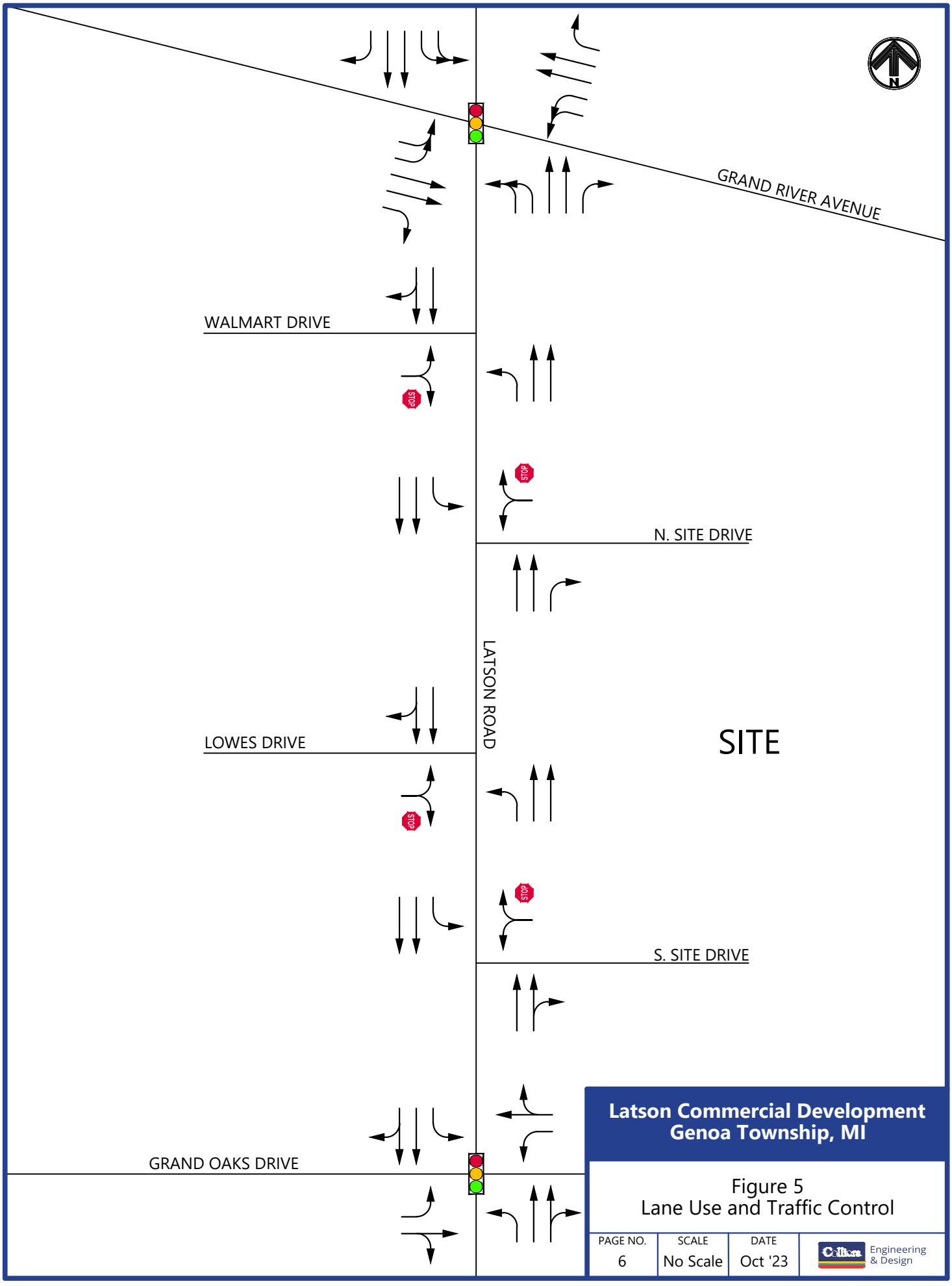

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Figure 5
Lane Use and Traffic Control

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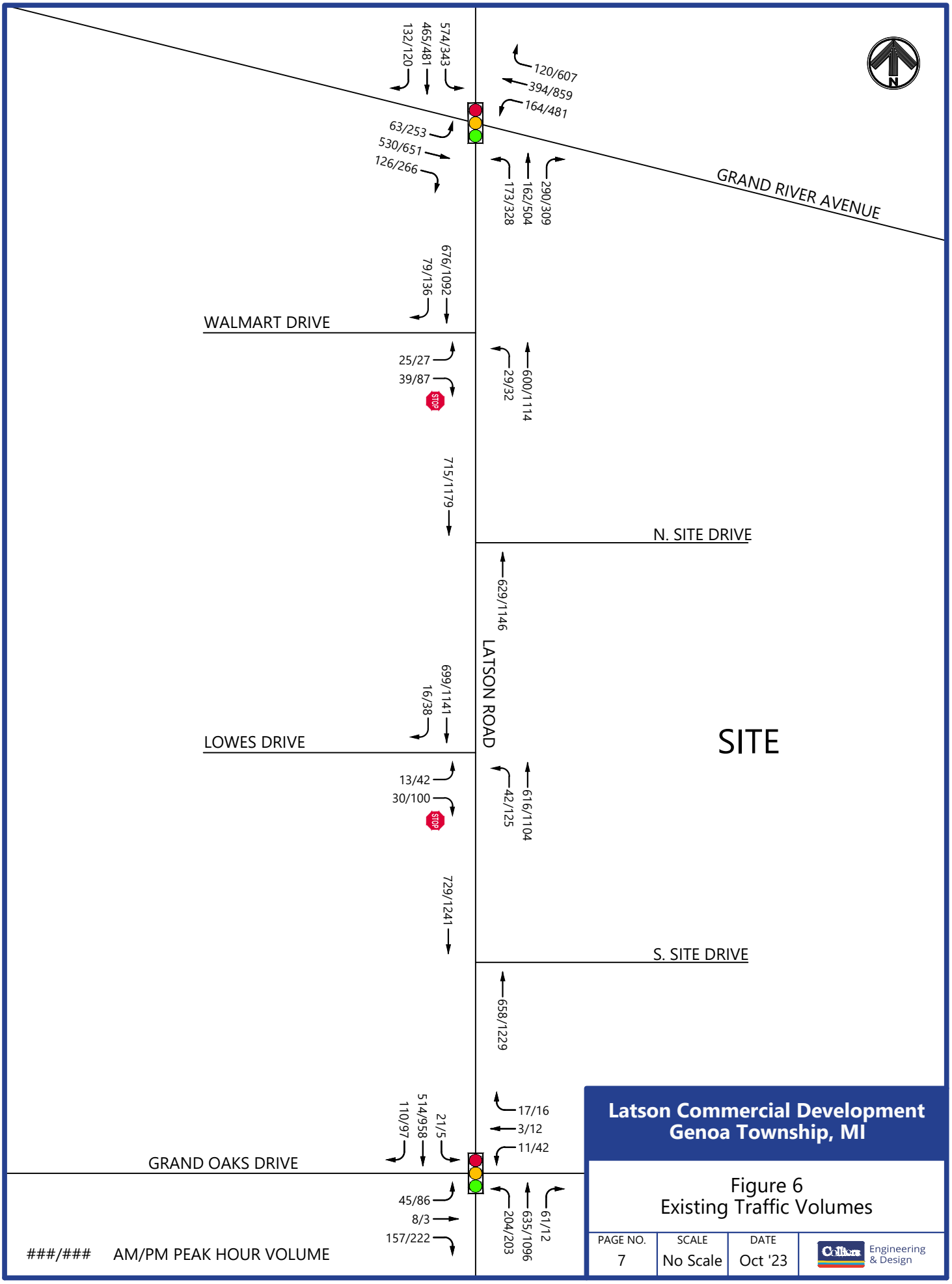

Latson Commercial Development
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Figure 6
Existing Traffic Volumes

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2023 Existing Conditions

Analysis Methodologies

The performance of the study intersections was evaluated through a qualitative measure of operating conditions called Levels of Service (LOS). Six LOS are defined with letter designations from A to F with LOS A representing minimal delay, and LOS F indicating failing conditions. Typically, LOS D is considered acceptable in suburban/urban areas.

The LOS measurement for both signalized and unsignalized intersections is average control delay, which is quantified in terms of seconds of delay per vehicle. Control delay includes deceleration delay, stopped delay, queue move-up delay, and acceleration delay. The LOS criteria for unsignalized and signalized intersections taken from the HCM are included in Appendix B.

The LOS and delay calculations are based on the procedures and methodologies outlined in the Transportation Research Board's Highway Capacity Manual, 6th Edition (HCM6) which sets forth nationally accepted standards regarding traffic operations and capacity analysis. Traffic signal timings were modeled per traffic signal timing permits provided by LCRC.

Simulations of the study network were also observed using SimTraffic in order to identify potential issues related to vehicle queuing, traffic flow between intersections, and the overall study network. The existing conditions SimTraffic models were calibrated in accordance with the procedures outlined in the MDOT Electronic Traffic Control Device Guidelines.

Existing Traffic Conditions

Existing peak hour vehicle delays and LOS were calculated at the study intersections based on the existing lane configurations and traffic control shown on **Figure 5**, the existing traffic volumes shown on **Figure 6,** and the methodologies presented in the HCM. The results of the analysis of existing conditions are presented in **Appendix B**, summarized in **Table 2** and described in further detail below.

The results of the existing conditions analysis indicate that all approaches and movements at the study intersections are currently operating acceptably at a LOS D or better with the exception of the following:

- The NB right-turn movement at the signalized intersection of Grand River Avenue & Latson Road currently operates at a LOS E during the AM peak hour. During the PM peak hour, the NB left-turn movement operates at a LOS E while the WB left, and right-turn movement and SB left-turn movement operate at a LOS F.
- The STOP controlled Lowes Drive approach which currently operates at a LOS E during the PM peak hour.

Observation of peak hour simulations indicates acceptable traffic operations during the AM peak hour and significant vehicle queues are not observed. During the PM peak hour, long vehicle queues are observed for the WB right-turn movement and NB and SB left-turn movements at the

intersection of Grand River Avenue & Latson Road which occupy available storage lengths. A long vehicle queue is also observed for the STOP controlled Lowes driveway approach which lasts throughout the majority of the PM peak hour.

Table 2: Existing Conditions

Intersection	Control	Approach	Movement	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
Latson Road & Grand River Avenue (I-96 BL)	Signal	EB	Left	43.5	D	44.7	D
			Thru	32.1	C	42.0	D
			Right	22.2	C	27.9	C
		WB	Left	54.8	D	79.3	F
			Thru	28.1	C	41.7	D
			Right	13.6	B	69.4	F
		NB	Left	44.3	D	75.6	E
			Thru	36.5	D	39.8	D
			Right	67.0	E	29.1	C
		SB	Left	41.8	D	112.4	F
			Thru	30.2	C	40.9	D
			Right	25.0	C	25.3	C
		Overall		**37.2**	**D**	**53.1**	**D**
Latson Road & Grand Oaks Drive / Ascension Medical Drive	Signal	EB	Left	30.8	C	27.4	C
			Thru/Right	37.9	D	33.3	C
		WB	Left	37.9	D	37.1	D
			Thru/Right	28.9	C	24.5	C
		NB	Left	8.4	A	15.2	B
			Thru/Right	6.0	A	10.3	B
		SB	Left	10.2	B	12.8	B
			Thru/Right	13.0	B	21.7	C
		Overall		**13.0**	**B**	**18.3**	**B**
Latson Road & Wal-Mart Drive	STOP (Minor)	EB	Left/Right	16.0	C	24.6	C
		NB	Left	10.1	B	12.2	B
			Thru	Free		Free	
		SB	Thru/Right	Free		Free	
Latson Road & Lowes Drive	STOP (Minor)	EB	Left/Right	15.0	C	42.2	E
		NB	Left	10.0	B	13.5	B
			Thru	Free		Free	
		SB	Thru/Right	Free		Free	

No-Build Conditions

No-Build Traffic Volumes

Traffic impact studies typically include an evaluation of traffic operations in the future as they would be without the proposed development. This no-build condition serves to identify any mitigation that may be required, regardless of the project, and as a baseline for comparison of future buildout

conditions. This scenario is comprised of existing traffic conditions, plus ambient traffic growth, plus traffic from approved developments in the study area that have yet to be constructed. At the time of this study the following developments were identified within the study area and immediate vicinity that have yet to be constructed or were currently under construction:

1. Versa Mixed-Use Development
2. Westbury Phase II Residential Development
3. SJMHS Hospital Expansion

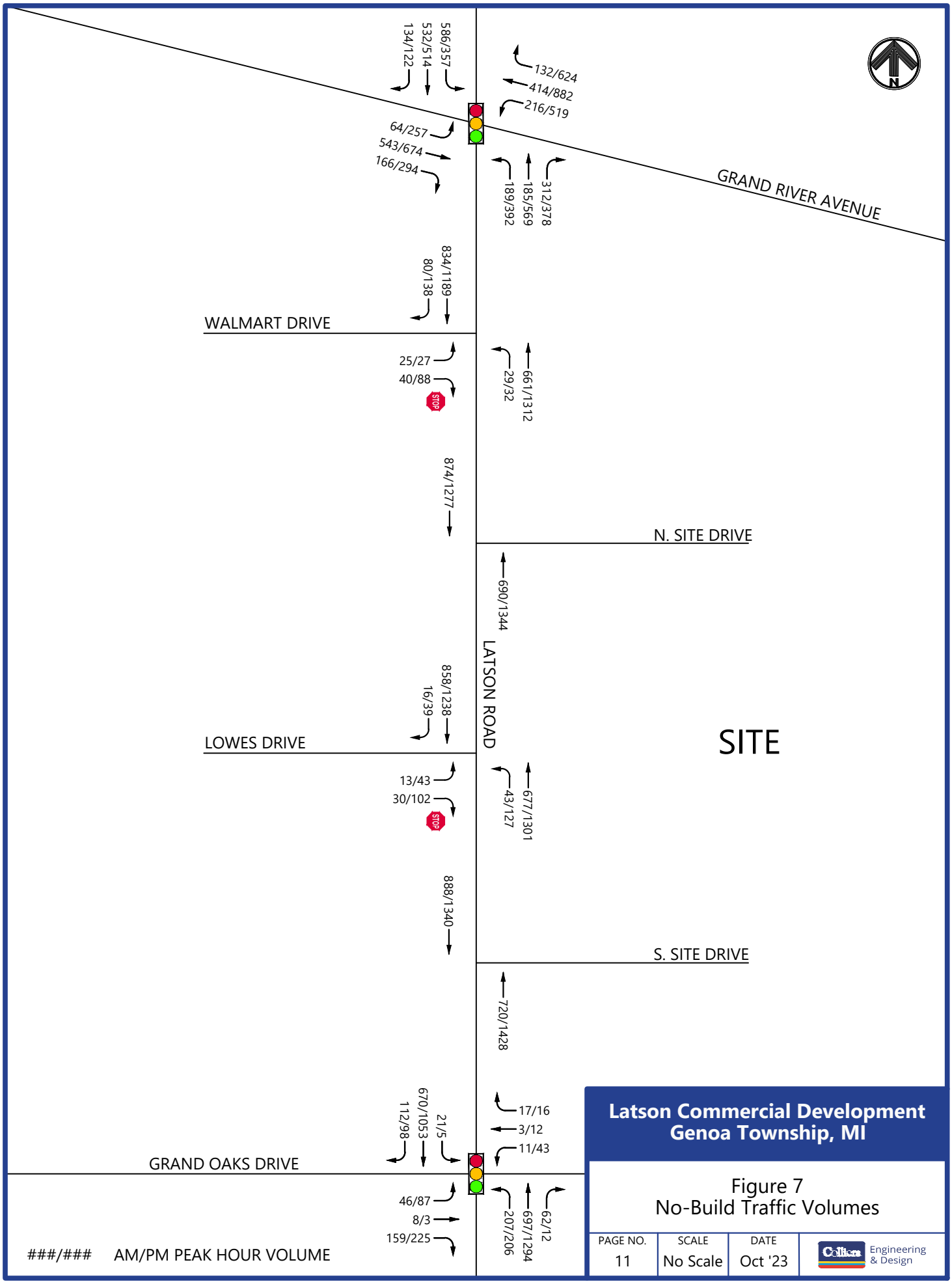
The vehicle trips that would be generated by the background developments were assigned to the study intersections based on the respective traffic study completed for each development. Where a traffic study was not completed for the development or the traffic study did not include the same intersections or time periods as this study, the number of vehicle trips was forecast based on data published by ITE in *Trip Generation, 11th Edition* and assigned to the study road network based on existing traffic patterns.

In addition to background developments, an ambient growth factor is applied to existing traffic volumes to account for future projects in the study area and population increases, as well as growth in regular traffic volumes due to development projects outside the study area. The recent construction of the I-96 & Latson Road interchange has resulted in significant changes in traffic patterns throughout the study area. As a result, historical traffic volumes do not provide an accurate representation of traffic growth in the area. Therefore, publicly available data from the Southeast Michigan Council of Governments (SEMCOG), including population and employment forecasts for Genoa Township were referenced.

The SEMCOG data indicates annual population and employment growths ranging from 0.35% to 1.64% between 2015 and 2045 as shown in **Table 3**. Therefore, an ambient background growth rate of 0.75% per year will be utilized for this study. The ambient growth rate and trips from the background developments were applied to the existing 2023 traffic volumes for a period of two years to forecast the no-build traffic volumes ***without the proposed development.*** The resultant 2025 no-build traffic volumes are summarized on **Figure 7.**

Table 3: Community Annual Growth Rate

Community	Measure	Growth
Genoa Township	Employment	0.38%
	Population	1.54%
Howell	Employment	0.35%
	Population	0.57%
Brighton	Employment	0.47%
	Population	0.69%
Brighton Township	Employment	0.63%
	Population	1.64%
Average		**0.78%**



Latson Commercial Development
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Figure 7
No-Build Traffic Volumes

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No-Build Traffic Conditions

No-build peak hour vehicle delays and LOS were calculated at the study intersections based on the existing lane configurations and traffic control shown on **Figure 5**, the no-build traffic volumes shown on **Figure 7**, and the methodologies presented in the HCM. The results of the analysis of no-build conditions are presented in Appendix C, summarized in **Table 4**, and described in further detail below.

Table 4: No-Build Traffic Conditions

Intersection	Control	Approach	Movement	AM Peak Hour				PM Peak Hour			
				Existing		No-Build		Existing		No-Build	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Latson Road & Grand River Avenue (I-96 BL)	Signal	EB	Left	43.5	D	43.5	D	44.7	D	44.9	D
			Thru	32.1	C	32.8	C	42.0	D	45.5	D
			Right	22.2	C	23.0	C	27.9	C	29.8	C
		WB	Left	54.8	D	103.1	F	79.3	F	102.4	F
			Thru	28.1	C	28.7	C	41.7	D	45.6	D
			Right	13.6	B	13.8	B	69.4	F	81.5	F
		NB	Left	44.3	D	43.9	D	75.6	E	131.2	F
			Thru	36.5	D	37.2	D	39.8	D	43.0	D
			Right	67.0	E	82.5	F	29.1	C	33.1	C
		SB	Left	41.8	D	42.1	D	112.4	F	127.6	F
			Thru	30.2	C	31.9	C	40.9	D	42.4	D
			Right	25.0	C	25.3	C	25.3	C	25.1	C
		Overall		**37.2**	**D**	**42.4**	**D**	**53.1**	**D**	**63.0**	**E**
Latson Road & Grand Oaks Drive / Ascension Medical Drive	Signal	EB	Left	30.8	C	30.7	C	27.4	C	27.2	C
			Thru/Right	37.9	D	37.8	D	33.3	C	33.1	C
		WB	Left	37.9	D	37.9	D	37.1	D	37.1	D
			Thru/Right	28.9	C	28.8	C	24.5	C	24.3	C
		NB	Left	8.4	A	9.7	A	15.2	B	17.4	B
			Thru/Right	6.0	A	6.2	A	10.3	B	12.0	B
		SB	Left	10.2	B	10.3	B	12.8	B	15.5	B
			Thru/Right	13.0	B	14.5	B	21.7	C	24.1	C
		Overall		**13.0**	**B**	**13.6**	**B**	**18.3**	**B**	**19.6**	**B**
Latson Road & Wal-Mart Drive	STOP (Minor)	EB	Left/Right	16.0	C	19.4	C	24.6	C	30.2	D
		NB	Left	10.1	B	11.1	B	12.2	B	12.9	B
			Thru	Free		Free		Free		Free	
		SB	Thru/Right	Free		Free		Free		Free	
Latson Road & Lowes Drive	STOP (Minor)	EB	Left/Right	15.0	C	17.5	C	42.2	E	60.0	F
		NB	Left	10.0	B	11.0	B	13.5	B	14.6	B
			Thru	Free		Free		Free		Free	
		SB	Thru/Right	Free		Free		Free		Free	

The results of the no-build conditions analysis indicate that all approaches and movements would continue to operate similar to existing conditions during both peak hours with the exception of the signalized intersection of Grand River Avenue & Latson Road which would be reduced to an overall LOS E during the PM peak hour. Additionally, several approaches and movements would be reduced to a LOS E or F including the WB left-turn movement and NB right-turn movement during the AM peak hour and NB left-turn movement during the PM peak hour.

At all other study intersections, no-build conditions remain acceptable and/or similar to existing conditions. Review of network simulations continue to indicate acceptable traffic operations during the AM peak hour and significant vehicle queues are not observed. During the PM peak hour, long vehicle queues and cycle failures occur with increased frequency at the intersection of Grand River Avenue & Latson Road, as compared to existing conditions. Specifically, a long vehicle queue is observed for the SB left-turn movement and WB right-turn movement which exceeds available storage length throughout the majority of the PM peak hour. It should be noted that these operations reflect modeled prohibition of all right turns on red at this intersection. The dynamic case signs allow for additional right turn demand processing and would result in shorter queues for actual field conditions.

No-Build Improvements

In order to improve traffic operations in the no-build conditions, mitigation measures were investigated. At the intersection of Grand River Avenue & Latson Road, recent improvements were made as part of the I-96 & Latson Road interchange project to provide dual left-turn lanes and right turn overlap phasing on all approaches, as well as additional travel lanes along Latson Road. The intersection of Grand River Avenue & Latson Road is considered to be built out, and additional physical capacity improvements (i.e., additional lanes) at this intersection are constrained by available right-of-way. Therefore, further geometric improvements at the intersection to mitigate all movements to a LOS D or better are considered to be regional and beyond the scope and context of this study.

As a result, improvements at Grand River Avenue & Latson Road are limited to signal timing and traffic control modifications. Signal cycle length and timing changes were therefore evaluated. The results of this analysis indicate that optimized timings with a 90 second cycle length in the AM peak hour and 100 second cycle length during the PM peak hour would result in future traffic operations which are similar to or improved compared to existing conditions; however, several intersection approaches and movements would continue to operate at a LOS E or F during the peak hours (noting modeling constraints for dynamic right turn on red). The results of the no-build conditions analysis with recommended improvements are summarized in **Table 5**.

Although these improvements are needed to help mitigate no-build operations; these improvements are not included in any planned roadway improvements. Therefore, the build conditions analysis for this study evaluates traffic operations with the existing traffic signal timings and geometrics at the intersections.

Table 5: No-Build Traffic Conditions with Improvements

Intersection	Control	Approach	Movement	AM Peak Hour				PM Peak Hour			
				No-Build		No-Build IMP		No-Build		No-Build IMP	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Latson Road & Grand River Avenue (I-96 BL)	Signal	EB	Left	43.5	D	43.5	D	44.9	D	44.9	D
			Thru	32.8	C	34.1	C	45.5	D	51.7	D
			Right	23.0	C	24.5	C	29.8	C	28.5	C
		WB	Left	103.1	F	48.6	D	102.4	F	59.0	E
			Thru	28.7	C	27.6	C	45.6	D	41.1	D
			Right	13.8	B	13.8	B	81.5	F	54.9	D
		NB	Left	43.9	D	47.3	D	131.2	F	66.1	E
			Thru	37.2	D	37.2	D	43.0	D	64.6	E
			Right	82.5	F	59.8	E	33.1	C	35.0	D
		SB	Left	42.1	D	48.6	D	127.6	F	64.6	E
			Thru	31.9	C	32.3	C	42.4	D	61.7	E
			Right	25.3	C	25.6	C	25.1	C	27.8	C
		Overall		**42.4**	**D**	**38.2**	**D**	**63.0**	**E**	**51.8**	**D**

Build Conditions

Site Trip Generation

The number of AM and PM peak hour vehicle trips that will be generated by the proposed development will be forecast based on the rates and equations published by ITE in *Trip Generation, 11th Edition*. The proposed development plans include a 2,950 SF coffee-shop with drive-through, 2,700 SF sit-down restaurant, 4,025 SF of general retail space, and automated car wash.

The proposed uses were matched to the ITE land use category that most closely matches their proposed operation. For this study, ITE *Land Use #822, Strip Retail Plaza* was utilized for the retail space, *Land Use #932, High-Turnover Sit-Down Restaurant,* was utilized for the proposed restaurant, *Land Use #937, Coffee-Shop with Drive-Through* was utilized for the coffee-shop, and *Land Use #948, Automated Car Wash* was utilized for the carwash. For Land Use #948, trip generation data is not available during the AM peak hour as most carwashes are closed during this time frame or generate small amounts of traffic; however, to provide a conservative approach, AM peak hour trips were forecast to be 25% of the PM peak hour trips for this study.

As is typical of most retail and restaurant uses, a portion of the site-generated trips are already present on the adjacent road network and are interrupted to visit the site. These trips are known as 'pass-by' trips, which create turning movements at the site driveways, but do not increase traffic volumes on the adjacent road network or off-site intersections. Similar to pass-by trips, a portion of the site-generated trips are vehicles that are traveling on the adjacent roadway that alter their direction of travel to visit the site then return to their original route. These trips are known as "diverted-link" trips. For the purposes of this study, pass-by trips were assumed to follow existing traffic patterns along Latson Road. Diverted link trips were applied to turning movements patterns at the intersection of Grand River Avenue & Latson Road.

ITE publishes pass-by rates for various commercial land uses in the *Trip Generation Handbook*. For Land Use #822 and #932, 34% and 43% of trips are expected to be pass-by in nature. ITE does not publish pass-by data for Land Use #937 or #948. For Land Use #937, 50% of trips were assumed to be pass-by in nature consistent with other fast-food with drive-through uses. For Land Use #948, 35% of trips were assumed to be pass-by in nature based on data for drive-in banks and other retail uses. The diverted-link trips are assumed to represent a portion of the pass-by trips, not an additional reduction to overall site trip generation. These trips are already present at the intersection of Grand River Avenue & Latson Road but divert to visit the site. The number of pass-by and diverted-link vehicle trips was subtracted from the total number of site-generated trips to determine the number of new peak hour trips for the overall development. The resultant trip generation forecast for the proposed development is shown in **Table 6**.

Table 6: Site Trip Generation

Land Use	ITE Code	Amount	Units	ADT	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Strip Retail Plaza	822	4,025	SF	400	9	6	15	21	20	41
		Pass-By (34% PM)		*136*	*0*	*0*	*0*	*7*	*7*	*14*
		New Trips		264	9	6	15	14	13	27
High-Turnover (Sit-Down) Restaurant	932	2,700	SF	289	14	12	26	15	9	24
		Pass-By (43%)		*124*	*5*	*5*	*10*	*5*	*5*	*10*
		New Trips		165	9	7	16	10	4	14
Coffee Shop with Drive-Through	937	2,950	SF	1,574	129	124	253	58	57	115
		Pass-By (50%)		*787*	*63*	*63*	*126*	*29*	*29*	*58*
		New Trips		787	66	61	127	29	28	57
Automated Car Wash	948	1	Tunnel	0	10	10	20	39	39	78
		Pass-By (35%)		*0*	*3*	*3*	*6*	*13*	*13*	*26*
		New Trips		0	7	7	14	26	26	52
Total		**Total Trips**		**2,263**	**162**	**152**	**314**	**133**	**125**	**258**
		Pass-By Trips		***1,047***	***71***	***71***	***142***	***54***	***54***	***108***
		New Trips		**1,216**	**91**	**81**	**172**	**79**	**71**	**150**

Trip Distribution

The vehicle trips that would be generated by the proposed development were assigned to the study road network based on existing peak hour traffic patterns, local population densities, and ITE methodologies. These methods indicate that pass-by trips enter and exit the development in their original direction of travel and new trips will return to their direction of origin. Peak hour traffic volumes on Grand River Avenue and Latson Road were reviewed together with local population densities to determine the origin and destinations of new site-generated traffic. Pass-by traffic was assumed to follow existing traffic patterns along Latson Road and at the intersection of Grand River Avenue & Latson Road. The resultant site trip distribution is summarized in **Table 7**.

Site-generated trips were assigned to the site driveways based on these trip distribution percentages and the proposed site access plan. The north site driveway is expected to service both the carwash and retail uses while the south site driveway is expected to primarily service the retail /

restaurant uses. Therefore, all retail / restaurant traffic approaching from the south was assumed to utilize the south site driveway while the majority (75%) of retail / restaurant traffic approaching from the north was assumed to utilize the south site driveway. All car wash traffic was assumed to utilize the north site driveway. Traffic was assumed to exit via the same driveway that was entered.

Table 7: Site Trip Distribution

NEW TRIPS			PASS-BY / DIVERTED TRIPS				
To/From	Via	AM/PM	From	To	Via	AM	PM
North	Latson Road	25%	South	North	Latson Road	19%	22%
South	Latson Road	20%	North	South	Latson Road	22%	22%
East	Grand River Avenue	25%	North	East	Grand River Avenue	19%	7%
West	Grand River Avenue	30%	North	West	Grand River / Latson	4%	2%
			West	North	Grand River / Latson	2%	12%
			West	East	Grand River / Latson	17%	17%
			East	North	Grand River / Latson	4%	5%
			East	West	Grand River / Latson	13%	13%
Total		**100%**	**Total**			**100%**	**100%**

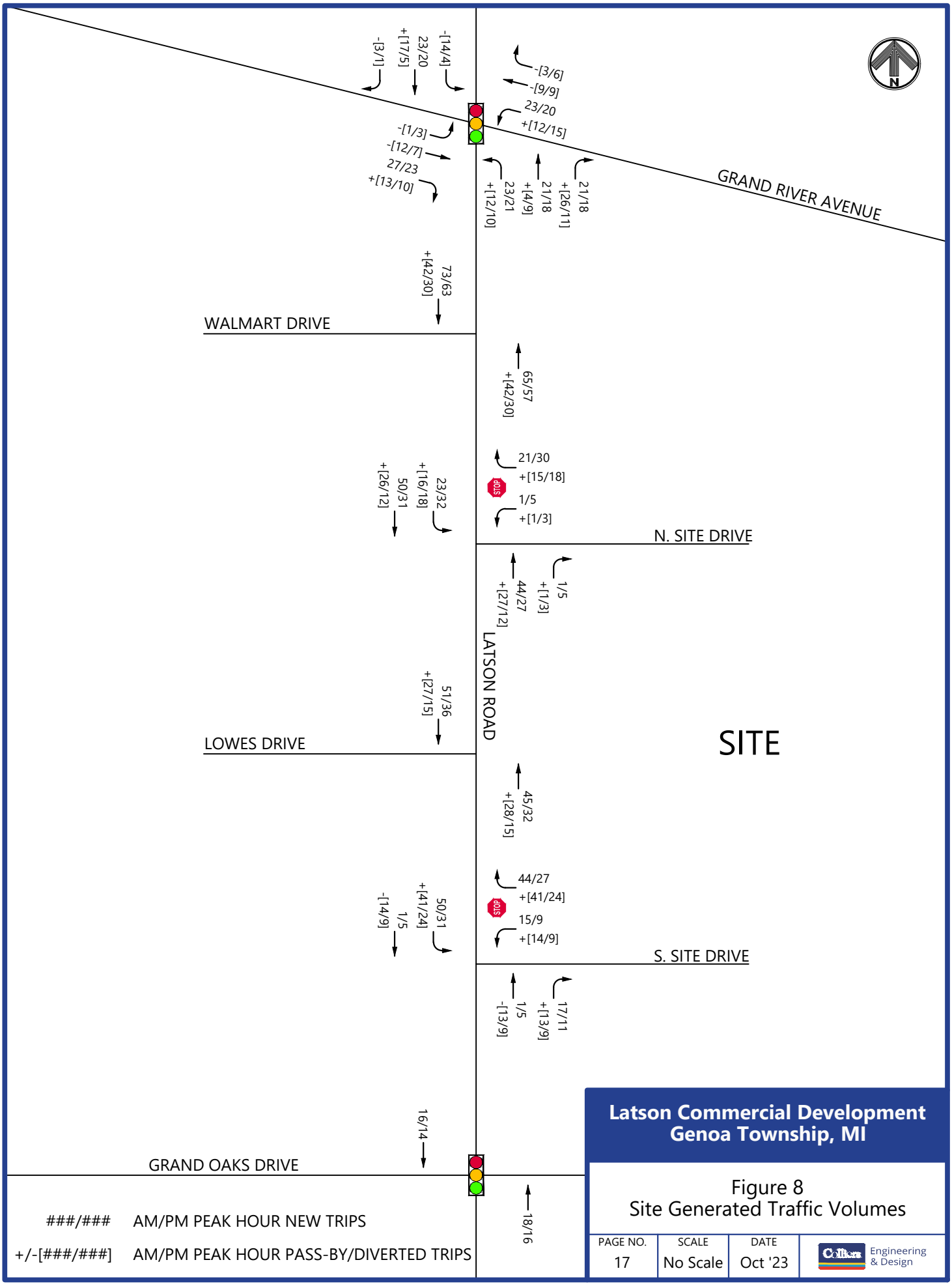
The site-generated vehicle trips were assigned to the study network as shown on **Figure 8**. These trips were added to the 2025 no-build traffic volumes shown on **Figure 7** to calculate the future build traffic volumes shown on **Figure 9**.

Build Conditions

Future build peak hour vehicle delays and LOS with the proposed development were calculated based on existing lane configurations and traffic control shown on **Figure 5**, build traffic volumes shown on **Figure 9**, and HCM methodologies. SimTraffic simulations were also utilized to evaluate traffic flow and vehicle queues throughout the study network. Additionally, per conversations with LCRC, in order to accommodate left-turns at the proposed N. site driveway, the left-turn movement at the Wal-Mart driveway was assumed to be restricted with all existing left-turns reassigned to utilize the Lowes site driveway. The build conditions results are included in Appendix D and summarized in **Table 8**.

The results of the build conditions analysis indicate that the proposed development will not have a significant impact on the adjacent road network. All approaches and movements at the signalized intersections will continue to operate in a manner similar to no-build conditions and LOS for all movements will remain unchanged with the exception of the SB through movement and NB right-turn movements at the intersection of Grand River Avenue & Latson Road which will be reduced from a LOS C to LOS D during the AM and PM peak hours, respectively; however, the delay increase for these movements is less than five seconds per vehicle.

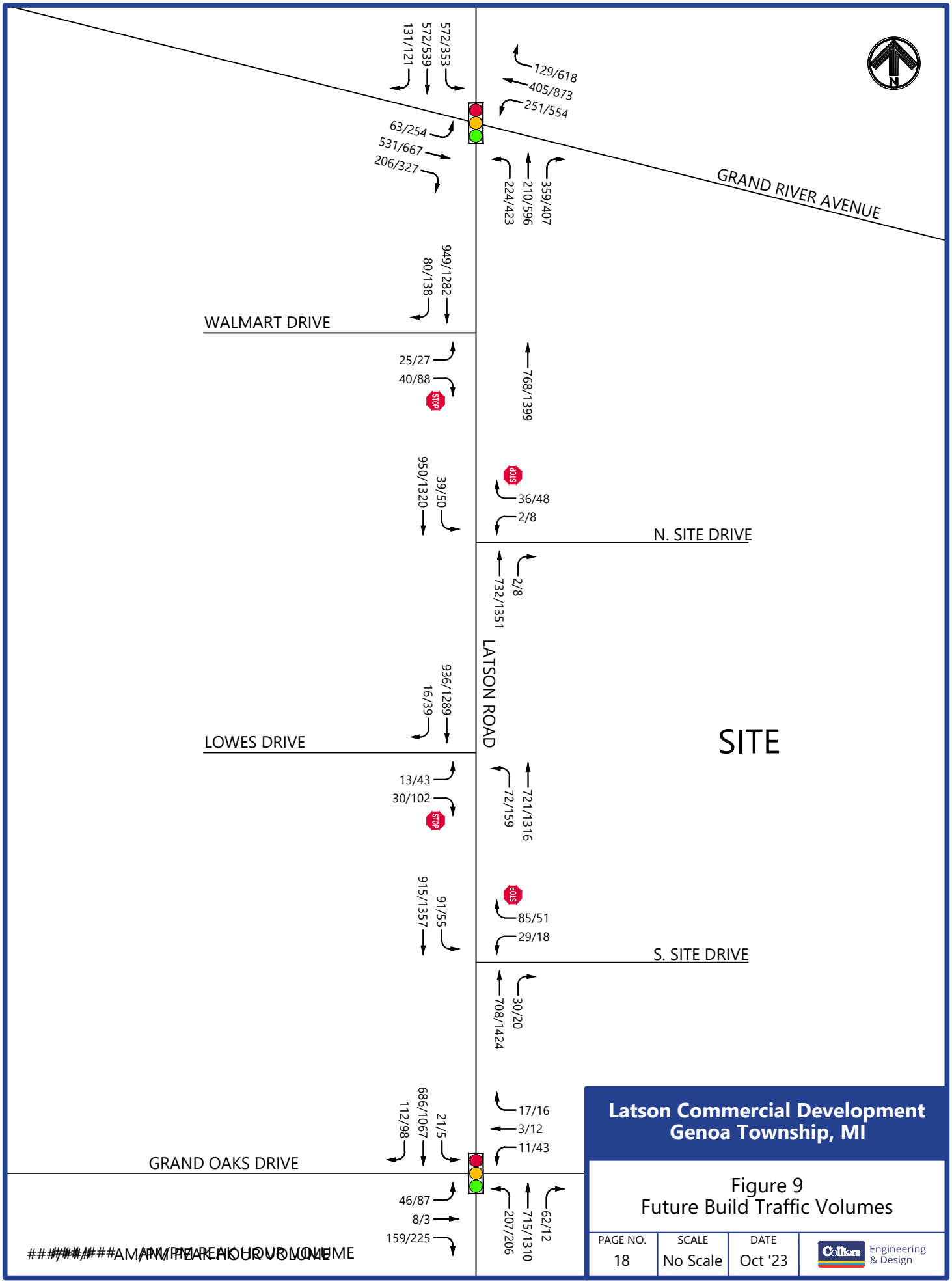
Most approaches will continue to operate acceptably at a LOS D or better during both peak hours. The signalized intersection of Grand River Avenue & Latson Road will continue to worsen with the addition of site-generated traffic if those movements operating at a LOS E or F are not improved under no-build conditions.



Latson Commercial Development
Genoa Township, MI

Figure 8
Site Generated Traffic Volumes

PAGE NO.	SCALE	DATE	
17	No Scale	Oct '23	Engineering & Design



Latson Commercial Development
Genoa Township, MI

Figure 9
Future Build Traffic Volumes

PAGE NO.	SCALE	DATE	
18	No Scale	Oct '23	Colliers Engineering & Design

Table 8: Build Traffic Conditions

Intersection	Control	Approach	Movement	AM Peak Hour				PM Peak Hour			
				No-Build		Build		No-Build		Build	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Latson Road & Grand River Avenue (I-96 BL)	Signal	EB	Left	43.5	D	43.5	D	44.9	D	44.8	D
			Thru	32.8	C	32.1	C	45.5	D	44.7	D
			Right	23.0	C	22.9	C	29.8	C	32.1	C
		WB	Left	103.1	F	157.5	F	102.4	F	128.7	F
			Thru	28.7	C	28.2	C	45.6	D	44.2	D
			Right	13.8	B	13.7	B	81.5	F	77.8	F
		NB	Left	43.9	D	43.1	D	131.2	F	164.9	F
			Thru	37.2	D	38.0	D	43.0	D	45.3	D
			Right	82.5	F	128.6	F	33.1	C	35.7	D
		SB	Left	42.1	D	41.8	D	127.6	F	122.7	F
			Thru	31.9	C	35.0	D	42.4	D	44.5	D
			Right	25.3	C	26.6	C	25.1	C	25.1	C
		Overall		**42.4**	**D**	**52.3**	**D**	**63.0**	**E**	**67.6**	**E**
Latson Road & Grand Oaks Drive / Ascension Medical Drive	Signal	EB	Left	30.7	C	30.7	C	27.2	C	27.2	C
			Thru/Right	37.8	D	37.8	D	33.1	C	33.1	C
		WB	Left	37.9	D	37.9	D	37.1	D	37.1	D
			Thru/Right	28.8	C	28.8	C	24.3	C	24.3	C
		NB	Left	9.7	A	9.8	A	17.4	B	17.7	B
			Thru/Right	6.2	A	6.3	A	12.0	B	12.1	B
		SB	Left	10.3	B	10.4	B	15.5	B	15.7	B
			Thru/Right	14.5	B	14.6	B	24.1	C	24.4	C
		Overall		**13.6**	**B**	**13.6**	**B**	**19.6**	**B**	**19.8**	**B**
Latson Road & Wal-Mart Drive	STOP (Minor)	EB	Left/Right	19.4	C	21.5	C	30.2	D	33.1	D
		NB	Left	11.1	B	Prohibited		12.9	B	Prohibited	
			Thru	Free		Free		Free		Free	
		SB	Thru/Right	Free		Free		Free		Free	
Latson Road & Lowes Drive	STOP (Minor)	EB	Left/Right	17.5	C	19.8	C	60.0	F	81.2	F
		NB	Left	11.0	B	12.0	B	14.6	B	16.3	C
			Thru	Free		Free		Free		Free	
		SB	Thru/Right	Free		Free		Free		Free	
Latson Road & N. Site Drive	STOP (Minor)	WB	Left/Right			12.6	B			20.8	C
		NB	Thru/Right	Free		Free		Free		Free	
		SB	Left			10.1	B			13.7	B
			Thru	Free		Free		Free		Free	
Latson Road & S. Site Drive	STOP (Minor)	WB	Left/Right			36.7	E			153.2	F
		NB	Thru/Right	Free		Free		Free		Free	
		SB	Left			10.4	B			14.3	B
			Thru	Free		Free		Free		Free	

At the proposed site driveways, all approaches and movements will operate acceptably with the exception of the STOP controlled S. site driveway approach with Latson Road which will operate at a LOS E and LOS F during the AM and PM peak hours, respectively.

Review of peak hour simulations also indicate future build traffic operations which are similar to no-build conditions. Acceptable traffic operations are continued to be observed during the AM peak hour with no significant vehicle queues. Long vehicle queues and cycle failures are continued to be observed at the intersection of Grand River Avenue & Latson Road during the PM peak hour with queues for the NB, WB, and SB left-turn movements and WB right-turn movement exceeding available storage length.

Vehicle queue lengths were also calculated and evaluated with respect to the proposed site driveways. On Latson Road, the NB left turn queue length from the Lowes Driveway is critical to the ingress left turn operation of the S. site driveway as both movements will utilize the center left turn lane. Additionally, the NB approach queue from the signalized intersection of Grand River Avenue & Latson Road is critical to ingress and egress operation from the proposed N. Site Drive. The queue length calculations based on SimTraffic simulations are shown in **Table 9**.

Table 9: Build Traffic Conditions Vehicle Queues

Intersection	Control	Approach	Movement	Available Storage	AM Peak		PM Peak	
					Avg	95th	Avg	95th
Grand River Avenue & Latson Road	Signal	NB	Left	500 ft	51	96	490	759
			Through		56	98	137	208
Lowes Drive	Yield	NB	Left	150 ft	30	61	56	86
S. Site Drive		SB	Left		29	57	26	57

The results of the queue evaluation indicate that there will be adequate distance in the center left turn lane on Latson Road to store queued vehicles and facilitate ingress left turns. During the AM peak hour, queues from the intersection of Grand River Avenue & Latson Road will not block the N. Site Driveway; however, the NB left-turn queue will block the intersection during portions of the PM peak hour.

Build Improvements

In order to improve traffic operations in the build conditions, the mitigation measures previously identified under no-build conditions were investigated. The results of the build conditions analysis with these improvements are summarized in **Table 10** below and indicate improved operations at the intersection of Grand River Avenue & Latson Road; however, several approaches and movements will continue to operate at a LOS E or F during the peak hours. As previously discussed, this intersection is considered to be built out, and additional physical capacity improvements (i.e., additional lanes) are constrained by available right-of-way. Therefore, further geometric improvements at the intersection to mitigate all movements to a LOS D or better are considered to be regional and beyond the scope and context of this study.

Review of network simulations also indicates acceptable traffic operations at all study intersections with the exception of the Grand River Avenue & Latson Road intersection where long vehicle queues

are continued to be observed for the WB right-turn movement during portions of the PM peak hour. However, queues along the NB approach are reduced and no longer block the proposed N. Site Drive. Additionally, the simulations indicate that the traffic signals at Grand River Avenue and Grand Oaks Drive provide notable gaps in the traffic stream, allowing egress traffic to enter Latson Road. As a result, average queue lengths for the STOP controlled site drive approaches are calculated to be 68 feet (2-3 vehicles) or less with 95th percentile queue lengths of 106 feet (4 vehicles) or less. This condition is consistent with other STOP controlled full-access driveways on this segment of Latson Road, such as the Lowes driveways.

Table 10: Build Traffic Conditions with Improvements

Intersection	Control	Approach	Movement	AM Peak Hour				PM Peak Hour			
				No-Build		Build IMP		No-Build		Build IMP	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Latson Road & Grand River Avenue (I-96 BL)	Signal	EB	Left	43.5	D	43.5	D	44.9	D	44.8	D
			Thru	32.8	C	34.9	C	45.5	D	50.4	D
			Right	23.0	C	25.7	C	29.8	C	30.5	C
		WB	Left	103.1	F	51.7	D	102.4	F	73.3	E
			Thru	28.7	C	27.2	C	45.6	D	40.2	D
			Right	13.8	B	13.7	B	81.5	F	52.5	D
		NB	Left	43.9	D	48.9	D	131.2	F	82.8	F
			Thru	37.2	D	38.0	D	43.0	D	74.7	E
			Right	82.5	F	76.1	E	33.1	C	38.1	D
		SB	Left	42.1	D	47.7	D	127.6	F	62.7	E
			Thru	31.9	C	35.0	D	42.4	D	70.9	E
			Right	25.3	C	26.6	C	25.1	C	27.8	C
		Overall		**42.4**	**D**	**40.9**	**D**	**63.0**	**E**	**55.9**	**E**

Conclusions

The Conclusions related to this Traffic Impact Study and relative analyses are as follows:

1. Existing weekday AM (7:00 to 9:00) and PM (4:00 to 6:00) peak hour turning movement counts were collected by CED at the study intersections. At the signalized intersections of Latson Road with Grand River Avenue and Grand Oaks Drive, counts were collected on Wednesday, November 13th, 2019. At the unsignalized Lowes and Wal-Mart driveways with Latson Road, counts were collected on Thursday, August 10th, 2023.
2. All study intersection approaches and movements currently operate acceptably at a LOS D or better during both peak hours with the exception of the following:
    a. The NB right-turn movement at the signalized intersection of Grand River Avenue & Latson Road currently operates at a LOS E during the AM peak hour. During the PM peak hour, the NB left-turn movement operates at a LOS E while the WB left, and right-turn movement and SB left-turn movement operate at a LOS F.
    b. The STOP controlled Lowes Drive approach which currently operates at a LOS E during the PM peak hour.
3. Ambient traffic growth of 0.75% was applied to establish 2025 no-build traffic volumes without the proposed development. Several background developments were also identified in the study area and included in this study.
4. No-build conditions analyses indicate that several movements at the intersection of Grand River Avenue & Latson Road will experience degraded operations.
5. Future build conditions analyses indicate that most study intersection approaches and movements will continue to operate acceptably; however, there are several movements with undesirable or failing conditions at the intersection of Grand River Avenue & Latson Road that are expected to worsen in the future if those movements operating at a LOS E or F are not improved under no-build conditions.
6. With the improvements outlined below, all study network intersections and site driveways will operate acceptably, or in a manner similar or improved compared to no-build conditions during the peak hours.

Based on the results of this study, the following should be considered to provide acceptable traffic operations with the proposed development project:

1. Optimize signal timings at the intersection of Grand River Avenue & Latson Road.

SITE PLAN
FOR
SOUTH LATSON COMMERCIAL DEVELOPMENT
PART OF NW QUARTER, SECTION 4 & 9
GENOA CHARTER TOWNSHIP, LIVINGSTON COUNTY, MI

PROPERTY DESCRIPTION:

PROPERTY DESCRIPTION PER KEM-TEC PROJECT #21-03542 DATE 11-24-21 PARCEL #4711-09-100-004

LAND SITUATED IN THE TOWNSHIP OF GENOA, COUNTY OF LIVINGSTON IN THE STATE OF MICHIGAN AND IS DESCRIBED AS FOLLOWS:

A PART OF THE NORTHWEST 1/4 OF THE NORTHWEST 1/4 OF SECTION 9, TOWN 2 NORTH, RANGE 5 EAST, MICHIGAN, DESCRIBED AS: BEGINNING 632 FEET SOUTH OF THE NORTHWEST CORNER OF THE NORTHWEST 1/4, THENCE EAST 223.00 FEET; THENCE NORTH 97.67 FEET; THENCE WEST 223.00 FEET; THENCE SOUTH 97.67 FEET TO THE POINT OF BEGINNING.

PROPERTY DESCRIPTION PER METRO CONSULTING ASSOCIATES PROJECT #1037-17-8480 DATED 01-19-18 PARCEL #4711-04-300-017

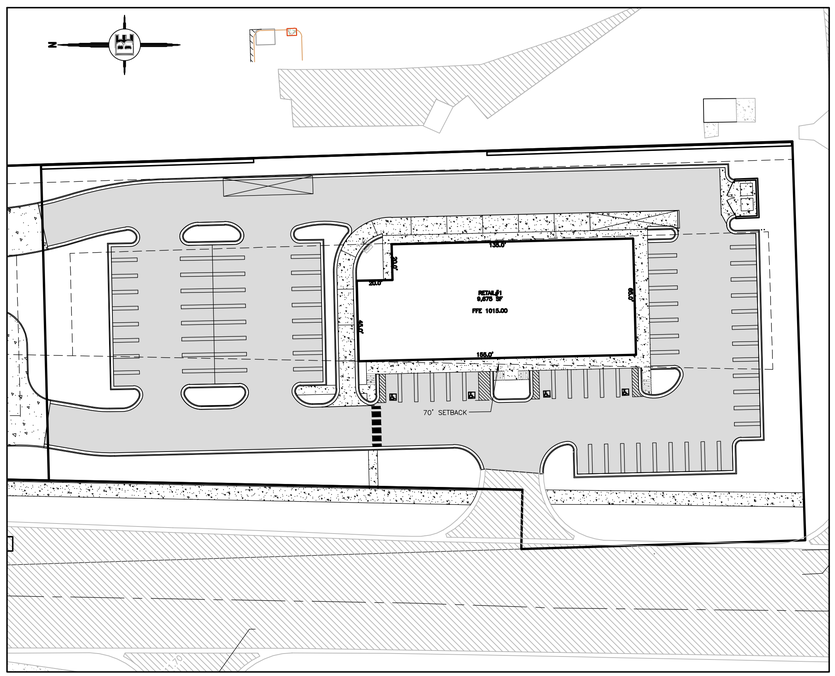
Commencing at the Southwest Corner of Section 4, Town 2 North, Range 5 East, Genoa Township, Livingston County, Michigan, said corner being N01°46'11"W 19.43 feet from a point referenced in Quit Claim Deed dated January 29, 1957, recorded April 4, 1961 in Liber 391, Page 382, Livingston County Records; thence N87°18'40"E 56.81 feet along the North line of said Section 9 and the South line of said Section 4, as established and approved by the Livingston County Remonumentation Peer Group, dated June 6, 2002 and recorded in LSCA 171.0n, Livingston County Records to the POINT OF BEGINNING; thence 159.36 feet along the arc of a 10,060.00 foot radius non-tangential circular curve to the left, having a central angle of 00°54'27" having a chord which bears N00°15'46"W 159.36 feet along the East line of MDOT Right-of-Way as recorded in Instrument # 2011R-023812, Livingston County Records; thence N89°33'52"E 150.45 feet along the South line of Parcel 3 as described in a Warranty Deed recorded June 6, 2016, in Instrument # 2016R-019284 and the North line of the Consumers Power Company land per Warranty Deed recorded in 539, Page 13, Livingston County Records; thence S01°15'25"E 125.00 feet along said Consumers Power Company land and parallel with the West line of said Section 4; thence the following four (4) courses along the North, East and South line of a Quit-Claim Deed to Consumers Power Company, recorded in Liber 391, Page 382, Livingston County Records: (1) N88°33'52"E 12.94 feet (recorded as 13.00 feet), (2) S01°14'15"E 30.69 feet to the South line of said Section 4, (3) S01°46'21"E 557.91 feet and (4) S66°08'19"W 223.00 feet along the North line of the South 97.67 feet as stated in Warranty Deed recorded in Liber 232, Page 199, Livingston County Records; thence N01°46'11"W 61.11 feet along the West line of said Section 9 and within the Right-of-Way of Latson Road (variable width); thence S88°52'35"E 33.10 feet along the South line of MDOT Right-of-Way as recorded in Instrument # 2011R-023812; thence the following two (2) courses along said Right-of-Way: (1) N01°07'25"E 333.02 feet and (2) 163.72 feet along the arc of a 10,060.00 foot radius circular curve to the left, with a central angle of 00°55'57", having a chord which bears N00°39'26"E 163.71 feet to the POINT OF BEGINNING. Containing 2.69 acres of land, more or less. Being part of the SW. 1/4 of the SW. 1/4 of Section 4 and part of the NW. 1/4 of Section 9, Town 2 North, Range 5 East, Genoa Township, Livingston County, Michigan. Subject to the right of the Public over the West 33.00 feet thereof, as occupied by Latson Road (Variable Width), being subject to any other Easement and restrictions of record, if any.

RESULTANT PARCEL

PROPOSED PARCEL 2 (SOUTH):

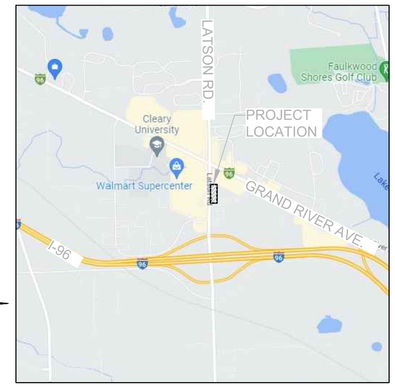
Part of the Northwest 1/4 of Section 9, T2N-R5E, Genoa Township, Livingston County, Michigan, more particularly described as follows: Commencing at the Northwest Corner of Section 9, also being the Southwest 1/4 of Section 4, said corner being North 01 degree 46 minutes 11 seconds West, 19.43 feet from a point referenced in Quit Claim Deed, dated January 29, 1957, recorded April 4, 1961 in Liber 391, Page 382, Livingston County Records; thence along the North line of Section 9 and the South line of Section 4, N 87°18'40" E, 56.81 feet; thence along the East line of MDOT Right-of-Way for Latson Road, as recorded in Instrument #2011R-023812, Livingston County Records, the following two (2) courses: 1) Southerly along an arc left, having a length of 163.71 feet, a radius of 10,091.50 feet, a central angle of 00°55'46", and a long chord which bears S 00°39'23" W, 163.71 feet; thence S 01°07'25" W, 68.33 feet, to the POINT OF BEGINNING of the Parcel to be described; thence N 88°33'38" E, 176.57 feet; thence S 01°46'21" E, 322.42 feet; thence S 01°46'11" E, 97.67 feet; thence S 88°08'19" W, 223.00 feet; thence along the West line of said Section 9 and within the Right-of-Way of Latson Road (Variable Width Right of Way), N 01°46'11" W, 158.78 feet; thence along the South line of MDOT Right-of-Way for Latson Road, as recorded in Instrument #2011R-023812, Livingston County Records, S 88°52'35" E, 33.10 feet; thence along the East line of MDOT Right-of-Way for Latson Road, as recorded in Instrument #2011R-023812, Livingston County Records, the following two (2) courses: 1) N 01°07'25" E, 264.69 feet, to the POINT OF BEGINNING, containing 1.91 acres, more or less, and subject to the rights of the public over the existing Latson Road. Also subject to any other easements or restrictions of record.

Bearings are based on Michigan State Plane Coordinate System, South Zone and legal description per Chicago Title Insurance Company, File No.: 21040145- C, Policy No.: 7430600-224063018, dated 6-4-21:



OVERALL SITE MAP

NO SCALE



LOCATION MAP

NO SCALE

SHEET INDEX

SHEET NO.	DESCRIPTION
1	COVER SHEET
2	GENERAL NOTES & LEGEND
3	EXISTING CONDITIONS, DEMOLITION, NATURAL FEATURES PLAN
4	OVERALL SITE PLAN
5	SITE PLAN
6	GRADING & DRAINAGE PLAN
7	SOIL EROSION & SEDIMENTATION CONTROL PLAN
8	UTILITY PLAN
9	LANDSCAPE PLAN
10	CONSTRUCTION DETAILS
11	BASIN DETAILS
12	UNDERGROUND DETENTION DETAILS
13-16	MHOG DETAILS
	PLANS BY OTHERS
1	PHOTOMETRIC PLAN
A.100	FLOOR PLAN
A.200	BUILDING ELEVATION

PERMITS & APPROVALS

AGENCY	DATE SUBMITTED	DATE APPROVED
· TOWNSHIP ENGINEERING APPROVAL	–	–
· LCRC	–	–
· LCDC SESC	–	–
· EGLE – ACT 399	–	–

LIGHTING PREPARED BY:
GASSER BUSH ASSOCIATES
30984 INDUSTRIAL RD
LIVONIA, MI 48150
QUOTES@GASSERBUSH.COM
PHONE: 734-266-6705

OWNER:
1015 LATSON ROAD LLC
29592 BECK RD
WIXOM, MI 48393
CONTACT: KEVIN BAHNAM
PHONE: 248.767.5337
EMAIL: KBAHNAM@USA2GOQUICKSTORES.COM

PREPARED BY:

BEBOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670
CONTACT: SCOTT TOUSIGNANT, P.E.
EMAIL: SCOTTT@BOSSENG.COM

STATE OF MICHIGAN – LICENSED – SCOTT T. TOUSIGNANT – ENGINEER – No. 6201044872 – PROFESSIONAL ENGINEER

INDEMNIFICATION STATEMENT

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

FOR SITE PLAN APPROVAL ONLY!
NOT FOR CONSTRUCTION

NO	BY	CK	REVISION	DATE	JOB NO: 21-519
1	ST	ST	PER TOWNSHIP COMMENTS	10-25-23	ISSUE DATE: 10/04/23

1

GENERAL NOTES

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

INDEMNIFICATION STATEMENT

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

CONTRACTOR TO FOLLOW MANUFACTURER SPECS/RECOMMENDATIONS THAT SUPERCEDE PLANS

GENERAL GRADING & SESC NOTES

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

GENERAL LANDSCAPE NOTES

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

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

    SEED MIXTURE SHALL BE AS FOLLOWS:

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

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

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

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

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

GENERAL UTILITY NOTES

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

GENERAL STORM NOTES

1. ALL STORM PIPE LENGTHS ARE SHOWN FROM C/L TO C/L OF STRUCTURE OR FROM C/L OF STRUCTURE TO DISCHARGE END OF FLARED END SECTION.
2. STORM PIPE MATERIALS SHALL BE AS FOLLOWS:
   2.1. RCP(REINFORCED CONCRETE PIPE): SHALL MEET THE REQUIREMENTS OF ASTM C76 WITH MODIFIED GROOVED TONGUE AND RUBBER GASKETS MEETING THE REQUIREMENTS OF ASTM C443. RCP TO BE EITHER CLASS IV OR V AS CALLED OUT ON THE PLANS.
   2.2. HDPE(HIGH DENSITY POLYETHYLENE): SHALL MEET THE REQUIREMENTS OF ASTM F2648.
   2.3. PP(POLYPROPYLENE): SHALL MEET THE REQUIREMENTS OF ASTM F2881.
   2.4. PVC(POLYVINYL CHLORIDE): SHALL MEET THE REQUIREMENTS OF ASTM D3034.
3. STORM PIPE JOINTS SHALL MEET THE REQUIREMENTS OF ASTM D3212. HDPE AND PP PIPE GASKETS SHALL MEET THE REQUIREMENTS OF ASTM F477.
4. ALL STORM PIPE TO HAVE WATERTIGHT PREMIUM JOINTS, UNLESS OTHERWISE NOTED ON THE PLANS.
5. STORM DRAINAGE STRUCTURES SHALL BE FURNISHED WITH STEPS WHICH SHALL BE STEEL ENCASED WITH POLYPROPYLENE PLASTIC OR EQUIVALENT. STEPS SHALL BE SET AT 16" CENTER TO CENTER.
6. ALL FLARED END SECTIONS 15" AND LARGER SHALL BE FURNISHED WITH AN ANIMAL GRATE.
7. FLARED END SECTIONS DISCHARGING STORM WATER SHALL RECEIVE A MINIMUM OF 10 SQ YDS OF PLAIN COBBLESTONE RIP RAP WITH A MINIMUM STONE SIZE OF 6" AND SHALL BE PLACED ON A GEOTEXTILE FABRIC WRAP.
8. ALL CATCH BASINS WITHIN THE ROADWAY SHALL INCLUDE INSTALLATION OF 6" DIAMETER PERFORATED PIPE SUBDRAIN.
9. STORM DRAINAGE STRUCTURE COVERS SHALL BE OF THE FOLLOWING (OR APPROVED EQUAL):

TYPE	LOCATIION	FRAME	COVER/INLET
'MH'	ALL	1040	SANITARY–SOLID SELF–SEALING STORM–VENTED
'CB'	TYPE A CURB	7000–T1–M1	FLAT GRATE WITH VERT. OPEN BACK
'CB'	TYPE B CURB	7065–T1–M1	FLAT GRATE WITH ROLL BACK
'CB'	PAVEMENT/SHOULDER	1020–M1	FLAT GRATE
'CB'	OPEN AREA	1020–01	BEEHIVE GRATE 4" HIGH
'CB'	GUTTER	5100	CONCAVE INLET

GENERAL SANITARY NOTES

1. ALL SANITARY PIPE LENGTHS ARE SHOWN FROM C/L OF STRUCTURE TO C/L OF STRUCTURE.
2. SANITARY PIPE MATERIALS SHALL BE AS FOLLOWS:
   2.1. PVC SDR–26 (SANITARY MAIN)
   2.2. PVC SDR–23.5 (SANITARY LEADS)
   2.3. HDPE DR–11 (SANITARY FORCEMAIN)
3. ALL PVC SDR SANITARY SEWER PIPE SHALL MEET THE REQUIREMENTS OF ASTM D3034 AND D2241. PVC SCHD 40 PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785. GASKET JOINTS FOR SANITARY PIPE SHALL MEET THE REQUIREMENTS OF ASTM D3139 AND D3212.
4. SANITARY STRUCTURES SHALL BE FURNISHED WITH STEPS WHICH SHALL BE STEEL ENCASED WITH POLYPROPYLENE PLASTIC OR EQUIVALENT. STEPS SHALL BE SET AT 16" CENTER TO CENTER.
5. ALL NEW MANHOLES SHALL BE MINIMUM 4' DIAMETER, PRECAST MANHOLE SECTIONS AND AN ECCENTRIC CONE. PRECAST MANHOLE JOINTS SHALL BE INSTALLED WITH BUTYL ROPE MEETING THE REQUIREMENTS OF ASTM C990.
6. MANHOLES SHALL BE CONSTRUCTED WITH FLOW CHANNEL WALLS THAT ARE FORMER, AT A MINIMUM, TO THE SPRINGLINE OF THE PIPE.
7. ALL NEW MANHOLES SHALL HAVE AN APPROVED FLEXIBLE, WATERTIGHT SEALS WHERE PIPES PASS THROUGH MANHOLE WALLS.
8. WHEREVER AN EXISTING MANHOLE IS TO BE TAPPED, THE STRUCTURE SHALL BE CORED AND A KOR–N–SEAL BOOT UTILIZED FOR THE PIPE CONNECTION.
9. ALL MANHOLES SHALL BE PROVIDED WITH WATERTIGHT COVERS. COVERS TO BE EJCO 1040 TYPE 'A' SOLID COVER.
10. A MAXIMUM OF 12" OF GRADE ADJUSTMENT RINGS SHALL BE USED TO ADJUST THE FRAME ELEVATION. BUTYL ROPE SHALL BE USED BETWEEN EACH ADJUSTMENT RING.
11. SANITARY SEWER LATERALS SHALL HAVE A MINIMUM SLOPE OF 1.0%.
12. CLEANOUTS SHALL BE INSTALLED EVERY 100', AT ALL BENDS AND STUBS.
13. PUBLIC SANITARY SEWER SHALL BE CENTERED WITHIN A 20 FOOT WIDE SANITARY SEWER EASEMENT.

GENERAL WATERMAIN NOTES

1. WATERMAIN PIPE MATERIALS SHALL BE AS FOLLOWS:
   1.1. D.I.P. CL.52 (WATERMAIN)
   1.2. TYPE 'K' COPPER (WATER LATERAL – MAIN TO CURB STOP)
   1.3. HDPE DR–9 (WATER LATERAL – CURB STOP TO STUB)
2. WATERMAIN FITTINGS SHALL BE OF DUCTILE IRON WITH CEMENT MORTAR LINING AND MECHANICAL JOINTS CONFORMING TO AWWA C110.
3. WATERMAINS SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C651. BAC–T SAMPLES SHALL BE TAKEN IN ACCORDANCE WITH R235.11110 OF THE ADMINISTRATIVE RULES PROMULGATED UNDER MICHIGAN SAFE DRINKING WATER ACT, 1976 PA 399, AS AMENDED.
4. ALLOWABLE LEAKAGE OR HYDROSTATIC PRESSURE TESTING SHALL BE IN ACCORDANCE WITH AWWA C600 AND C605.
5. MAXIMUM DEFLECTION AT PIPE JOINTS SHALL BE IN ACCORDANCE WITH PIPE MANUFACTURERS CURRENT RECOMMENDATIONS AND AWWA SPECIFICATIONS.
6. A FULL STICK OF PIPE SHALL BE LAID CENTERED AT A PIPE CROSSING IN ORDER TO MAINTAIN THE MAXIMUM SEPARATION OF WATERMAIN JOINT TO THE CROSSING PIPE.
7. WATERMAIN SHALL BE INSTALLED WITH A MINIMUM OF 5.5' OF COVER FROM FINISHED GRADE TO TOP OF PIPE AND NO MORE THAN 8' OF COVER, UNLESS SPECIAL CONDITIONS WARRANT.
8. WATERMAIN VALVES SHALL BE IRON BODY RESILIENT WEDGE GATE VALVES, NON–RISING STEMS, COUNTERCLOCKWISE OPEN, AWWA C509.
9. FIRE HYDRANTS SHALL BE INSTALLED WITH AN AUXILIARY VALVE WITH CAST IRON VALVE BOX. THE HYDRANT PUMPER HOSE CONNECTION SHALL FACE THE ROADWAY.
10. THE BREAKAWAY FLANGE AND ALL BELOW GRADE FITTINGS SHALL HAVE STAINLESS STEEL NUTS AND BOLTS.
11. PUBLIC WATERMAIN SHALL BE CENTERED WITHIN A 25 FOOT WIDE WATERMAIN EASEMENT.

LINES & HATCHES LEGEND

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

LIGHTING LEGEND

PROPOSED (PR)	EXISTING (EX)	
		DOUBLE FIXTURE LIGHT POLE
		SINGLE FIXTURE LIGHT FIXTURE
		WALL MOUNTED LIGHT FIXTURE
		GROUND LIGHT FIXTURE
.0.1		FOOT CANDLES ON SITE
.2.5		FOOT CANDLES OFF SITE
5		FOOT CANDLES CONTOURS
		CANOPY MOUNTED LIGHT FIXTURE

LANDSCAPE LEGEND

- EXISTING CONIFER TREE
- EXISTING DECIDUOUS TREE
- PROPOSED CONIFER TREE
- PROPOSED DECIDUOUS TREE
- PROPOSED TREE PROTECTION
- PROPOSED ORNAMENTAL TREE
- PROPOSED DECIDUOUS SHRUBS
- SOD
- PROPOSED GRASSES & PERENNIALS
- SEED
- PROPOSED LANDSCAPE BOULDER
- MULCH

ABBREVIATIONS

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

SYMBOL LEGEND

- STORM DRAINAGE FLOW
- GUY WIRE
- POWER POLE
- TRANSFORMER PAD
- ELECTRICAL RISER
- U.G. ELECTRIC MARKER
- ELECTRICAL METER
- AIR CONDITIONING UNIT
- TELEPHONE RISER
- U.G. TELEPHONE MARKER
- GAS RISER
- U.G. GAS MARKER
- GAS METER
- CABLE TV RISER
- U.G. CABLE TV MARKER
- MAILBOX
- WELL
- WATER MANHOLE
- GATE VALVE (EXISTING)
- GATE VALVE (PROPOSED)
- HYDRANT (EXISTING)
- HYDRANT (PROPOSED)
- CATCH BASIN (EXISTING)
- YARD CATCH BASIN (EXISTING)
- CATCH BASIN (PROPOSED)
- STORM MANHOLE (EXISTING)
- STORM MANHOLE (PROPOSED)
- END SECTION (EXISTING)
- END SECTION (PROPOSED)
- SANITARY MAN

SANITARY SEWER INVENTORY:

SAN MH1 RIM=1009.24
INV. N=1002.04 (8")
INV. S=1002.14 (8")

SAN MH2 RIM=1011.15
INV. N=1004.05 (8")
INV. S=1004.15 (8")

SAN MH3 RIM=1012.06
INV. N=1005.11 (8")
INV. S=1005.16 (8")

SAN MH4 RIM=1013.91
INV. N=1006.81 (8")
INV. S=1006.91 (8")
INV. E=1008.91 (6")

STORM SEWER INVENTORY:

LT23 RIM=1009.05 M
RIM=1009.35 R
INV. S=1003.27 R (15")

LT22 RIM=1009.36 M
RIM=1009.91 R
INV. S=1002.75 R (18")
INV. N=1002.85 R (15")
INV. E=1006.00 R (12")
INV. N=1006.90 R (12")

LT24A RIM=1009.12 M
RIM=1009.51 R
INV. W=1006.50 (12")

LT24B RIM=1009.64 M
RIM=1009.88 R
INV. S=1007.00 R (12")

LT21 RIM=1011.78 M
RIM=1012.20 R
INV. S=1001.10 R (24")
INV. N=1001.10 R (24")

LT21A RIM=1011.61 M
RIM=1011.90 R
INV. S=1008.20 R (12")

LT20 RIM=1012.23 M
RIM=1012.25 R
INV. S=1000.90 R (24")
INV. N=1000.90 R (24")
INV. E=1007.00 R (12")

LT20A RIM=1011.93 M
RIM=1012.25 R
INV. W=1008.00 R (12")
INV. N=1008.00 R (12")

STORM SEWER INVENTORY:

LT22 RIM=1010.55 M
RIM=1010.87 R
INV. S=1001.55 R (24")
INV. N=1001.65 R (18")
INV. E=1006.78 R (12")
INV. N=1006.90 R (12")

LT22A RIM=1010.48 M
RIM=1010.85 R
INV. W=1007.10 R (12")
INV. N=1007.20 R (12")

LT22B RIM=1010.40 M
RIM=1010.79 R
INV. S=1007.30 R (12")

LT22C RIM=1010.46 M
RIM=1010.83 R
INV. S=1007.00 R (12")

LT19 RIM=1012.86 M
RIM=1013.18 R
INV. S=1000.70 R (24")
INV. N=1000.70 R (24")
INV. E=1008.00 R (12")

LT19A RIM=1012.62 M
RIM=1012.94 R
INV. W=1009.00 R (12")

LT18 RIM=1013.17 M
RIM=1013.50 R
INV. S=1000.00 R (30")
INV. N=1000.50 R (24")
INV. E=1008.50 R (12")

LT18A RIM=1013.07 M
RIM=1013.30 R
INV. W=1009.50 R (12")

GENERAL SURVEY NOTES:

1. BEARINGS WERE ESTABLISHED FROM METRO CONSULTING ASSOCIATES, JOB NO. SG-19193, DATED 01/19/2018.
2. SUBSURFACE UTILITIES NOT LOCATED FOR THIS SURVEY MAY EXIST. IT IS THE RESPONSIBILITY OF THE OWNER OF THE RESPECTIVE UTILITY TO ACCURATELY LOCATE SUCH UTILITIES.
3. EASEMENTS OR RESTRICTIONS OF RECORD NOT DEPICTED ON THIS DRAWING MAY EXIST.
4. ELEVATIONS WERE ESTABLISHED WITH GPS USING OPUS GPS POST-PROCESSING. (NAVD88 DATUM)
5. CONTOURS ARE SHOWN AT 1 FOOT INTERVALS.
6. THE LOCATIONS OF STORM SEWER, SANITARY SEWER & WATERMAIN, AS SHOWN ON THIS DRAWING ARE APPROXIMATE. THE LOCATIONS ARE BASED ON PHYSICAL FIELD LOCATIONS OF STRUCTURES ALONG WITH DRAWINGS SUPPLIED BY MDOT AND MHOG.
7. ALL WORK SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY, THE COUNTY, AND THE STATE OF MICHIGAN.
8. ALLOW THREE WORKING DAYS BEFORE YOU DIG, CALL MISS DIG TOLL FREE 1-800-482-7171.
9. THERE WAS SNOW ON THE GROUND AT THE TIME OF FIELDWORK FOR THIS SURVEY.

SOIL NOTES:

THE PROJECT SITE IS COMPRISED OF THE FOLLOWING SOIL TYPE ACCORDING TO THE USDA NATURAL RESOURCES CONSERVATION SERVICE:

CvraaB -- CONOVER LOAM, 0 TO 4 % SLOPES
MoB -- MIAMI LOAM, 2 TO 6 % SLOPES
Wh -- WASHTENAW SILT LOAM

SITE BENCHMARKS (NAVD88):

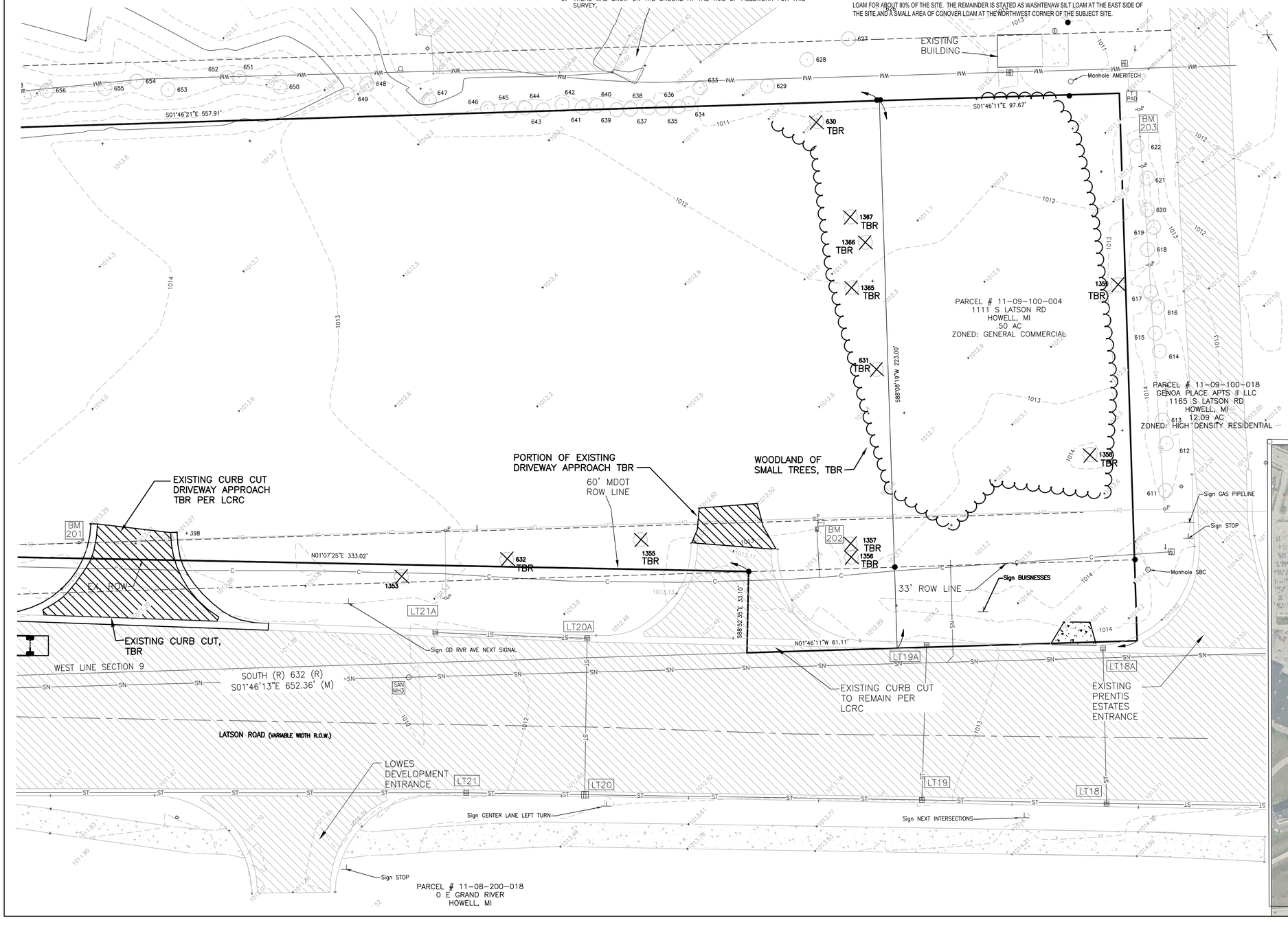
-BM #200 = NAIL/TAG S/S POWER POLE
ELEV.=1013.34
-BM #201 = NAIL/TAG NE/S POWER POLE
ELEV.=1014.28
-BM #202 = NAIL/TAG NE/S POWER POLE
ELEV.=1013.57
-BM #203 = NORTH EAST CORNER TRANS-PAD
ELEV.=1011.58

NATURAL FEATURES NARRATIVE:

NATURAL FEATURES WERE IDENTIFIED DURING AN ON-SITE VISIT TO THE PROPERTY ON SEPTEMBER 28, 2023. SITE IS VACANT AND PRIMARILY CAN BE DESCRIBED AS UNMANICURED TALL GRASS. THE SOUTHERN PORTION OF THE SITE CONTAINS SOME TREES AS INDICATED BY THE PLAN BELOW AND TREE LIST ON THIS SHEET.

ENTIRE SITE IS RELATIVELY FLAT, WITH A LOWER ELEVATION AT LATSON ROAD. SITE SLOPES WESTERLY TO LATSON ROAD AT SLOPES OF 2-4%. SOILS ARE ALSO UNIFORM PER USDA NRCS SOILS DATA CONSISTING OF MIAMI LOAM FOR ABOUT 80% OF THE SITE. THE REMAINDER IS STATED AS WASHTENAW SILT LOAM AT THE EAST SIDE OF THE SITE AND A SMALL AREA OF CONOVER LOAM AT THE NORTHWEST CORNER OF THE SUBJECT SITE.

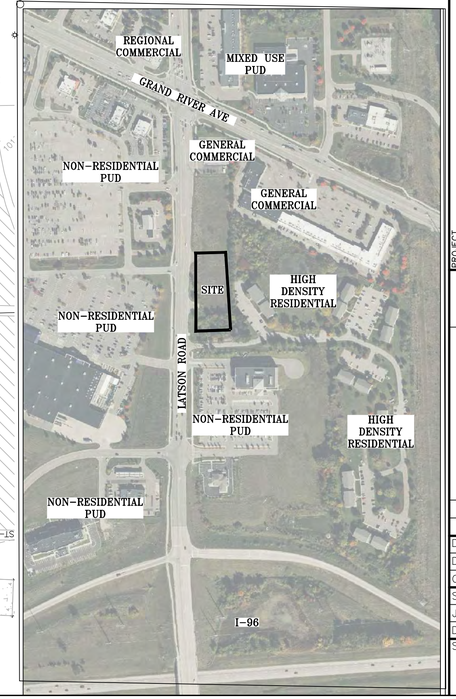
SEE SHEET 2 FOR GENERAL NOTES AND LEGEND



Tag #	Botanical Name	Common Name	Size	Condition
~~1355~~ TBR	~~Quercus rubra~~	~~Northern Red Oak~~	~~13.5"~~	good
~~1356~~ TBR	~~Pinus resinosa~~	~~Red Pine~~	~~11.5"~~	good
~~1357~~ TBR	~~Quercus rubra~~	~~Northern Red Oak~~	~~13"~~	good
~~1358~~ TBR	~~Pinus sylvestris~~	~~Scotch Pine~~	~~15.5", 15"~~	good
611	Pinus resinosa	Red Pine	14.5"	good
612	Pinus resinosa	Red Pine	17"	fair
613	Pinus resinosa	Red Pine	14.5"	fair
614	Pinus resinosa	Red Pine	10"	poor
615	Pinus resinosa	Red Pine	12"	poor
616	Pinus resinosa	Red Pine	9"	poor
617	Pinus resinosa	Red Pine	12"	poor
TBR 1359	Acer rubrum	Red Maple	30"	good
618	Pinus resinosa	Red Pine	13.5"	poor
619	Pinus resinosa	Red Pine	7"	poor
620	Pinus resinosa	Red Pine	16"	poor
621	Pinus resinosa	Red Pine	15"	poor
622	Pinus resinosa	Red Pine	13"	poor
623	Picea abies	Norway Spruce	14"	good
624	Picea abies	Norway Spruce	14"	good
625	Picea abies	Norway Spruce	17"	good
626	Picea abies	Norway Spruce	25"	good
627	Pinus resinosa	Red Pine	15"	fair
628	Pinus resinosa	Red Pine	11"	fair
629	Pinus resinosa	Red Pine	13"	good
TBR ~~630~~	~~Populus deltoides~~	~~Eastern cottonwood~~	~~6"~~	good
1368	Prunus serotina	Black Cherry	11",13"	poor
TBR ~~1367~~	~~Quercus bicolor~~	~~Swamp White Oak~~	~~13",16"~~	good

Tag #	Botanical Name	Common Name	Size	Condition
TBR ~~1366~~	~~Pinus sylvestris~~	~~Scotch Pine~~	~~13"~~	fair
TBR ~~1365~~	~~Prunus serotina~~	~~Black Cherry~~	~~11", 6"~~	good
TBR ~~631~~	~~Acer saccharinum~~	~~Silver Maple~~	~~37"~~	good
TBR ~~632~~	~~Quercus rubra~~	~~Northern Red Oak~~	~~18"~~	good
TBR ~~1353~~	~~Acer platanoides~~	~~Norway Maple~~	~~6"~~	good
633	Pinus resinosa	Red Pine	17"	fair
634	Thuja occidentalis	Northern White Cedar	8"	good
635	Thuja occidentalis	Northern White Cedar	6"	good
636	Thuja occidentalis	Northern White Cedar	7", 5"	good
637	Thuja occidentalis	Northern White Cedar	7", 5"	good
638	Thuja occidentalis	Northern White Cedar	7"	good
639	Thuja occidentalis	Northern White Cedar	7"	good
640	Thuja occidentalis	Northern White Cedar	6.5", 7"	good
641	Thuja occidentalis	Northern White Cedar	8"	good
642	Thuja occidentalis	Northern White Cedar	8"	good
643	Thuja occidentalis	Northern White Cedar	8.5"	good
644	Thuja occidentalis	Northern White Cedar	7.5"	good
645	Thuja occidentalis	Northern White Cedar	6", 5"	good
646	Thuja occidentalis	Northern White Cedar	6",5",4"	good
647	Pinus resinosa	Red Pine	13"	fair
648	Pinus resinosa	Red Pine	16"	good
649	Pinus resinosa	Red Pine	16"	good
650	Pinus resinosa	Red Pine	18"	good
651	Pinus resinosa	Red Pine	11", 15"	fair
652	Pinus resinosa	Red Pine	15"	fair
653	Pinus resinosa	Red Pine	10", 15", 17"	good
654	Pinus resinosa	Red Pine	10", 11"	good
Tag #	Botanical Name	Common Name	Size	Condition
655	Pinus resinosa	Red Pine	24"	good
656	Pinus sylvestris	Scotch Pine	20"	good

SURROUNDING AREAS MAP



THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN HEREON IS NOT GUARANTEED TO BE EXACT NOR IS IT GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITIES PRIOR TO CONSTRUCTION. IN ADDITION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND BETWEEN THE PLANS AND THE LOCATION OR DEPTH OF UTILITIES.

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171 IT'S THE LAW!!

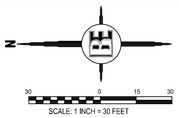
BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT: SOUTH LATSON COMMERCIAL DEVELOPMENT
PREPARED FOR: 1015 LATSON ROAD LLC
JEFF BECK 40/40
3959 BECK ROAD
WIXOM, MI 48393
248.773.7992

TITLE: EXISTING CONDITIONS, DEMO & NATURAL FEATURES PLAN

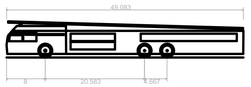
NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 3



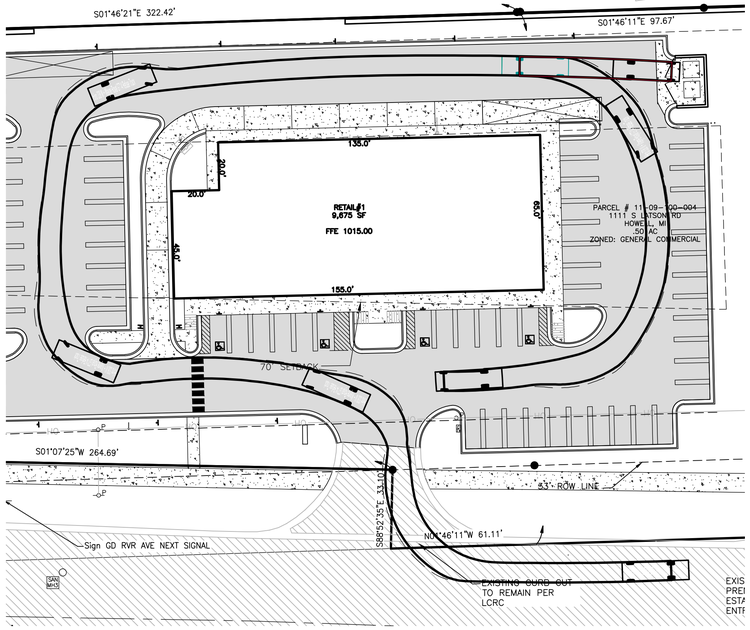
Hino 338 M + Wayne Royal GT14 Refuse Truck

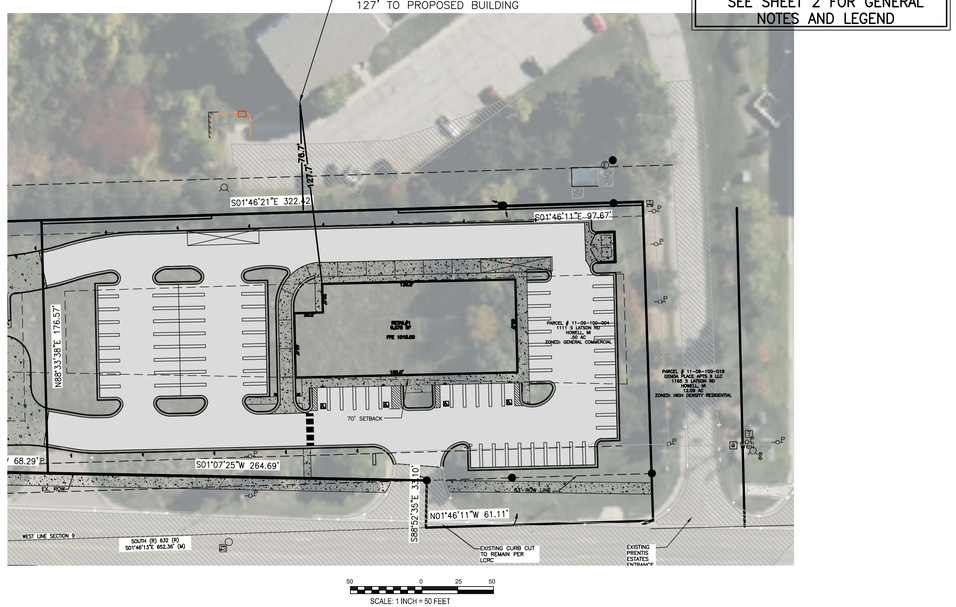
Overall Length	27.883ft
Overall Width	8.042ft
Overall Body Height	10.488ft
Min Body Ground Clearance	1.318ft
Track Width	8.042ft
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	27.400ft



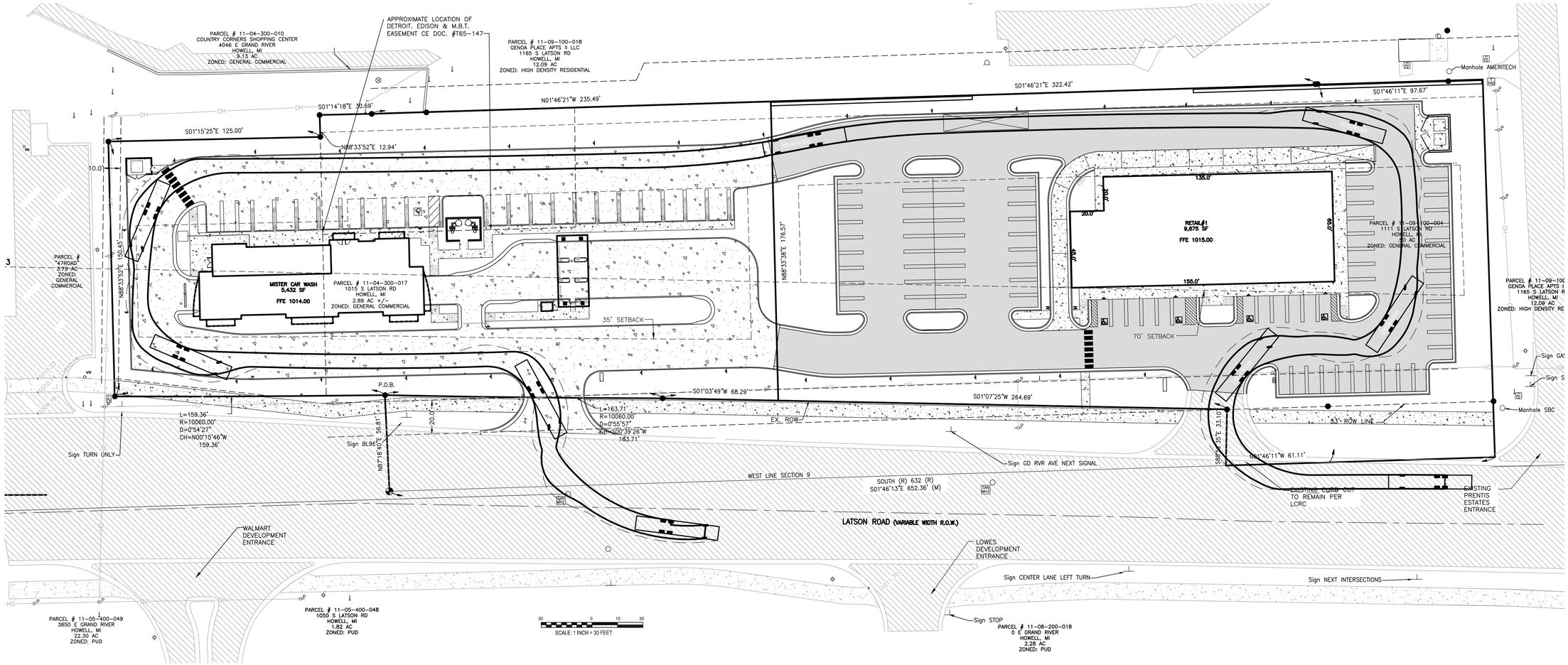
Brighton Area Fire Authority

Overall Length	49.083ft
Overall Width	8.167ft
Overall Body Height	7.500ft
Min Body Ground Clearance	0.750ft
Track Width	8.167ft
Lock-to-lock time	5.00s
Max Steering Angle (Virtual)	45.00°





SEE SHEET 2 FOR GENERAL
NOTES AND LEGEND



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3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
IT'S THE LAW!!
(MI PA 53 OF 2013)
PA 174 AMENDING PA 53 OF 2013 EFFECTIVE 10/1/2014

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

PROJECT
SOUTH LATSON COMMERCIAL DEVELOPMENT
1015 LATSON ROAD LLC
25950 BECK ROAD
WIXOM, MI 48393
248.773.7992

PREPARED FOR

TITLE
OVERALL SITE PLAN

NO	BY	1 ST	REVISION PER	PER TOWNSHIP COMMENTS	DATE
					10-25-23

DESIGNED BY:	ST
DRAWN BY:	ST
CHECKED BY:	
SCALE:	VARIES
JOB NO:	21-519
DATE:	10/04/2023
SHEET NO.	4

BOSS Engineering

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

SCALE: 1 INCH = 20 FEET

SITE DATA
PARCEL # 4711-04-300-017 & 4711-09-100-004
1015 S. LATSON RD & 1111 S LATSON RD
HOWELL, MI
GENOA TOWNSHIP
3.40 AC
ZONING: GENERAL COMMERCIAL DISTRICT (GCD)
CURRENT USE: VACANT

GENERAL COMMERCIAL DISTRICT

-	MIN. LOT AREA: 1 ACRE	
-	MIN. LOT WIDTH: 150 FT	
-	BUILDING SETBACK:	PROVIDED
	FRONT: 70 FT	70.0 FT
	SIDE: 15 FT	90.6 FT
	REAR: 50 FT	50.5 FT
-PARKING SETBACK:		PROVIDED
	FRONT: 20 FT	38.9 FT
	SIDE: 10 FT	10.0 FT
	REAR: 10 FT	10.0 FT
-MAX LOT COVERAGE:		PROVIDED
	PARCEL AREA:	83,376 SFT (1.91 AC)
	BUILDING: 35%	9,675 SFT (11.6%)
	IMPERVIOUS: 75%	60,805 SFT (72.9%)
-MAX BUILDING HEIGHT: 35 FT (2 STORIES)		20 FT

* TOTAL PROPOSED GROSS SQUARE FOOTAGE:

-COFFEE SHOP W/ DRIVE-THROUGH	2,950 GSF
-GENERAL RETAIL	4,025 GSF
-SIT DOWN RESTAURANT (NO LIQUOR LICENSE)	2,700 GSF
TOTAL	9,675 GSF

PARKING CALCULATIONS:

-FAST FOOD DRIVE THRU: 1 SPACE PER 70 SQFT GROSS LEASABLE FLOOR AREA (85% OF GROSS FLOOR AREA)
2950 * 85% = 2508 / 70 = 36 SPACES & 10 STACKING SPACES

-SIT DOWN RESTAURANT WITHOUT LIQUOR LICENSE = 1 SPACE/100 SFT GFA
2,700 SFT / 100 SFT = 27 SPACES

-RETAIL = 1 SPACE /250 SFT GFA
4,025 SFT / 250 SFT = 16 SPACES

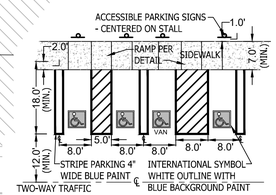
REQUIRED: 36 + 27 + 16 = 79 SPACES
PROVIDED: 79 SPACES

LOADING/UNLOADING SPACES: 10' x 50'
REQUIRED: 5,001 GFA TO 20,000 GFA REQUIRES 2 SPACES
PROVIDED: 2 LOADING/UNLOADING SPACES

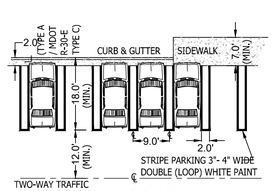
PLANNING COMMISSION WAIVERS REQUESTED:
A REDUCTION IN LANDSCAPE BUFFER ON THE WEST AND EAST SIDE OF PROPERTY DUE TO SHALLOW DEPTH OF EXISTING PARCEL. A WALL AND ADEQUATE LANDSCAPING ARE STILL PROPOSED TO MEET THE ORDINANCE TO THE MAXIMUM EXTENT POSSIBLE.
VARIANCES REQUIRED:
1) FRONT PARKING SETBACK
2) DRIVE-THRU SEPARATION TO ANOTHER DRIVE-THRU

GENERAL NOTES

1. ALL OUTDOOR LIGHTS SHALL BE SHIELDED TO REDUCE GLARE AND SHALL BE ARRANGED TO NOT INTERFERE WITH THE VISION OF PERSONS ON ADJACENT ROADWAYS OR ADJACENT PROPERTY.
2. ALL SIGNS SHALL MEET LOCAL MUNICIPALITY ORDINANCE REQUIREMENTS.
3. THE BUILDING ADDRESS SHALL BE A MINIMUM 6" HIGH LETTERS OF CONTRASTING COLORS AND BE CLEARLY VISIBLE FROM THE STREET. THE LOCATION AND SIZE SHALL BE VERIFIED PRIOR TO INSTALLATION.
4. A KEY BOX/KNOX BOX SHALL BE LOCATED NEAR THE FRONT ENTRY AT EACH TENANT SPACE (FINAL LOCATION TO BE DETERMINED BETWEEN THE OWNER & FIRE MARSHALL).
5. ONE SIDE OF THE STREET SHALL BE MARKED AS A FIRE LANE AND SHALL HAVE APPROPRIATE SIGNAGE.
6. ACCESS ROADS TO THE SITE SHALL BE PROVIDED AND MAINTAINED DURING CONSTRUCTION.
7. ACCESS ROADS SHALL BE CONSTRUCTED TO BE CAPABLE OF SUPPORTING THE IMPOSED LOAD OF FIRE APPARATUS WEIGHING AT LEAST 84,000 LBS.
8. A MINIMUM VERTICAL CLEARANCE OF 13.5 FEET SHALL BE MAINTAINED THROUGHOUT THE SITE. THIS INCLUDES ENCROACHMENTS FROM LARGE TREE CANOPIES, LIGHTING, ETC.
9. DURING THE CONSTRUCTION PROCESS, THE BUILDING WILL BE EVALUATED FOR EMERGENCY RESPONDER RADIO SIGNAL STRENGTH. IF COVERAGE IS FOUND TO BE QUESTIONABLE OR INADEQUATE; AN APPROVED CONTRACTOR SHALL BE HIRED TO PERFORM A GRID TEST OF THE FACILITY. IF THE SIGNAL STRENGTH COVERAGE IS FOUND TO BE NON-COMPLIANT, AN APPROVED EMERGENCY RESPONDER RADIO COVERAGE SYSTEM SHALL BE PROVIDED IN THE BUILDING.
10. SITE LIGHTING SHALL BE PLACED ON TIMERS TO BE OFF DURING NON-USE HOURS TO THE EXTENT POSSIBLE WHILE MAINTAINING SITE SAFETY. SITE LIGHTING SHALL BE PROGRAMMED TO TURN OFF AT NIGHT WHEN ACTIVITIES ARE NO LONGER OCCURRING ON THE PROPERTY.
11. DELIVERIES SHALL BE ARRANGED FOR OFF PEAK HOURS TO AVOID POTENTIAL VEHICULAR CONFLICTS.



TYPICAL ACCESSIBLE PARKING SPACE
(NOT TO SCALE)



TYPICAL PARKING SPACE
(NOT TO SCALE)

FOR SITE PLAN APPROVAL ONLY!
NOT FOR CONSTRUCTION

BOSS Engineering
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HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT
SOUTH LATSON COMMERCIAL DEVELOPMENT

PREPARED FOR
1015 LATSON ROAD LLC
2092 BECK ROAD
WIXOM, MI 48393
248.773.7992

TITLE
SITE PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: ST
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 5

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

SCALE: 1 INCH = 20 FEET

DRAINAGE AREA TABLE				
DRAINAGE AREA	TOTAL AREA (AC)	IMP. AREA (AC)	C VALUE	A*C
100	-	-	-	-
101	0.12	0.12	0.87	0.11
102	0.05	0.04	0.78	0.04
103	0.13	0.12	0.88	0.11
104	0.25	0.17	0.68	0.17
105	0.16	0.14	0.82	0.13
106	0.17	0.15	0.83	0.14
107	0.01	0.01	0.90	0.01
108	0.45	0.34	0.73	0.33
109	0.12	0.07	0.57	0.07
110	0.22	0.22	0.90	0.20
TOTALS	1.46	1.16	0.76	1.11

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

PROJECT: SOUTH LATSON COMMERCIAL DEVELOPMENT
1015 LATSON ROAD LLC
PREPARED FOR: 29991 BECK ROAD WIXOM, MI 48393 248.773.7992

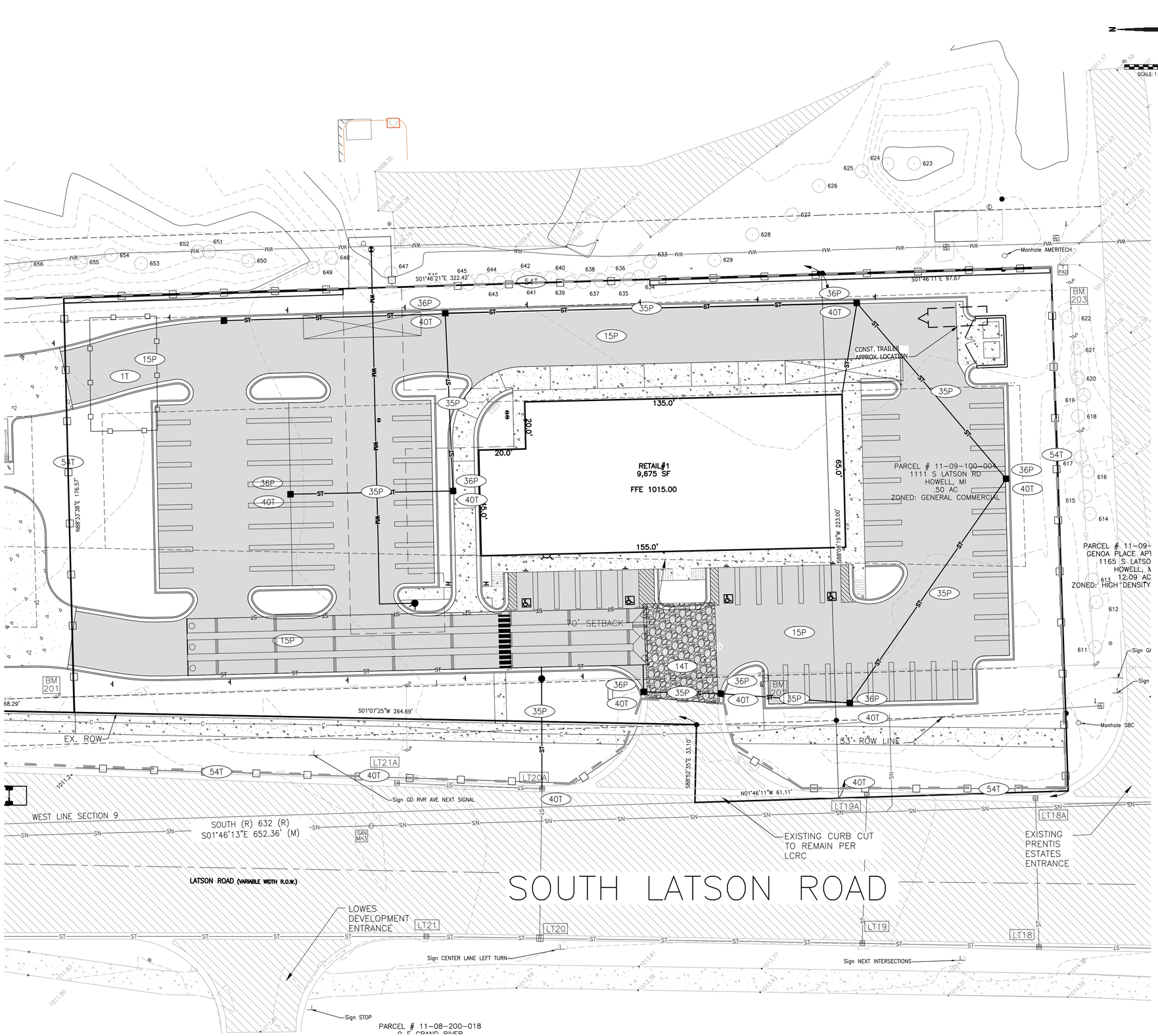
TITLE: GRADING & DRAINAGE PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: DH
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 6

BOSS Engineering

g:\21-519\DWG\SP\21-519 SHEETS SP-COMMERCIAL.dwg, 10/26/2023 12:27:49 PM, AutoCAD PDF (Smallest File).pc3



SOIL EROSION CONTROL MEASURES

1	STRIPPING & STOCKPILING TOPSOIL	TOPSOIL MAY BE STOCKPILED ABOVE BORROW AREAS TO ACT AS A DIVERSION STOCKPILE SHOULD BE TEMPORARILY SEEDED
6	SEEDING WITH MULCH AND/OR MATTING	FACILITATES ESTABLISHMENT OF VEGETATIVE COVER EFFECTIVE FOR DRAINAGEWAYS WITH LOW VELOCITY EASILY PLACED IN SMALL QUANTITIES BY INEXPERIENCED PERSONNEL SHOULD INCLUDE PREPARED TOPSOIL BED
14	AGGREGATE COVER	STABILIZES SOIL SURFACE, THUS MINIMIZING EROSION PERMITS CONSTRUCTION TRAFFIC IN ADVERSE WEATHER MAY BE USED AS PART OF PERMANENT BASE CONSTRUCTION OF PAVED AREAS
15	PAVING	PROTECTS AREAS WHICH CANNOT OTHERWISE BE PROTECTED, BUT INCREASES RUNOFF VELOCITY IRREGULAR SURFACE WILL HELP SLOW VELOCITY
16	CURB & GUTTER	KEEPS HIGH VELOCITY RUNOFF ON PAVED AREAS FROM LEAVING PAVED SURFACE COLLECTS AND CONDUCTS RUNOFF TO ENCLOSED DRAINAGE SYSTEM OR PREPARED DRAINAGEWAY
35	STORM SEWER	SYSTEM REMOVES COLLECTED RUNOFF FROM SITE, PARTICULARLY FROM PAVED AREAS CAN ACCEPT LARGE CONCENTRATIONS OF RUNOFF CONDUCTS RUNOFF TO MUNICIPAL SEWER SYSTEM OR STABILIZED OUTFALL LOCATION USE CATCH BASINS TO COLLECT SEDIMENT
36	CATCH BASIN, DRAIN INLET	COLLECTS HIGH VELOCITY CONCENTRATED RUNOFF MAY USE FILTER CLOTH OVER INLET
40	INLET SEDIMENT FILTER	EASY TO SHAPE COLLECTS SEDIMENT MAY BE CLEANED AND EXPANDED AS NEEDED
51	RETAINING WALL	REDUCES GRADIENT WHERE SLOPES ARE EXTREMELY STEEP PERMITS RETENTION OF EXISTING VEGETATION, KEEPING SOIL STABLE IN CRITICAL AREAS MINIMIZES MAINTENANCE
54	SILT FENCE	USES GEOTEXTILE FABRIC AND POST OR POLES. EASY TO CONSTRUCT AND LOCATE AS NECESSARY. (SEE DETAIL THIS SHEET)

T= TEMPORARY, P= PERMANENT
TOTAL DISTURBED AREA= 1.90 AC.

SURFACE WATER & COUNTY DRAINS
WETLAND – APPROXIMATELY 200 FT SOUTHEAST BEHIND PLATINUM CONTRACTING
LAKES – APPROXIMATELY 4000 FT NORTHEAST TO LAKE CHEMUNG
STREAMS – APPROXIMATELY 1000 FT NORTHWEST TO LIVINGSTON COMMONS SHOPPING CENTER
BASINS – APPROXIMATELY 900 FT NORTHWEST TO SLEEPCHEK MATTRESS STORE
DRAINS – APPROXIMATELY 650 FT NORTHWEST TO LATSON ROAD DRAIN
PONDS – APPROXIMATELY 200 FT EAST BEHIND PLATINUM CONTRACTING

CONSTRUCTION SEQUENCE

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

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

CONTROLS & MEASURES POST CONSTRUCTION SEQUENCE

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

CONTROLS & MEASURES NARRATIVE

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

PROPOSED CONST. SCHEDULE FOR THE YEAR 2024

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

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3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171
MEMBER OF MICHIGAN ONE CALL SYSTEM

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

PROJECT: SOUTH LATSON COMMERCIAL DEVELOPMENT
1015 LATSON ROAD LLC
PREPARED FOR
2597 BECK ROAD
WIXOM, MI 48393
248.773.7992

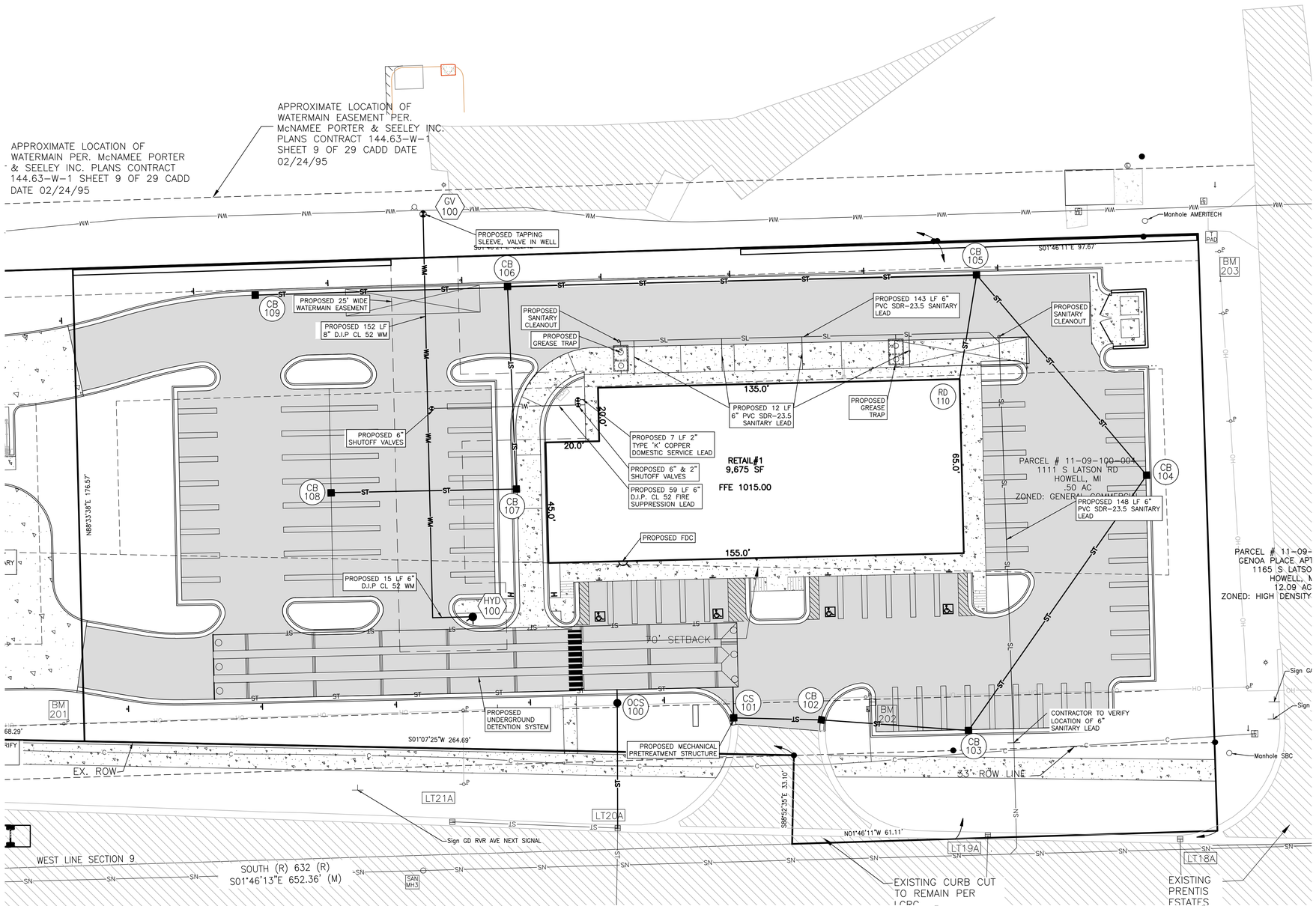
TITLE: SOIL EROSION & SEDIMENTATION CONTROL PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: JS
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 7

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

SCALE: 1 INCH = 20 FEET



FROM	TO	DRAIN AREA	ACRES A	RUNOFF COEFF C	EQUIV. AREA A * C	INTEN-SITY I	TIME OF CONC. T_c	ADDL RUNOFF Q	RUNOFF (CFS) Q	PIPE LENGTH (LF)	PIPE DIA. (IN)	VELOCITY FLOWING FULL (FPS)	HYDRAULIC GRADIENT SLOPE %	ACTUAL SLOPE USED	MANNING COEFFICIENT	MANNING FLOW CAPACITY	MANNING'S VELOCITY (FT/SEC)	TIME (MIN)	HG ELEV UPPER END	HG ELEV LOWER END	RIM ELEV UPPER END	RIM ELEV LOWER END	INVERT UPPER END	INVERT LOWER END
108	107	108	0.45	0.73	0.33	4.38	15.00		1.43	69	12	2.44	0.29%	0.32%	0.013	2.02	2.57	0.45	1011.16	1010.96	1013.09	1014.19	1010.18	1009.95
107	106	107	0.01	0.90	0.01	4.33	15.45		1.47	76	12	2.51	0.30%	0.32%	0.013	2.02	2.57	0.49	1010.96	1010.73	1014.19	1013.02	1009.95	1009.71
106	105	106	0.17	0.83	0.14	4.27	15.94	0.31	2.38	175	15	2.52	0.23%	0.24%	0.013	3.17	2.59	1.13	1010.73	1010.33	1013.02	1013.03	1009.51	1009.09
105	104	105	0.15	0.84	0.12	4.16	17.07	0.87	3.76	98	18	2.64	0.20%	0.20%	0.013	4.71	2.67	0.61	1010.33	1010.13	1013.03	1013.00	1008.89	1008.70
104	103	104	0.19	0.75	0.14	4.10	17.68		4.36	116	18	3.47	0.34%	0.20%	0.013	4.71	2.67	0.73	1010.13	1009.74	1013.00	1012.94	1008.70	1008.46
103	102	103	0.13	0.88	0.11	4.03	18.40		4.81	55	18	3.59	0.36%	0.30%	0.013	5.77	3.26	0.28	1009.74	1009.54	1012.94	1013.22	1008.46	1008.30
102	101	102	0.05	0.78	0.04	4.01	18.69		4.96	33	18	3.59	0.36%	0.30%	0.013	5.77	3.26	0.17	1009.54	1009.42	1013.22	1013.04	1008.30	1008.20
101	BASIN	101	0.12	0.87	0.11	3.99	18.85		5.39	12	18	4.24	0.51%	0.30%	0.013	5.77	3.26	0.06	1009.42	1009.37	1013.04	1013.33	1008.20	1008.17
109	106	109	0.12	0.57	0.07	4.38	15.00		0.31	94	12	1.54	0.12%	0.32%	0.013	2.02	2.57	0.61	1010.44	1010.33	1013.07	1013.02	1009.59	1009.29
110	105	110	0.22	0.90	0.20	4.38	15.00		0.87	39	8	3.30	0.90%	1.00%	0.013	1.21	3.47	0.19	1010.10	1009.74	1015.00	1013.03	1009.52	1009.13
BASIN	OCS	ALL	1.61	0.79	1.272737	5.60	18.85		7.13	5	12	3.34	0.54%	0.32%	0.013	2.02	2.57	0.03	1009.08	1009.05	100.00	100.00	1008.17	1008.15
OCS	EX	OCS	-	-	-	-	18.89		7.13	47	12	3.34	0.54%	0.32%	0.013	2.02	2.57	0.30	1009.05	1008.80	100.00	-	1008.15	1008.00

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HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT: SOUTH LATSON COMMERCIAL DEVELOPMENT
PREPARED FOR: 1015 LATSON ROAD LLC
2597 BECK ROAD WIXOM, MI 48393 248.773.7992
TITLE: UTILITY PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: DH
CHECKED BY:
SCALE: 1" = 20'
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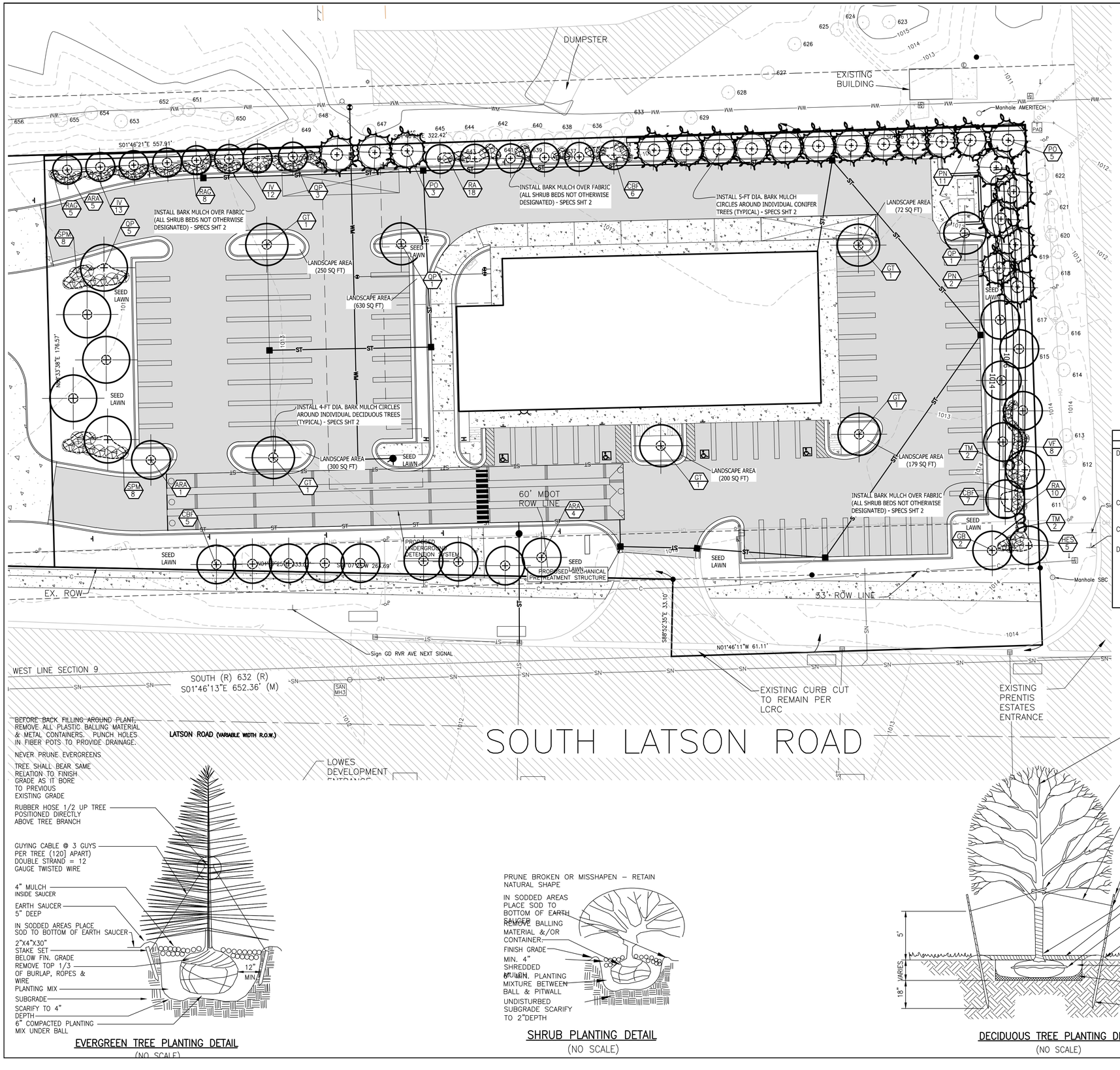
SHEET NO. 8



SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

LANDSCAPE CALCULATIONS GCD ZONING:

REQUIRED:

GREENBELT - PUBLIC R.O.W. :	1 CANOPY TREE / 40 LFT FRONTAGE, MIN 20 FT WIDTH
BUFFER - SOUTH ADJ. TO MULTI-FAMILY - TYPE B:	MIN. 20-FT WIDTH, 6-FT HGT CONTINUOUS WALL OR 3-FT HGT BERM + 1 CANOPY TREE + 1 CONIFER TREE + 4 SHRUBS / 30 LFT
BUFFER - NORTH ADJ. TO COMMERCIAL - TYPE C:	1 CANOPY OR CONIFER TREE OR 4 SHRUBS / 20 LFT MIN. 10 FT WIDTH
BUFFER - EAST ADJ. TO MULTI-FAMILY- TYPE B:	6-FT HGT CONTINUOUS WALL + 1 CANOPY TREE + 1 CONIFER TREE + 4 SHRUBS / 30 LFT
PARKING AREA (>10 SPACES):	1 CANOPY TREE & 100 SF OF LANDSCAPE AREA / 10 SPACES. 1/3 OF TREES MUST BE ON THE INTERIOR OF THE PARKING
DETENTION / RETENTION BASIN:	N/A - UNDERGROUND SYSTEM

PROVIDED:

GREENBELT - PUBLIC R.O.W. :	423.47 LFT FRONTAGE / 40 = 11 CANOPY TREES PROVIDED
BUFFER - SOUTH PROP. LINE: ADJ. TO MULTI-FAMILY - TYPE B:	190.00 / 30 = 7 CANOPY + 7 CONIFER TREES + 26 SHRUBS WITH BERM AND 20-FT WIDTH
BUFFER - NORTH PROP. LINE ADJ. TO COMMERCIAL - TYPE C:	176.57 / 20 = 9 TREES OR 36 SHRUBS OR COMBINATION 5 TREES + 16 SHRUBS PROVIDED
BUFFER - EAST ADJ. TO MULTI-FAMILY - TYPE B:	420.09 / 30 = 14 CANOPY + 14 CONIFER TREES + 56 SHRUBS + 290-FT WALL ; PROPOSED SHORTER LENGTH WALL DUE TO EX. CONDITIONS: APPROX. 90 LFT OF EX. MATURE CONIFER SCREENING VEGETATION AT THE PROPERTY LINE RESTRICTS NEW WALL INSTALLATION
PARKING AREA (>10 SPACES):	79 (SPACES PROVIDED) / 10 = 8 TREES + 790 SQFT OF LANDSCAPE AREA 8 TREES & 1630+ SQFT OF LANDSCAPE AREA PROVIDED

PLANT LIST

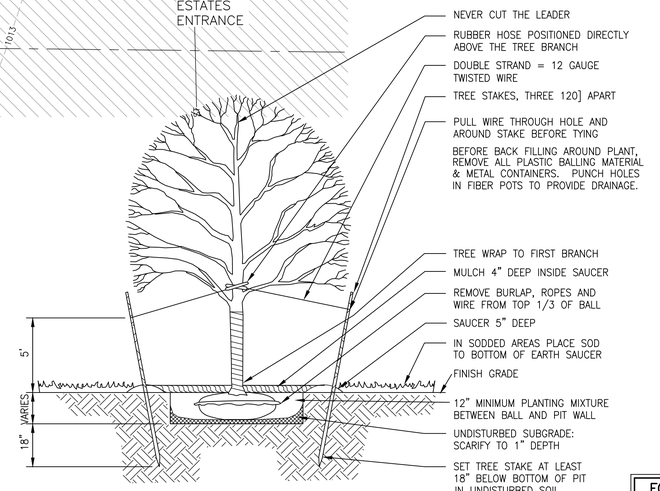
KEY	QUAN.	BOTANICAL NAME	COMMON NAME	SIZE	REMARK
DECIDUOUS TREES					
CBF	18	Carpinus betulus 'Frans Fontaine'	Frans Fontaine European Hornbeam	2-1/2" cal.	B-B
ARA	10	Acer ruburm 'jfs KW 78'	Armstrong Gold Red Maple	2-1/2" cal.	B-B
GB	2	Ginkgo biloba 'Princeton Sentry'	Princeton Sentry Columnar Ginkgo	2-1/2" cal.	B-B
GT	5	Gleditsia triacanthos var inermis 'Skycole'	Skyline Honeylocust	2-1/2" cal.	B-B
QP	10	Quercus plalustris	Northern Pin Oak	2-1/2" cal.	B-B
CONIFER TREES					
PN	13	Pinus nigra 'Oregon Green'	Oregon Green Austrian Pine	6-ft hgt.	B-B
PO	8	Picea omorika	Serbian Spruce	6-ft hgt.	B-B
CONIFER SHRUBS					
TM	3	Taxus x media 'Densiformis'	Densiformis Spreading Yew	30" ht./#5	Cont.
DECIDUOUS SHRUBS					
HES	5	Hydrangea macrophylla 'Bailmer'	Endless Summer Hydrangea	36" ht./#5	Cont.
IV	25	Itea virginica 'Sprich'	Little Henry Virginia Sweetspire	25" ht./#3	Cont.
RA	10	Ribes Alpinum 'Greenmound'	Greenmound Currant	18" ht./#3	Cont.
RAG	13	Rhus aromatica 'Gro-Low'	Gro-Low Fragrant Sumac	24" ht./#3	Cont.
SPM	16	Syringa patula 'Miss Kim'	Miss Kim Lilac	24" ht./#3	Cont.
VF	8	Viburnum farreri nanum	Dwarf Fragrant Viburnum	18" ht./#3	Cont.

SUPPLEMENTAL LANDSCAPE NOTES

1. ANY SUBSTITUTIONS OF PLANT MATERIAL FROM THE APPROVED SITE PLAN WILL BE APPROVED BY THE TOWNSHIP PRIOR TO INSTALLATION.

EVERGREEN TREE PLANTING DETAIL
(NO SCALE)

SHRUB PLANTING DETAIL
(NO SCALE)



DECIDUOUS TREE PLANTING DETAIL
(NO SCALE)

FOR SITE PLAN APPROVAL ONLY! NOT FOR CONSTRUCTION

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3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171
(IT'S THE LAW) (IT'S A GOOD IDEA)
MEMBER OF MICHIGAN ONE CALL SYSTEM, INC.

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HOWELL, MI. 48843
517.546.4836 FAX 517.548.1670

PROJECT: SOUTH LATSON COMMERCIAL DEVELOPMENT

PREPARED FOR: 1015 LATSON ROAD LLC
2097 BECK ROAD
WIXOM, MI 48393
248.773.7992

TITLE: LANDSCAPE PLAN

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: PC
DRAWN BY: PC
CHECKED BY:
SCALE: 1" = 20'-0"
JOB NO: 21-519
DATE: 10/03/2023
SHEET NO. 9

LIVINGSTON COUNTY SOIL EROSION PERMIT TEMPLATE
TEMPORARY CONTROLS AND SEQUENCE

1. NOTIFY LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE 24 HOURS PRIOR TO START OF GRADE WORK.
2. IN ACCORDANCE WITH PUBLIC ACT NO. 53, OF 1974 THE PERMIT HOLDER SHALL CALL MISS DIG FOR STAKING AND LOCATING OF UTILITIES, AT LEAST 72 HOURS IN ADVANCE OF THE START OF ANY WORK.

PERMITTING STANDARDS

3. (IMPORTANT NOTICE) RETENTION/DETENTION PONDS SHALL BE EXCAVATED, TOPSOILED, SEEDED, MULCHED AND TACKED PRIOR TO THE START OF MASSIVE EARTH DISRUPTION. INGRESS/EGRESS MUST HAVE LARGE CRUSHED ROCK TO REDUCE THE TRACKING OF SOIL ONTO THE PUBLIC TRAFFIC AREAS. SEE DETAIL ITEMS BELOW.
4. 36" M.D.O.T SPECIFICATION TYPE SILT FABRIC FENCE AS SHOWN ON PLANS SHALL BE PLACED AND MAINTAINED ALONG PERIMETER ON ALL LOW LYING AREAS OF THE CONSTRUCTION SITE TO FILTER RUNOFF BEFORE LEAVING PROJECT SITE.

5. ALL TEMPORARY EROSION CONTROL DEVICES AS NOTED ON PLANS SHALL BE INSTALLED PRIOR TO THE START OF MASSIVE EARTH DISTRIBUTION.
6. PLAN DOES DENOTE A DETAILED EROSION CONTROL DEVICE TO RESTRICT TRACKING OF MATERIAL ONTO THE HIGHWAY. STONE DIAPERS SHALL BE INSTALLED AT ALL INGRESS/EGRESS AREAS OF THE SITE PRIOR TO THE START OF MASSIVE EARTH DISRUPTION. DIAPERS SHALL BE OF CRUSHED STONE AND SHALL HAVE A MINIMUM LENGTH OF 100' LINEAL FEET.

RETENTION PONDS

7. RETENTION/DETENTION/SEDIMENTATION PONDS SHALL BE EXCAVATED, TOPSOILED, SEEDED, MULCHED AND TACKED PRIOR TO THE START OF MASSIVE EARTH DISRUPTION.
8. DETENTION POND OUTLETS SHALL BE OF THE STANDPIPE AND STONE FILTER SYSTEM, WITH TRASH SCREEN. OUTLET FLOW SHALL NOT EXCEED 0.20 CUBIC FEET OF WATER PER SECOND/PER ACRE. POND DIKES SHALL HAVE A MINIMUM OF ONE (1) FOOT OF FREEBOARD. AN EMERGENCY SPILLWAY SHALL BE CONSTRUCTED WITHIN THE FREEBOARD LEVEL.
9. THE EMERGENCY SPILLWAY FROM THE DETENTION POND SHALL BE SODDED AND PEGGED, OR RIP RAPPED, 15 FEET PAST THE TOE OF THE SLOPE OF THE BERM.
10. DIKES AND BERMS SHALL BE FREE OF ALL ORGANIC MATTER.
11. RETENTION/DETENTION PONDS SHALL BE FENCED WITH A 4' CHAIN LINK FENCE, INCLUDING A 12' ACCESS GATE FOR MAINTENANCE UNLESS MINIMUM 5 FT. HORIZONTAL TO 1 FT. VERTICAL SIDE SLOPES ARE PROVIDED. THE FENCE SHALL BE INSTALLED AT THE OUTER PORTION OF THE BERM, TO ALLOW FOR MAINTENANCE WORK TO BE DONE INSIDE THE FENCE.
12. ALL UNIMPROVED DISTURBED AREAS SHALL BE STRIPPED OF TOPSOIL WHICH WILL BE STORED ONSITE DURING THE EXCAVATING STAGE. TOPSOIL PILES SHALL BE SEEDED AND MULCHED, OR MATTED WITH STRAW IN THE NON-GROWING SEASON, IMMEDIATELY AFTER THE STRIPPING PROCESS IS COMPLETED, TO PREVENT WIND AND WATER EROSION.
13. SOIL EROSION CONTROLS SHALL BE MONITORED DAILY BY THE ON-SITE ENGINEER, OR CONTRACTOR, WHICHEVER CASE APPLIES.

SLOPES AND DITCHES

14. ON SITE DITCHES SHALL BE OF THE FLAT BOTTOM TYPE MINIMUM WIDTH OF 2' WITH A MINIMUM OF 3 HORIZONTAL TO 1 VERTICAL SIDE SLOPES, 3:1.
15. DITCHES WITH STEEP SLOPES WILL NEED FLOW CHECKS TO PREVENT SCOURING OF THE DITCH BOTTOM. THESE SHALL BE INSTALLED AS DIRECTED BY THE ENGINEER OR INSPECTOR.
16. SLOPES IN EXCESS OF 3 HORIZONTAL TO 1 VERTICAL SHALL NOT BE USED EXCEPT WITH A MECHANICAL DEVICE SUCH AS A RETAINING WALL, TERRACING, OR OTHER PRIOR APPROVED DEVICE.

STORM DRAINS

17. ALL STORM WATER STRUCTURES, CATCH BASINS AND/OR MANHOLES, IF BLOCK, SHALL BE PLASTERED ON BOTH THE INSIDE AND OUTSIDE OF THE STRUCTURES. GROUTING AND POINTING WILL BE NECESSARY AT THE CASTING AND STRUCTURE JOINT TO PREVENT LEAKAGE AND THE RESULTING SOIL MOVEMENT, AROUND THE STRUCTURE.

18. STORM WATER INLETS SHALL HAVE AS A TEMPORARY CONTROL A STRAW BALE BARRIER AND STONE FILTER INSTALLED AROUND THE INLET DURING CONSTRUCTION. AS AN ALTERNATIVE TO THE STRAW BALE BARRIER, A BURLAP AND PEA STONE FILTER MAY BE USED. THREE LAYERS OF BURLAP FIBER AND A FILTER OF PEA STONE MINIMUM 1 FT. IN DEPTH CAN BE USED. DUE TO THE POROSITY OF THE BURLAP FILTER THE MINIMUM OF 1 FT. OF STONE IS VERY IMPORTANT. THE CONTROL SHALL BE INSTALLED AS SOON AS THE STRUCTURE IS BUILT AND INSPECTED DAILY.
19. BURLAP AND PEA STONE FILTERS WILL NEED TO BE CHANGED AFTER EACH RAINFALL.
20. COUNTY CODE REQUIRES A MINIMUM PIPE SIZE OF 12" IN DIAMETER. IF SMALLER PIPE IS NEEDED FOR OUTLET PURPOSES THE 12" CAN BE BAFFLED TO THE CORRECT SIZE. ALL PIPE SHALL MEET THE 12" DIAMETER CODE SIZE.
21. ALL STORM DRAIN OUTLETS 15" IN DIAMETER OR LARGER SHALL HAVE ANIMAL GUARDS INSTALLED TO PREVENT ENTRANCE TO THE SYSTEM.

22. ALL STORM DRAINAGE PIPE 30" IN DIAMETER OR LARGER SHALL BE POINTED, AT THE JOINTS ON THE INSIDE WITH MORTAR, AFTER BACKFILLING.
23. ALL STORM DRAIN OUTLETS THAT DO NOT EMPTY INTO THE RETENTION/DETENTION POND SHALL HAVE A TEMPORARY 5'X10'X3' SUMP INSTALLED AT THE TERMINATION OF THE STORM SEWER. UPON COMPLETION OF THE STABILIZATION WORK THE SUMP AREA SHALL BE FILLED AND RIP RAPPED WITH COBBLE STONE. SILT TRAPS SHALL BE INSPECTED AFTER EACH STORM.
24. STORM WATER OUTLETS DO DENOTE RIP RAP. ALL OUTLETS SHALL BE RIP RAPPED OVER KEYED FILTER FABRIC WITH A MINIMUM OF 15 SQ. YARDS OF 6" OR LARGER COBBLE STONE.
25. RIP RAP AS NOTED ON THE PLAN SHALL BE OF A FUNNEL SHAPE CONSTRUCTION, WIDTH SHALL INCREASE AS DISTANCE FROM THE OUTLET POINT INCREASES AT A 3:1 RATIO.
26. RIP RAP SHALL BE OF COBBLE STONE, 6" IN DIAMETER OR LARGER. GROUTING MAY BE NECESSARY, AND SHALL BE A MINIMUM OF 6" IN DEPTH WITH THE COBBLE SET IN THE CEMENT SLURRY.
27. STORM WATER OUTLET IS IN NEED OF A SPLASH BLOCK WHICH IS NOT NOTED ON THE PLAN. INSTALL SPLASH BLOCK IF SLOPE OF THE PIPE IS 4% OR GREATER.
28. IT WILL BE NECESSARY FOR THE DEVELOPER TO HAVE THE STORM DRAINAGE LINES CLEANED PRIOR TO FINAL INSPECTION BY THE LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE. IF REQUIRED, THIS WORK SHALL BE DONE BY A PROFESSIONAL SEWER CLEANING FIRM AND CERTIFIED IN WRITING BY THE PROJECT ENGINEER. ALL SUMPS AND TEMPORARY SILT TRAPS SHALL ALSO BE CLEANED AT THIS TIME.

STABILIZATION

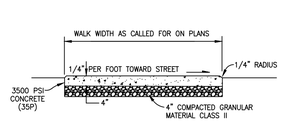
29. ALL UNIMPROVED DISTURBED AREAS SHALL BE RE-TOP SOILED, WITH A MINIMUM OF 3" OF MATERIAL, SEEDED, MULCHED AND TACKED WITHIN 15 DAYS OF THE COMPLETION OF THE MASSIVE EARTH DISRUPTION. IN THE NON-GROWING SEASON STRAW MATTING WILL SUFFICE. HYDROSEEDING WILL BE AN ACCEPTABLE ALTERNATE FOR MULCHING. EXTREME CARE SHOULD BE EXERCISED IN SPRING AND FALL PERIODS AS A FROST WILL BREAK THE BIND OF THE HYDROSEEDING, WHICH WILL AFFECT THE EFFECTIVENESS OF THIS PROCEDURE.
30. IN THE NON-GROWING SEASON, TEMPORARY STABILIZATION OF MASSIVELY EXPOSED AREAS FOR WINTER STABILIZATION SHALL BE DONE WITH STRAW MATTING.
31. PERIODIC INSPECTIONS WILL BE MADE THROUGHOUT THE COURSE OF THE PROJECT. IT WILL BE THE RESPONSIBILITY OF THE MANAGERS OF THE PROJECT TO CONTACT THIS OFFICE FOR THE FINAL INSPECTION AT THE END OF THE PROJECT.
32. THIS COMMERCIAL PERMIT IS VALID FOR THE MASS EARTH MOVEMENT, THE INSTALLATION OF ROADS, DRAINS, AND UTILITIES AND IS NOT FOR ANY SINGLE FAMILY RESIDENCE. ALL RESIDENTIAL BUILDERS WILL NEED TO SECURE WAIVERS AND OR PERMITS AS NECESSARY FOR EACH LOT IN THIS DEVELOPMENT AT THE TIME APPLICATION FOR SINGLE FAMILY RESIDENCE IS MADE.
33. THE ISSUING BUILDING DEPARTMENT SHALL NOT ISSUE THE CERTIFICATE OF OCCUPANCY UNTIL THE FINAL INSPECTION LETTER FROM THE LIVINGSTON COUNTY DRAIN COMMISSIONER'S OFFICE HAS BEEN OBTAINED.
34. PER THE LIVINGSTON COUNTY DRAIN COMMISSIONER THE SEEDING, FERTILIZER AND MULCH MINIMUM QUANTITIES SHALL BE AS FOLLOWS:

TOP-SOIL	3" IN DEPTH
GRASS SEED	218 LBS. PER ACRE
FERTILIZER	150 LBS. PER ACRE
STRAW MULCH	3" IN DEPTH 1.5 TO 2 TONS PER ACRE (ALL MULCHING MUST HAVE A TIE DOWN, SUCH AS TACKIFIER, NET BINDING, ETC.)
HYDRO-SEEDING	HYDRO-SEEDING IS NOT ACCEPTABLE FOR SLOPES EXCEEDING 1%, IN SUCH CASES STABILIZATION SHALL BE DONE WITH SEED AND STRAW MULCH WITH A TACKIFIER.

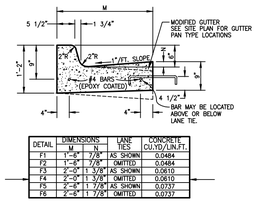
MAINTENANCE SCHEDULE FOR SOIL EROSION CONTROLS

1. SILT FENCE SHALL BE INSPECTED WEEKLY AND AFTER EACH MAJOR STORM EVENT. MAINTENANCE SHALL INCLUDE REMOVAL OF ACCUMULATED SILT AND REPLACEMENT OF TORN SECTIONS. SILT FENCE SHALL BE REMOVED WHEN ALL CONTRIBUTING AREAS HAVE BEEN STABILIZED.
2. TRACKING PAD SHALL BE INSPECTED MONTHLY FOR ACCUMULATED DIRT. TRACKING PAD SHALL BE REPLACED WHEN THE STONES ARE CHOKED WITH DIRT. TRACKING PAD SHALL BE REMOVED IMMEDIATELY PRIOR TO THE FIRST COURSE OF ASPHALT BEING LAID.
3. DETENTION/RETENTION POND SHALL BE INSPECTED QUARTERLY ON A PERMANENT BASIS. MAINTENANCE SHALL INCLUDE SEDIMENT REMOVAL, EMBANKMENT STABILIZATION AND MAINTAINING THE OUTLET STRUCTURE IN GOOD CONDITION. NO TREES SHALL BE ALLOWED TO GROW ON THE EMBANKMENT.
4. CATCH BASINS SHALL BE INSPECTED ANNUALLY FOR ACCUMULATION OF SEDIMENT. ALL SEDIMENT MUST BE REMOVED AND DISPOSED OF PROPERLY WHEN THE SUMP IS FULL.
5. COMMON AREAS SHALL BE STABILIZED NO LATER THAN 15 DAYS AFTER GRADE WORK, PURSUANT TO RULE 1709 (5).

SILT FENCE SHALL BE A MINIMUM 36".

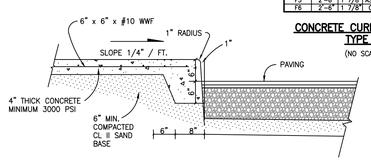


4" CONCRETE SIDEWALK
(NO SCALE)

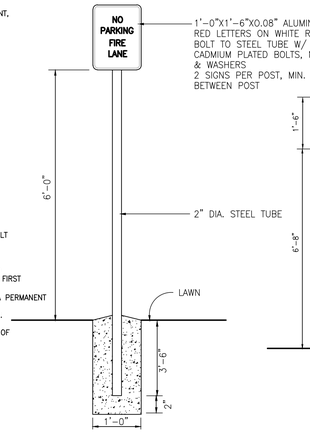


DETAIL	DIMENSIONS M	N	LANE TIES	CONCRETE CU.YD./LIN.FT.
F1	1'-6"	7/8"	AS SHOWN	0.0484
F2	1'-6"	7/8"	OMITTED	0.0484
F3	2'-0"	1 3/8"	AS SHOWN	0.0610
F4	2'-0"	1 3/8"	OMITTED	0.0610
F5	2'-6"	1 7/8"	AS SHOWN	0.0737
F6	2'-6"	1 7/8"	OMITTED	0.0737

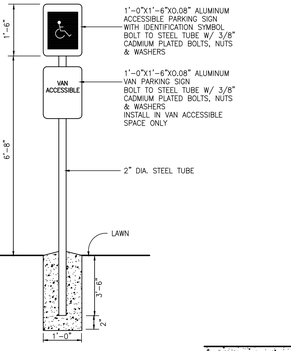
CONCRETE CURB & GUTTER TYPE F
(NO SCALE)



INTEGRAL CONCRETE WALK / CURB DETAIL
(NO SCALE)

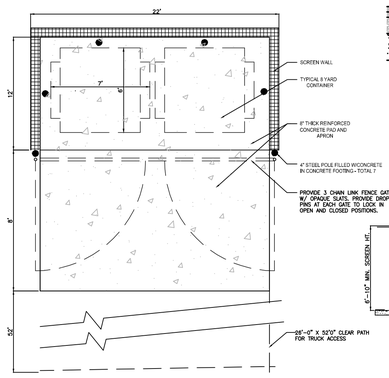


NO PARKING SIGN DETAIL
(NO SCALE)

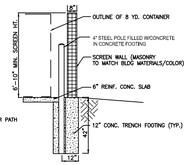


HANDICAP PARKING SIGN DETAIL
(NO SCALE)

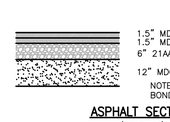
DUMPSTER PAD CONCRETE PAVEMENT CROSS SECTION
(NO SCALE)



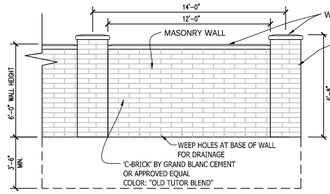
DUMPSTER ENCLOSURE DETAIL
(NO SCALE)



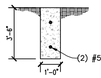
SECTION PLAN



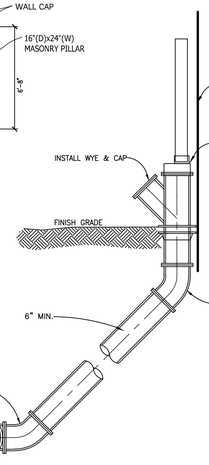
ASPHALT SECTION
(NO SCALE)



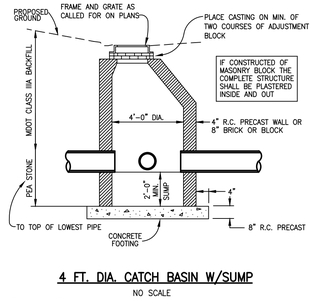
SCREEN WALL DETAIL – EAST PROPERTY LINE
(NO SCALE)



WALL FOOTING DETAIL



ROOF DRAIN CLEANOUT DETAIL
NO SCALE

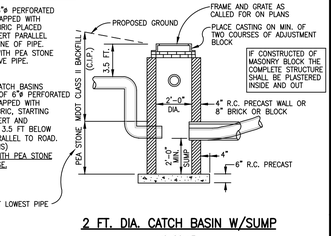


4 FT. DIA. CATCH BASIN W/SUMP
NO SCALE

INSTALL SUBDRAINS AT ALL CATCH BASINS LOCATED WITHIN ROADWAY

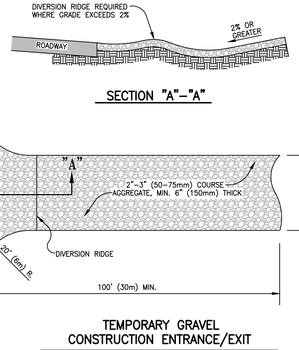
(1) 4 L.F. (MIN.) 6"ø PERFORATED P.V.C. PIPE WRAPPED WITH GEOTEXTILE FABRIC PLACED AT LOWEST INVERT PARALLEL TO ROAD OR LINE OF PIPE. BACK–FILLED WITH PEA STONE ONE FOOT ABOVE PIPE.

(2) AT LOWPOINT CATCH BASINS 20 L.F. (MIN.) OF 6"ø PERFORATED P.V.C. PIPE WRAPPED WITH GEOTEXTILE FABRIC, STARTING AT LOWEST INVERT AND CONTINUING AT 3.5 FT BELOW ROAD–WAY, PARALLEL TO ROAD. (BOTH DIRCTIONS) BACK–FILLED WITH PEA STONE TO THE SUBBASE.

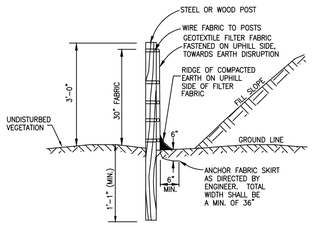


2 FT. DIA. CATCH BASIN W/SUMP
NO SCALE

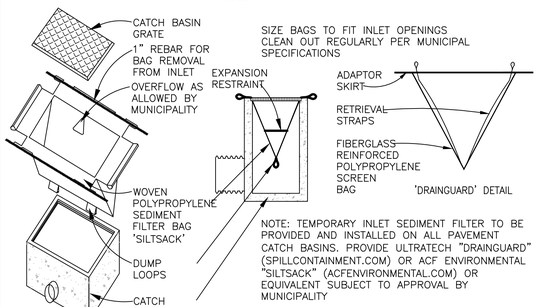
MANHOLE FRAME & COVER & CATCH BASIN INLETS					
TYPE	LOCATION	MANUFACTURER OR EQUAL EAST JORDAN	MANUFACTURER OR EQUAL NEENAH	TYPE OF COVER OR INLET	MAXIMUM DRAINAGE AREA (ACRES)
MH	ALL	1040	R-1916 F1	SANITARY-SOLID SELF-SEALING STORM-VENTED	N/A
CB	TYPE A CURB	7000-T1-M1	R-3070	FLAT GRATE WITH VERT. OPEN BACK	0.71
CB	TYPE B CURB	7065-T1-M1	R-3034-B	FLAT GRATE WITH ROLL BACK	0.87
CB	PAVEMENT/ SHOULDER	1020-M1	R-2060-D	FLAT GRATE	0.66
CB	OPEN AREA	1020-01	R-2560-D	BEEHIVE GRATE 4" HIGH	0.63
CB	GUTTER	5100	R-3238	CONCAVE INLET	0.96



TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT
NO SCALE

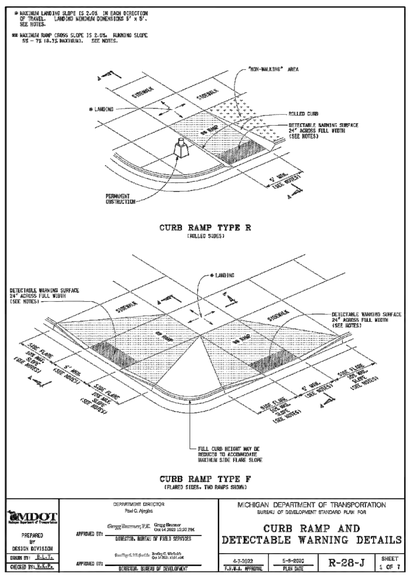


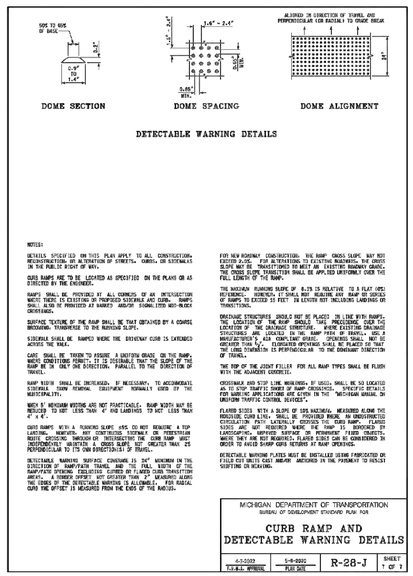
SILT FENCE DETAIL
NO SCALE



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

TEMPORARY INLET SEDIMENT FILTER DETAIL
(NO SCALE)





SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE PLANS IS NOT GUARANTEED TO BE COMPLETE OR EXACT. THE CONTRACTOR SHALL BE COMPLETELY RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITIES AT CONNECTION POINTS BEFORE BEGINNING WORK. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND BETWEEN THE PLANS AND THE LOCATION OR DEPTH OF UTILITIES.

MISS DIG
3 WORKING DAYS BEFORE YOU DIG
1-800-482-7171
IT'S THE LAW!
(P.A. 53 AS AMENDED BY PUBLIC ACT 174 OF 2013)
FOR NE LICENSE OF UNDERGROUND FACILITIES

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

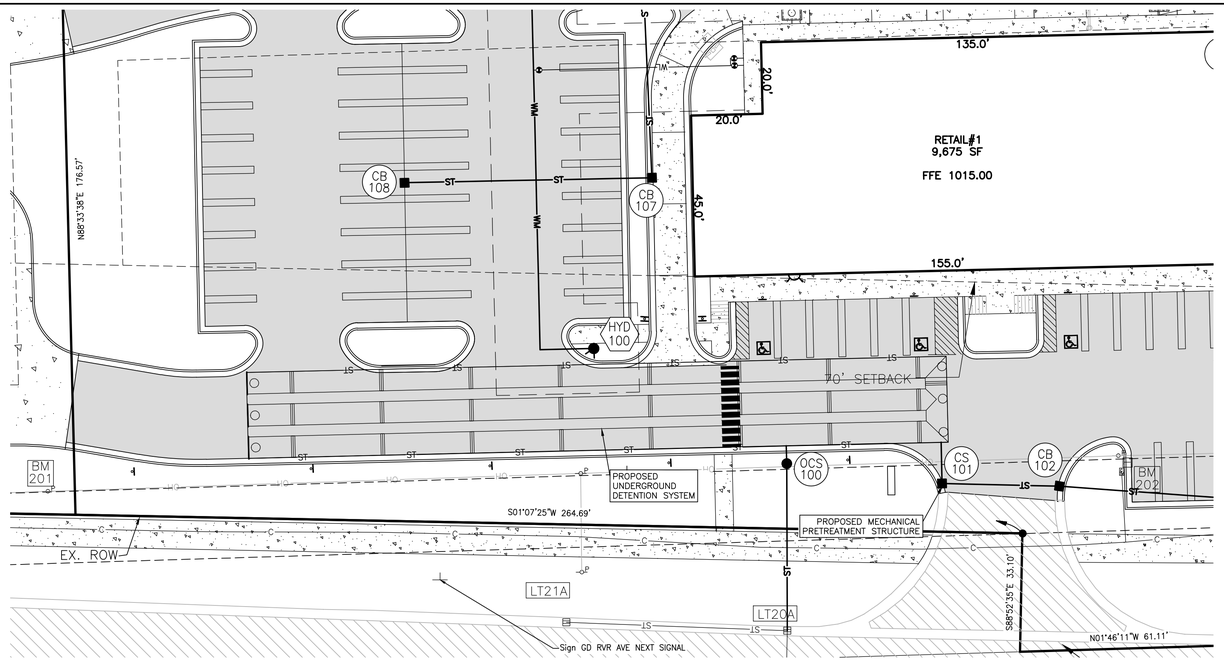
PROJECT: SOUTH LATSON COMMERCIAL DEVELOPMENT
1015 LATSON ROAD LLC
2939 BECK ROAD
WIXOM, MI 48393
248.773.7992
PREPARED FOR:

TITLE: CONSTRUCTION DETAILS

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: DH/JS
CHECKED BY:
SCALE: NO SCALE
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 10

BOSS Engineering



SCALE: 1 INCH = 20 FEET

SEE SHEET 2 FOR GENERAL NOTES AND LEGEND

STORM WATER MANAGEMENT NARRATIVE

PRE-DEVELOPMENT:
THE SITE CURRENTLY SITS VACANT AND SHEET FLOWS FROM EAST TO WEST TO THE LATSON ROAD STORM SEWER SYSTEM.

POST DEVELOPMENT:
THE SITE WILL BE DEVELOPED AND PAVED FOR USE AS A MULTI-TENANT COMMERCIAL SPACE WITH RESTAURANT AND RETAIL USE. THE SITE WILL CONTAIN A STORM SEWER COLLECTION SYSTEM WHICH WILL COLLECT ALL ON-SITE (AND SOME TRIBUTARY OFF-SITE) STORM WATER AND ROUTE IT TO A MECHANICAL PRETREATMENT UNIT. THE MECHANICAL PRETREATMENT UNIT IS PROPOSED AND DESIGNED TO MEET THE REQUIRED WATER QUALITY STANDARDS PRIOR TO DISCHARGE INTO THE PROPOSED ON-SITE UNDERGROUND DETENTION SYSTEM. INFILTRATION TESTING HAS BEEN COMPLETED ON A NEARBY AREA TO THE NORTH THAT INDICATE THAT ON-SITE SOILS IN THE VICINITY OF THE PROPOSED BASIN ARE APPROXIMATELY 1.5 IN/HR. APPLYING A FACTOR OF SAFETY OF 2, THE SITE IS UTILIZING A SOILS INFILTRATIVE CAPACITY OF 0.75 IN/HR.

ONE OF THE MAIN GOALS OF THE CURRENT LIVINGSTON COUNTY DRAIN COMMISSIONER STORM WATER STANDARDS IS TO PROMOTE ON-SITE INFILTRATION IF SUITABLE SOILS EXIST. IF SITE SOILS EXCEED 0.25 IN/HR, INFILTRATION IS EXPECTED TO BE IMPLEMENTED. AND WITH ON-SITE SOILS WITH INFILTRATIVE RATES GREATER THAN 0.50 IN/HR, THE SOILS DO NOT NEED ANY AMENDMENT TO FURTHER PROMOTE INFILTRATION. DUE TO THE GEOMETRICS OF THE SUBJECT SITE (BEING SHALLOW AND A SMALLER COMMERCIAL PARCEL), THERE ARE MINIMAL OPPORTUNITY TO PROMOTE INFILTRATION OTHER THAN AT THE LOCATION OF THE UNDERGROUND DETENTION SYSTEM. IN ORDER TO PROMOTE INFILTRATION AT THE BASIN FOOTPRINT PRIOR TO STORM WATER DISCHARGE TO THE LATSON ROAD STORM SEWER SYSTEM OCCURRING, THE UNDERGROUND DETENTION SYSTEM PIPE INVERT IS SET BELOW THE OUTLET CONTROL ORIFICE ELEVATION BY 2.5'. SO 2.5' OF THE 6' DIAMETER UNDERGROUND SYSTEM PIPE WILL BE BELOW THE OUTLET ELEVATION. A PERFORATED PIPE AND THE SURROUNDING STRUCTURAL BACKFILL AROUND THE UNDERGROUND DETENTION SYSTEM WILL AID IN PROMOTION OF THE INFILTRATION OF STORM WATER IN THE ON-SITE 0.75 IN/HR SOILS. THE VOLUME WITHIN THE UNDERGROUND SYSTEM THAT IS BELOW THE OUTLET ELEVATION IS 6,613 CFT:

593 LFT PIPE X 11.1511 CFT/LFT OF PIPE (BOTTOM 2.5' OF 6' DIA PIPE) = 6,613 CFT

THE 6,613 CFT PROVIDED BELOW THE INVERT IS INTENDED TO MEET OR EXCEED THE REQUIRED CHANNEL PROTECTION VOLUME 6,002 CFT. THIS DESIGN MEETS THAT VOLUME REQUIREMENT.

PER THE LCDC STANDARDS, VOLUME PROVIDED FOR THE CHANNEL PROTECTION VOLUME CAN BE CREDITED TOWARDS THE REQUIRED 100-YR DETENTION VOLUME, SO LONG AS THE REMAINING DETENTION VOLUME REQUIRED IS NOT LESS THAN THE EXTENDED DETENTION VOLUME. WITH THIS, A REMAINING 9,577 CFT OF VOLUME IS NEEDED:

16,190 CFT – 6,613 CFT = 9,577 CFT (REMAINING VOLUME NEEDED ABOVE OUTLET)
9,577 CFT > 8,772 CFT (EXTENDED DETENTION VOLUME)

A VOLUME OF 10,154 CFT IS PROVIDED ABOVE THE OUTLET CONTROL ELEVATION.

593 LFT PIPE X 17.1232 CFT/LFT OF PIPE (TOP 3.5' OF 6' DIA PIPE) = 10,154 CFT

THE TOTAL STORAGE VOLUME PROVIDED IN THE SYSTEM IS 16,767 CFT
(6,613 CFT BELOW OUTLET FOR CPVC INFILTRATION VOLUME + 10,154 CFT ABOVE OUTLET)

IN ORDER FOR INFILTRATION TO OCCUR IN THE BASIN FOOTPRINT, AN ADEQUATE FOOTPRINT FOR INFILTRATION MUST BE PROVIDED. PER THE LCDC STANDARDS AND WITH AN INFILTRATION RATE OF 0.75 IN/HR, A MINIMUM BASIN FOOTPRINT OF 3,430 SFT IS REQUIRED. A BASIN FOOTPRINT OF THE PROPOSED SYSTEM IS 4,692 SFT. WITH THIS FOOTPRINT AREA AND ON-SITE INFILTRATION RATE, THE PROVIDED RATE OF INFILTRATION IS 293.3 CFT/HR WHICH RESULTS IN FULL INFILTRATION WITHIN 22.5 HOURS.

4,692 SFT X (0.75 IN/HR X 1FT/12IN) = 293.3 CFT/HR
6,613 CFT / 293.3 CFT/HR = 22.5 HRS TO INFILTRATE THE PROVIDED CPVC STORAGE VOLUME BELOW THE OUTLET INVERT.

LIVINGSTON COUNTY DETENTION BASIN CALCULATIONS

AREA (ACRES)	IMPERVIOUS FACTOR	ACRE IMPERVIOUS
1.36	0.9	1.22
0.00	0.7	0.00
0.25	0.2	0.05

COMPOUND C = 0.79
TOTAL DRAINAGE AREA = 1.61 ACRES

WATER QUALITY VOLUME V_{WQ}
V_{WQ}= 3,630(C)(A) = 4617 FT³
Are upstream infiltration BMP's provided? no
V_F= 0.15(V_{WQ}) = 693 FT³

WATER QUALITY RATE FOR MECHANICAL STRUCTURE
T_C = MAX TIME OF CONCENTRATION = 18.85 MIN
Q_{WQ}= (C)(A)30.2/(T_C+9.17)^.81 = 2.58 CFS

CHANNEL PROTECTION VOLUME CONTROL - REQUIRED
V_{CP-R} = 4,719(C)(A) = 6002 FT³

CHANNEL PROTECTION VOLUME CONTROL - PROVIDED
In-Situ Infiltration rate = 0.75 IN/HR
Are upstream infiltration BMP's provided? NO INFILTRATION
Basin Footprint Infiltration Area Required = 3430 FT²
V_{CP-P} = 6813 FT³

CHANNEL PROTECTION RATE CONTROL (EXTENDED DETENTION VOLUME)
V_{ED} = 6,897(C)(A) = 8772 FT³

EXTENDED DETENTION OUTLET RATE
Q_{ED} = V_{ED}/(48hr) = 0.051 CFS
H_{ED} = V_{ED}/4,800 ($H^{1/2}$) = 1.0 1" HOLES
H = 1.69 FT
$ELEV_{ED}$ = 1010.86 FT

100-YEAR ALLOWABLE OUTLET RATE
Q_{DRAIN} = Restricted Drain Rate = 0.2 CFS/ACRE
Q_{VRR} = 1.1055 - 0.206LN(A) = 1.000 CFS/ACRE
Q_{100P} = (LESSER OF Q_{DRAIN} & Q_{VRR})*A = 0.322 CFS

VARIABLE RELEASE RATE	
1 CFS/ACRE	< 2 ACRES
0.15 CFS/ACRE	> 100 ACRES

100-YEAR DETENTION VOLUME
V_{100R} = 18985 (C)(A) = 24147 FT³
Q_{100IN} = (C)(A)83.3/(T_C+9.17)^0.81 = 7.12 CFS
R = 0.206-.15(ln(Q_{100P}/Q_{100IN}) = 0.6705
V_{100D} = V_{100R}*R-V_{CP-P} = 9577 FT³
Is V_{100D} ≥ V_{ED} ? YES
V_{100D} = 9577 FT³

BASIN STORAGE PROVIDED
Lineal Footage of Pipe in system: 593 lft

ELEVATION	INCREMENTAL VOLUME / LFT	VOLUME (FT³)	TOTAL VOLUME (FT³)	
1011.67	1.1254	667.4	10,154	16,767
1011.17	1.9721	1169.5	9,487	
1010.67	2.4302	1441.1	8,317	
1010.17	2.7225	1614.4	6,876	
1009.67	2.9009	1720.2	5,262	
1009.17	2.9861	1770.8	3,542	
1008.67	2.9861	1770.8	1,771	
1008.17		0.0	0	**BOTTOM OF STORAGE**
1008.17	2.9009	1720.2	6,613	**VOLUME BELOW OUTLET**
1007.67	2.7225	1614.4	4,892	**(FOR CPVC VOLUME)**
1007.17	2.4302	1441.1	3,278	
1006.67	1.9721	1169.5	1,837	
1006.17	1.1254	667.4	667	
1005.67	0	0	0	

PROVIDED FOOTPRINT OF BASIN BOTTOM AREA 4692 FT²

OUTLET CONTROL STRUCTURE

Q_{ED} ACTUAL
H_{ED} = 1 (1" HOLES)
A_{ED} = 0.0055 FT²
$Q_{ED-ACTUAL}$ = (A_{ED})(0.62 x (2 x 32.2 x h)^0.5) = 0.035 CFS

Q_{100ALL} OUTLET
$Q_{100-ACTUAL}$ = Q_{100P} - $Q_{ED-ACTUAL}$ = 0.287 CFS
A_{100} = $Q_{100-ACTUAL}$ / (0.62 * (2 *32.2 * ($ELEV_{DHWL}$ - $ELEV_{ED}$))^0.5) = 0.064 FT²
AREA OF 2 INCH DIAMETER ORIFICE = 0.022 FT²
ORIFICES = A100 / 0.005 = 2.0 ORIFICES

OVERFLOW SPILLWAY DESIGN
Design Flow Rate: Q_{100IN} = 7.12 CFS
Depth of Spillway: D_{SPILL} = 6 INCHES
Width of Spillway: W_{SPILL} = Q_{100IN}/3.33$D_{SPILL}^{3/2}$= 6.0 FT

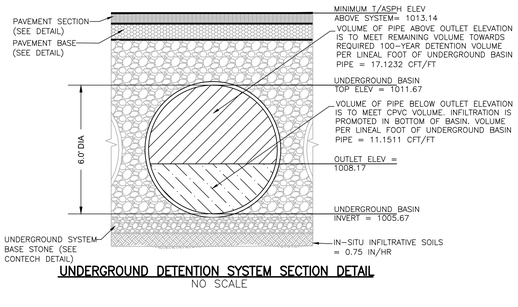
BASIN DESIGN SUMMARY	
BASIN SIZE REQUIRED =	9577 FT³
BASIN SIZE PROVIDED =	TOTAL VOLUM FT³

ORIFICE DESIGN SUMMARY		
ELEVATION	# OF HOLES	DIAMETER OF HOLES
1008.17	1.0	1 INCH
1010.86	2.0	2 INCH

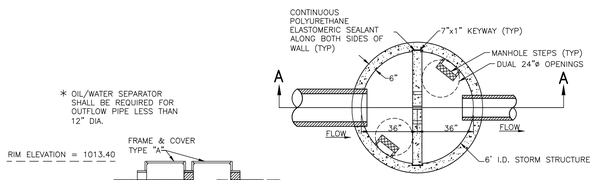
OVERFLOW SPILLWAY SUMMARY	
WIDTH OF OVERFLOW SPILLWAY =	8 FT

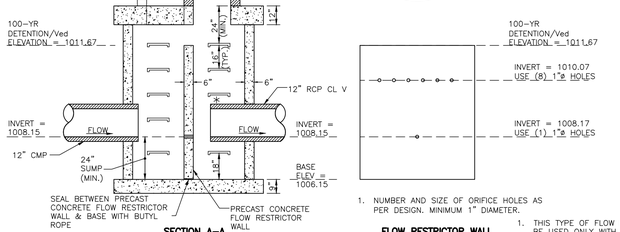
Design Criteria					
Site Designation	CS 101			Sizing Method	Treatment Flow Rate
Screening Required?	No	Treatment Flow Rate	2.58	Peak Flow (cfs)	5.39
Groundwater Depth (ft)	5 - 10	Pipe Invert Depth (ft)	0 - 5	Bedrock Depth (ft)	5 - 10
Multiple Inlets?	No	Grate Inlet Required?	Yes	Pipe Size (in)	18.00
Required Particle Size Distribution?	No	90° between two inlets?	N/A		

Treatment Selection					
Treatment Unit	CASCADE SEPARATOR	System Model	CS-6		
Target Removal	80%	Particle Size Distribution (PSD)	250		



UNDERGROUND DETENTION SYSTEM SECTION DETAIL
NO SCALE



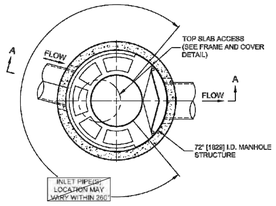


OVERFLOW CONTROL STRUCTURE 100 DETAIL
NO SCALE

1. NUMBER AND SIZE OF ORIFICE HOLES AS PER DESIGN. MINIMUM 1" DIAMETER.

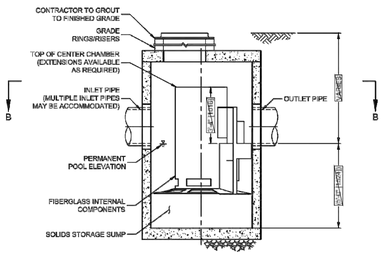
FLOW RESTRICTOR WALL
(FRONT VIEW)

1. THIS TYPE OF FLOW RESTRICTOR TO BE USED ONLY WITH UNDERGROUND DETENTION SYSTEMS.
2. THE PRECAST REINFORCED FLOW RESTRICTOR STRUCTURE SHALL BE MANUFACTURED PER ASTM C-478 SPECIFICATIONS.



PLAN VIEW B-B
NOT TO SCALE

FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE



ELEVATION A-A
NOT TO SCALE

CASCADE separator™

CASCADE SEPARATOR DESIGN NOTES

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

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

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (cfs [L/s])			
PEAK FLOW RATE (cfs [L/s])			
RETURN PERIOD OF PEAK FLOW (yrs)			
RIM ELEVATION			
PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			

NOTES / SPECIAL REQUIREMENTS:

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE, www.ContechES.com
3. CASCADE SEPARATOR'S WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. CASCADE SEPARATOR STRUCTURE SHALL MEET AASHTO H20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [0-10], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

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

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

CS-6
CASCADE SEPARATOR
STANDARD DETAIL

MECHANICAL PRETREATMENT STRUCTURE 101 DETAIL

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE PLANS IS APPROXIMATE AND NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL LOCATE AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CONNECTIONS PRIOR TO CONSTRUCTION AND SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND TO EXIST BETWEEN THE PROPOSED CONSTRUCTION AND EXISTING UTILITIES FROM THE PLANS. THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171
IT'S THE LAW!!! (MICHIGAN PUBLIC ACT 53 OF 1974, AS AMENDED) MISS DIG SYSTEM, INC.

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

PROJECT: SOUTH LATSON COMMERCIAL DEVELOPMENT
1015 LATSON ROAD LLC
2932 BECK ROAD
WIXOM, MI 48393
248.773.7992
PREPARED FOR

TITLE: BASIN DETAILS

NO	BY	REVISION PER	DATE
1	ST	PER TOWNSHIP COMMENTS	10-25-23

DESIGNED BY: ST
DRAWN BY: DH
CHECKED BY:
SCALE: 1" = 20'
JOB NO: 21-519
DATE: 10/04/2023
SHEET NO. 11

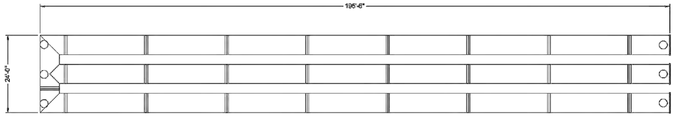
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 583 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 10,179 CF
- PIPE STORAGE VOLUME = 10,707 CF
- BACKFILL STORAGE VOLUME = 0 CF

PIPE DETAILS
- DIAMETER = 72"
- CORRUGATION = 6x1
- GAGE = 10
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

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



NOTES
- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE, ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A905.
- ALL RISERS AND STUBS ARE 2⅔" x ½" CORRUGATION AND 10 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE IS OWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYO DS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 20'

DATE	REVISION DESCRIPTION	BY

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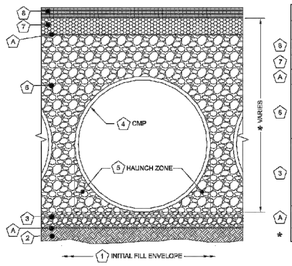
CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO39920 East Latson - South Parcel
South Parcel - COPY
Howell, MI
DETENTION SYSTEM

PROJECT# / NO.: 20585	REV. No.: 89002	DATE: 10/25/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: EYO	
SHEET NO.:	1	



Infiltration Systems - CMP Infiltration & CMP Perforated Drainage Pipe

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

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

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT.

FOUNDATION/BEDDING PREPARATION

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

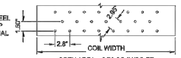
3 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMLY COMPACTED WITHOUT SOFT SPOTS.

BACKFILL
MATERIAL SHALL BE PLACED IN 6"-10" MAXIMUM LIFTS. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY PIPE IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

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

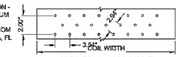
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

2 2/3" x 1/2" CORRUGATION - STEEL AND ALUMINUM CMP EDGE SPACING EQUAL ON BOTH SIDES



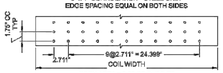
OPEN AREA = 3.76 SQ IN/SQ FT

3" x 1" CORRUGATION - STEEL AND ALUMINUM CMP (COIL PROVIDED FROM CONTECH LANTANA, FL PLANT)



OPEN AREA = 4.16 SQ IN/SQ FT

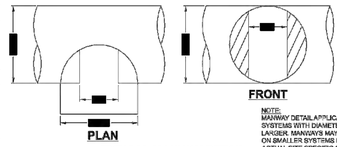
5" x 1" CORRUGATION - STEEL ONLY EDGE SPACING EQUAL ON BOTH SIDES



OPEN AREA = 3.33 SQ IN/SQ FT

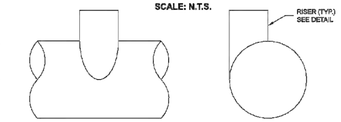
NOTES:
1. PERFORATIONS MEET AASHTO AND ASTM SPECIFICATIONS.
2. PERFORATION OPEN AREA PER SQUARE FOOT OF PIPE IS BASED ON THE NOMINAL DIAMETER AND LENGTH OF PIPE.
3. ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
4. ALL HOLES Ø3/8".

TYPICAL PERFORATION DETAIL
SCALE: N.T.S.



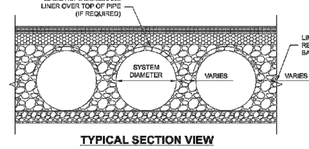
TYPICAL MANWAY DETAIL
SCALE: N.T.S.

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



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

TYPICAL RISER DETAIL
SCALE: N.T.S.



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

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

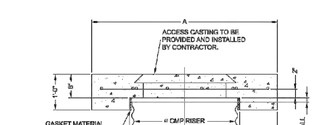
CONSTRUCTION LOADS

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

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	16-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

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

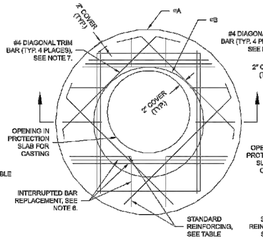
CONSTRUCTION LOADING DIAGRAM
SCALE: N.T.S.



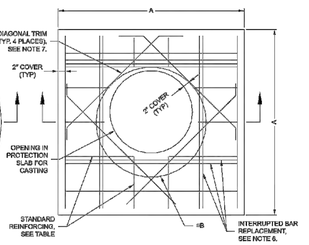
SECTION VIEW

REINFORCING TABLE				
ø CMP RISER	A	ø B	REINFORCING	**BEARING PRESSURE (PSF)
24"	ø 6" 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	ø 6" 4'-0" X 4'-4"	33"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	ø 8" X 5'	39"	#5 @ 10" OCEW #5 @ 10" OCEW	1,800 1,350
42"	ø 10"-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	ø 12" X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

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

MANHOLE CAP DETAIL
SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

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

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

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

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

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

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

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

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

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

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

GALVANIZED: AASHTO M-36 OR ASTM A-760

ARMAMIDE COATED: AASHTO M-245 OR ASTM A-762

ALUMINUM: AASHTO M-196 OR ASTM B-745

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

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

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

DATE	REVISION DESCRIPTION	BY

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO39920 East Latson - South Parcel
South Parcel - COPY
Howell, MI
DETENTION SYSTEM

PROJECT# / NO.: 20585	REV. No.: 89002	DATE: 10/25/2023
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: EYO	
SHEET NO.:	1	

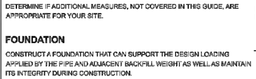
CMP DETENTION INSTALLATION GUIDE

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

FOUNDATION

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

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

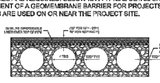


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING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

GEOMEMBRANE BARRIER

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

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



IN-SITU TRENCH WALL

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

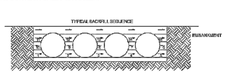
IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.

BACKFILL PLACEMENT

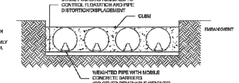
MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

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

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 6'-TO 10'-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



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

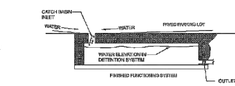


CONSTRUCTION LOADING

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

ADDITIONAL CONSIDERATIONS

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



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

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

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

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

MAINTENANCE

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

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

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

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

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED

PIPE RESTRAINT SCHEDULE

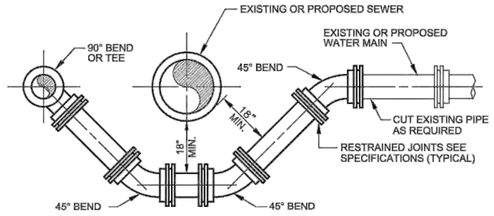
GROUND BURIED PRESSURE PIPE - POLYETHYLENE ENCASED DUCTILE IRON PIPE

PIPE DIAMETER	TEES, 90° BENDS	45° BENDS	22-1/2° BENDS	11-1/4° BENDS	DEAD ENDS	REDUCERS (ONE SIZE REDUCTION)*	REDUCERS (TWO SIZE REDUCTIION)*
4	13	5	3	1	40	--	--
6	19	8	4	2	58	31	--
8	24	10	5	2	75	30	70
12	34	14	7	3	107	57	116
16	43	18	9	4	139	59	137
20	52	22	10	5	169	59	134
24	61	25	12	6	199	60	132
30	73	30	15	7	242	85	168
36	84	35	17	8	281	84	168

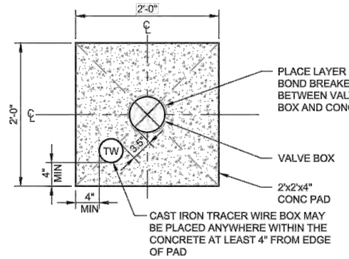
1. LENGTHS OF PIPE RESTRAINT ARE GIVEN IN FEET.
2. IF REQUIRED PIPE DIAMETER IS NOT LISTED IN THIS TABLE, THE NEXT LARGEST PIPE DIAMETER SHALL BE USED.
3. THIS TABLE IS BASED ON A TEST PRESSURE OF 180 PSI (OPERATING PRESSURE PLUS WATER HAMMER. FOR OTHER TEST PRESSURES, ALL VALUES TO BE INCREASED OR DECREASED PROPORTIONALLY.
4. THE VALUES PROVIDED OF RESTRAINT LENGTH ARE IN EACH DIRECTION FROM THE POINT OF DEFLECTION OR TERMINATION EXCEPT FOR TEES, AT WHICH ONLY THE BRANCH IN THE DIRECTION OF THE STEM.
5. IF TIE RODS ARE USED, USE FOUR RODS MINIMUM AND ADD 1/8-INCH TO BAR DIAMETER AS CORROSION ALLOWANCE.

* SIZE REDUCTION IS BASED UPON THE PIPE DIAMETER SHOWN IN THIS TABLE.

BASED UPON:
INTERNAL PRESSURE: 180
PIPE DEPTH: 5
BEDDING CLASS: TYPE 4
SOIL TYPE: GOOD SAND
SAFETY FACTOR: 2

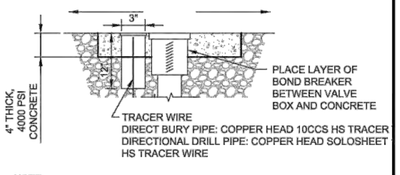


WATER MAIN UTILITY OFFSET



NOTE: ALL BOXES & ADJOINING TW BOXES SHALL BE ENCASED IN A CONC. PAD UNLESS OTHERWISE DETERMINED BY MHOG.

PLAN

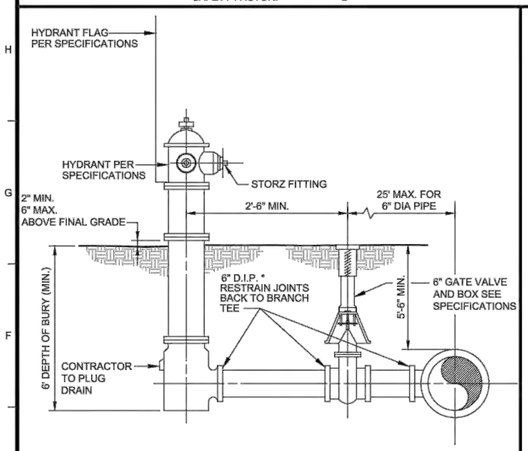


NOTE:
1. TRACER WIRE BOXES LOCATED WITHOUT A VALVE BOX ONLY REQUIRE AN 18" X 18" CONCRETE PAD.
2. TRACER WIRE BOX SHALL HAVE A LOCKING LID W/STANDARD AWWA PENTAGON KEY.
3. TRACER WIRE BOX SHALL BE COPPERHEAD RB14"TP IN ASPHALT INSTALLATIONS AND CD14"TP FOR ALL OTHER INSTALLATIONS.

SECTION

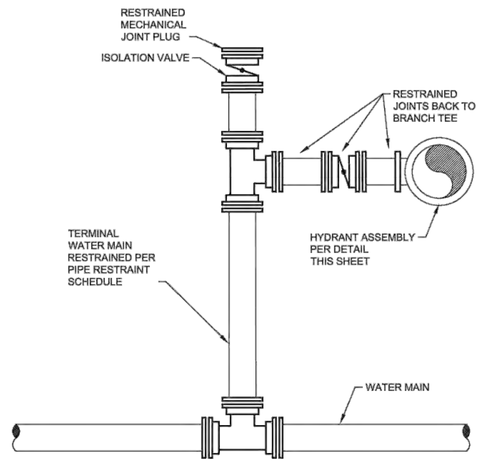
VALVE/TRACER WIRE BOX IN CONCRETE DETAIL

NO SCALE

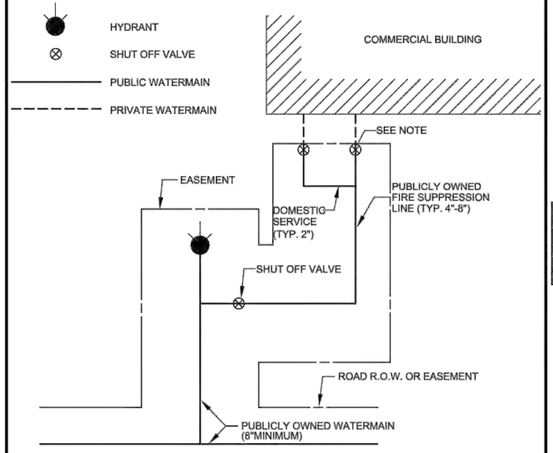


* THE LENGTH OF 6" PIPE FROM THE MAIN TO THE HYDRANT ASSEMBLY CANNOT EXCEED 25'. ANY PIPE OVER 25 FEET SHALL BE 8" DIAMETER MINIMUM AND DESIGNED PER MHOG SPECIFICATIONS.

FIRE HYDRANT ASSEMBLY

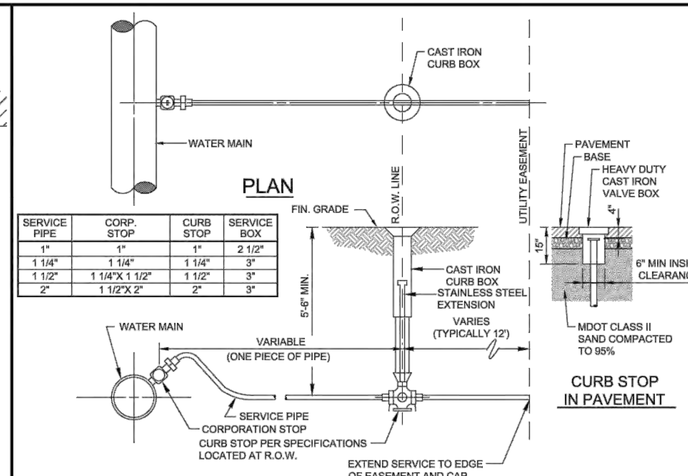


TERMINAL HYDRANT DETAIL



NOTE: FIRE SUPPRESSION LINE AND DOMESTIC SERVICE TO BE LOCATED WITHIN EASEMENT UP TO SHUTOFF VALVES OUTSIDE OF BUILDING.

COMMERCIAL BUILDING WATER SERVICE LAYOUT

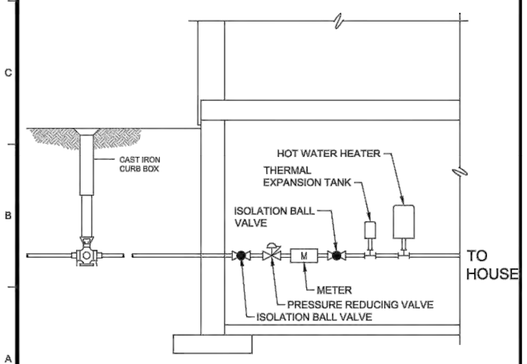


SERVICE PIPE	CORP. STOP	CURB STOP	SERVICE BOX
1"	1"	1"	2 1/2"
1 1/4"	1 1/4"	1 1/4"	3"
1 1/2"	1 1/4"X 1 1/2"	1 1/2"	3"
2"	1 1/2"X 2"	2"	3"

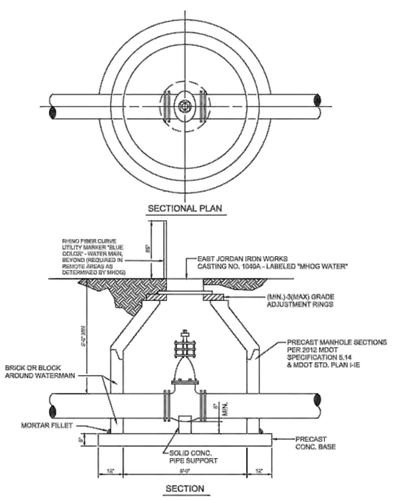
CURB STOP IN PAVEMENT

SECTION

WATER SERVICE LATERAL

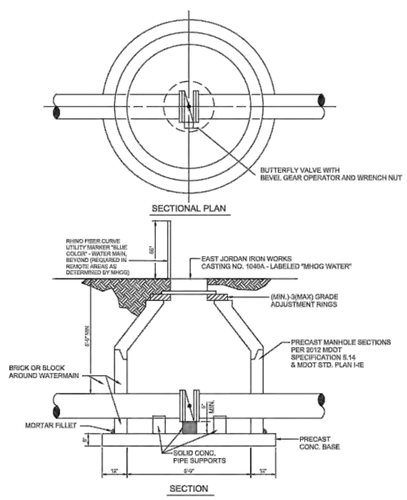


PRIVATE RESIDENCE
PRESSURE REDUCING VALVE (PRV)



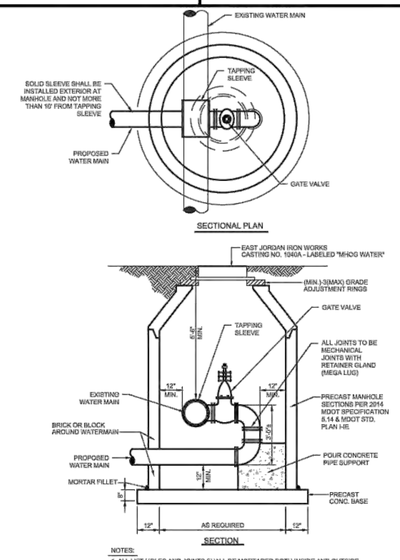
NOTES:
1. ALL LIFT HOLES AND JOINTS SHALL BE MORTARED BOTH INSIDE AND OUTSIDE.
2. BLOCK MANHOLES TO BE USED ONLY WITH ENGINEERS PERMISSION.
3. NO STEPS PERMITTED.

VALVE AND GATE WELL



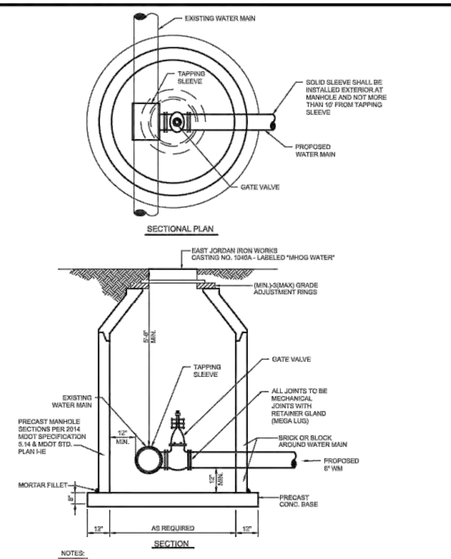
NOTES:
1. ALL LIFT HOLES AND JOINTS SHALL BE MORTARED BOTH INSIDE AND OUTSIDE.
2. BLOCK MANHOLES TO BE USED ONLY WITH ENGINEERS PERMISSION.
3. NO STEPS PERMITTED.

BUTTERFLY VALVE AND WELL



NOTES:
1. ALL LIFT HOLES AND JOINTS SHALL BE MORTARED BOTH INSIDE AND OUTSIDE.
2. BLOCK MANHOLES TO BE USED ONLY WITH ENGINEERS PERMISSION.
3. TAPPING SLEEVES ONLY PERMITTED FOR CONNECTIONS SMALLER THAN MAIN LINE.
4. NO STEPS PERMITTED.

REVERSE TAP GATE WELL



NOTES:
1. ALL LIFT HOLES AND JOINTS SHALL BE MORTARED BOTH INSIDE AND OUTSIDE.
2. BLOCK MANHOLES TO BE USED ONLY WITH ENGINEERS PERMISSION.
3. TAPPING SLEEVES ONLY PERMITTED FOR CONNECTIONS SMALLER THAN MAIN LINE.
4. NO STEPS PERMITTED.

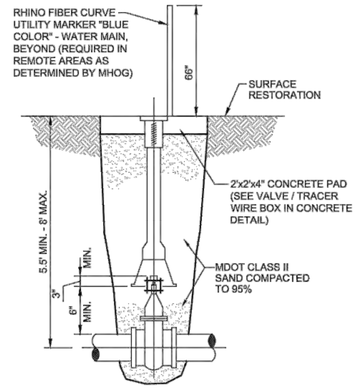
REGULAR TAP GATE WELL

MARION HOWELL OCEOLA GENOA
Sewer and Water Authority

STANDARD DETAILS

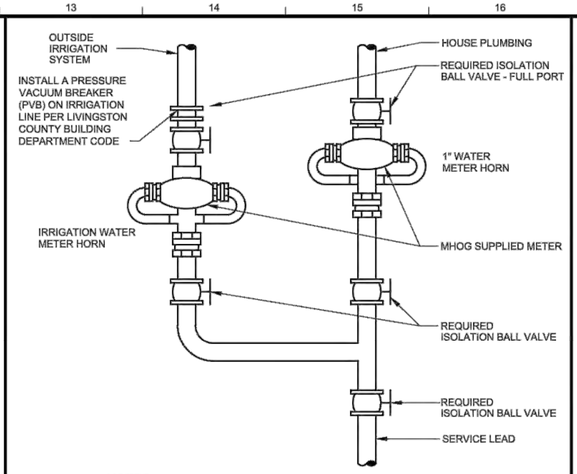
Scale:	NONE
Issued Date	JANUARY - 2014

UPDATED: MAY 2015
UPDATED: FEBRUARY 2016
UPDATED: APRIL 2016
UPDATED: OCTOBER 2017
UPDATED: FEBRUARY 2019
UPDATED: NOVEMBER 2022



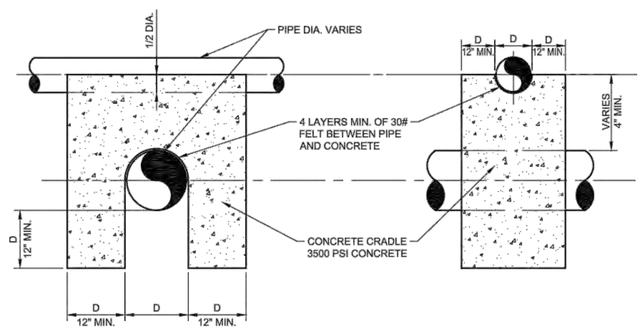
NOTES:
1. VALVE BOX SHALL NOT REST ON VALVE OR MAIN LINE PIPE.
2. A VALVE STEM EXTENSION WITH CENTERING RING IS REQUIRED FOR VALVES BURIED DEEPER THAN 8'.

GATE VALVE AND BOX



NOTES:
1. ALL METERS ARE TO BE INSTALLED HORIZONTALLY IN A DRY, CLEAN, SANITARY LOCATION THAT IS READILY ACCESSIBLE. THIS DRAWING IS NOT TO SCALE & IS ONLY A REPRESENTATION OF HOW THE VALVES AND METERS SHOULD BE INSTALLED. THE SECOND METER IS OPTIONAL FOR IRRIGATION USAGE. METERS SHOULD NOT BE INSTALLED IN LINE (ONE RIGHT AFTER THE OTHER).
2. PROPERTIES DESIGNATED "HIGH HAZARD" PER THE MHOG CROSS CONNECTION RULES MANUAL WILL REQUIRE THE INSTALLATION OF A REDUCED PRESSURE ZONE (RPZ) BACK FLOW PREVENTION DEVICE.

TYPICAL METER HORN INSTALLATION



CONCRETE CRADLE DETAIL

SCALE: NONE

MHOG CASTING DETAIL

NO SCALE

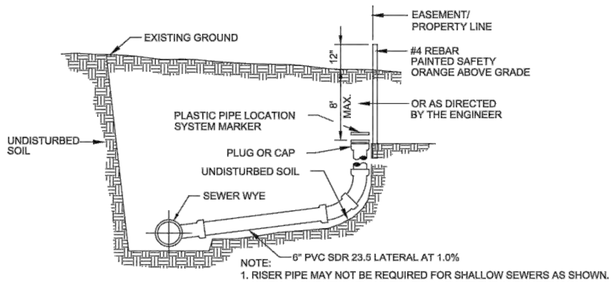
MARION HOWELL OCEOLA GENOA
Sewer and Water Authority

STANDARD DETAILS

Scale: NONE

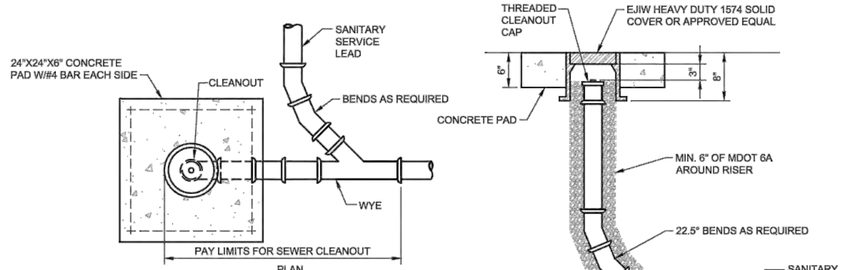
Issued Date JANUARY - 2014

UPDATED: MAY 2015
UPDATED: FEBRUARY 2016
UPDATED: APRIL 2016
UPDATED: OCTOBER 2017
UPDATED: FEBRUARY 2019
UPDATED: NOVEMBER 2022



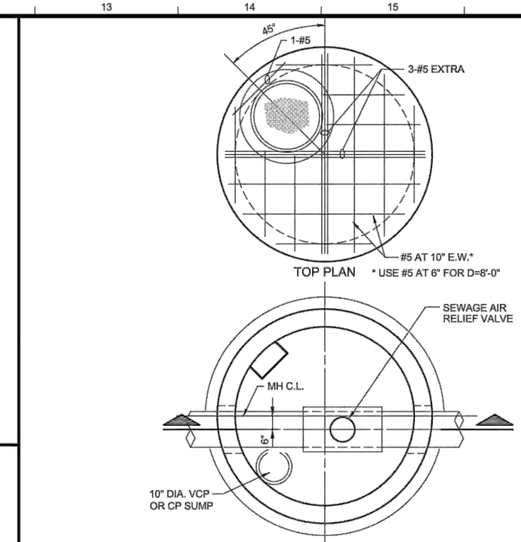
NOTE:
1. RISER PIPE MAY NOT BE REQUIRED FOR SHALLOW SEWERS AS SHOWN.
2. WHEN CONNECTING TO AN EXISTING SEWER THE AUTHORITY MAY REQUIRE CORING OF THE EXISTING PIPE AND INSTALLATION OF A SEWER SADDLE. SADDLE SHALL BE ROMAC "CB" SEWER SADDLE OR APPROVED EQUAL.

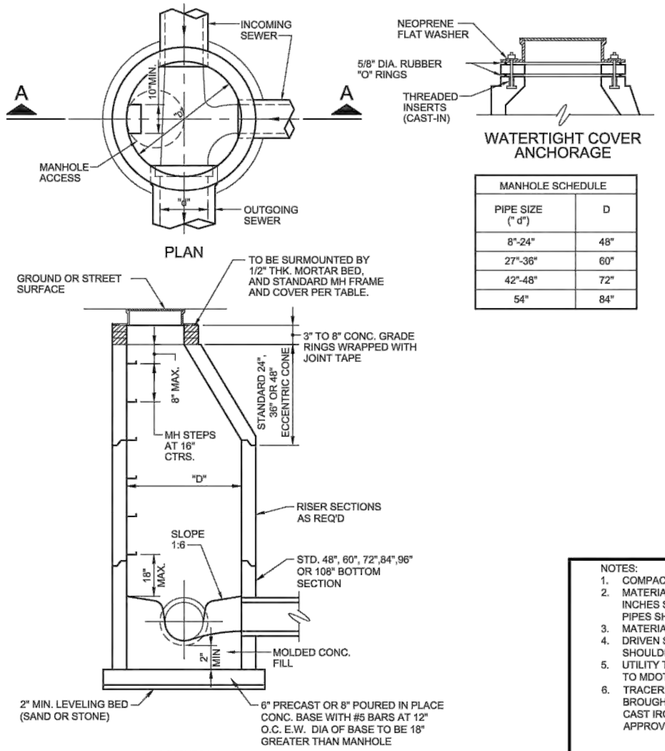
SANITARY SEWER LATERAL



NOTES:
1. ALL CONNECTION SHALL BE BELL AND SPIGOT TYPE.
2. CLEANOUT IS TO BE SAME DIAMETER AS SERVICE LEAD.
3. CONCRETE PAD REQUIRED UNLESS OTHERWISE DETERMINED BY MHOG.
4. THERE MUST BE A 3" GAP FROM THE BOTTOM OF THE CLEAN OUT LID TO THE TOP OF THE THREADED CAP.

SEWER CLEANOUT DETAIL



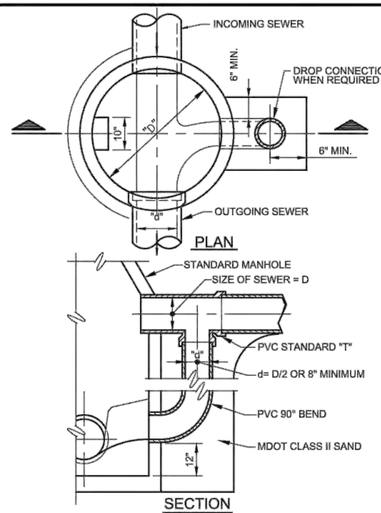


MANHOLE SCHEDULE	
PIPE SIZE ("d")	D
8"-24"	48"
27"-36"	60"
42"-48"	72"
54"	84"

NOTES:
1. ALL SANITARY MANHOLES TO BE PRECAST REINFORCED CONCRETE WITH PREMIUM JOINTS. SEE SPECIFICATIONS FOR BASE SLAB AND PIPE OPENINGS AND CONNECTIONS.
2. MANHOLE CONES SHALL BE THE ECCENTRIC TYPE.
3. PROVIDE 6" OF COMPACTED GRANULAR MATERIAL UNDER ALL PRECAST CONCRETE BASE SLPVC.
4. FORCE MAINS CONNECT DIRECTLY TO A MANHOLE SHALL BE INSTALLED SO THAT THE ELEVATION OF THE PIPE CROWNS MATCH. THE FORCE MAIN SHALL BE DIRECTED DOWNWARD INTO THE FLOW CHANNEL.
5. FOR SANITARY SEWERS ALL PIPES SHALL ENTER MANHOLE THROUGH RUBBER BOOTED CONNECTION.

FRAME & COVER FOR SANITARY SEWER MANHOLES			
		MANUFACTURER OR EQUAL	
TYPE	TYPE OF COVER	EAST JORDAN	NEENAH
MH	SANITARY - SOLID SELF-SEALING	1040.0000	R-1642
MH	SANITARY - SOLID WATERTIGHT	1040-APT	R-1916-F
CO	SOLID	1574A	R-1973-A

STANDARD MANHOLE



REQUIRED WHEN AN INLET PIPE IS 24" OR MORE ABOVE THE OUTLET PIPE IN A MANHOLE

DROP CONNECTION

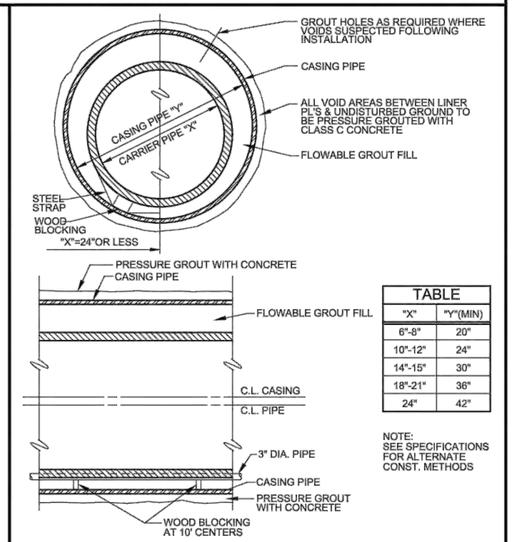
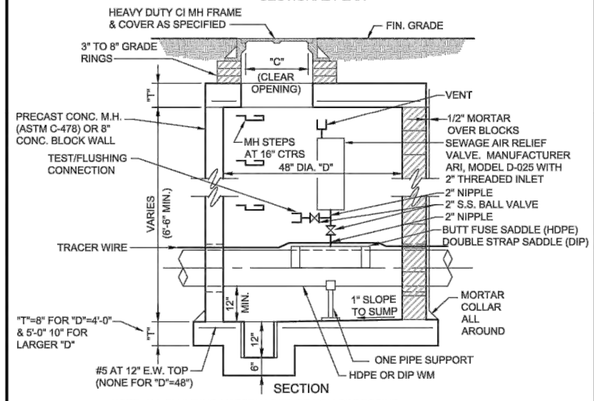


TABLE	
"X"	"Y"(MIN)
6"-8"	20"
10"-12"	24"
14"-15"	30"
18"-21"	36"
24"	42"

NOTE:
SEE SPECIFICATIONS FOR ALTERNATE CONST. METHODS

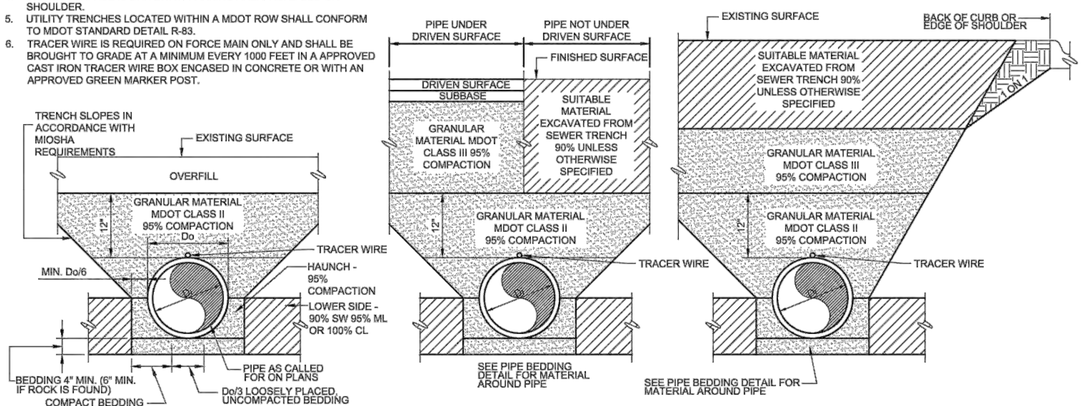
CASING PIPE



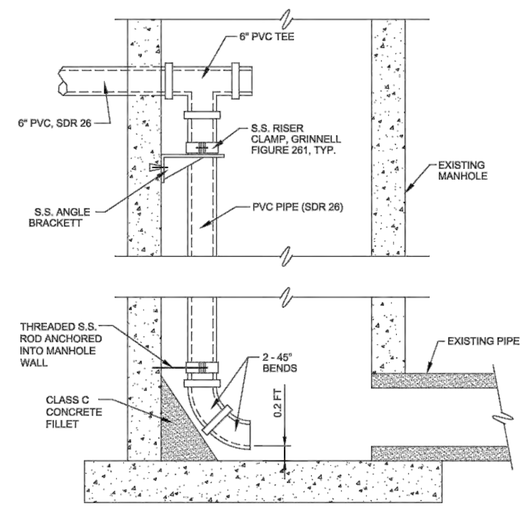
NOTE: ALL PLUMBING MATERIALS TO BE NON-CORROSIVE, ALL FITTINGS SHALL BE STAINLESS STEEL.

AIR RELIEF STRUCTURE

NOTES:
1. COMPACTION PRESENTED AS MINIMUM STANDARD PROCTOR VALUES.
2. MATERIALS AROUND THERMOPLASTIC PIPE WITH DIAMETER < 6 INCHES SHALL PASS 0.5 INCH SIEVE, MATERIALS AROUND OTHER PIPES SHALL PASS 1.5 INCH SIEVE.
3. MATERIALS AROUND HDPE PIPE TO BE MDOT 6A OR 21AA.
4. DRIVEN SURFACE IS DRIVEWAY, PARKING AREA, ROAD BED OR SHOULDER.
5. UTILITY TRENCHES LOCATED WITHIN A MDOT ROW SHALL CONFORM TO MDOT STANDARD DETAIL R-83.
6. TRACER WIRE IS REQUIRED ON FORCE MAIN ONLY AND SHALL BE BROUGHT TO GRADE AT A MINIMUM EVERY 1000 FEET IN A APPROVED CAST IRON TRACER WIRE BOX ENCASED IN CONCRETE OR WITH AN APPROVED GREEN MARKER POST.



TRENCH EXCAVATION & PIPE BEDDING



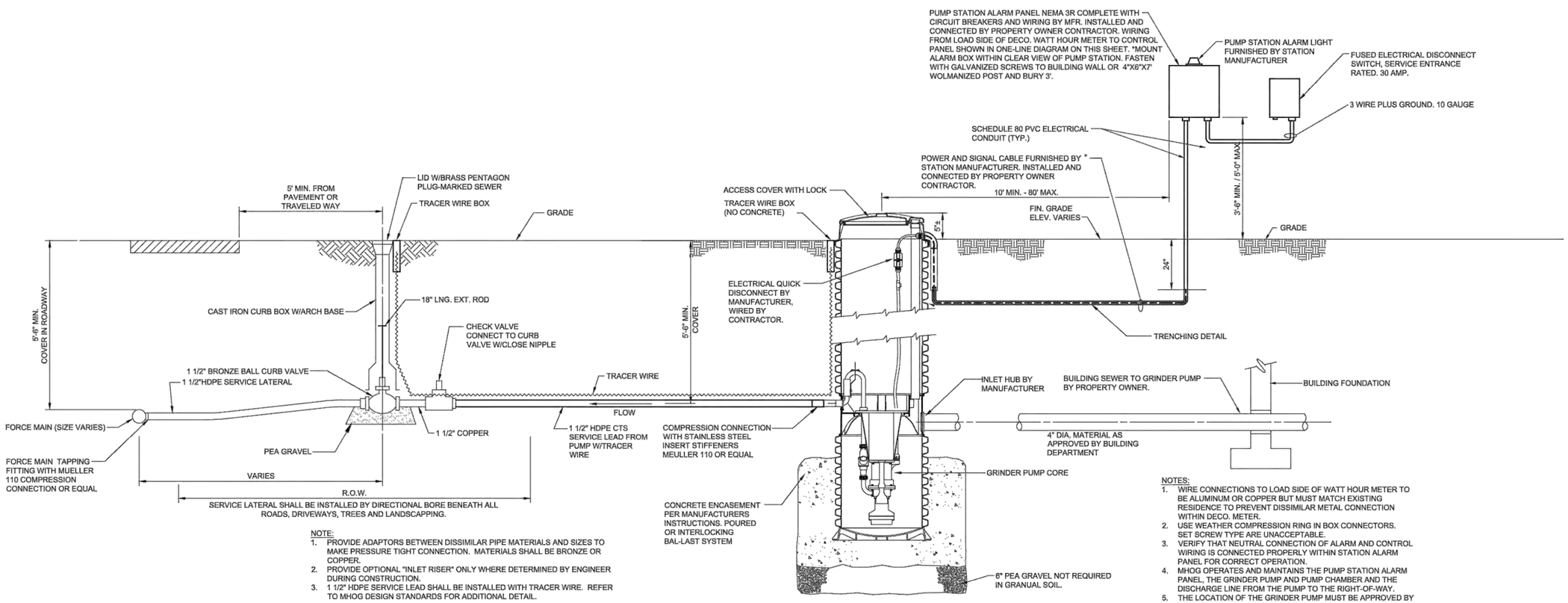
INTERIOR SEWER LATERAL DROP CONNECTION

MARION HOWELL OCEOLA GENOA
Sewer and Water Authority

STANDARD DETAILS

Scale: NONE
Issued Date JANUARY - 2014

UPDATED: MAY 2015
UPDATED: FEBRUARY 2016
UPDATED: APRIL 2016
UPDATED: OCTOBER 2017
UPDATED: FEBRUARY 2019

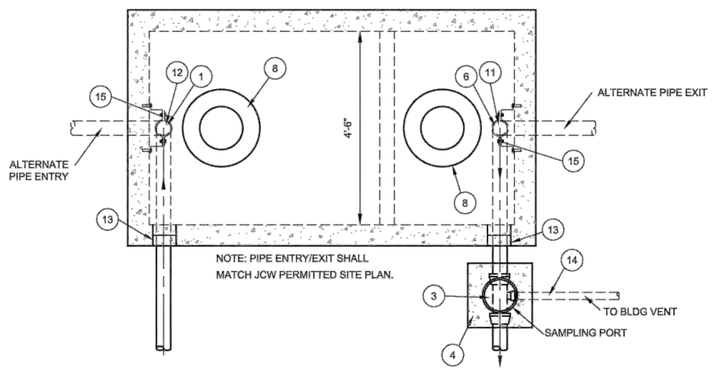


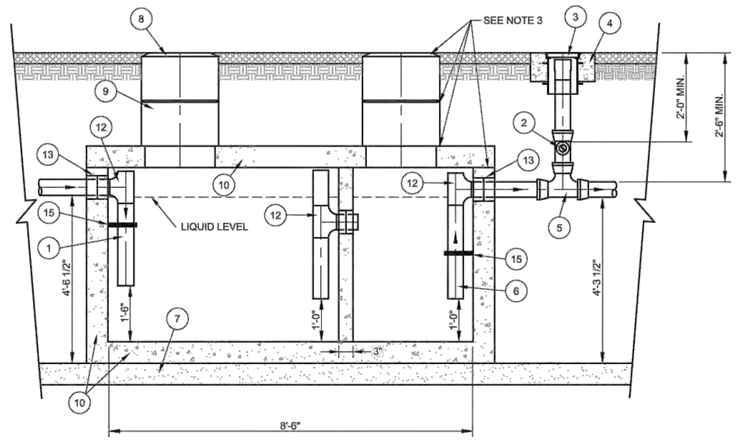
NOTE:
1. PROVIDE ADAPTORS BETWEEN DISSIMILAR PIPE MATERIALS AND SIZES TO MAKE PRESSURE TIGHT CONNECTION. MATERIALS SHALL BE BRONZE OR COPPER.
2. PROVIDE OPTIONAL "INLET RISER" ONLY WHERE DETERMINED BY ENGINEER DURING CONSTRUCTION.
3. 1 1/2" HDPE SERVICE LEAD SHALL BE INSTALLED WITH TRACER WIRE. REFER TO MHOG DESIGN STANDARDS FOR ADDITIONAL DETAIL.

NOTES:
1. WIRE CONNECTIONS TO LOAD SIDE OF WATT HOUR METER TO BE ALUMINUM OR COPPER BUT MUST MATCH EXISTING RESIDENCE TO PREVENT DISSIMILAR METAL CONNECTION WITHIN DECO. METER.
2. USE WEATHER COMPRESSION RING IN BOX CONNECTORS. SET SCREW TYPE ARE UNACCEPTABLE.
3. VERIFY THAT NEUTRAL CONNECTION OF ALARM AND CONTROL WIRING IS CONNECTED PROPERLY WITHIN STATION ALARM PANEL FOR CORRECT OPERATION.
4. MHOG OPERATES AND MAINTAINS THE PUMP STATION ALARM PANEL, THE GRINDER PUMP AND PUMP CHAMBER AND THE DISCHARGE LINE FROM THE PUMP TO THE RIGHT-OF-WAY.
5. THE LOCATION OF THE GRINDER PUMP MUST BE APPROVED BY MHOG PRIOR TO INSTALLATION. THE GRINDER PUMP MUST BE SERVICEABLE (ACCESSIBLE BY TRUCK) AND FREE FROM OBSTRUCTION.
6. MHOG MUST BE ONSITE FOR STARTUP OF ALL NEW GRINDER PUMPS.

SIMPLEX/DUPLEX GRINDER PUMPING STATION

NO SCALE





ITEM	DESCRIPTION
1	4" PVC INLET PIPE*
2	4"x4"x2" TEE WITH 2" PIPE TO BUILDING VENT*
3	THREADED C/O CAP JOSAM 58860 OR APP EQUAL**
4	CONCRETE PAD
5	4"x4"x4" TWO-WAY CLEANOUT TEE*
6	4" PVC OUTLET*
7	4" - 6" GRAVEL BEDDING
8	HEAVY-DUTY CAST IRON FRAME AND COVER ***
9	CONCRETE ADJUSTMENT RINGS
10	REINFORCE AS REQUIRED FOR SERVICE CONDITIONS
11	4" PVC 90° ELBOW*
12	4" PVC TEE*
13	A-LOK OR PRESS SEAL PSX PIPE/WALL CONNECTOR
14	2" VENT PIPE (IDENTIFY PIPE TYPE, CLASS & JOINT AS REQUIRED FOR PROJECT)
15	STAINLESS STEEL PIPE SUPPORT CLAMP ****

* 6" PIPE MAY BE SUBSTITUDED TO MATCH UPSTREAM PIPE DIAMETER.
** REFER TO CLEAN OUT DETAIL(S) ON STANDARD DETAIL SHEET.
*** CLAY & BAILEY 2008 BV OR EQUAL (FROST PROOF COVERS OPTIONAL)
****FM STAINLESS FASTNERS #63 OR EQUAL. 1/2"x2-1/2" SS BRACKET W/ 1/2"x1-1/2" FULLY THREADED SS HEX BOLT WITH 1/2" SS WASHER AND 1/2"X1-3/4" SS ANCHORS. CLAMP TO BE FACTORY INSTALLED.

NOTES:
1. THREE COVERS AND RISERS SHOWN. TWO COVERS AND RISERS CENTERED OVER UPPER TWO BAFFLES ARE OPTIONAL.
2. INTERCEPTOR SIZE - 1000 GAL MINIMUM (REVISE THE SIZE DIMENSIONS, AS NEEDED, FOR LARGER CAPACITY INTERCEPTORS)
3. ALL JOINTS AT THE FRAME & COVER*, CONCRETE ADJUSTMENT RINGS AND THE LID OF THE INTERCEPTOR SHALL BE SEALED WITH A MINIMUM OF TWO (2) ROWS OF 3/4 TO 1 INCH PREFORMED BUTYL JOINT SEALER AND A 6" BUTYL JOINT WRAP AROUND SLEEVE (EZ WRAP). THE ENDS OF THE 6" EZ WRAP SHALL OVERLAP BY 12".
4. PIPING ON THE INTERIOR OF THE INTERCEPTOR SHALL BE PVC WITH SOLVENT-CEMENTED JOINTS.
5. GREASE INTERCEPTOR INCLUDING ADJUSTMENT RINGS AND CASTINGS SHALL BE WATER TESTED FOR WATER TIGHTNESS AFTER THE BACKFILL OPERATIONS HAVE BEEN COMPLETED. WATER TESTING SHALL CONSIST OF THE FOLLOWING: 1. SEAL THE TANK, 2. FILL WITH WATER, 3. LET STAND FOR 24 HOURS, 4. REFILL TANK, 5. TANK IS APPROVED IS WATER LEVEL IS HELD FOR 1 HOUR.
6. ONLY KITCHEN WASTE SHALL BE DIVERTED TO THE GREASE TRAP.

GREASE INTERCEPTOR 1000 GALLON

NO SCALE

MARION HOWELL OCEOLA GENOA
Sewer and Water Authority

STANDARD DETAILS

Scale: NONE
Issued Date JANUARY - 2014

UPDATED: MAY 2015
UPDATED: FEBRUARY 2016
UPDATED: APRIL 2016
UPDATED: OCTOBER 2017
UPDATED: FEBRUARY 2019
UPDATED: NOVEMBER 2022

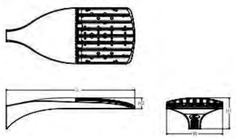
D-Series Size 1
LED Area Luminaire

Catalog Number
Notes
Type

d-series

Specifications

EPA:	0.69 ft² (0.06 m²)
Length:	32.71" (83.1 cm)
Width:	14.26" (36.2 cm)
Height H1:	7.88" (20.0 cm)
Height H2:	2.73" (6.9 cm)
Weight:	34 lbs (15.3 kg)



Introduction

The modern styling of the D-Series features a highly refined aesthetic that blends seamlessly with its environment. The D-Series offers the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. D-Series outstanding photometry aids in reducing the number of poles required in area lighting applications with typical energy savings of 65% and expected service life of over 100,000 hours.

Ordering Information

EXAMPLE: DSX1 LED P7 40K 70CRI T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX1 LED

Series	LEDs	Color temperature	Color Rendering Index	Distribution	Voltage	Mounting
DSX1 LED	**Forward optics** (this section 70CRI only): P1 P6; P2 P7; P3 P8; P4 P9; P5 (this section 80CRI only, extended lead times apply); **Rotated optics** P10 P12; P11 P13	30K 3000K; 40K 4000K; 50K 5000K; 27K 2700K; 30K 3000K; 35K 3500K; 40K 4000K; 50K 5000K	70CRI; 80CRI; 80CRI; 80CRI; 80CRI	AFR Automotive front row; T1S Type I short; T2M Type II medium; T3M Type III medium; T3LG Type III low glare; T4M Type IV medium; T4LG Type IV low glare; TFTM Forward throw medium; T5M Type V medium; T5LG Type V low glare; T5W Type V wide; BLC3 Type III backlight control; BLC4 Type IV backlight control; LCCO Left corner cutoff; RCCO Right corner cutoff	MVOLT (120V-277V); HVOLT (347V-480V); XVOLT (277V - 480V); 120; 208; 240; 277; 347; 480	**Shipped included** SPA Square pole mounting (#8 drilling); RPA Round pole mounting (#8 drilling); SPA5 Square pole mounting (#5 drilling); RPA5 Round pole mounting (#5 drilling); SPA8N Square narrow pole mounting (#8 drilling); WBA Wall bracket; MA Mast arm adapter (mounts on 2 1/8" OD horizontal tenon)

Control options	Other options	Finish
Shipped installed NLTAIR2 PIRHN nLight AIR gen 2 enabled with fc-level motion / ambient sensor, 8–40' mounting height, ambient sensor enabled at 2fc; PIR fc-level, motion/ambient sensor, 8–40' mounting height, ambient sensor enabled at 2fc; PER NEMA twist-lock receptacle only (controls ordered separately); PERS Five-pin receptacle only (controls ordered separately)	PER7 Seven-pin receptacle only (controls ordered separately); FAO Field adjustable output; BL30 Bi-level switched dimming, 30%; BL50 Bi-level switched dimming, 50%; DMG 0-10V dimming wires pulled outside fixture (for use with an external control, ordered separately); DS Dual switching	**Shipped installed** SPD20KV 20kV surge protection; HS Houseside shield (black finish standard); L90 Left rotated optics; R90 Right rotated optics; CCE Coastal Construction; HA 50°C ambient operation; BAA Buy American Act Compliant; SF Single fuse (120, 277, 347V); DF Double fuse (208, 240, 480V); **Shipped separately** EGSR External Glare Shield (reversible, field-install required, matches housing finish); BSDB Bird Spikes (field install required)	DDBXD Dark Bronze; DBLXD Black; DNAXD Natural Aluminum; DWHXD White; DDBTXD Textured dark bronze; DBLBXD Textured black; DNATXD Textured natural aluminum; DWHGXD Textured white

LITHONIA LIGHTING COMMERCIAL OUTDOOR

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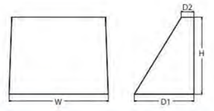
DSX1 LED Rev. 09/05/23 Page 1 of 10

WDGE2 LED
Architectural Wall Sconce Precision Refractive Optic

Catalog Number
Notes
Type

Specifications

Depth (D1):	7"
Depth (D2):	1.5"
Height:	9"
Width:	11.5"
Weight: (without options)	13.5 lbs



Introduction

The WDGE LED family is designed to meet specifier's every wall-mounted lighting need in a widely accepted shape that blends with any architecture. The clean rectilinear design comes in four sizes with lumen packages ranging from 1,200 to 25,000 lumens, providing a true site-wide solution. Embedded with nLight® AIR wireless controls, the WDGE family provides additional energy savings and code compliance.

WDGE2 with industry leading precision refractive optics provides great uniform distribution and optical control. When combined with multiple integrated emergency battery backup options, including an 18W cold temperature option, the WDGE2 becomes the ideal wall-mounted lighting solution for pedestrian scale applications in any environment.

WDGE LED Family Overview

Luminaire	Optics	Standard (0°, 25°C)	Cold (0°, -30°C)	Sensor	Approximate Lumens (4000K, 80CRI) P0	P1	P2	P3	P4	P5	P6
WDGE1 LED	Visual Comfort	4W		—	250	1,200	2,000	—	—	—	—
WDGE2 LED	Visual Comfort	10W	13W	Standalone / nLight	—	1,200	2,000	3,000	4,500	6,000	—
WDGE2 LED	Precision Refractive	10W	13W	Standalone / nLight	700	1,200	2,000	3,200	4,200	—	—
WDGE3 LED	Precision Refractive	15W	19W	Standalone / nLight	—	2,500	8,500	10,000	12,000	—	—
WDGE4 LED	Precision Refractive			Standalone / nLight	—	12,000	16,000	18,000	20,000	22,000	25,000

Ordering Information

EXAMPLE: WDGE2 LED P3 40K 80CRI VF MVOLT SRM DDBXD

Series	Package	Color Temperature	CRI	Distribution	Voltage	Mounting	
WDGE2 LED	P0	27K 2700K	70CRI	T1S Type I Short	MVOLT	**Shipped included** SRM Surface mounting bracket	**Shipped separately** AWS 3/8inch Architectural wall spacer
	P1	30K 3000K	80CRI	T2M Type II Medium	347		
	P2	40K 4000K	LOR Limited Wavelength	T3M Type III Medium	480	KCW Indirect Canopy/Ceiling Washer bracket (dry location only)	PBBW 5/8inch surface-mounted back box (top, left, right conduit entry). Use when there is no junction box available.
	P3	50K 5000K		T4M Type IV Medium			
	P4	AMB Amber		TFTM Forward Throw Medium			

Options	Finish
E10WH Emergency Battery backup, Certified in CA Title 20 MAEDBS (10W, 0°C min)	DDBXD Dark Bronze
E20WC Emergency battery backup, Certified in CA Title 20 MAEDBS (18W, -20°C min)	DBLXD Black
PE Photocell, Button Type	DNAXD Natural aluminum
DMG Wires pulled outside fixture (for use with an external control, ordered separately)	DWHXD White
BCE Bottom conduit entry for back box (PBBW). Total of 4 entry points.	DSSTXD Sandstone
BAA Buy American Act Compliant	DDBTXD Textured dark bronze
	DBLBXD Textured black
	DNATXD Textured natural aluminum
	DWHGXD Textured white
	DSSTXD Textured sandstone

Standalone Sensors/Controls

PIR Bi-level (100/35%) motion sensor for 8-15' mounting heights. Intended for use on switched circuits with external dusk to dawn switching

PIRH Bi-level (100/35%) motion sensor for 15-30' mounting heights. Intended for use on switched circuits with external dusk to dawn operation

PIR1FC3V Bi-level (100/15%) motion sensor for 8-15' mounting heights with photocell pre-programmed for dusk to dawn operation

PIRH1FC3V Bi-level (100/15%) motion sensor for 15-30' mounting heights with photocell pre-programmed for dusk to dawn operation

Networked Sensors/Controls

NLTAIR2 PIR nLight AIR Wireless enabled bi-level motion/ambient sensor for 8-15' mounting heights.

NLTAIR2 PIRH nLight AIR Wireless enabled bi-level motion/ambient sensor for 15-30' mounting heights. See page 9 for standalone functionality

LITHONIA LIGHTING COMMERCIAL OUTDOOR

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WDGE2 LED Rev. 11/21/22

PRO-15 [H4]

Catalog Number
Notes
Type

PROJECT:
MODEL #:
FIXTURE TYPE:

STANDARD SPECIFICATIONS

FRAME
Heavy duty aluminum with roll formed aluminum bands. The optional trim bars are solid 0.250" thick aluminum, held in place by fasteners.

DIFFUSER
Translucent, UV stabilized, white acrylic. Diffuser is form molded allowing for a uniform standard thickness of 0.100" throughout.

PAN
Heavy duty formed aluminum, featuring thread inserts to prevent rusting of fasteners.

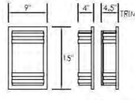
LED PERFORMANCE - 3500K STANDARD
120-277V - 3500K, 82 CRI - L80 rating - 60,000 hrs - L70 rating (projected) - 100,000 hrs
Amperage rated @ 110V input
Operating ambient temperature: -20°C / -4°F - 50°C / 122°F

Delivered 3500K lumens noted. Consult Brownlee.com for performance of all CCTs.
B06 - 6W nominal, .05 A input - 484 lm. Non-dimming.
B12 - 12W nominal, .10 A input - 957 lm. Dimmable (0-10V).
C09 - 9W nominal, .10 A input - 675 lm. Dimmable (0-10V).
C17 - 16W nominal, .15 A input - 1594 lm. Dimmable (0-10V).
C24 - 23W nominal, .20 A input - 2186 lm. Dimmable (0-10V).

MOUNTING
Directly to J-box (by others). Mounting hardware included.

FINISH
All 7601 parts are prepared using a three step pre-treatment/sealing process, followed by a powder coat primer prior to applying any of the Brownlee paint finishes.

WARRANTY
5 year limited warranty on this LED product. Consult factory for details.



*Note: For a proportionally larger size, refer to Model #: 7600 LED.

WET ADA T24 COMPLIANT

ORDERING INFORMATION

7601 - 2. - 3. - 4. - 5. - 6. (if required)
Model

2. FINISH

STANDARD
AB Antique Bronze
AS Antique Silver
BL Black
BZ Bronze
DB Desert Bronze
GM Gun Metal
MB Metallic Bronze
NT Nickel Tone
PL Platinum
WH White

CUSTOM
Provide color sample or RAL code to match

3. WATTAGE

B06 6W B Series LED
B12 12W B Series LED
C09 9W C Series LED
C17 16W C Series LED
C24 23W C Series LED

4. TRIM

VB0 No trim
VB1 1 vertical bar*
VB2 2 vertical bars*
*Does not meet ADA requirements.

5. COLOR TEMPERATURE

35K 3500K standard color temperature
27K 2700K color temperature
30K 3000K color temperature
40K 4000K color temperature

6. AVAILABLE OPTIONS

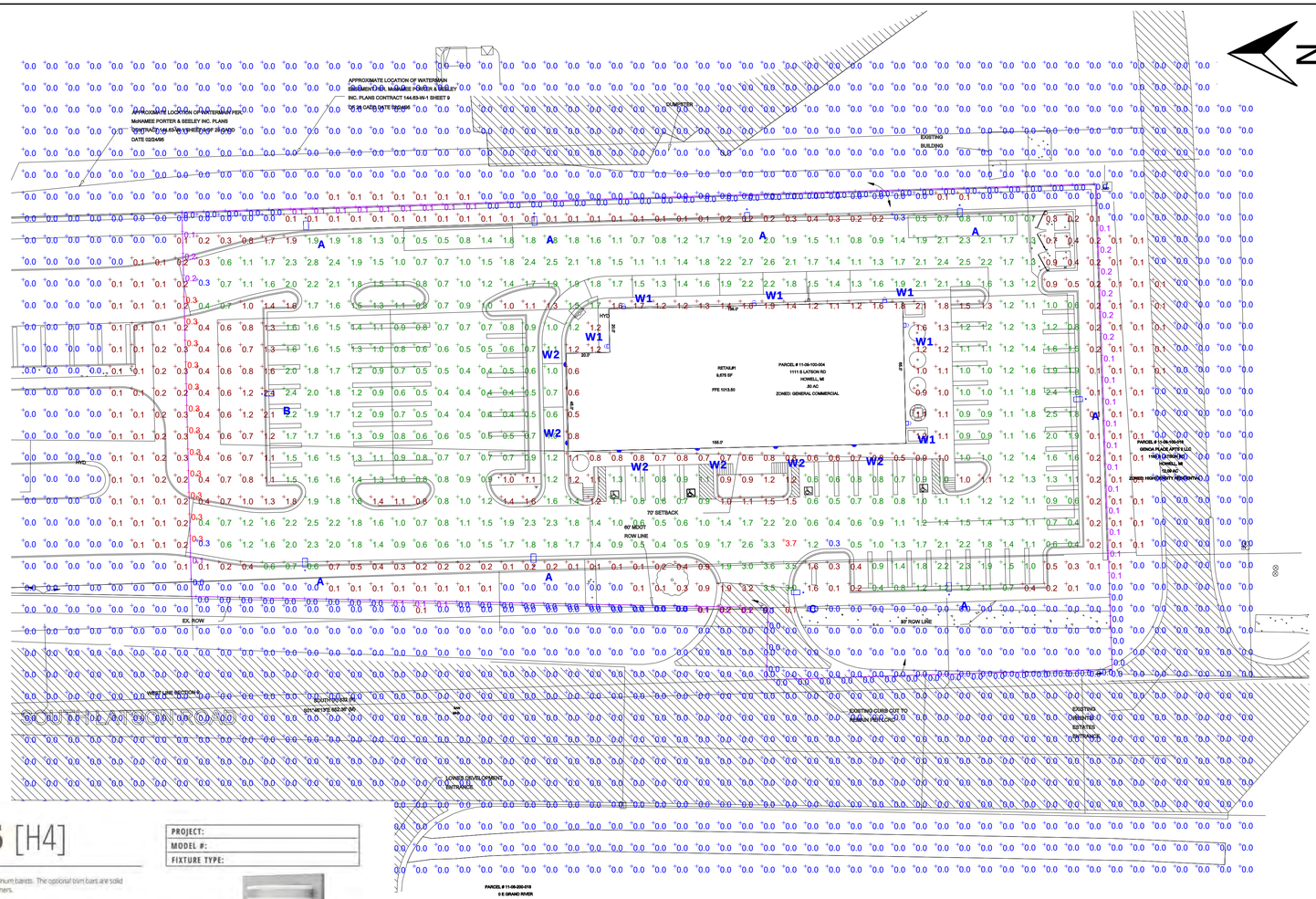
BAC Buy American Compliant
BBI Integral Battery Backup (BW) (adds 1.5" to depth)
BBC Integral Battery Backup, Cold Weather (16W) (adds 1.5" to depth)
Battery must be connected to continuous power supply and be 1 hot, or 2 hot/neutral. See Warranty Note 3.
BLD Bi-Level Dimming (All except B06)
DTR1 Triac/Line Voltage Dimming (120V) (All except B06)
ECW Extreme Cold Weather (-40°C / -40°F min.)
ES ENERGY STAR®
EXT Extended Housing (Intended to match BBI(C) aesthetic) (Adds 1.5" to depth)
FCL French Canadian Labels
OCC Occupancy Sensor
T24 Title 24 JA8 Compliant (B12 & C24 in 3000K only)

Universal Footnotes (only applies if option is listed on spec sheet): (1) 0160 - 90 CRI output/lms multiplier. 0.95 (maximum). Cannot be combined with BL, VLBAC, cannot be combined with BCL. (2) 0260/0265/0280 - cannot be combined with ECW or EXT. (3) BLD - includes integral microwave motion sensor (do not combine with OCC option). Cannot be combined with DTR. (4) DTR - cannot be combined with BLD. (5) ECW - cannot be combined with BBI, BBC, or CTA. (6) ES - cannot be combined with Wide or CTA. (7) FCL - cannot be combined with BAC. (8) OCC - integral microwave motion sensor (ON/OFF). (9) T24 - includes JA8 labeling and NO CRI LEDs (still not combined with 90+ options). Cannot be combined with BS. (10) PCUP - cannot be combined with BBI, BBC, or CTA. (11) VB0 - Not available with B06. (12) VB1 - Not available with B06. (13) VB2 - Not available with B06. (14) Dimming range is 10% to 100%. (15) Dimming range is 5% to 100%. (16) Dimming range is 20% to 100%. (17) Motion is continuous dimmed down to 1% until it either sees motion or the set period. Configurable via dedicated App (available on iOS and Android). (18) Motion is continuous dimmed down to 5% until it either sees motion or the set period. Configurable via dedicated App (available on iOS and Android).

Specifications and dimensions subject to change without notice.
Consult your Brownlee Lighting representative for availability and ordering information.

BROWNLEE LIGHTING www.brownlee.com

REVISED 07/01/2020



Plan View
Scale - 1" = 30ft

Ordering Note

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

Drawing Note

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

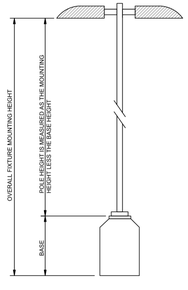
General Note

1. SEE SCHEDULE FOR LUMINAIRE MOUNTING HEIGHT.
2. SEE LUMINAIRE SCHEDULE FOR LIGHT LOSS FACTOR.
3. CALCULATIONS ARE SHOWN IN FOOTCANDLES AT: 0' - 0".

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

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

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



Schedule

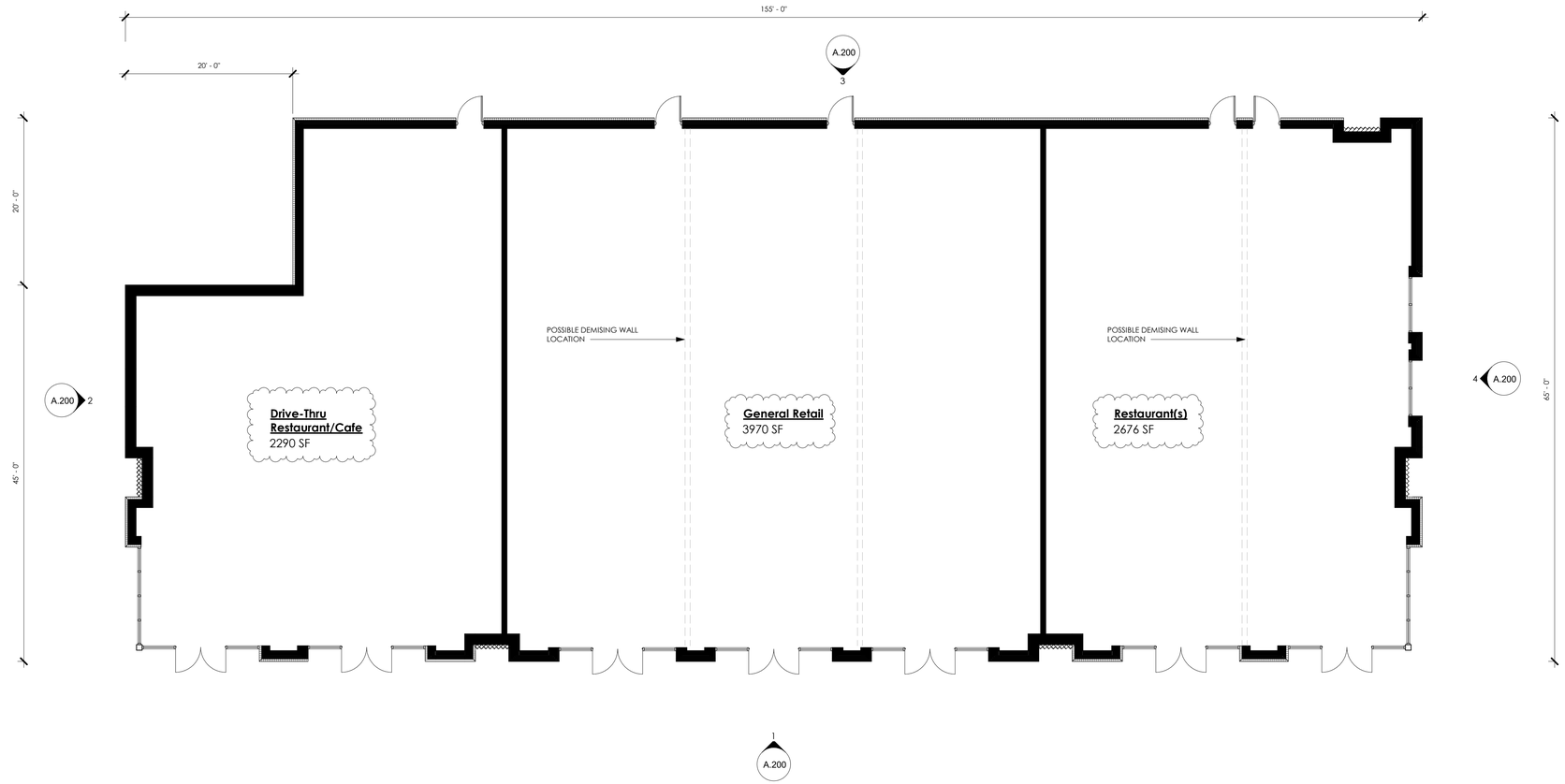
Symbol	Label	QTY	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Lumens per Lamp	LLF	Wattage	Mounting Height
	A	8	Lithonia Lighting	DSX1 LED P2 40K 70CRI BLC4	D-Series Size 1 Area Luminaire P2 Performance Package 4000K CCT 70 CRI Type 4 Extreme Backlight Control	LED	1	7334	0.9	67.79	20'-0"
	B	1	Lithonia Lighting	DSX1 LED P2 40K 70CRI T4M	D-Series Size 1 Area Luminaire P2 Performance Package 4000K CCT 70 CRI Type 4 Medium	LED	1	9909	0.9	67.79	20'-0"
	C	1	Lithonia Lighting	DSX1 LED P2 40K 70CRI LCCO	D-Series Size 1 Area Luminaire P2 Performance Package 4000K CCT 70 CRI Left Corner Cutoff Extreme Backlight Control	LED	1	7165	0.9	67.79	20'-0"
	W1	6	Lithonia Lighting	WDGE2 LED P1 40K 70CRI T4M	WDGE2 LED WITH P1 - PERFORMANCE PACKAGE, 4000K, 70CRI, TYPE 4 MEDIUM OPTIC	LED	1	1397	0.9	11.1658	12'-0"
	W2	6	Brownlee Lighting	7601-C17-40K	Formed housing, frosted plastic lens enclosure	LED	1	1594	0.9	16.21	12'-0"

Statistics

Description	Symbol	Avg	Max	Min	Max / Min	Avg / Min	Avg / Max
OVERALL	+	0.2 fc	3.7 fc	0.0 fc	N/A	N/A	0.1:1
PROPERTY LINE	+	0.1 fc	0.3 fc	0.0 fc	N/A	N/A	0.3:1
RETAIL PARKING	+	1.3 fc	3.7 fc	0.3 fc	12.3:1	4.3:1	0.4:1

LATSON ROAD COMMERCIAL
PHOTOMETRIC SITE PLAN
GASSER BUSH ASSOCIATES
PREPARED FOR:: BOSS ENGINEERING
WWW.GASSERBUSH.COM

Designer DB/KB
Date 10/2/2023
Scale Not to Scale
Drawing No. #23-17620-V2



Floor Plan

1/8" = 1'-0"

KRIEGER KLATT ARCHITECTS

2120 E. 11 Mile Rd. | Royal Oak, MI 48067
P: 248.414.9270 **F:** 248.414.9275
www.kriegerklatt.com

Client:

Group 10 Management
29200 Northwestern Hwy., Suite 450
Southfield, MI 48034

Project:

South Latson Commercial Development
1015 & 1111 S. Latson Rd.
Howell, MI 48843
(Genoa Township)

Issued	Description	By
04.01.2022	Conceptual Design	
10.04.2023	Site Plan Submittal	
10.25.2023	SPA Revisions	

PRELIMINARY NOT FOR CONSTRUCTION

Seal:

Note:

Do not scale drawings. Use calculated dimensions only. Verify existing conditions in field.

North Arrow:

North

Sheet Title:

Floor Plan

Project Number:

22-033

Scale:

1/8" = 1'-0"

Sheet Number:

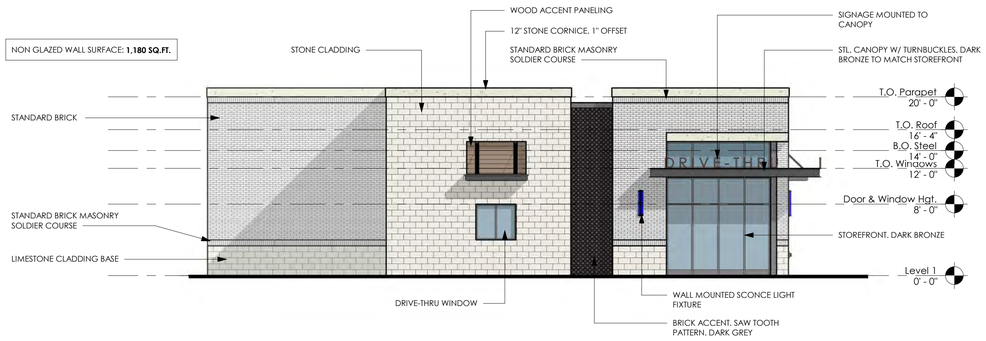
A.100

1 A.100 **West (Front) Elevation**
1/8" = 1'-0"

MATERIAL PERCENTAGES: FRONT (WEST) FACADE

FRONT FACADE: 2,027 SQ FT

MATERIALS	TOTAL (S.F.)	% OF OPAQUE	TOTAL PERCENTAGE OF OPAQUE
BRICK	813 SF	40%	BRICK/STONE MATERIALS MAX ALLOWED: **100%** PROVIDED: **86%**
CAST STONE/ LIMESTONE CLADDING	932 SF	46%	
WOOD PANELING	154 SF	8%	ACCENT MATERIALS MAX ALLOWED: **25%** PROVIDED: **14%**
METAL DARK BRONZE	106 SF	6%	

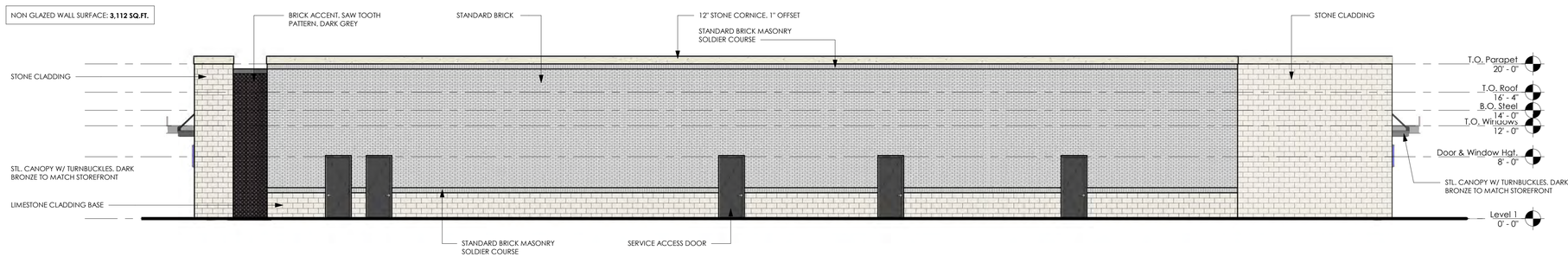


2 A.100 **North (Side) Elevation**
1/8" = 1'-0"

MATERIAL PERCENTAGES: SIDE (NORTH) FACADE

FRONT FACADE: 1,180 SQ FT

MATERIALS	TOTAL (S.F.)	% OF OPAQUE	TOTAL PERCENTAGE OF OPAQUE
BRICK	590 SF	50%	BRICK/STONE MATERIALS MAX ALLOWED: **100%** PROVIDED: **95%**
CAST STONE/ LIMESTONE CLADDING	532 SF	45%	
WOOD PANELING	24 SF	2%	ACCENT MATERIALS MAX ALLOWED: **25%** PROVIDED: **5%**
METAL DARK BRONZE	26 SF	3%	



3 A.100 **East (Rear) Elevation**
1/8" = 1'-0"

MATERIAL PERCENTAGES: REAR (EAST) FACADE

FRONT FACADE: 3,112 SQ FT

MATERIALS	TOTAL (S.F.)	% OF OPAQUE	TOTAL PERCENTAGE OF OPAQUE
BRICK	2,095 SF	67%	BRICK/STONE MATERIALS MAX ALLOWED: **100%** PROVIDED: **100%**
CAST STONE/ LIMESTONE CLADDING	1,014 SF	33%	
WOOD PANELING	0 SF	0%	ACCENT MATERIALS MAX ALLOWED: **25%** PROVIDED: **0%**
METAL DARK BRONZE	3 SF	0%	

4 A.100 **South (Side) Elevation**
1/8" = 1'-0"

MATERIAL PERCENTAGES: SIDE (SOUTH) FACADE

FRONT FACADE: 1,056 SQ FT

MATERIALS	TOTAL (S.F.)	% OF OPAQUE	TOTAL PERCENTAGE OF OPAQUE
BRICK	256 SF	24%	BRICK/STONE MATERIALS MAX ALLOWED: **100%** PROVIDED: **92%**
CAST STONE/ LIMESTONE CLADDING	712 SF	68%	
WOOD PANELING	49 SF	5%	ACCENT MATERIALS MAX ALLOWED: **25%** PROVIDED: **8%**
METAL DARK BRONZE	31 SF	3%	

KRIEGER KLATT ARCHITECTS
2120 E. 11 Mile Rd. | Royal Oak, MI 48067
P: 248.414.9270 **F:** 248.414.9275
www.kriegerklatt.com

Client:
Group 10 Management
29200 Northwestern Hwy., Suite 450
Southfield, MI 48034

Project:
South Latson Commercial Development
1015 & 1111 S. Latson Rd.
Howell, MI 48843
(Genoa Township)

Issued	Description	By
04.01.2022	Conceptual Design	
10.04.2023	Site Plan Submittal	
10.25.2023	SPA Revisions	

PRELIMINARY NOT FOR CONSTRUCTION

Seal:

Note:
Do not scale drawings. Use calculated dimensions only. Verify existing conditions in field.

North Arrow:

Sheet Title:
Exterior Elevations

Project Number:
22-033

Scale:
As indicated

Sheet Number:
A.200

GENOA CHARTER TOWNSHIP APPLICATION

~~Sketch Plan Review~~ Site Plan Review

TO THE GENOA TOWNSHIP PLANNING COMMISSION:

APPLICANT NAME & ADDRESS: Livingston County, Planning

If applicant is not the owner, a letter of Authorization from Property Owner is needed.

OWNER'S NAME & ADDRESS: Livingston County, 304 E. Grand River, Howell, MI 48843

SITE ADDRESS: 7075 McClements, Brighton, MI 48114 PARCEL #(s): 4711-02-400-004

APPLICANT PHONE: (517) 540-8734 OWNER PHONE: ( )

LOCATION AND BRIEF DESCRIPTION OF SITE:

Fillmore County Park, located at McClements and Kellogg

Vacant parcel approximately 89 acres, located on the west side of Kellogg Rd.

BRIEF STATEMENT OF PROPOSED USE: Installation of mountain biking trail and obstacle course

THE FOLLOWING IMPROVEMENTS ARE PROPOSED: Trail crossing at Kellogg Rd.

Mountain bike trail (3 loops), 3 bridges

Obstacle Course: berms and hills, rock features, wood features jumps and ramps

I HEREBY CERTIFY THAT ALL INFORMATION AND DATA ATTACHED TO AND MADE PART OF THIS APPLICATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: Martha Haglund, Livingston County Principal Planner

ADDRESS: 304 E. Grand River, Howell MI 48843

Contact Information - Review Letters and Correspondence shall be forwarded to the following:

1.) Martha Haglund (Name) of Livingston County (Business Affiliation) at mhaglund@livgov.com (Email Address)

FEE EXCEEDANCE AGREEMENT

All sketch plans are allocated one (1) consultant review and one (1) Planning Commission meeting. If additional reviews or meetings are necessary, the applicant will be required to pay the actual incurred costs for the additional reviews. If applicable, additional review fee payment will be required concurrent with submittal for a Land Use Permit. By signing below, applicant indicates agreement and full understanding of this policy.

SIGNATURE: Martha M Haglund DATE: 10/25/2023

PRINT NAME: MARTHA HAGLUND PHONE (517)540-8734

November 8, 2023

Planning Commission
Genoa Township
2911 Dorr Road
Brighton, Michigan 48116

Attention:	Amy Ruthig, Planning Director
Subject:	Fillmore Park – Site Plan Review #1
Location:	7075 McClements Road – north side of McClements, between Kellogg and Hacker Roads
Zoning:	PRF Public and Recreational Facilities District

Dear Commissioners:

At the Township's request, we have reviewed the site plan submitted by Livingston County Planning proposing bike trails for Fillmore Park.

We have reviewed the proposal in accordance with the applicable provisions of the Genoa Township Zoning Ordinance.

A. Summary

1. The submittal does not identify the proposed setbacks; however, the requirement is not met at the trail crossing across Kellogg Road.
2. If granted, sketch plan approval is valid for only 1 year, though the project timeline extends out to 2026.
3. The applicant will need to apply for and obtain extensions to cover the full project (which will be evaluated based on Ordinance standards and may or may not be granted).
4. The internal signs must meet setback requirements and be no more than 2 square feet in area to be exempt from the Township sign regulations.
5. The applicant must address any comments provided by the Township Engineer or Brighton Area Fire Authority.

B. Proposal

The applicant requests site plan review and approval for a mountain bike trail covering the westerly portion of Fillmore Park. Improvements include a trail, trail crossing, signage, and mountain bike obstacle course.

Public parks are permitted by right in the PRF district. As an established public park, the proposed trail and related features require site plan review/approval by the Planning Commission.

C. Site Plan Review

1. **Dimensional Requirements.** The PRF District requires a front yard setback equal to that of the most restrictive adjacent zoning district. In this instance, the most restrictive setback is 75 feet required by the AG District. Side and rear setback requirements are 50 feet for trails.

   The submittal does not identify the proposed setbacks; however, the requirement is not met at the trail crossing across Kellogg Road.

   Additionally, trails are exempt from the 25-foot nature feature setback; however, if the proposed bridges encroach, we are of the opinion that approval under Section 13.02.04 will be required.

Aerial view of site and surroundings (looking north)

2. **Project Phasing.** The submittal identifies 4 specific project components with anticipated timelines. The applicant should be aware that sketch plan approval is valid for 1 year.

   If the Commission grants approval, it will not cover project work in 2025 and 2026, unless extensions are requested and granted. Any such extensions will be evaluated based on the standards of Section 18.09.02 with no guarantee that they are granted.

3. **Signs.** Several signs are proposed – some are internal to the project area, while others are to be located in the public right-of-way.

   So long as the internal signs meet setback requirements and are no larger than 2 square feet, they may be exempt from review as "incidental signs."

   Additionally, the signs in the public right-of-way are exempt as "regulatory, directional and street signs;" however, the applicant must obtain approval from the Livingston County Road Commission for such signage.

Should you have any questions concerning this matter, please do not hesitate to contact our office.

Respectfully,
SAFEBUILT

Brian V. Borden, AICP
Michigan Planning Manager

November 8, 2023

Ms. Amy Ruthig
Genoa Township
2911 Dorr Road
Brighton, MI 48116

Re: Fillmore Mountain Biking Park
Sketch Plan Review No. 2

Dear Ms. Ruthig:

Tetra Tech conducted a second review of the proposed Fillmore Park Mountain Bike Trail sketch plan last dated October 25, 2023. The sketch plan was submitted by Livingston County Planning. The site is located in the northwest quadrant of the Kellogg Road and McClements Road intersection. The Petitioner is proposing to install a 2.5-mile mountain bike trail on the west side of Kellogg Road at Fillmore County Park, which will be accessed from the existing park parking lot located on the east side of Kellogg Road.

We offer the following comments:

GENERAL

1. The Petitioner has already obtained a permit from the Livingston County Road Commission regarding the signage required for the proposed trail crossing and this has been provided to the Township.

2. The Petitioner has noted that an EGLE wetland permit will be required for some portions of the proposed trail improvements. This permit should be provided to the Township for their records once it is obtained.

3. The Petitioner is proposing to use the existing park parking lot to serve the proposed mountain bike trail. Traffic counts were provided for a weekend of use at the park and the Petitioner has stated in their impact assessment that there is adequate existing parking for the additional use.

4. The existing parking lot and site drive is aggregate surface with concrete paved ADA parking spaces. Zoning Ordinance requires the parking lots and drives be hard surface with concrete curbing; however, the aggregate drive and parking lot was previously approved as a Low Impact Development alternative due to the low amount of traffic and intent to not clear snow in the winter. The Petitioner should provide more information regarding the proposed additional use of the parking lot and whether it will necessitate snow clearing in the winter. If not, the existing aggregate surface would be acceptable.

Tetra Tech
3497 Coolidge Road, East Lansing, MI 48823
Tel 517.316.3930 Fax 517.484.8140 www.tetratech.com

DRAINAGE AND GRADING

1. The proposed mountain bike trail will not include any grading or tree clearing. It appears that the trail will not require any surface modification other than clearing small vegetation, logs, and mowing the path limits.

We recommend the above comments be addressed by the Petitioner to the Township's satisfaction prior to approval. Please call if you have any questions.

Sincerely,

Shelby Byrne

Shelby Byrne, P.E.
Project Engineer

BRIGHTON AREA FIRE AUTHORITY
615 W. Grand River Ave.
Brighton, MI 48116
o: 810-229-6640 f: 810-229-1619

November 3, 2023

Amy Ruthig
Genoa Township
2911 Dorr Road
Brighton, MI 48116

RE: Mountain Bike Trail
7075 McClements Rd
Genoa Twp., MI

Dear Amy,

The Brighton Area Fire Department has reviewed the above-mentioned site plan. The plans were received for review on October 27, 2023 and the sketches are dated January 1, 2018 (not really sketches) . The project is based on a proposed mountain bike trail installed at the Fillmore Park and adjoining property. The plan review is based on the requirements of the International Fire Code (IFC) 2021 edition.

1. The plan calls for a varying width of 6' to 10' of the trail. The fire authority recommends that the clear access trail width be maintained wide enough for a 4 x 4 pickup truck should access be needed in the event of an emergency. **(Note has been updated that trail clearing will be conducted as provided.)**

2. I recommend signage stating "No Motorized Vehicles Allowed" at the trail crossing and trailhead location. **(This has not been provided and is only a recommendation from the fire authority and would be up to other parties to enforce if desired.)**

If you have any questions about the comments on this plan review please contact me at 810-229-6640.

Cordially,

Rick Boisvert, CFPS
Fire Marshal

Fillmore County Park
PRF Impact Assessment

The following impact assessment follows the requirements of Section 18.07 "Written Impact Assessment Requirements" of the Genoa Township Zoning Ordinance.

a. Preparer.

Prepared by:
Kathleen Kline-Hudson,
Director Livingston
County Planning
Department
Staff Facilitator, Livingston County Parks and Open Space
Advisory Committee 304 E. Grand River Ave.
Howell, MI 48843

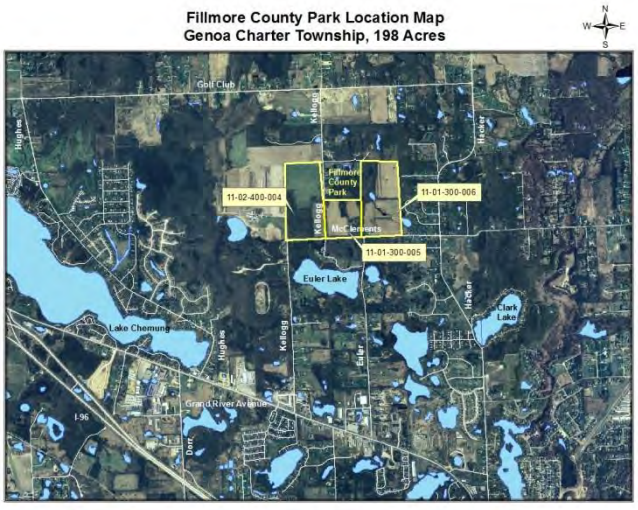
10/25/2023-Update: Changes noted in RED
Fillmore Park West: Mountain Bike Trail
Martha Haglund, Principal Planner
Livingston County Planning Department
Staff Facilitator, Livingston County Park and Open Space Advisory Committee

Prepared for: Livingston County Government
304 E. Grand River Ave.
Howell, MI 48843

Genoa Charter Township
2911 Dorr Rd.
Brighton, MI 48116

b. Description of the Project Site.

Fillmore County Park consists of 198 acres located in Sections 1 and 2 of the northeast quadrant of Genoa Charter Township. The land was bequeathed to Livingston County for park purposed by Raymond Fillmore. The site primarily consists of fallow agricultural land with the exception of the Fillmore farmstead located at 7315 McClements. For the near future the county intends to have the farmstead residence occupied by a park caretaker. In the future, this structure may be demolished or used for park purposes such as an interpretative center.



The site is bordered by agriculture and rural residences to the north and west, Camp Chaldean to the south and Del-Sher Estates to the east.

The Livingston County Park and Open Space Advisory Committee (POSAC) is partnering with Motor City Mountain Bike Association (MCMBA) to install a mountain bike trail on the west side of Kellogg Rd. at Fillmore County Park. The MCMBA will be responsible for constructing and maintaining the trail.

The trail will be 2.5 miles long with the potential to install an additional 1.5 miles trail. An obstacle course is also proposed in the southern field portion of the parcel. The mountain bike project does not propose any changes to the existing parking or driveway. The mountain bike trail will be accessed by crossing the Kellogg Rd.

c. Impact on Natural Features.

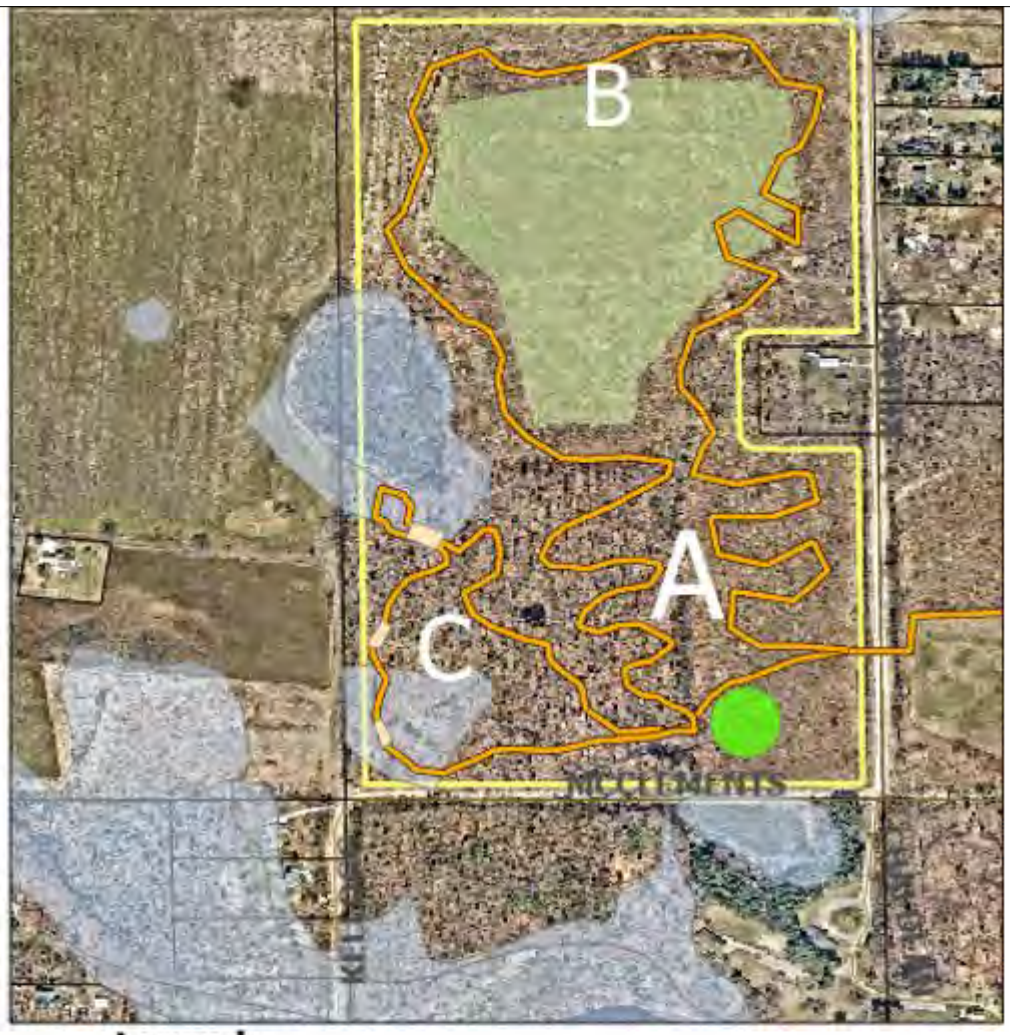
The project site contains three unregulated wetlands of less than 5 acres in size (NWI) (See Fillmore West below), three woodland areas totaling approximately 32 acres, and open, fallow agricultural land. The land is generally low- sloped, with gently-rolling topography of 0-12%. Elevations range from a low of 975 feet USGS to a high of 1,000 feet. The USDA Soil Survey of Livingston County indicates that the soils on-site are predominately well-drained Miami Loam, Owosso Miami Sandy Loam and Fox-Boyer Complex. These soils present only slight or moderate limitations for nonfarm use. The site also contains scattered pockets of muck soils.

Livingston County's High-Quality Natural Areas, a 2003 publication of the Livingston County Planning Department, indicates that there are two (2) Priority 2 natural areas located on site. Priority 2 natural areas are usually between 50 and 200 acres and have average scores for bio-diversity. This project is intended to not harm the natural features on-site; to do so would be counter-productive to the park setting.

Natural features on the Fillmore County Park site have been recorded by the Huron River Watershed Council (HRWC) through a Bioreserve Site Assessment. This assessment has been submitted to the Township with the rezoning application. In summary, the HRWC ranked East Fillmore (approx.120 acres). West Fillmore (approx.80 acres) for 15 ecological criteria. HRWC rankings place both areas of the park in the lower range for all the Bioreserve Sites in the watershed ranging from 25 to 1244. The main differences between the two areas were that Fillmore East got slightly more points for being better connected to other natural areas and Fillmore West got points for being less ecologically disturbed than Fillmore East (Fillmore East got zero points for this due to former farming of land).

Fillmore West: The wetland located within the southwest corner of the 89-acre parcel is larger than first assessed in 2018. A site assessment by EGLE (Department of Environment Great Lakes and Energy) was conducted on (October 19, 2023) and approved the trail corridor in the southwest corner (Loop C). The three proposed bridges/boardwalks will need a General Permit prior to construction estimated to be 2025. The positioning of the trail and installation of approved bridges will have no impact on wetlands.

Mountain bike trail is located on the Fillmore West. No trees are proposed to be removed. The clearing of the trail corridor (approx. 6 by 10 ft) will require the clearing fallen trees, small vegetation, and mowing in the field portion.



Legend

- Bridge
- Trail
- Future Trails
- Obstacle Course
- EGLE Wetland Data
- 50 Foot Setback
- Property Lines

Fillmore Park Mt Bike Trail

Perimeter 2.5 Miles

N
W E
S

0 0.05 0.1 0.2 Miles

LOOP	ESTIMATED CONTRUCTION TIME	ESTIMATED OPEN TO PUBLIC
A	Fall 2023 & Spring 2024	Fall 2024
B	Fall 2024 & Spring 2025	Fall 2026
C	Fall 2024-Spring 2026	Fall 2027
Obstacle Course	On-Going	2026

d. Impact on Stormwater Management.

Grading and construction operations at the site will be very minimal for the entrance drive, parking area, playfield, restroom facility and trail, therefore, there should be little to no impact on stormwater management. The Drain Commissioner is a member of the Livingston County Parks and Open Space Advisory Committee, and his expertise will be sought throughout the construction project.

The project at Fillmore Park West does not propose changes to existing features. A future obstacle course will require minimal grading to construct features such as: berms, hills, and ramps. The obstacle course will have little to no impact on surrounding stormwater management.

e. Impact on Surrounding Land Use.

Phase I development of Fillmore County Park will entail the construction of: a park entrance, driveway, parking lot with ADA spaces, a restroom facility with vaulted toilet, a sidewalk that will connect parking to the restroom, a sports playfield and a 5K trail. This construction will primarily occur near the Kellogg/McClements Road intersection.

Each of these permitted uses in the PRF zoning district are compatible with the adjacent recreational land uses and the PRF zoning of Camp Chaldean. Additionally, the future recreational uses of Fillmore County Park will not be detrimental to surrounding residential property values in terms of views, light, noise and other nuisances which could negatively impact adjacent properties. Conversely, use of the park will provide health and welfare benefits to the surrounding residential areas.

Subsequent phases of the park may be planned for the future. A conceptual site plan for park development has been created and can be found in the rezoning application materials. Additionally, the site currently contains the Fillmore farmstead consisting of a residence and outbuildings at 7315 McClements Road.

The Livingston County Parks and Open Space Advisory Committee has kept residents in the immediate area and the facility manager of Camp Chaldean, regularly informed of the plans for the park since February 2014 when a public meeting was held for a Michigan Natural Resources Trust Fund grant that was being submitted by Livingston County at that time. Since the February 2014 public meeting, the committee has maintained communication through periodic visits and e-mail contact, as well as through two (2) liaison Del-Sher Estates residents that attend meetings of the Parks and Open Space Advisory Committee in order to keep informed of the plans for the park so that they can better inform their neighbors.

The mountain bike project at the Fillmore Park West expects no changes to surrounding land use. The neighbor at 724 S. Kellogg Rd. was notified of the project on October 12, 2023.

f. Impact on Public Facilities and Services.

The Park will serve the Howell, Brighton and Hartland areas, being centrally located between them. With this ideal location, Fillmore County Park should attract a modest number of visitors, primarily on the weekends. There is no anticipated impact on public schools. County employee presence will be periodic. In collaboration with the Livingston County Parks and Open Space Advisory Committee, the Livingston County Road Commission will provide upkeep of the gravel road and lot, and the Sheriff's Department will patrol the main use area. Letters of support were obtained from both of these entities for the Land and Water Conservation Fund grant that will partially fund park development.

g. Impact on Public Utilities.

Fillmore County Park will not be served by municipal utilities, nor are utilities currently requested for this park usage. Sanitary services will be provided to public by a waterless vault toilet in a restroom facility.

The mountain bike trail at Fillmore Park West does not propose any changes to the public utilities.

h. Storage and Handling of Any Hazardous Materials.

Hazardous substances will not be used, stored or disposed of on the site.

i. Impact on Traffic and Pedestrians.

Access to Fillmore County Park will be from McClements Road, a gravel road on the south side of the property. The park entrance drive will be located approximately 400 feet east of the intersection of Kellogg and McClements Roads, nearest to the areas from which most traffic will arrive. Through park planning it was determined that this is the best point of entry into the park. This entrance location creates a good starting point for future phases of the park, and the location is buffered from neighboring residential areas while establishing good cross access to the neighboring Camp Chaldean.

Based on the Institute of Transportation Engineers (ITE) common trip generation rates at the PM Peak Hour, a County Park of 198 acres generates 17.8 trips (.09 per unit).

The mountain bike trail at Fillmore Park West expects a slight increase in park use with the installation of the mountain bike trail. The existing 20 space, gravel parking and restroom facilities will accommodate new visitors. In August 2021 a traffic counter located in the parking lot entrance calculated a total of 35 visitors from Friday-Sunday. We expect this to be very similar with the installation of the mountain bike trail. The average that weekend was 2 visitors per hour between the hours 1-6:00 PM. This would leave approximately 15 spaces available for additional visitors.

The mountain bike trail will have a trail crossing approximately 560 feet north of McClements with advance crossing signs placed 600 feet north of the crossing providing plenty of warning. All required permits will be acquired in accordance with Livingston Road Commission. The mountain bike trail will also have pedestrian stop signs placed along trail to ensure safe crossing.

j. Special Provisions.

The trust agreement of Raymond Fillmore states that Livingston County is to only use the land for recreation purposes as a county park. Therefore, Livingston County is unable to utilize the land for any other purpose.

Sources:

- Livingston County Road Commission Traffic Counts
- National Wetlands Inventory Maps
- United States Geological Survey (USGS)Topographic Quadrangle Maps
- United States Department of Agriculture (USDA) Soil Conservation Service, Soil Survey of Livingston County, Michigan
- Livingston County's High-Quality Natural Areas, Livingston County Planning Department 2003
- Huron River Watershed Council, Bioreserve Site Assessment, 2014
- 9th Edition ITE Trip Generation Manual

APPLICATION AND PERMIT

to construct, operate, maintain
use and/or remove within a county
road right-of-way

Permit Number: MS-2305-11

Issuance Date: 10/25/23

BOARD OF COUNTY ROAD COMMISSIONERS, of LIVINGSTON COUNTY, MICHIGAN
ADDRESS: 3535 GRAND OAKS, HOWELL, MICHIGAN 48843-8575
TELEPHONE: 517-546-4250
EMAIL: PERMITS@LIVINGSTONROADS.ORG

If applicant hires a contractor to perform the work, BOTH must complete this form and BOTH assume responsibility for the provisions of this Application and Permit

APPLICANT	CONTRACTOR
NAME: LIVINGSTON COUNTY PLANNING DEPT.	NAME:
MAILING ADDRESS: 304 E. GRAND RIVER	MAILING ADDRESS:
CITY, STATE, ZIP: HOWELL, MI 48843	CITY, STATE, ZIP:
TELEPHONE NO.: 5175408734	TELEPHONE NO.:
EMAIL: MHAGLUND@LIVGOV.COM	EMAIL:

☑ By checking this box, I am hereby accepting the terms and conditions as outlined on the permit and attached documents. I also agree that this permit may be returned to me via email.	☐ By checking this box, I am hereby accepting the terms and conditions as outlined on the permit and attached documents. I also agree that this permit may be returned to me via email.

FINANCIAL REQUIREMENTS	ATTACHMENTS REQUIRED
Application/Permit Fee: NO CHARGE	Proof of Insurance
Receipt Number:	Insurance Attached: ☐ Yes ☐ No
Date:	Expiration Date:
	LCRC File #:

APPLICATION

Applicant and/or Contractor request a Permit for the purpose indicated in the attached plans and specifications at the following location:

TOWNSHIP: GENOA SECTION: 1/2

NAME OF ROAD: KELLOGG Parcel or Lot #:

BEGINNING DATE: 10/25/23 ENDING DATE: 10/25/24

PERMIT TO PLACE TRAIL CROSSING WITHIN THE KELLOGG ROAD RIGHT-OF-WAY FOR THE FILLMORE PARK MOUNTAIN BIKE TRAIL AS DETAILED ON THE ATTACHED PLAN. ALL TRAFFIC SHALL BE MAINTAINED PER THE MMUTCD.

PERMIT

A permit is granted in accordance with the foregoing application for the period stated above, subject to the following terms agreed to by the Permit Holder. When Applicant hires a Contractor the "Permit Holder" is both the Applicant and the Contractor.

RECOMMENDED FOR ISSUANCE:

KIM HILLER — Investigator

10/25/23 — Date

PERMITS & UTILITIES ENGINEER — Title

BOARD OF COUNTY ROAD COMMISSIONERS
LIVINGSTON COUNTY, MICHIGAN

By _____

1. All work performed under this permit must be done in accordance with the plans, specifications, maps and statements filed with the Commission and must comply with the Commission's current requirements and specifications on file at its office and M.D.O.T. specifications.

2. **Fees and Costs.**
   Permit Holder shall be responsible for all fees incurred by the Commission in connection with this permit and shall deposit estimated fees and costs as determined by the Commisssion, at the time the permit is issued.

3. **Bond.**
   Permit Holder shall provide a cash deposit, letter of credit or bond in a form and amount acceptable to the Commission at the time permit is issued.

4. **Insurance.**
   Permit Holder shall furnish proof of liability and property damage insurance in the amount stated on this permit naming the Commission as an insured. Such insurance shall cover a period not less than the term of this permit and shall provide that it cannot be cancelled without ten (10) days advance written notice by certified mail with return receipt required to the Commission.

5. **Indemnification.**
   Permit Holder shall hold harmless and indemnify and keep indemnified the Commission, its officers and employees from all claims, suits and judgments to which the Commission, its officers, or employees may be subject and for all costs and actual attorney fees which may be incurred on account of injury to persons or damage to property, including property of the commission, whether due to the negligence of the Permit Holder or the joint negligence of the Permit Holder and the Commission, arising out of the work under this permit, or in connection with work not authorized by this permit, or resulting from failure to comply with the terms of this permit, or arising out the continued existence of the work product which is the subject of this permit; or any other claim relating to or arising out of the operations, use or continued existence of the work which is the subject of this permit.

6. **Miss Dig.**
   The Permit Holder must comply with the requirements of Act 53 of Public Acts of 1974, as amended. CALL MISS DIG AT (800) 482-7171 AT LEAST THREE (3) FULL WORKING DAYS, BUT NOT MORE THAT TWENTY-ONE (21) CALENDAR DAYS, BEFORE YOU START WORK. Permit Holder assumes all responsibility for damage to or interruption of underground utilities.

7. **Notification of Start and Completion of Work.**
   Permit Holder must notify the Commission at least 48 hours before starting work and must notify the Commission when work is completed.

8. **Time Restrictions.**
   All work shall be performed Mondays through Fridays between 8:00 A.M. and 5:00 P.M. unless written approval is obtained from the Commission, and work shall be performed only during the period set forth in this permit.

9. **Safety.**
   Permit Holder agrees to work under this permit is a safe manner and to keep the area affected by this permit in a safe condition until the work is completed. All work site conditions shall comply with Michigan Manual of Uniform Traffic Control Devices.

10. **Restoration and Repair of Road.**
    Permit Holder agrees to restore the road and right-of-way to a condition equal to or better than its condition before the work began; and to repair any damage to the road right-of-way which is the result of the facility whenever it occurs or appears.

11. **Limitation of Permit.**
    This permit does not relieve Permit Holder from meeting other applicable laws and regulations of other agencies. Permit Holder is responsible for obtaining additional permits or releases which may be required in connection with this work from other government agencies, public utilities, corporations and individuals, including property owners. Permission may be reqired from the adjoining property owners.

12. **Revocation of Permit.**
    This permit may be suspended or revoked at will, and the Permit Holder shall surrender this permit and alter, relocate or remove its facilities at its expense at the request of the Commission. It is to be understood that the rights granted herein are revocable at the will of this Board and that the Permit Holder acquires no rights in the highway and expressly waives any right to claim damages or compensation in case this permit is revoked. In the event the County Road Commission determines it is in the public interest to widen or make any other improvements to the county road in which this permit is granted, Permit Holder agrees that if, in the course of widening, altering or modifying said road right-of-way and/or the roadbed itself which necessitiates changes, modifications, or alterations to the Permit Holder's installation within or outside the existing county road right-of-way, such changes, alterations and modifications will be undertaken promptly upon receipt of a written request from the County Road Commission and without costs or expenses to the County Road Commission. The Permit Holder herein acknowledges that the contents of this paragraph are a substantial portion of the consideration received by the County Road Commission in the issuance of this permit.

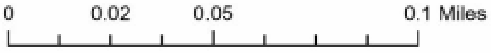
13. **Violation of Permit.**
    This permit shall become immediately null and void if Permit Holder violates the terms of this permit and this Commission may require immediate removal of Permit Holder's facilities, or the Commission may remove them without notice at Permit Holder's expense.

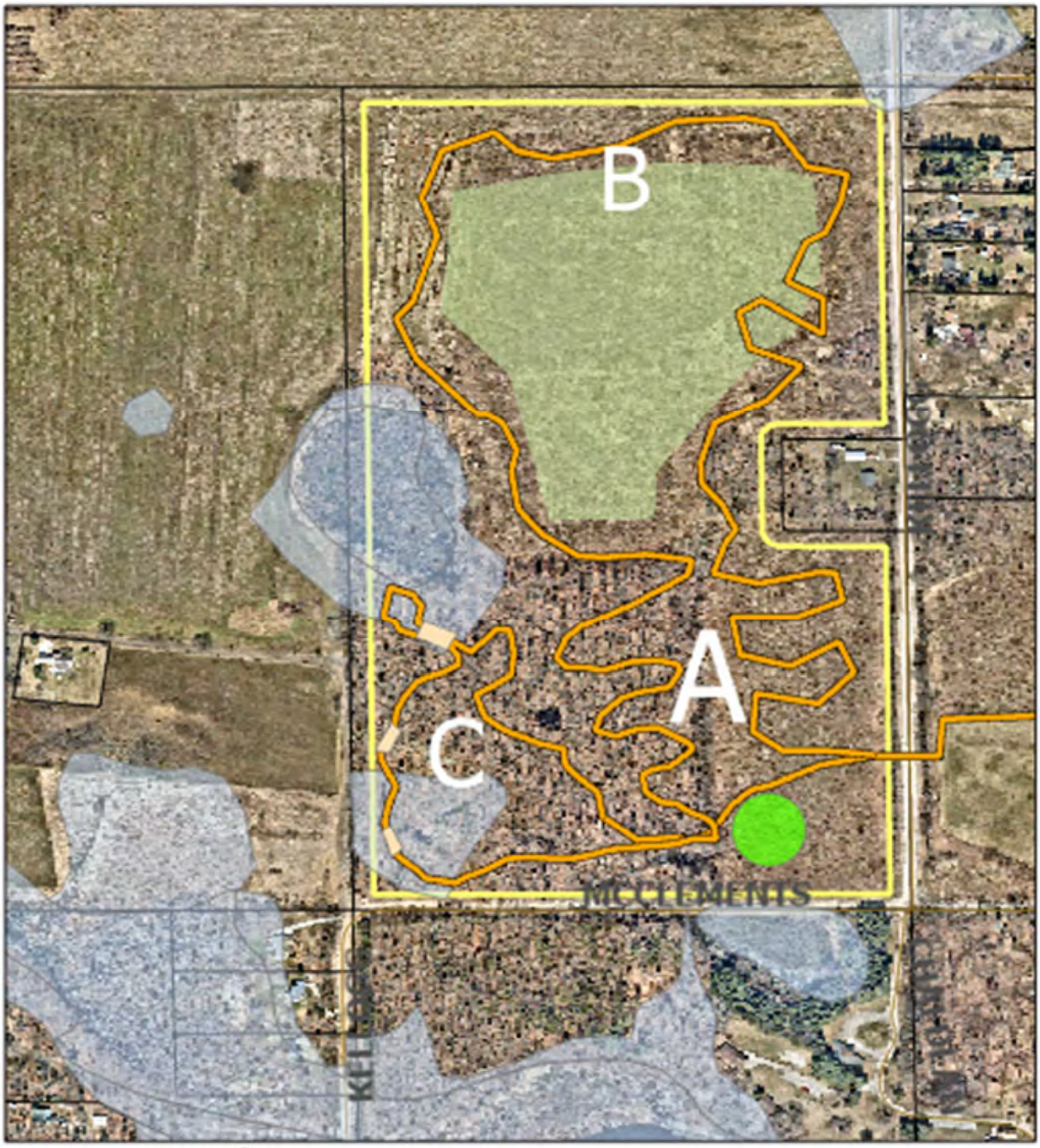
14. **Assignability.**
    This permit may not be assigned without the prior approval of the Commission. If approval is granted, the assignor shall remain liable and the assignee shall be bound by all terms of this permit.

15. This permit is subject to supplemental specifications on file with the Road Commission and Act 200 of Public Acts of 1969.

16. **Cooperation With Others.**
    The issuance of this permit does not give the Permit Holder an exclusive right to work within the area covered by this permit. The Permit Holder shall cooperate with others and shall conduct his operations in such a fashion as to cause minimum conflict with and/or inconvenience to others working in area. The work of others does not relieve the Permit Holder of this responsibility to complete the work in accordance with the permit.

Fillmore Mountain Biking
Trail Crossing Signs
Kellogg Rd





Legend

- Bridge
- Trail
- Future Trails
- Obstacle Course
- EGLE Wetland Data
- 50 Foot Setback
- Property Lines

Fillmore Park Mt Bike Trail

Perimeter 2.5 Miles

N
W E
S

0 0.05 0.1 0.2 Miles

October 25, 2023

Martha Haglund, Principal Planner
Livingston County Planning Department
Staff Facilitator, Livingston County Park and Open Space Advisory Committee.
304 E. Grand River Ave.
Howell, MI 48843

Genoa Charter Township
2911 Dorr Rd.
Brighton, MI 48116

Dear Genoa Township,

The Livingston County Park and Open Space Advisory Committee (POSAC) is partnering with Motor City Mountain Bike Association (MCMBA) under the terms of Memorandum of Understanding dated August 25, 2023; to install a mountain bike trail on the west side of Kellogg Rd at Fillmore County Park. The MCMBA will be responsible for constructing and maintaining the trail. Our Trail Coordinator Neal Glazebrook has years of experience in planning and constructing mountain bike trails and is very knowledgeable of mountain bike trail development guidelines and best practices.

The Sketch Plan Map outlines the trail perimeter. The parcel does have wetlands located in the southwest corner (Loop C) of the property. Genoa Township zoning ordinance 13.02.04 (d) allows for trails to be within the 25 ft setback for regulated wetlands. Additionally, EGLE's on-site assessment dated October 24, 2023, approved the trail corridor through Loop C. The project proposes to install three bridges in the wooded area. EGLE will require one General Permit for the three proposed bridges that can be obtained at the time of construction: estimated to be Fall 2025. No trees are proposed to be removed. The clearing of the trail corridor (approx. 6 by 10 ft) will require the clearing of fallen trees, small vegetation, and mowing. The MCMBA team will create a trail that is interesting and open to all skill levels. Hikers will be permitted on the trail, walking in the opposite direction and appropriate signage will be installed.

Future trail features will include additional trail and an obstacle course with wood, rock, and hill features. The trail pictures in this application are from Settlers Park in Hartland Township and illustrate examples of bridges and obstacle courses that the MCMBA has created and maintained for over 5 years. The Livingston County POSAC envision a similar trail at Fillmore County Park.

The trail will be accessing from the existing parking lot at Fillmore County Park crossing Kellogg Rd. The Livingston County Road Commission (LCRC) has confirmed that is an appropriate area to cross and will install trail crossing signs as needed along Kellogg Rd. prior to the trail opening to the public. The LCRC Sign Permit for the trail crossing is submitted with this application.

Our goal is to begin trail work November 2023 and to officially open the trail Summer/Fall 2024.

We look forward to answering any questions from the Genoa Township Planning Commission.

Thank you,

Martha Haglund


Project Area
11-02-400-004
89 acres
BLACKBERRY RIDGE
KELLOGG
MCCLEMENTS

LOOP	ESTIMATED CONTRUCTION TIME	ESTIMATED OPEN TO PUBLIC
A	Fall 2023 & Spring 2024	Fall 2024
B	Fall 2024 & Spring 2025	Fall 2026
C	Fall 2024-Spring 2026	Fall 2027
Obstacle Course	On-Going	2026

October 25, 2023

N
W E
S

Fillmore Mountain Biking
Trail Crossing Signs
Kellogg Rd

0 0.02 0.05 0.1 Miles

Mountain Bike Trail Features at Settlers Park, Hartland Township

Trail Map/Signs

Obstacle Course and Rock Feature

Wood Features

Junior Obstacle Course

October 25, 2023

Motor City Mountain Biking Association

22278 Cascade Dr.

Novi, MI 48375

Established in 1990 as part of the MMBA Southeast chapter, the Motor City Mountain Biking Association chapter of the International Mountain Biking Association is a section 501c3 advocacy organization focused on preserving, protecting, and promoting mountain bike access and diverse riding opportunities on Metropolitan Detroit's public lands through education, communication, and unified action.

Last year our active membership contributed over 4300 hours of service, primarily developing and maintaining area trail systems. The Bureau of Labor calculates volunteer time at an hourly rate of $28, which means that the MCMBA annually contributes over $122,000 in direct labor to our local parks and mountain bike trails. Our fund-raising events help support this work by purchasing tools and equipment for our volunteers, providing materials for bridges, kiosks, signs, and other capital improvements for our parks.

Working with our partner organizations, our chapter maintains approximately 100 miles of singletrack mountain bike trails in Oakland and Wayne counties. In addition, we are pursuing development opportunities for new trail systems in several communities.

The Motor City Mountain Biking Association is a member of the Michigan Mountain Biking Association, a federation of mountain biking clubs focused on state-wide advocacy issues.

FILLMORE COUNTY PARK
PHASE 1 IMPROVEMENTS

GRANT # 26-01775

GENERAL PROJECT NOTES:

1. ORIGINAL BASE SURVEY PROVIDED BY:
   HUBBELL, ROTH & CLARK, INC. on 06/06/2017
   PH: (248) 454-6300
2. BENCHMARK: DESC. - SEE SHEET C1 - EXISTING CONDITIONS
3. ALL UNITS OF MEASURE ARE IN ENGLISH.
4. THE CONTRACTOR(S) SHALL NOTIFY ALL EXISTING UTILITY COMPANIES PRIOR TO THE START OF CONSTRUCTION.
5. ALL WORK SHALL CONFORM TO THE CURRENT STANDARD SPECIFICATIONS OF ALL STATE AND LOCAL APPLICABLE AUTHORITIES.
6. CONTRACTOR(S) TO NOTIFY LIVINGSTON COUNTY 48 HOURS PRIOR TO THE START OF ANY PHASE OF CONSTRUCTION.
7. THE CONTRACTOR(S) SHALL OBTAIN ANY/ALL NECESSARY PERMITS FROM ALL APPLICABLE AGENCIES, PRIOR TO CONSTRUCTION.
8. THE CONTRACTOR(S) IS RESPONSIBLE FOR MAINTAINING ALL PREVIOUSLY INSTALLED S.E.S.C. MEASURES INCLUDING RESTORATION OF ALL DAMAGED AREAS OUTSIDE OF THE CONSTRUCTION LIMITS. AND INSTALLING AND MAINTAINING ALL NEW S.E.S.C. MEASURES.
9. CONTRACTOR(S) SHALL BE RESPONSIBLE FOR REPLACEMENT OR REPAIR OF ANY EXISTING UTILITIES OR OTHER SITE FEATURES THAT ARE DAMAGED DURING CONSTRUCTION TO THE SATISFACTION AND APPROVAL OF THE APPROPRIATE UTILITY COMPANY. OTHER EXISTING SITE ELEMENTS THAT ARE DAMAGED MUST BE REPAIRED OR REPLACED TO THE SATISFACTION AND APPROVAL OF THE OWNER.
10. NOTIFY MISS DIG AT 811 OR 1-800-482-7171, 72 HOURS PRIOR TO START OF CONSTRUCTION.
11. CONTRACTOR(S) SHALL BE RESPONSIBLE FOR ANY COORDINATION WITH SUBCONTRACTORS OR UTILITY COMPANIES AS REQUIRED TO ACCOMPLISH THEIR CONSTRUCTION OPERATIONS.
12. AS AN AID TO THE CONTRACTOR(S), VARIOUS UTILITIES ARE SHOWN ON THE PLAN. ALL INFORMATION CONCERNING ALL UTILITIES SHOWN ON THE PLAN ARE TAKEN FROM AVAILABLE RECORDS. THE OWNER OR ARCHITECT DOES NOT GUARANTEE THEIR LOCATION AND/OR ELEVATION. THE CONTRACTOR(S) SHALL BE RESPONSIBLE FOR MAKING HIMSELF FAMILIAR WITH THE EXACT LOCATIONS AND/OR ELEVATIONS OF ALL EXISTING UTILITIES AND REFLECT THAT IN THEIR BID.
13. IT IS UNDERSTOOD THAT THE CONTRACTOR(S) SHALL PERFORM ALL WORK UNDER THIS CONTRACT IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS, POLICIES, RULES AND STANDARDS OF THE MICHIGAN OCCUPATIONAL SAFETY AND HEALTH ACT (MIOSHA) BEING ACT 154 OF THE PUBLIC ACTS OF 1974 AND AS AMENDED.
14. ANY QUANTITIES GIVEN WITHIN THESE PLANS AND SPECIFICATIONS ARE APPROXIMATIONS ONLY AND SHOULD NOT BE USED TO DETERMINE COSTS. ALL QUANTITIES SHOULD BE VERIFIED BY THE CONTRACTOR(S) FOR BIDDING PURPOSES. THIS IS A LUMP SUM BID. UNIT PRICES WILL BE TAKEN FOR SPECIFIC ITEMS THAT MAY BE NECESSARY TO ADD OR DELETE DURING PROJECT CONSTRUCTION.
15. CONTRACTOR IS RESPONSIBLE FOR ALL STAKING AND LAYOUT FOR THIS PROJECT. THIS INCLUDES GRADES AND ESTABLISHMENT OF A BENCHMARK.
16. CONTRACTOR TO PROVIDE ALL TRAFFIC CONTROL DURING CONSTRUCTION. ALL TRAFFIC CONTROL SHALL CONFORM TO CURRENT MMUTCD STANDARDS.
17. ANY ITEMS INDICATED TO BE REMOVED ARE TO BE LEGALLY DISPOSED OF OFF-SITE UNLESS OTHERWISE NOTED.
18. ALL PERSONNEL ARE REQUIRED TO WEAR HARD HATS WITHIN WORK ZONES AND COMPLY WITH ALL MIOSHA STANDARDS.
19. CONTRACTOR SHALL PERFORM DAILY CLEAN UP OF MATERIALS AND DEBRIS GENERATED BY THEIR WORK WITHIN THE PROJECT LIMITS AND IN PUBLIC AREAS IN WHICH THEY CREATE DEBRIS AND/OR TRACKING OF SOIL MATERIALS.
20. CONTRACTOR IS RESPONSIBLE FOR SECURITY OF THEIR OWN TOOLS, EQUIPMENT, MATERIALS, ETC. TO GUARD AGAINST FIRE, THEFT, VANDALISM, AND/OR WEATHER DAMAGE.
21. CONTRACTOR TO COORDINATE CONSTRUCTION SCHEDULE AND DISRUPTIONS OF NORMAL ACTIVITIES WITH OWNER.
22. THE CONTRACTOR WILL PROVIDE ALL MATERIAL TESTING.

PREVIOUSLY APPROVED SITE PLAN FOR PARCEL LOCATED TO THE EAST.

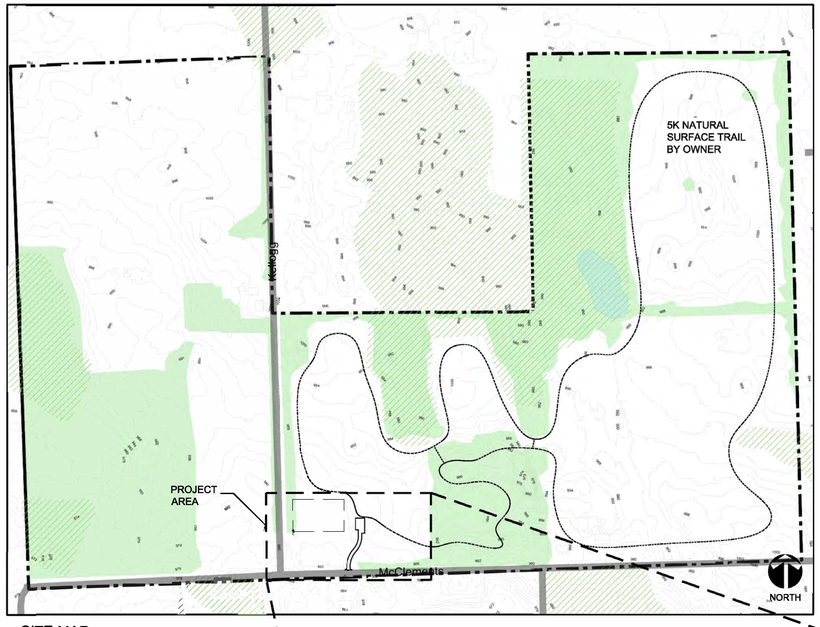
LEGAL DESCRIPTION

THE SOUTHWEST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 1, T.2N., R.5E., GENOA TOWNSHIP, LIVINGSTON COUNTY, MICHIGAN. SUBJECT TO ALL EASEMENTS AND RESTRICTIONS OF RECORD.

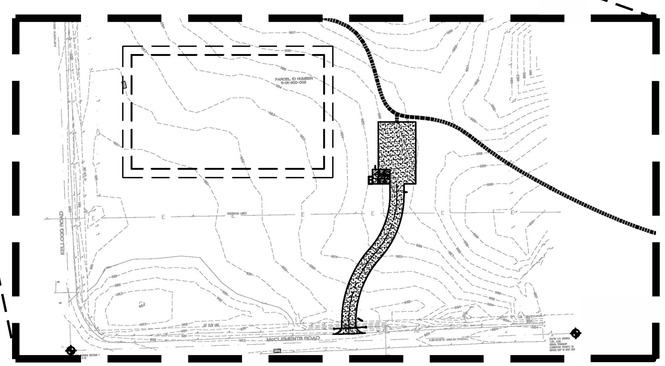
LOCAL UTILITY CONTACTS:

ELECTRICAL: DTE ENERGY, PAUL GANZ - (313) 702-0571, Paul.Ganz@dteenergy.com

COUNTY DRAIN: LIVINGSTON COUNTY DRAIN COMMISSIONER, (517) 546-0040, drain@livgov.com



SITE MAP
NOT TO SCALE



PROJECT AREA
NOT TO SCALE

VICINITY LOCATION MAP

NOT TO SCALE

7315 MC CLEMENTS RD.
GENOA TOWNSHIP, MI 48114

PROJECT SHEET INDEX:

ADDITIONAL POINTS OF CONTACT:

LIVINGSTON COUNTY
PH: (517) 546-7555
CONTACT PERSON: KATHLEEN KLINE-HUDSON
PLANNING DIRECTOR

LANDSCAPE ARCHITECTS & PLANNERS, INC
(517) 485-5500
CONTACT PERSON: PROJECT MANAGER
LAP OTHER POC

Know what's below. Call before you dig.

SURVEY COMPLETED BY :

HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

HUBBELL, ROTH & CLARK, INC.
555 HULET DRIVE, P.O. BOX 824
BLOOMFIELD HILLS, MI 48303
PH: (248) 454-6300 FAX: (248) 454-6312

ON 06/06/2017

STATE of MICHIGAN
ROBERT E. FORD
LANDSCAPE ARCHITECT
No. 909
REGISTERED LANDSCAPE ARCHITECT

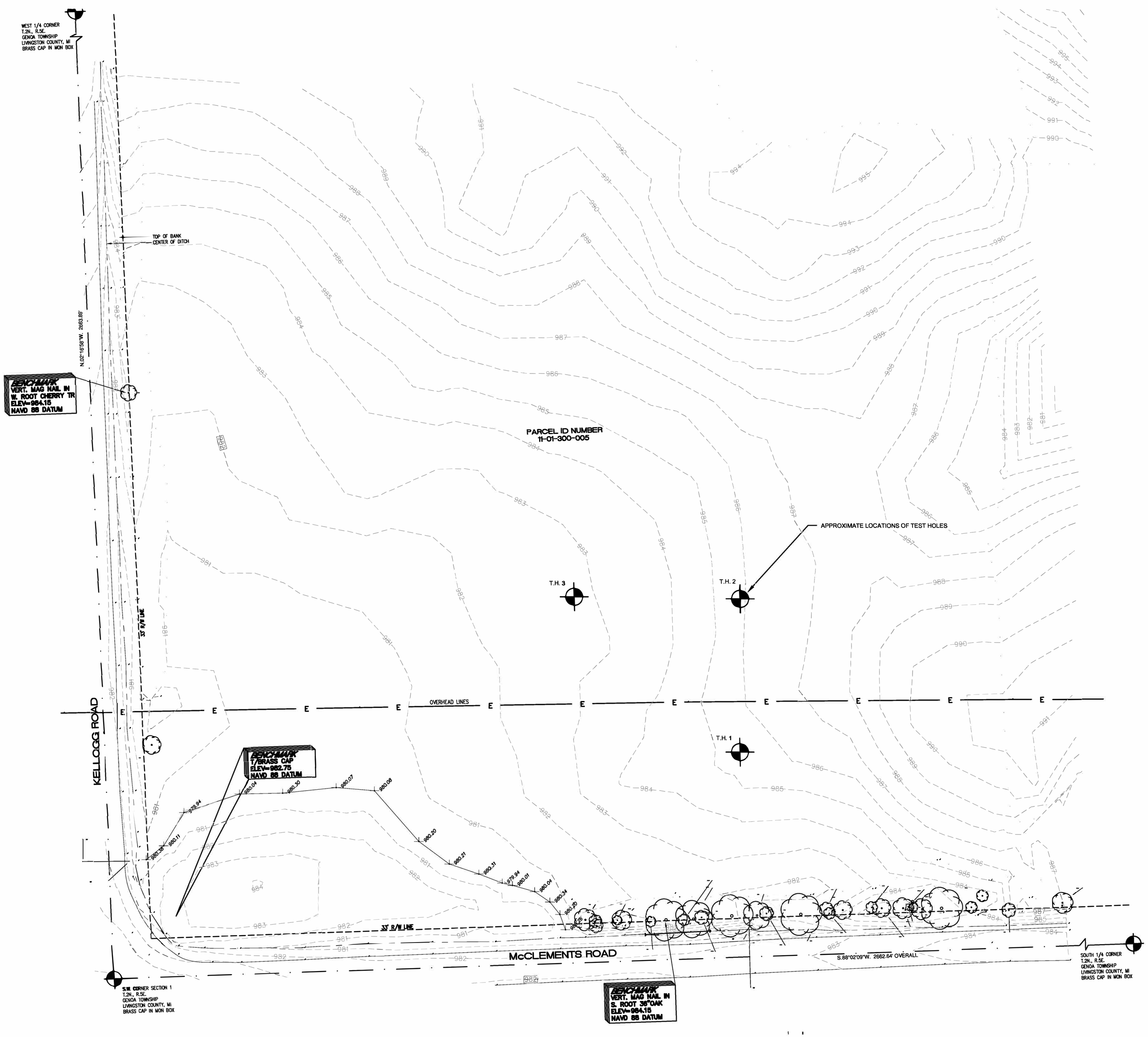
LIVINGSTON COUNTY
PLANNING DEPARTMENT
304 E. GRAND RIVER AVE. SUITE 206
HOWELL, MI 48843
PH: (517) 546-7555 FAX: ----

Livingston County, Michigan — Organized in 1836

Landscape Architects & Planners, Inc.
OAKLAND CENTER - 809 CENTER STREET - SUITE 1 - LANSING, MI 48906
PH: (517) 485-5500 - FAX: (517) 485-5576 - EMAIL: INFO@LAPINC.NET

DATE:	1/24/2018
DESIGNED BY:	----
CHECKED BY:	----
DRAWN BY:	NRW
PROJECT NO:	13040.02

SHEET
C0



TEST HOLES

- LOCATIONS ARE APPROXIMATE.
- SOIL CHARACTERIZATIONS ARE ACCURATE ONLY AT LOCATIONS SHOWN

T.H.1
0 - 8" LOAMY TOPSOIL
8" - 24" CLAYEY SAND
STOPPED DIGGING

T.H.2
0 - 12" LOAMY TOPSOIL
12" - 24" CLAYEY SAND
STOPPED DIGGING

T.H.3
0 - 16" LOAMY TOPSOIL
16" - 24" CLAYEY SAND
STOPPED DIGGING

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809 CENTER STREET
SUITE ONE
LANSING, MI 48906
P: (517) 485-5500
F: (517) 485-5576
info@lapinc.net

REVISIONS

INITIALS	DATE	COMMENTS

LIVINGSTON COUNTY
PLANNING DEPARTMENT
304 E. GRAND RIVER AVE. SUITE 206
HOWELL, MI 48843
P: (517) 546-7555 F: ----

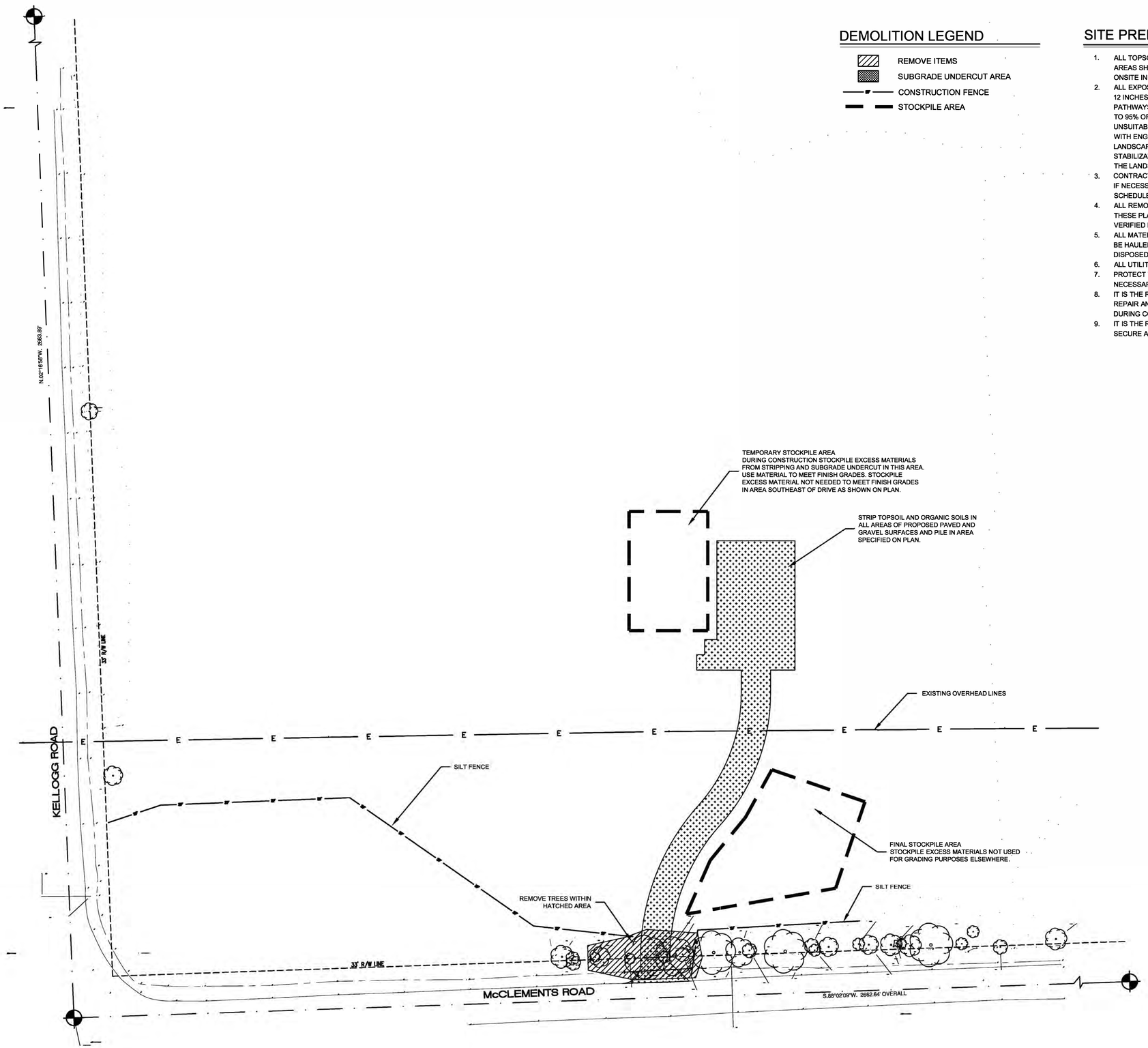
FILLMORE COUNTY PARK PHASE 1 IMPROVEMENTS

EXISTING CONDITIONS

7315 MC CLEMENTS RD. GENOA TOWNSHIP, MI 48114

DATE: 1/24/2018
DESIGNED BY: ----
CHECKED BY: ----
DRAWN BY: ----
PROJECT NO: 13040.02
SCALE:
HORIZ: N/A
VERT: N/A

SHEET
C1



DEMOLITION LEGEND

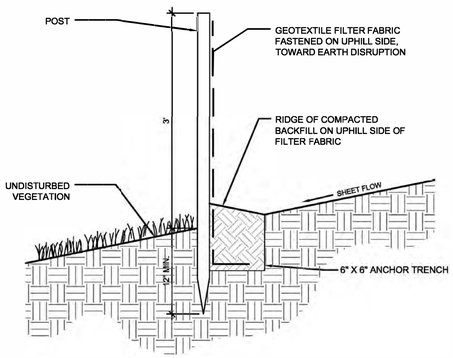
- REMOVE ITEMS
- SUBGRADE UNDERCUT AREA
- CONSTRUCTION FENCE
- STOCKPILE AREA

SITE PREPARATION NOTES:

1. ALL TOPSOIL AND ORGANIC SOILS ENCOUNTERED IN AREAS SHOWN SHALL BE STRIPPED AND SPREAD ONSITE IN AN AREA AS SHOWN ON PLAN.
2. ALL EXPOSED GRANULAR SUBGRADE TO A DEPTH OF 12 INCHES SCHEDULED FOR PAVEMENTS OR PATHWAYS OR STRUCTURES MUST BE COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY. ANY UNSUITABLE AREAS MUST BE EXCAVATED AND FILLED WITH ENGINEERED FILL AND BE APPROVED BY THE LANDSCAPE ARCHITECT. ALL SUBGRADE STABILIZATION PRACTICES MUST BE APPROVED BY THE LANDSCAPE ARCHITECT BEFORE PROCEEDING.
3. CONTRACTOR IS RESPONSIBLE FOR ALL DEWATERING IF NECESSARY TO STABILIZE THE SUBGRADE FOR SCHEDULED CONSTRUCTION.
4. ALL REMOVAL QUANTITIES AND AREAS NOTED ON THESE PLANS ARE APPROXIMATE AND SHOULD BE VERIFIED IN FIELD PRIOR TO BIDDING.
5. ALL MATERIALS CALLED OUT TO BE REMOVED SHALL BE HAULED OFF-SITE BY CONTRACTOR AND LEGALLY DISPOSED OF PROPERLY UNLESS OTHERWISE NOTED.
6. ALL UTILITIES TO REMAIN UNLESS OTHERWISE NOTED.
7. PROTECT TREES SCHEDULED TO REMAIN AS NECESSARY.
8. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR ANY DAMAGE TO THE UTILITIES IN THIS AREA DURING CONSTRUCTION.
9. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SECURE ALL EQUIPMENT.

TREE PROTECTION NOTES:

1. TREES WILL BE PROTECTED USING PROTECTION FENCE TO DRIPLINE; ORANGE SAFETY SCREEN ON STEEL T-POSTS 1.33 LB / FT, SEE DETAIL 1.
2. IF PROTECTION TO THE DRIPLINE IS NOT FEASIBLE, CONTRACTOR TO SUBMIT ALTERNATE PLAN.
3. TEETH ARE REQUIRED TO BE REMOVED FROM MACHINE BUCKET WHEN REMOVING MATERIALS NEAR TREE DRIPLINES.
4. WHEN REMOVING MATERIAL AROUND DRIPLINE, IT MUST BE PULLED AWAY FROM THE TREE USING HAND METHODS AND WITH EXTREME CAUTION.
5. NOTIFY LANDSCAPE ARCHITECT 24 HOURS PRIOR TO DEMOLITION FOR OBSERVATION TO ENSURE PROTECTION OF TREE FEEDER ROOTS.
6. IF ANY QUESTIONS OR CONCERNS ARISE, CONTACT THE LANDSCAPE ARCHITECT IN ADVANCE.



SILT FENCE INSTALLATION DETAIL

SECTION - NOT TO SCALE

NORTH

0 40 80 120

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Landscape Architects & Planners, Inc.

OAKLAND CENTER
809 CENTER STREET
SUITE ONE
LANSING, MI 48906
P: (517) 485-5500
F: (517) 485-5576
info@lapinc.net

REVISIONS

INITIALS	DATE	COMMENTS
---	---	---

LIVINGSTON COUNTY
PLANNING DEPARTMENT

304 E. GRAND RIVER AVE. SUITE 206
HOWELL, MI 48843
P: (517) 546-7555 F: —

FILLMORE COUNTY PARK PHASE 1 IMPROVEMENTS

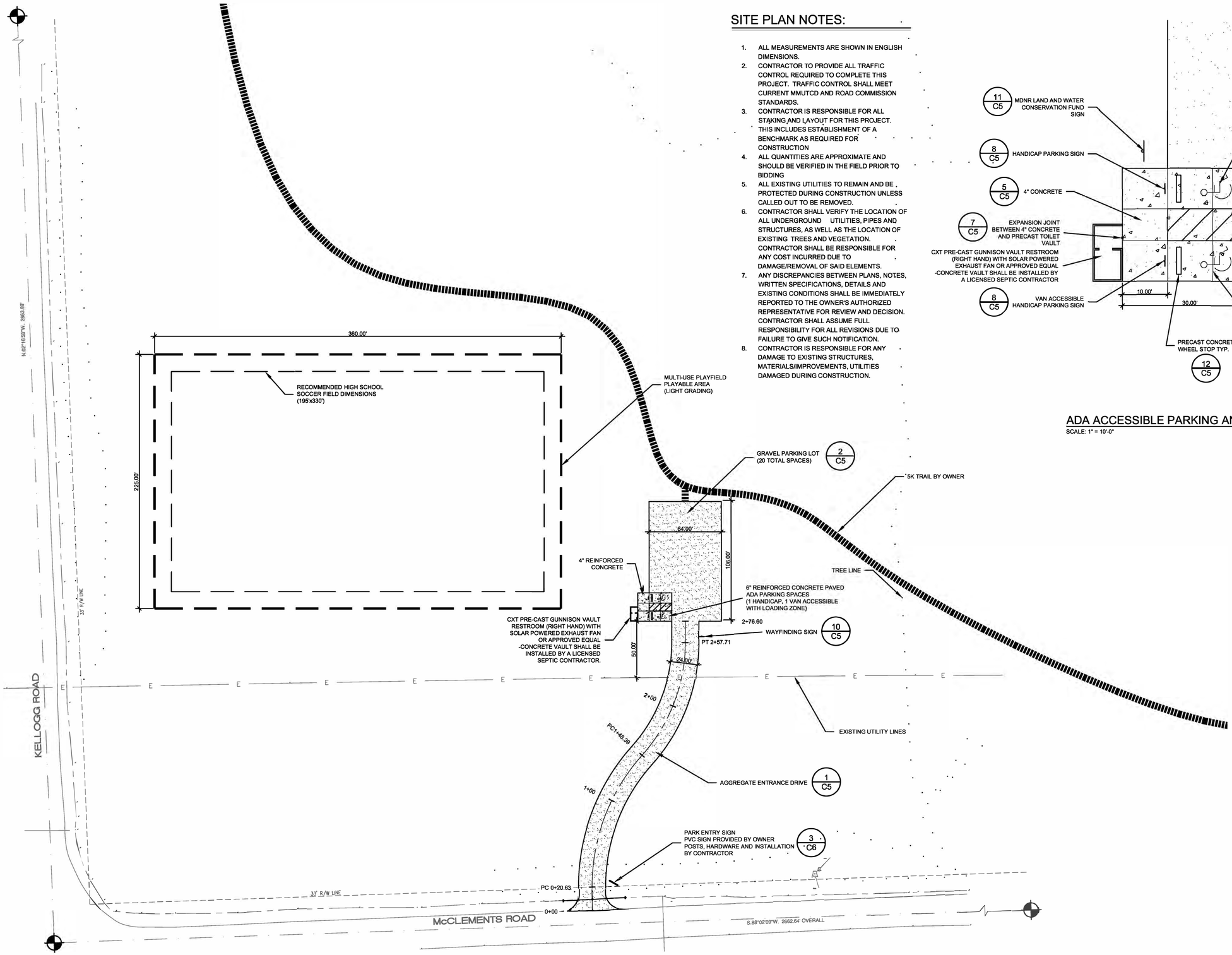
SITE PREPARATION PLAN

7315 MC CLEMENTS RD. GENOA TOWNSHIP, MI 48114

DATE: 1/24/2018
DESIGNED BY: —
CHECKED BY: —
DRAWN BY: NRW
PROJECT NO: 13040.02
SCALE:
HORIZ: N/A
VERT: N/A

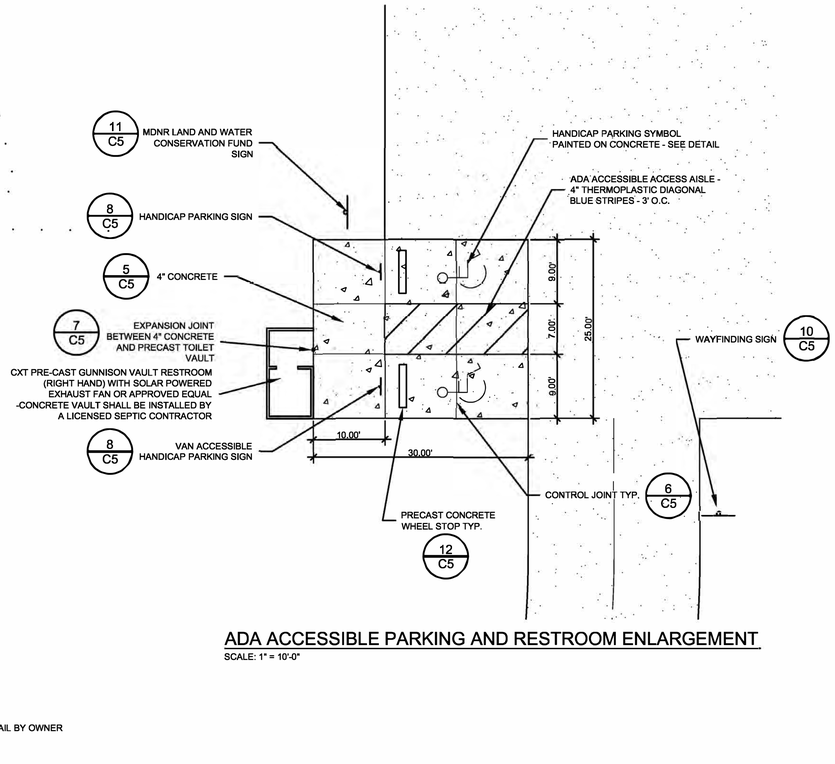
SHEET
C2

I:\AP-SERV\COMPANY\PROJECTS\PROJECTS 2013\13040.02 LIVINGSTON FILLMORE PARK CONSTRUCTION\08 PAGE LAYOUTS AND PRESENTATION BOARDS\AUTOCAD\SHEETSET\DEMOLITION\C2 DEMOLITION PLAN.DWG
Plot Date: 3/23/2018 4:28 PM



SITE PLAN NOTES:

1. ALL MEASUREMENTS ARE SHOWN IN ENGLISH DIMENSIONS.
2. CONTRACTOR TO PROVIDE ALL TRAFFIC CONTROL REQUIRED TO COMPLETE THIS PROJECT. TRAFFIC CONTROL SHALL MEET CURRENT MMUTCD AND ROAD COMMISSION STANDARDS.
3. CONTRACTOR IS RESPONSIBLE FOR ALL STAKING AND LAYOUT FOR THIS PROJECT. THIS INCLUDES ESTABLISHMENT OF A BENCHMARK AS REQUIRED FOR CONSTRUCTION
4. ALL QUANTITIES ARE APPROXIMATE AND SHOULD BE VERIFIED IN THE FIELD PRIOR TO BIDDING
5. ALL EXISTING UTILITIES TO REMAIN AND BE PROTECTED DURING CONSTRUCTION UNLESS CALLED OUT TO BE REMOVED.
6. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES, PIPES AND STRUCTURES, AS WELL AS THE LOCATION OF EXISTING TREES AND VEGETATION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY COST INCURRED DUE TO DAMAGE/REMOVAL OF SAID ELEMENTS.
7. ANY DISCREPANCIES BETWEEN PLANS, NOTES, WRITTEN SPECIFICATIONS, DETAILS AND EXISTING CONDITIONS SHALL BE IMMEDIATELY REPORTED TO THE OWNER'S AUTHORIZED REPRESENTATIVE FOR REVIEW AND DECISION. CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ALL REVISIONS DUE TO FAILURE TO GIVE SUCH NOTIFICATION.
8. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING STRUCTURES, MATERIALS/IMPROVEMENTS, UTILITIES DAMAGED DURING CONSTRUCTION.



ADA ACCESSIBLE PARKING AND RESTROOM ENLARGEMENT

SCALE: 1" = 10'-0"

NORTH

0 40 80 120

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

Landscape Architects & Planners, Inc.

OAKLAND CENTER
809 CENTER STREET
SUITE ONE
LANSING, MI 48906
P: (517) 485-5500
F: (517) 485-5576
info@lapinc.net

REVISIONS

INITIALS	DATE	COMMENTS

LIVINGSTON COUNTY
PLANNING DEPARTMENT

304 E. GRAND RIVER AVE. SUITE 206
HOWELL, MI 48843
P: (517) 546-7555 F: —

FILLMORE COUNTY PARK PHASE 1 IMPROVEMENTS

SITE LAYOUT

7315 MC CLEMENTS RD. GENOA TOWNSHIP, MI 48114

DATE: 1/24/2018
DESIGNED BY: —
CHECKED BY: —
DRAWN BY: —
PROJECT NO: 13040.02
SCALE: HORIZ: N/A
VERT: N/A

SHEET
C3

FILLMORE COUNTY PARK NATURAL TRAIL DESIGN/ CONSTRUCTION GUIDELINES
LIVINGSTON COUNTY PARKS & OPEN SPACE ADVISORY COMMITTEE

GENERAL DESIGN CONSIDERATIONS

1. MINIMIZE SOIL DISTURBANCE TO AVOID DAMAGE TO PLANTS AND HABITAT.
2. REDUCE OR ELIMINATE THE POTENTIAL FOR EROSION.
3. USE ARBORICULTURALLY-CORRECT PRUNING OR REMOVAL OF TREE LIMBS AND SHRUBS.
4. MINIMIZE DRAINAGE PROBLEMS THROUGH MINIMAL GRADING; AVOID STANDING WATER ON TRAIL.
5. MAINTAIN EXISTING DRAINAGE PATTERNS AND GRADES TO THE GREATEST EXTENT PRACTICABLE, SLOPE TRAIL TO FACILITATE SHEET DRAINAGE.
6. USE SELECT BORROW MATERIAL TO IMPROVE INADEQUATE TRAIL SURFACE AREAS.
7. REMOVE SHARP AND POTENTIALLY INJURIOUS PLANTS FROM CLOSE PROXIMITY TO THE TRAIL.
8. RETAIN DEAD STANDING VEGETATION ALONG THE TRAIL, WHEN SAFETY PERMITS, TO IMPROVE HABITAT.

GENERAL CONSTRUCTION, MAINTENANCE AND REPAIR GUIDELINES:

1. STAKE THE ROUTE IN ACCORDANCE WITH THE PLAN; CLEARLY DEFINE THE TRAIL BED AND CLEARING LIMITS. GENERALLY LOCATE THE TRAIL TO KEEP REMOVAL OF TREES AND BRUSH TO A MINIMUM; TO MINIMIZE GRADING AND FILLING OF UNSTABLE AREAS, AND TO AVOID WETLANDS AND SENSITIVE NATURAL AREAS.
2. REMOVE TREES, BRUSH, AND ROCKS AND VEGETATIVE DEBRIS FROM THE TRAIL BED. CUT SHRUBS AND SMALL TREES FLUSH WITH THE GROUND TO PREVENT TRIPPING AND TO REDUCE STUMP GROWTH.
3. REMOVE DEAD OR UNSTABLE OVERHANGING LIMBS AND VEGETATION WHICH MAY BE POTENTIALLY INJURIOUS TO TRAIL USERS.
4. PRUNE OVERHANGING BRANCHES NEATLY AT THE BRANCH COLLAR OF THE TRUNK OR WHERE A BRANCH FORKS. TO AVOID RAPID REGROWTH WHERE NECESSARY, REMOVE SMALL TREES RATHER THAN TRIMMING THEM. TRIM EXPOSED ROOTS FLUSH WITH THE SOIL SURFACE.
5. SCATTER REMOVED BRANCHES AND OTHER VEGETATIVE DEBRIS WELL OFF THE TRAIL, OR PILE FOR WILDLIFE COVER.
6. GRADE THE TRAIL BED. DUE TO THE FLAT AND LEVEL CHARACTER OF THE SITE, TRAIL GRADING WILL BE MINIMAL AND, FOR THE MOST PART, UNNECESSARY. SMOOTH OUT RUTTED OR PITTED AREAS THAT MAY CREATE IRREGULAR GROUND SURFACES INJURIOUS FOR PEDESTRIAN USE.
7. AFTER GRADING, PLACE WOOD CHIPS ON THE TRAIL BED IN A SMOOTH, UNIFORM LAYER OF 3" MINIMUM THICKNESS. AVOID UNNECESSARY DISTURBANCE OF THE GROUND SURFACE. PROVIDE A MINIMAL LAYER (E.G. 3" MAXIMUM, TYPICAL) WELL-DRAINING FILL MATERIAL WHERE NECESSARY TO ELEVATE THE TRAIL IN WET AREAS.
8. MOW TRAIL WIDTH (APPROXIMATELY 6' WIDE) A MINIMUM OF 5 TIMES PER YEAR. MOW TRAIL SIDES (APPROXIMATELY 10' WIDE EACH SIDE) A MINIMUM OF 2 TIMES EACH YEAR.

Kellogg

McClements

MULTI-USE PLAYFIELD

GRAVEL DRIVE AND PARKING LOT

APPROXIMATE LOCATION OF 5K TRAIL BY OWNER. EXACT LOCATION SHALL BE STAKED IN THE FIELD BY OWNER.

4
C6

NOTE: CONSTRUCTION OF 5K TRAIL IS NOT IN CONTRACT. CONSTRUCTION BY OWNER

NORTH

0 200 400 600

Know what's below.
Call before you dig.

Landscape Architects & Planners, Inc.
OAKLAND CENTER
809 CENTER STREET
SUITE ONE
LANSING, MI 48906
P: (517) 485-5500
F: (517) 485-5576
info@lapinc.net

REVISIONS

INITIALS	DATE	COMMENTS

LIVINGSTON COUNTY
PLANNING DEPARTMENT
304 E. GRAND RIVER AVE. SUITE 206
HOWELL, MI 48843
P: (517) 546-7555 F: —

FILLMORE COUNTY PARK PHASE 1 IMPROVEMENTS

5K TRAIL LAYOUT
(CONSTRUCTED BY OWNER)

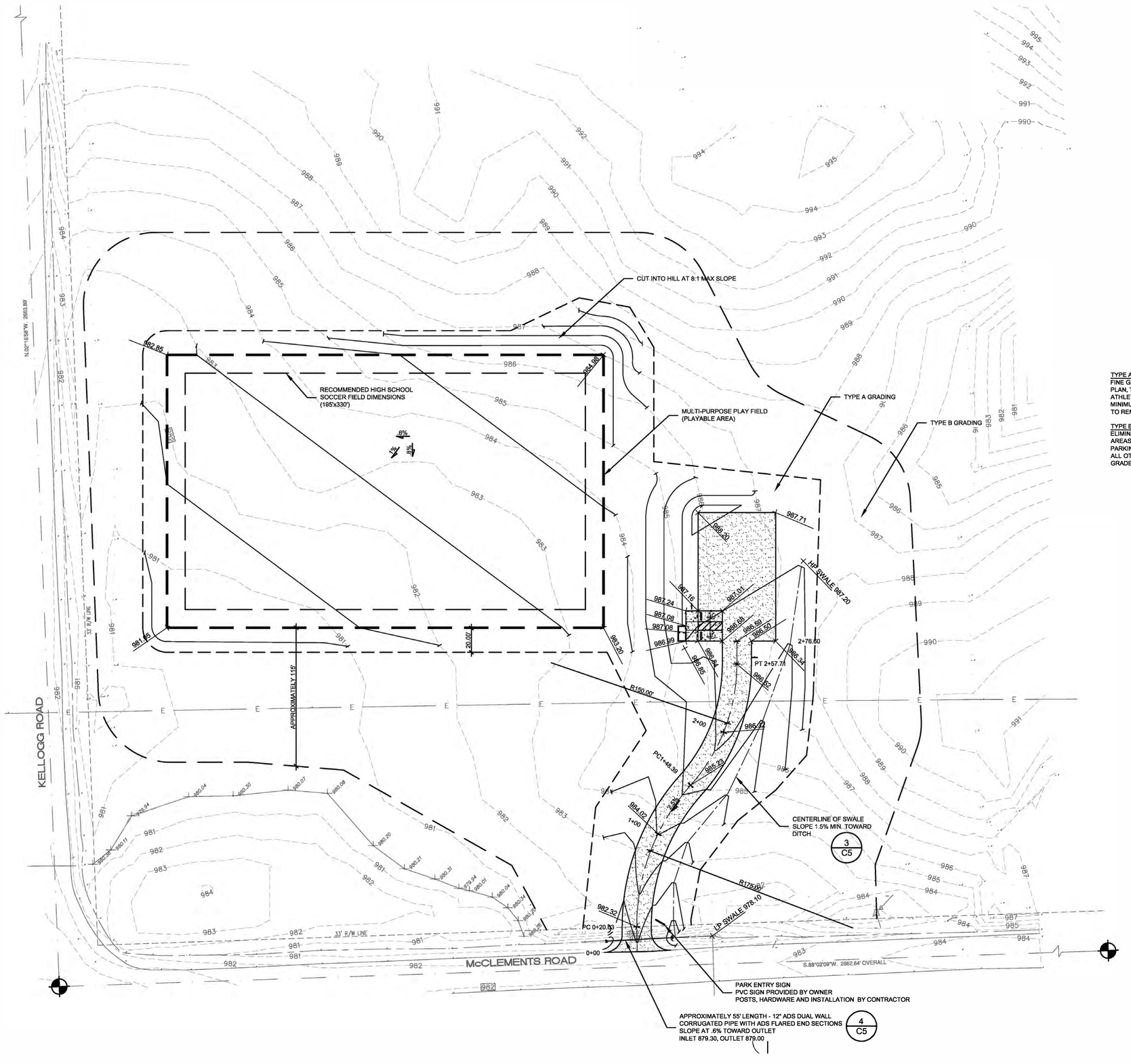
7315 MC CLEMENTS RD. GENOA TOWNSHIP, MI 48114

DATE: 1/24/2018
DESIGNED BY: —
CHECKED BY: —
DRAWN BY: NRW
PROJECT NO: 13040.02
SCALE:
HORZ: N/A
VERT: N/A

SHEET
C3.1

W:\AP-SERVCOMP\ANYPROJECTS\PROJECTS 2013\13040.02 LIVINGSTON FILLMORE PARK CONSTRUCTION\08 PAGE LAYOUTS AND PRESENTATION BOARDS\AUTOCAD\SHEETSET\SITE LAYOUT\C3.1 5K TRAIL LAYOUT.DWG

Plot Date: 3/23/2018 4:31 PM



TYPE A GRADING:
FINE GRADING TO MEET PROPOSED ELEVATIONS AS SPECIFIED ON PLAN, TO CREATE A UNIFORM SLOPE TO THE STANDARDS OF AN ATHLETIC PLAY FIELD. MECHANICALLY RAKE SOIL SURFACE TO A MINIMUM DEPTH OF 4" WITH YORK RAKE OR SIMILAR EQUIPMENT, TO REMOVE STONES AND DEBRIS LARGER THAN 1-1/2.

TYPE B GRADING:
ELIMINATE ALL DEPRESSIONS. CREATE A UNIFORM GRADE. AREAS NORTHEAST OF PLAYING FIELD AND AREAS EAST OF THE PARKING LOT AND DRIVE SHALL BE GRADED BETWEEN 2% - 8%. ALL OTHER AREAS DESIGNATED AS TYPE B GRADING SHALL BE GRADED BETWEEN 2% - 5%

SEEDING NOTES:

1. SEED ALL NON NATIVE DISTURBED AREAS UNLESS OTHERWISE NOTED WITH:
   - EARTH CARPET QUICK TO GROW LAWN SEED MIXTURE
   - 25% PERENNIAL RYEGRASS
   - 25% KENTUCKY BLUEGRASS
   - 25% ANNUAL RYEGRASS
   - 25% CREEPING RED FESCUE

APPLY AT THE RATE OF 5-6 POUNDS PER 1,000SF
HERBICIDE TREAT PRIOR TO SEEDING.

GRADING NOTES

1. ALL PATHWAY CROSS SLOPES SHALL BE BETWEEN 1% AND 2%. RUNNING SLOPE SHALL BETWEEN 1 % AND 4.9%. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ENSURING SIDEWALK SLOPES ARE WITHIN TOLERABLE LIMITS AND THAT ALL SIDEWALK AND RAMP SLOPES ARE IN COMPLIANCE WITH THE REGULATIONS AS SET FORTH IN THE AMERICANS WITH DISABILITIES ACT.

NORTH

0 40 80 120

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

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P: (517) 546-7555 F: —

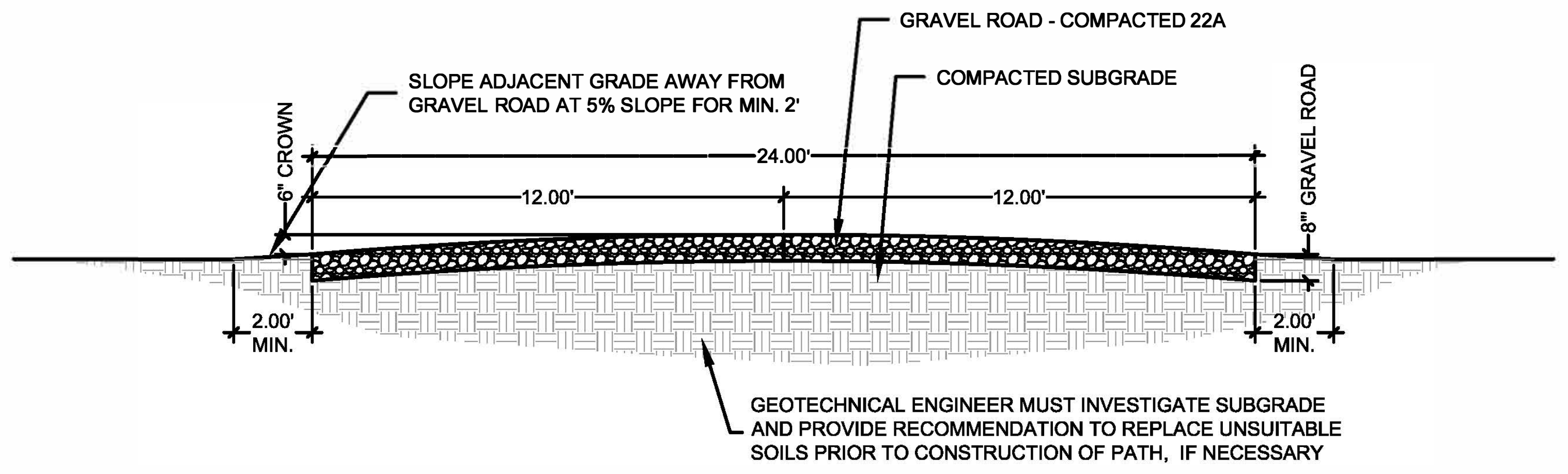
FILLMORE COUNTY PARK PHASE 1 IMPROVEMENTS

GRADING PLAN

7315 MC CLEMENTS RD. GENOA TOWNSHIP, MI 48114

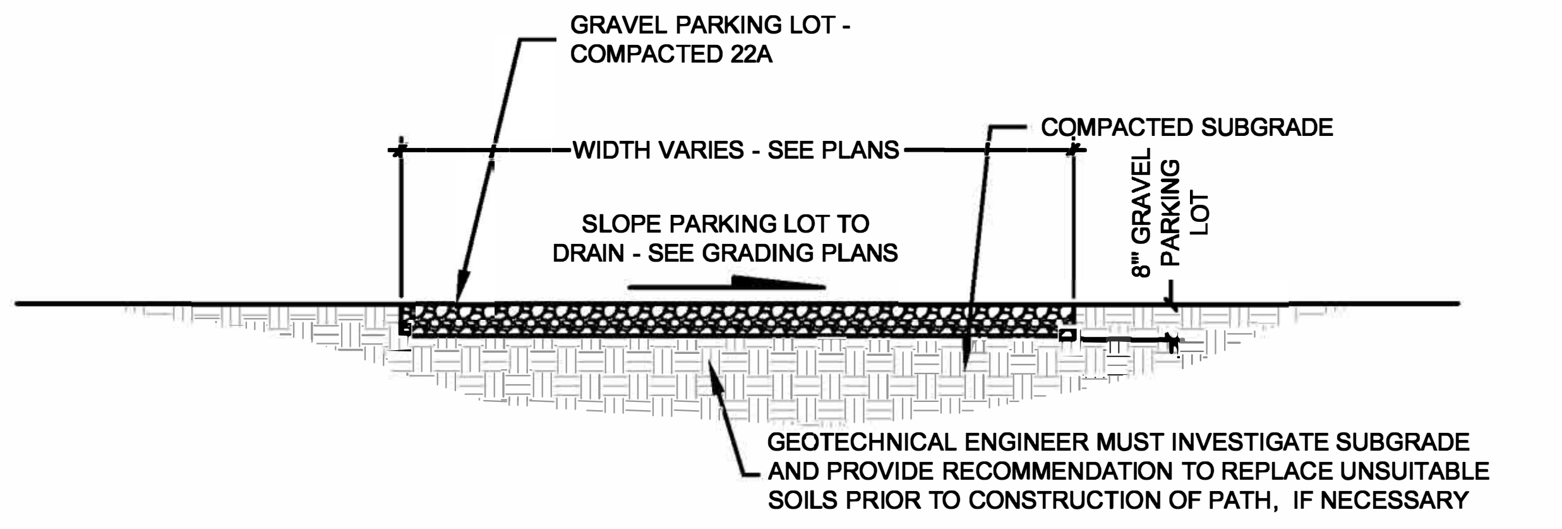
DATE: 1/24/2018
DESIGNED BY: —
CHECKED BY: —
DRAWN BY: MKW
PROJECT NO: 13040.02
SCALE: HORIZ: N/A
VERT: N/A

SHEET C4



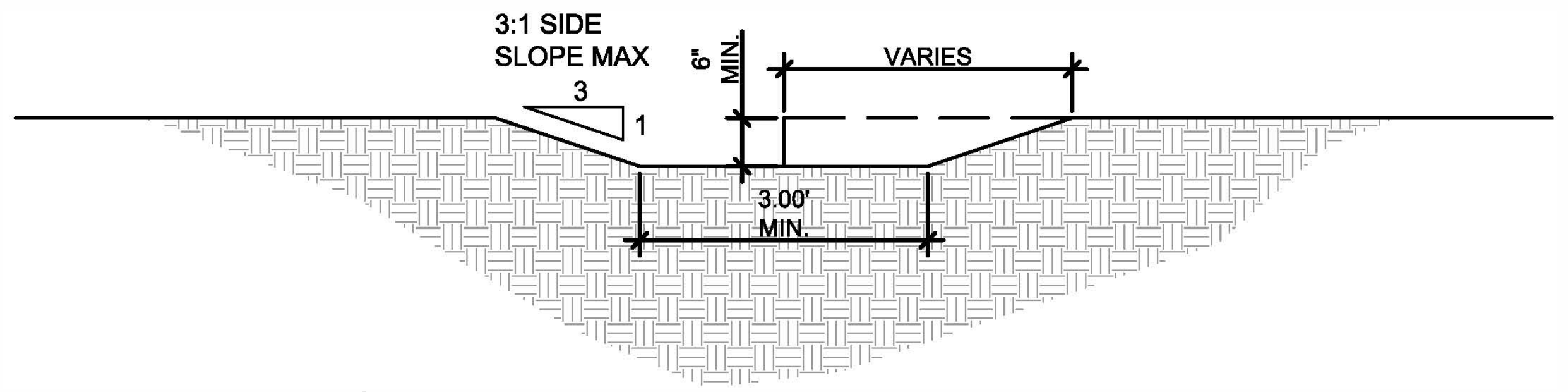
1 22A GRAVEL ROAD

SCALE: NOT TO SCALE



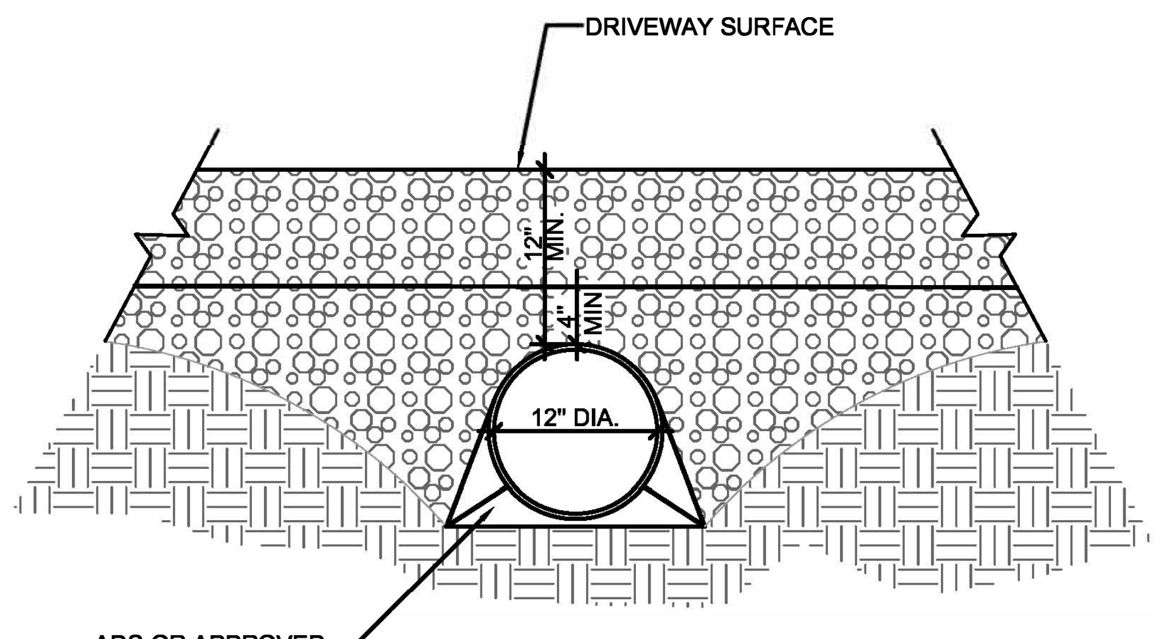
2 22A GRAVEL PARKING LOT

SCALE: NOT TO SCALE

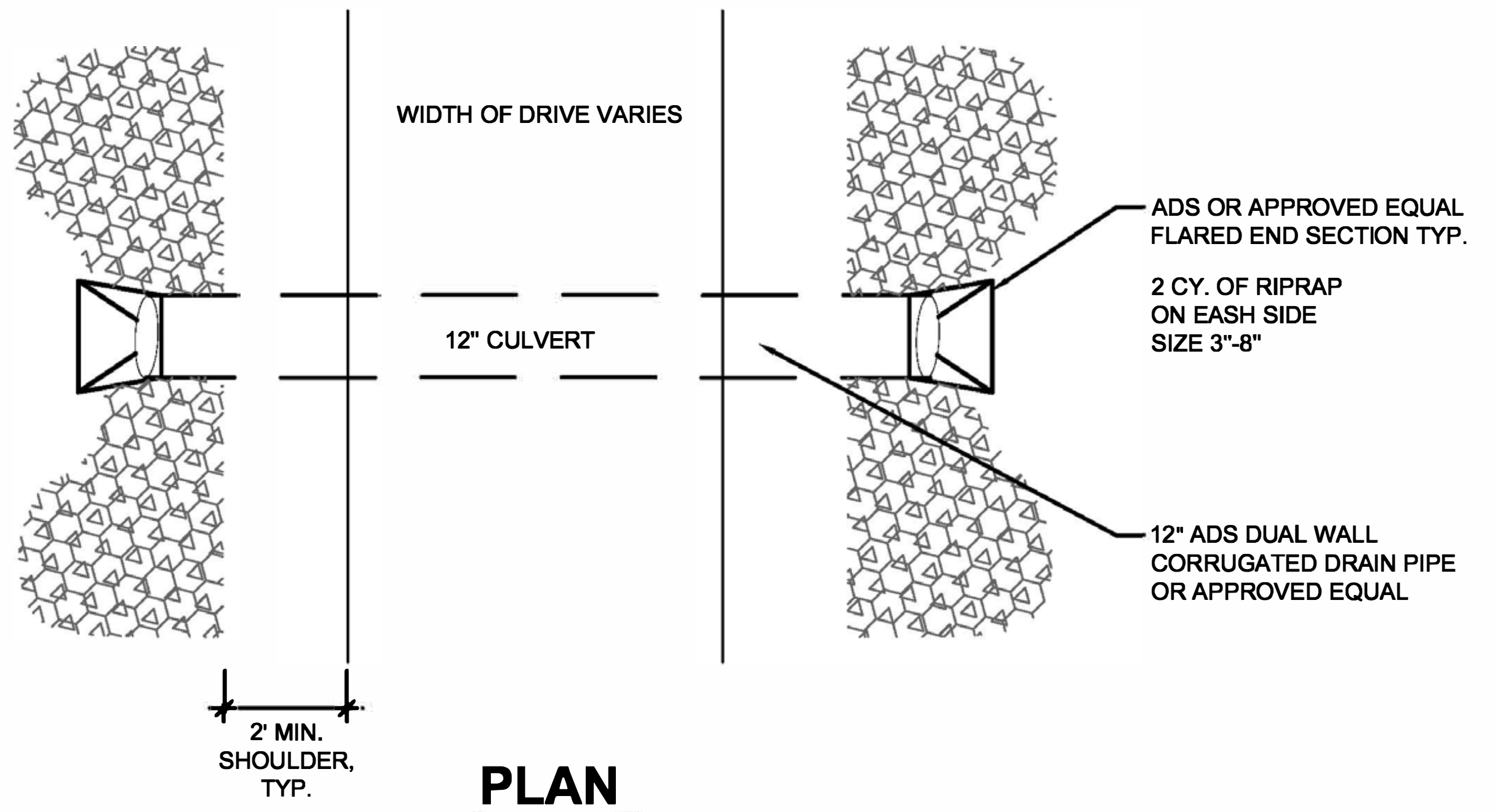


3 LAWN SWALE

SCALE: NOT TO SCALE



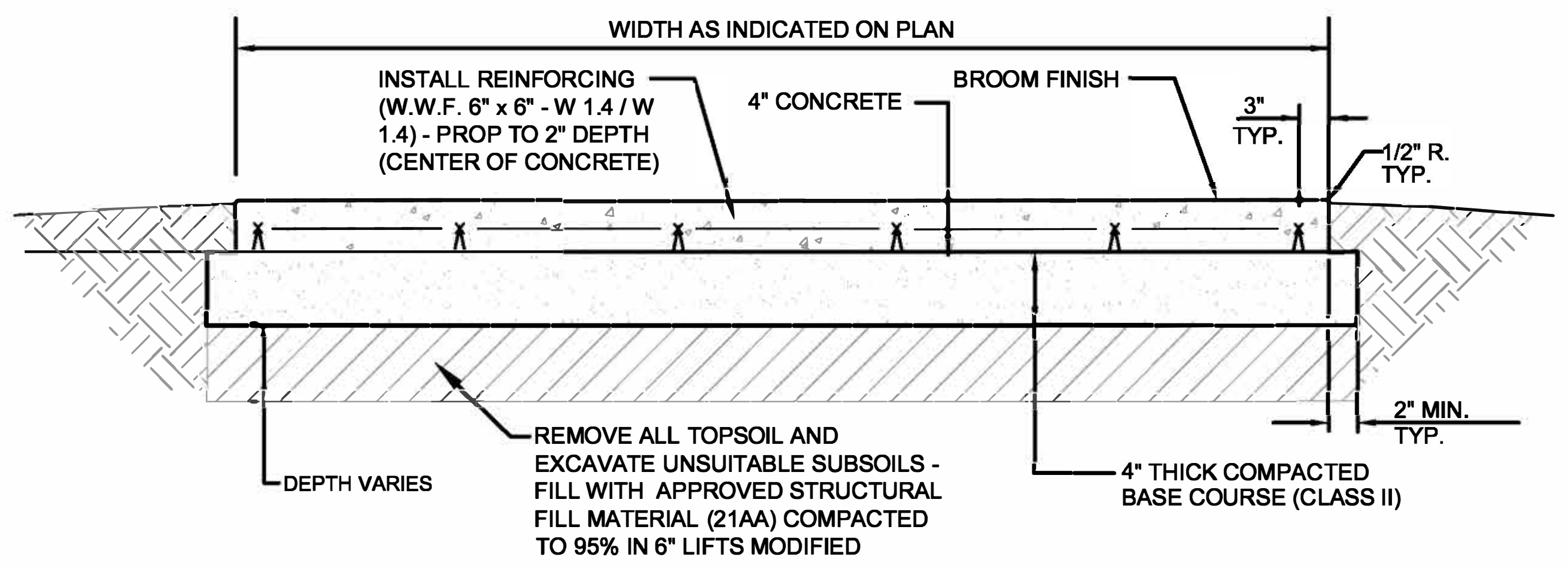
SECTION



PLAN

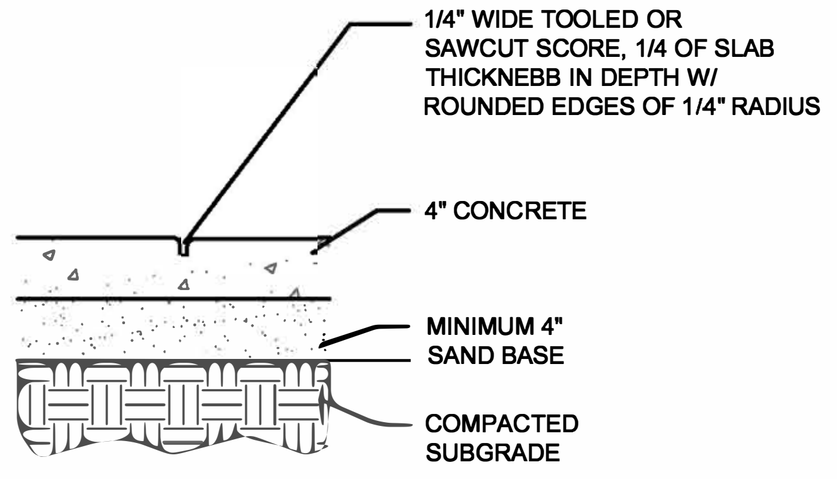
4 DRIVE CULVERT TYP.

SCALEENOT TO S :CAE



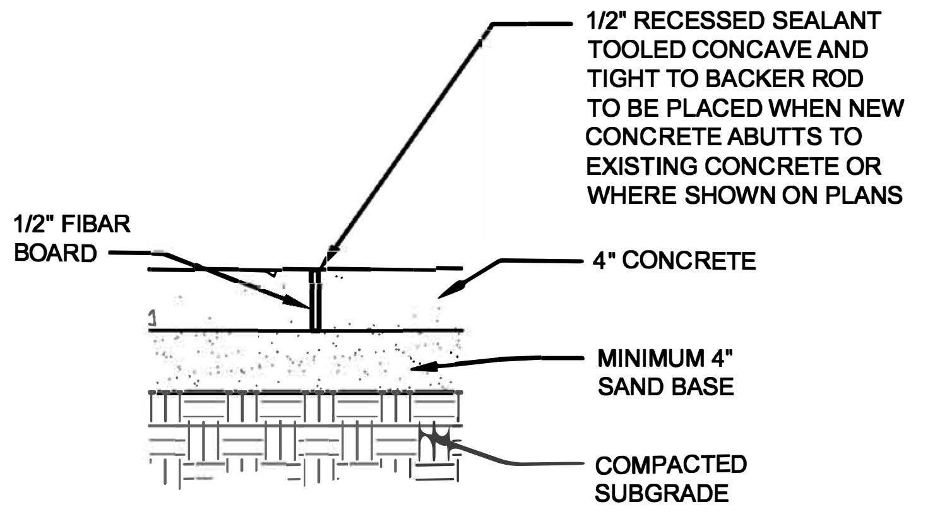
5 4 INCH REINFORCED CONCRETE

SCALE: NOT TO SCALE



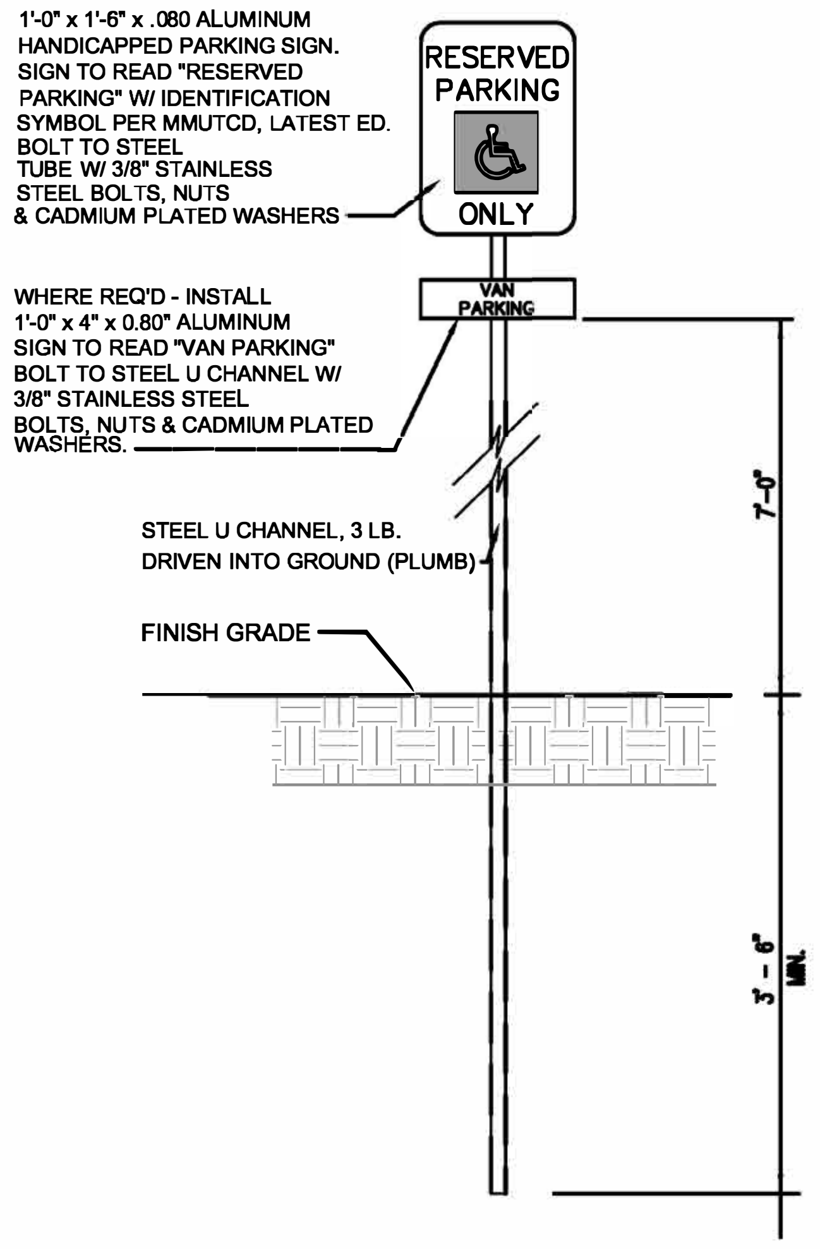
6 CONTROL JOINTS

SCALE: NOT TO SCALE



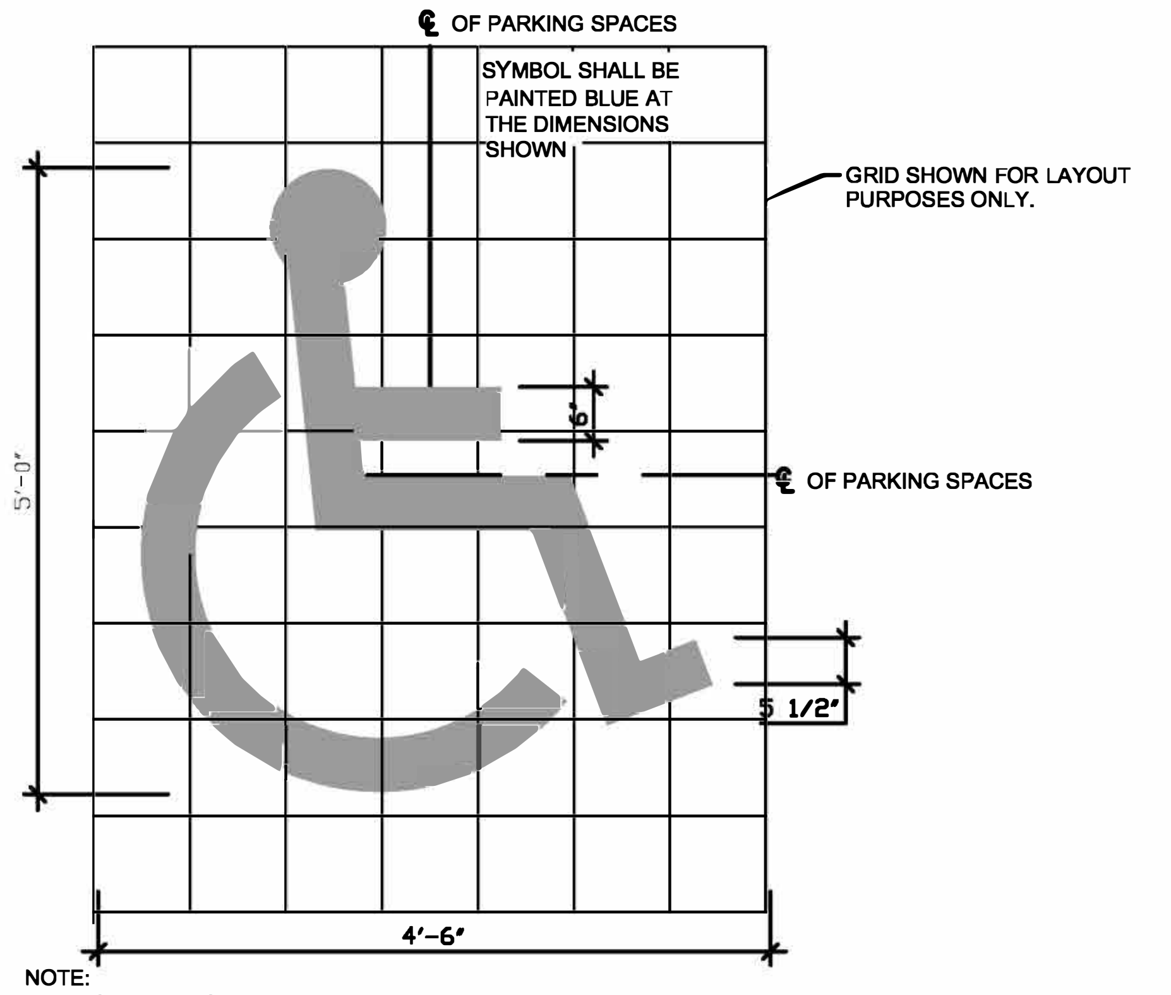
7 EXPANSION JOINTS

SCALE: NOT TO SCALE



8 SIGN - HANDICAP PARKING

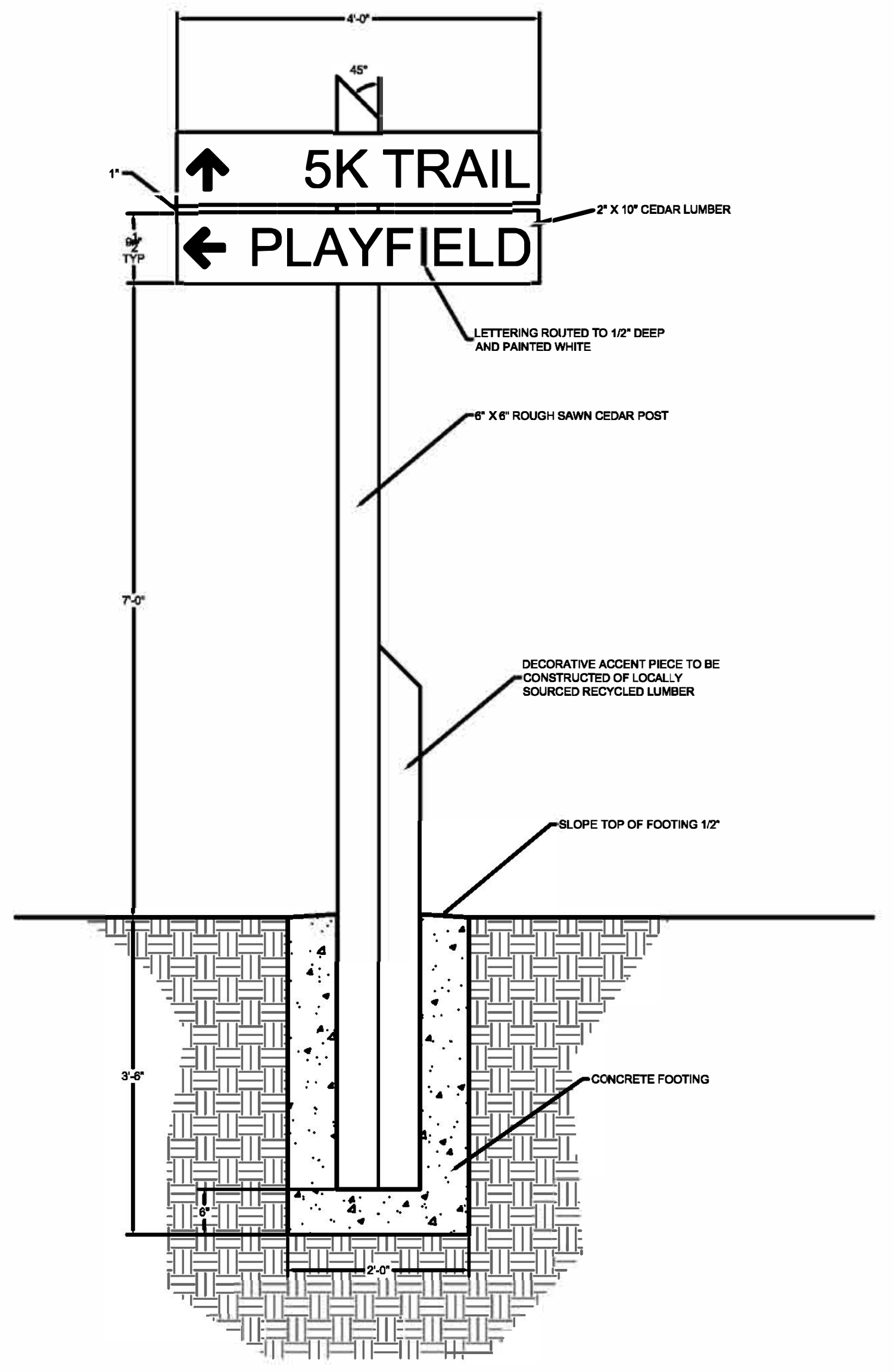
SCALE: NOT TO SCALE



NOTE:
HANDICAP SYMBOL SHALL BE FURNISHED AND INSTALLED PER MDOT STD. SPECS. FOR CONSTRUCTION, LATEST ED. AND MMUTCD, LATEST EDITION.

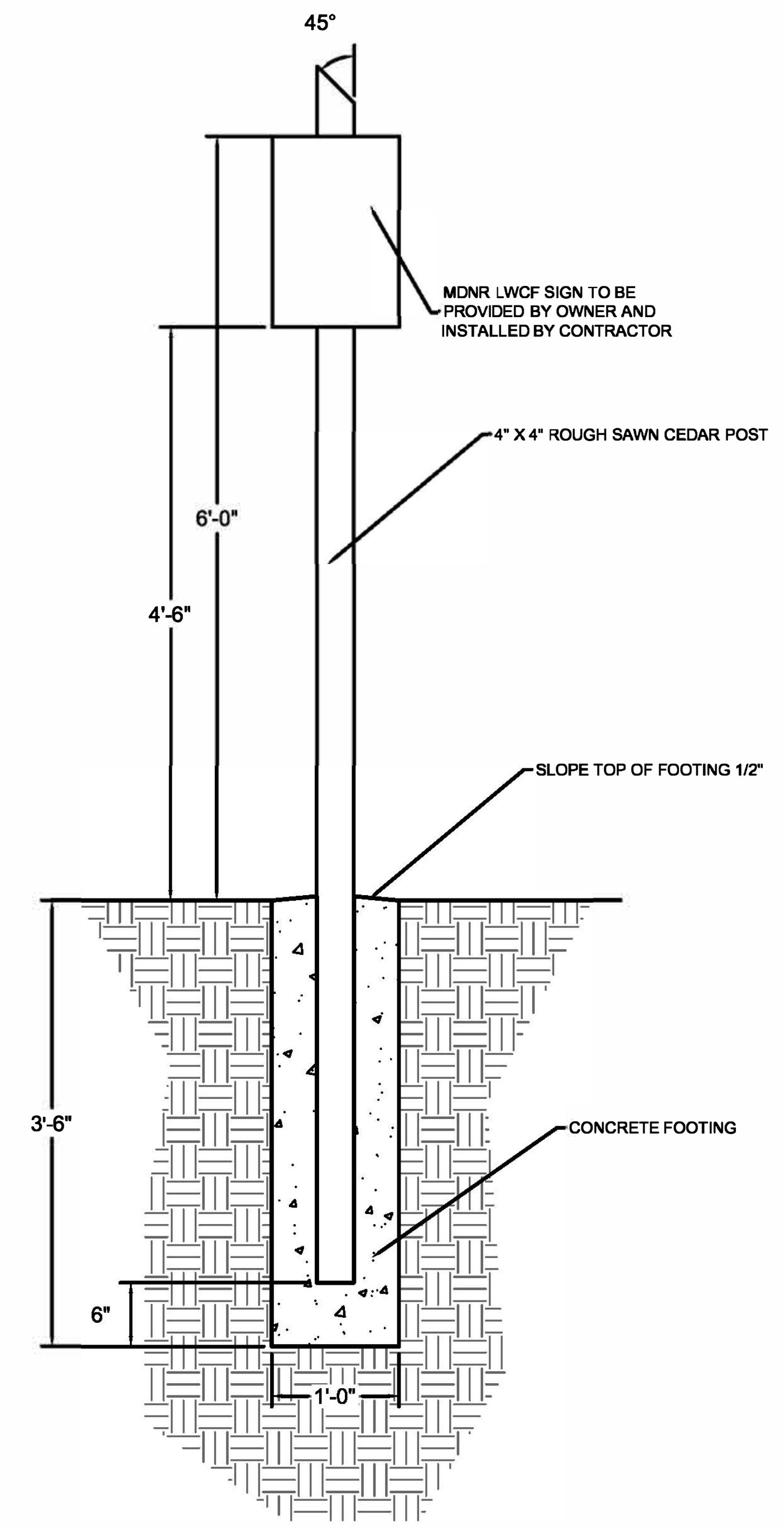
9 HANDICAP SYMBOL PAINT

SCALE: 1:1



10 WAYFINDING SIGN

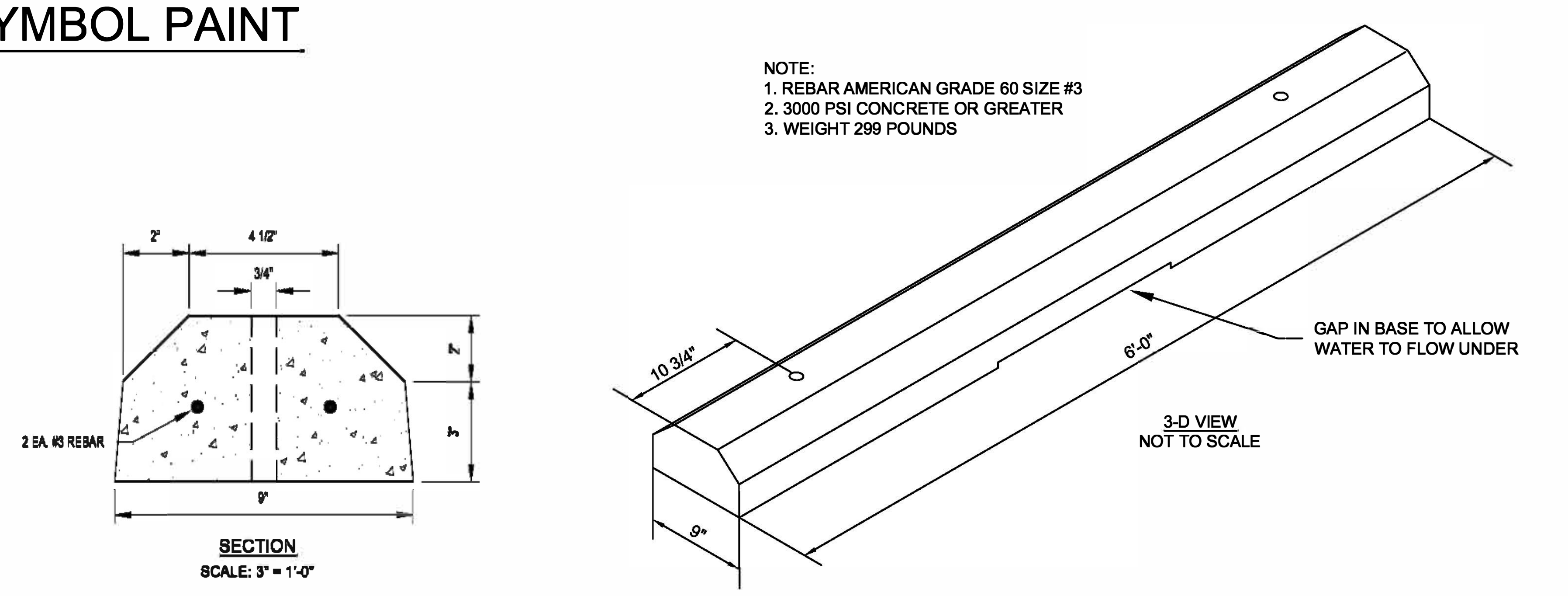
SCALE: 1/2" = 1'-0"



11 MDNR LWCF SIGN

SCALE: 3/4" = 1'-0"

NOTE:
1. REBAR AMERICAN GRADE 60 SIZE #3
2. 3000 PSI CONCRETE OR GREATER
3. WEIGHT 299 POUNDS



12 CONCRETE WHEEL STOP DETAIL

SCALE: 1:1

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REVISIONS

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LIVINGSTON COUNTY
PLANNING DEPARTMENT

304 E. GRAND RIVER AVE. SUITE 206
HOWELL, MI 48843
P: (517) 546-7555 F: ----

FILLMORE COUNTY PARK PHASE 1 IMPROVEMENTS

DETAILS

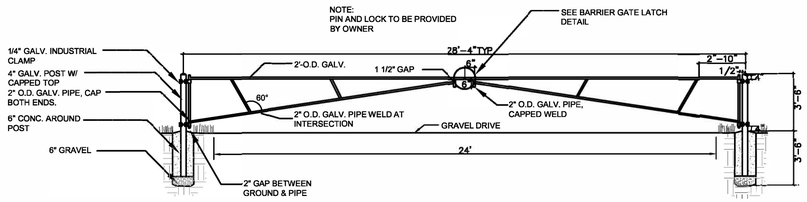
7315 MC CLEMENTS RD. GENOA TOWNSHIP, MI 48114

DATE: 1/24/2018
DESIGNED BY: ----
CHECKED BY: ----
DRAWN BY: NRW
PROJECT NO: 13040.02
SCALE:
HORIZ: N/A
VERT: N/A

SHEET
C5

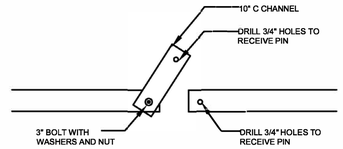
\\LAP-SERV\COMPANY\PROJECTS\PROJECTS 2013\13040.02 LIVINGSTON FILLMORE PARK CONSTRUCTION\08 PAGE LAYOUTS AND PRESENTATION BOARDS\AUTOCAD\SHEETSET\DETAILS\C5 DETAILS.DWG

Plot Date: 3/23/2018 4:33 PM



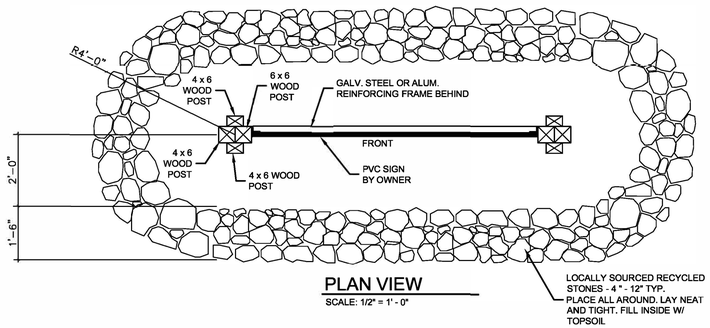
1 VEHICULAR BARRIER GATE (BY OWNER)

SCALE: NOT TO SCALE



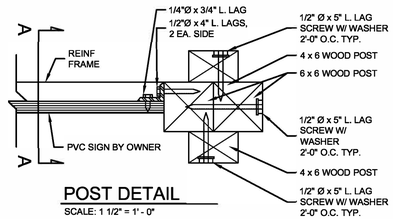
2 VEHICULAR BARRIER GATE LATCH (BY OWNER)

SCALE: NOT TO SCALE



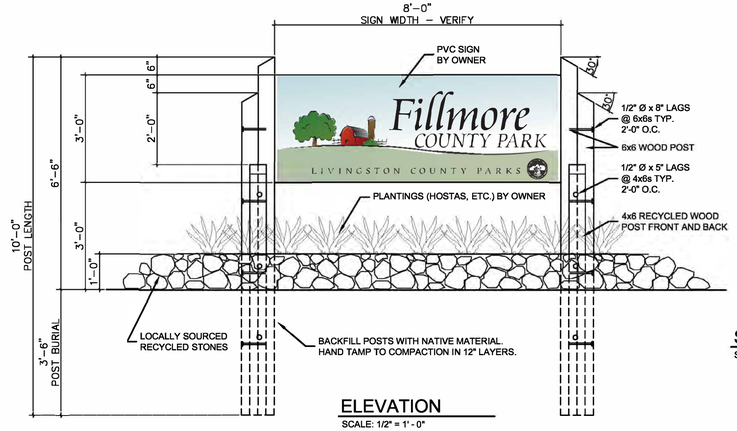
PLAN VIEW

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



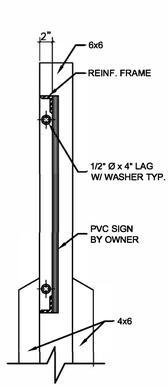
POST DETAIL

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



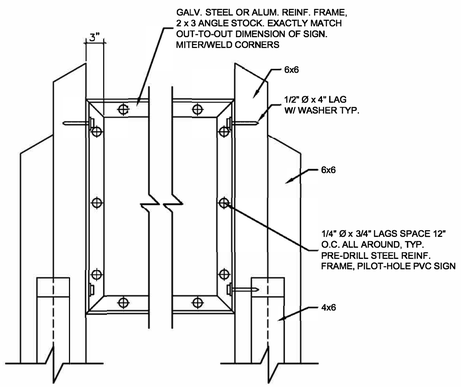
ELEVATION

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



SECTION A-A

SCALE: 1" = 1' - 0"

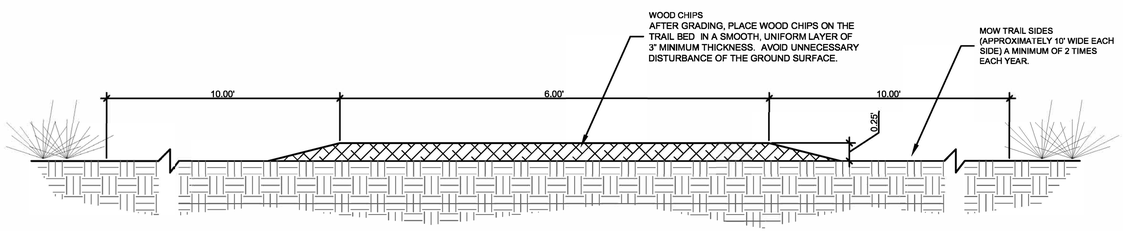


SIGN ELEV. (BACK)

SCALE: 1" = 1' - 0"

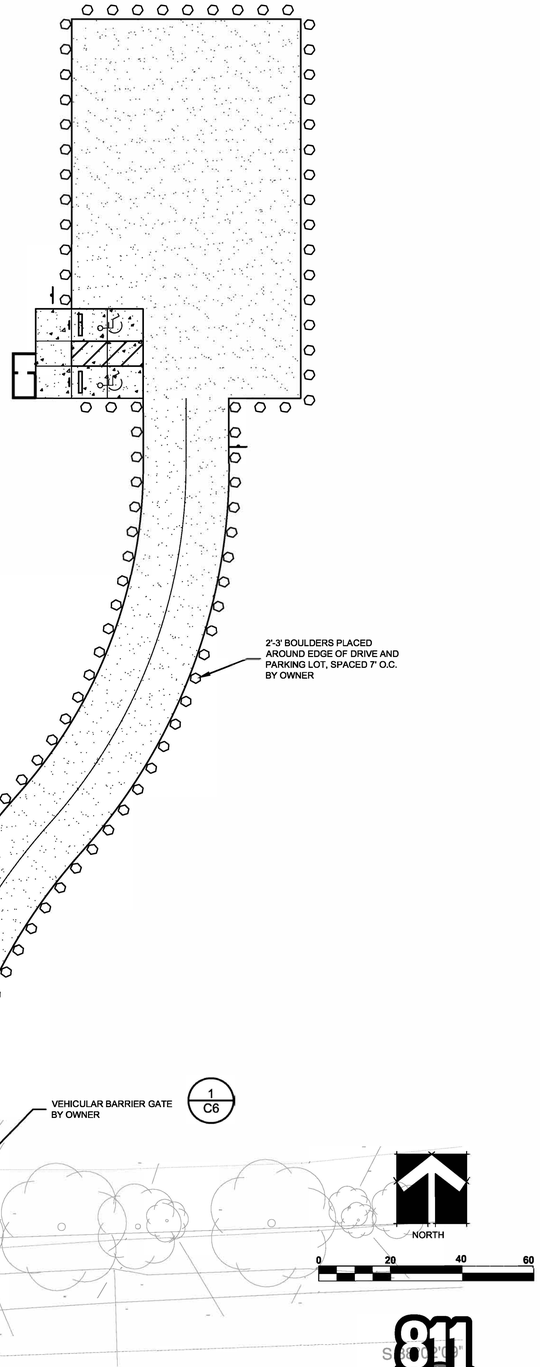
3 FILLMORE COUNTY PARK ENTRY SIGN

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



4 5K TRAIL SECTION

SCALE: 1:1



5 BOULDER LAYOUT PLAN (BY OWNER)

SCALE: 1" = 20' - 0"

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809 CENTER STREET
SUITE ONE
LANSING, MI 48906
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F: (517) 485-5576
info@lapinc.net

REVISIONS

INITIALS	DATE	COMMENTS
---	---	---

LIVINGSTON COUNTY
PLANNING DEPARTMENT

304 E. GRAND RIVER AVE. SUITE 206
HOWELL, MI 48843
P: (517) 546-7555 F: ---

FILLMORE COUNTY PARK PHASE 1 IMPROVEMENTS

DETAILS

7315 MC CLEMENTS RD. GENOA TOWNSHIP, MI 48114

DATE: 1/24/2018
DESIGNED BY: ---
CHECKED BY: ---
DRAWN BY: MEW
PROJECT NO.: 13040.02
SCALE:
HORIZ.: N/A
VERT.: N/A

SHEET C6

GENOA CHARTER TOWNSHIP
Application for Site Plan Review

GENOA TOWNSHIP
OCT 23 2023
RECEIVED

TO THE GENOA TOWNSHIP PLANNING COMMISSION AND TOWNSHIP BOARD:

APPLICANT NAME & ADDRESS: Trinity Continuing Care Services d/b/a Woodland Village 7533 Grand River, Brighton MI 48114
If applicant is not the owner, a letter of Authorization from Property Owner is needed.

OWNER'S NAME & ADDRESS: Trinity Continuing Care Services d/b/a Trinity Health Senior Communities, 20555 Victor Pkwy, Livonia MI 48152

SITE ADDRESS: 7533 Grand River, Brighton MI 48114 PARCEL #(s):

APPLICANT PHONE: (810)844-7447 OWNER PHONE: (734) 343-6600

OWNER EMAIL: sharon.cuddington@trinity-health.org

LOCATION AND BRIEF DESCRIPTION OF SITE: Adding to the southern most part of our current parking lot. We would remove some grass area and make it Asphalt.

BRIEF STATEMENT OF PROPOSED USE: We are looking to add additional parking for our facility. This was a previously approved project that now has funding available to complete.

THE FOLLOWING BUILDINGS ARE PROPOSED: This is to add to an existing parking lot.

I HEREBY CERTIFY THAT ALL INFORMATION AND DATA ATTACHED TO AND MADE PART OF THIS APPLICATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: Sharon Cuddington - Regional Operations Manager S Cuddington

ADDRESS: 7533 Grand River, Brighton MI 48114

Contact Information - Review Letters and Correspondence shall be forwarded to the following:

1.) Bowe Davey (Name) of Woodland Village (Administrator) (Business Affiliation) at bowe.davey@trinity-health.org (E-mail Address)

FEE EXCEEDANCE AGREEMENT

As stated on the site plan review fee schedule, all site plans are allocated two (2) consultant reviews and one (1) Planning Commission meeting. If additional reviews or meetings are necessary, the applicant will be required to pay the actual incurred costs for the additional reviews. If applicable, additional review fee payment will be required concurrent with submittal to the Township Board. By signing below, applicant indicates agreement and full understanding of this policy.

SIGNATURE: S Cuddington DATE: 9/29/2023

PRINT NAME: Sharon Cuddington PHONE: 810-844-7447

ADDRESS: 7533 Grand River, Brighton MI 48114

November 8, 2023

Planning Commission
Genoa Township
2911 Dorr Road
Brighton, Michigan 48116

Attention:	Amy Ruthig, Planning Director
Subject:	Fillmore Park – Site Plan Review #1
Location:	7075 McClements Road – north side of McClements, between Kellogg and Hacker Roads
Zoning:	PRF Public and Recreational Facilities District

Dear Commissioners:

At the Township's request, we have reviewed the site plan submitted by Livingston County Planning proposing bike trails for Fillmore Park.

We have reviewed the proposal in accordance with the applicable provisions of the Genoa Township Zoning Ordinance.

A. Summary

1. The submittal does not identify the proposed setbacks; however, the requirement is not met at the trail crossing across Kellogg Road.
2. If granted, sketch plan approval is valid for only 1 year, though the project timeline extends out to 2026.
3. The applicant will need to apply for and obtain extensions to cover the full project (which will be evaluated based on Ordinance standards and may or may not be granted).
4. The internal signs must meet setback requirements and be no more than 2 square feet in area to be exempt from the Township sign regulations.
5. The applicant must address any comments provided by the Township Engineer or Brighton Area Fire Authority.

B. Proposal

The applicant requests site plan review and approval for a mountain bike trail covering the westerly portion of Fillmore Park. Improvements include a trail, trail crossing, signage, and mountain bike obstacle course.

Public parks are permitted by right in the PRF district. As an established public park, the proposed trail and related features require site plan review/approval by the Planning Commission.

C. Site Plan Review

1. **Dimensional Requirements.** The PRF District requires a front yard setback equal to that of the most restrictive adjacent zoning district. In this instance, the most restrictive setback is 75 feet required by the AG District. Side and rear setback requirements are 50 feet for trails.

   The submittal does not identify the proposed setbacks; however, the requirement is not met at the trail crossing across Kellogg Road.

   Additionally, trails are exempt from the 25-foot nature feature setback; however, if the proposed bridges encroach, we are of the opinion that approval under Section 13.02.04 will be required.

Aerial view of site and surroundings (looking north)

2. **Project Phasing.** The submittal identifies 4 specific project components with anticipated timelines. The applicant should be aware that sketch plan approval is valid for 1 year.

   If the Commission grants approval, it will not cover project work in 2025 and 2026, unless extensions are requested and granted. Any such extensions will be evaluated based on the standards of Section 18.09.02 with no guarantee that they are granted.

3. **Signs.** Several signs are proposed – some are internal to the project area, while others are to be located in the public right-of-way.

   So long as the internal signs meet setback requirements and are no larger than 2 square feet, they may be exempt from review as "incidental signs."

   Additionally, the signs in the public right-of-way are exempt as "regulatory, directional and street signs;" however, the applicant must obtain approval from the Livingston County Road Commission for such signage.

Should you have any questions concerning this matter, please do not hesitate to contact our office.

Respectfully,
SAFEBUILT

Brian V. Borden, AICP
Michigan Planning Manager

TETRA TECH

November 8, 2023

Ms. Amy Ruthig
Genoa Township
2911 Dorr Road
Brighton, MI 48116

Re: Woodland Village Parking Expansion
Site Plan Review No. 1

Dear Ms. Ruthig:

Tetra Tech conducted a review of the proposed Woodland Village Parking Lot Expansion site plan submitted on October 23, 2023. The plans were submitted by Trinity Continuing Care Services. The submitted site plan was previously approved and was prepared by Desine Inc. in April of 2006. The site is located at the existing Woodland Village facility on the north side of Grand River Avenue. The Petitioner is proposing a parking addition to their existing parking lot.

The proposed parking lot expansion meets Township Standards, and the impact assessment notes that original storm systems on site were sized to accommodate the proposed parking area. The original storm drainage calcs should be provided to show that the proposed parking was included. Otherwise, we have no engineering related concern to the proposed parking expansion.

Please call or email if you have any questions.

Sincerely,

Shelby Byrne

Shelby Byrne, P.E.
Project Engineer

Tetra Tech
3497 Coolidge Road, East Lansing, MI 48823
Tel 517.316.3930 Fax 517.484.8140 www.tetratech.com

From:	Rick Boisvert
To:	Amy Ruthig
Cc:	Kelly VanMarter
Subject:	Plans
Date:	Friday, November 3, 2023 4:48:03 PM
Attachments:	7075 McClements Rd, Fillmore Park Mountain Bike GT (Site) 11032023.pdf 1015 S. Latson Rd - Mister Car Wash GT (Site) 11032023.pdf 1111 S Latson Rd South Latson Commercial Development GT (Site) 11032023.pdf 3639 E Grand River Ave - Arby"s (Site) (GT) 11032023.pdf

---

Amy,
Attached are review letters for those who need them from us.

We have no new comments on the Chestnut Site Grading and No issues with the Woodland Village Parking plans. I don't see a need for a letter unless you would like one for these two.

Cordially,

Rick Boisvert, FM, CFPS
Fire Marshal
Brighton Area Fire Authority
615 W. Grand River
Brighton, MI 48116
O:(810)229-6640 D:(810)299-0033
F:(810)229-1619 C:(248)762-7929
rboisvert@brightonareafire.com




IMPACT ASSESSMENT
FOR
SITE PLAN PETITION
"WOODLAND VILLAGE SENIOR LIVING- PARKING LOT EXPANSION"
GENOA TOWNSHIP, LICINGSTON COUNTY
MICHIGAN

Prepared for:

WOODLAND VILLAGE, SENIOR LIVING
7533 GRAND RIVER RD
BRIGHTON, MI 48114
810-844-7477

Prepared by:

LUKE SMITH, MANAGER OF ENVIRONMENTAL SERVICES
WOODLAND VILLAGE
7533 GRAND RIVER RD
BRIGHTON, MI 48114
810-844-7477

October 16, 2023

INTRODUCTION

The purpose of this impact assessment report it to show the effect that this proposed parking lot expansion development may have on various factors in the general vicinity of the project. This expansion is part of a previously approved project on the property that had a delay in funding, that is now available to complete the project.

DISCUSSION ITEMS

A. Names and address(es) of person(s) responsible for preparation of the impact assessment statement of their qualifications.

Prepared by:
Luke Smith
Woodland Village, Senior Living
Manager of Environmental Services
7533 Grand River Rd
Brighton, MI 48114
810-844-7477

Prepared for:
Woodland Village, Senior Living
7533 Grand River Rd
Brighton, MI 48114
810-844-7477

B. Maps(s) and written description / analysis of the project site including all existing structures, manmade facilities, and natural features.

The 7.5 acre site is located along the North side of Grand River between Hacker Road and Euler Road. The subject property is currently the Woodland Village, Senior Living community. There is the existing building, paved parking lot, and detention basins. The surrounding areas of the property contains natural areas with mature trees, shrubs, and scrub vegetation along with a pond on the South East and South West sides of the property.

C. Impact on natural features

The proposed parking will have minimal impact on the existing natural features. The proposed area does not impede on any wetlands on the property. There are no other natural resources impacted, that was not previously approved.

D. Impact on storm water management:

The existing storm water drain system has been designed to accommodate the previously approved parking expansion in 2006. The proposed parking lot was one of the indicated future impervious surface areas and thus has been accommodated in the stormwater calculations.

Soil erosion measures will be utilized throughout the construction process to reduce the risk of erosion and sedimentation. This will be accomplished through the use of silt fence installed along the perimeter of the disturbed area.

E. Impact on surrounding land use:

There will be little to no impact on the surrounding land uses for this additional parking. The parking was previously approved with the previous expansion in 2006. The impact of the surrounding land uses was considered at that time.

The new parking lot area will be illuminated with existing lighting and will have no adverse impacts on adjacent properties.

F. Impact on public facilities and services:

The new parking area will have little to no impact on public facilities and services.

G. Impact on public utilities:

There will be little to no impact on public utilities. As mentioned previously, this project was approved with the additional parking and the impact on the public facilities and utilities was considered with the approval. There will be no additional lighting added, as sufficient lighting exists.

H. Storage and Handling of any hazardous materials:

There will be no hazardous materials used or disposed of on this site.

I. Impact on traffic and pedestrians:

The parking is solely to support the existing facility. The impact of this parking addition will be minimal.

The site is serviced by a private drive that services the hospital and Genoa medical buildings. The expansion does not pose any additional load on the inbound or outbound traffic that it does not currently see. From our observation, this will not significantly impact or impede traffic for the shared drive. The impact from visitors are not at specific times, nor are they consistent

at the same times. The private drive is serviced from a 4 lane highway with a stop light to access, along with turning lanes.

J. Special Provisions:

None.

K. A list of all sources shall be provided.

Genoa Township's Submittal Requirements For Impact Assessment

Genoa Township Zoning Ordinances

SOILS MAP

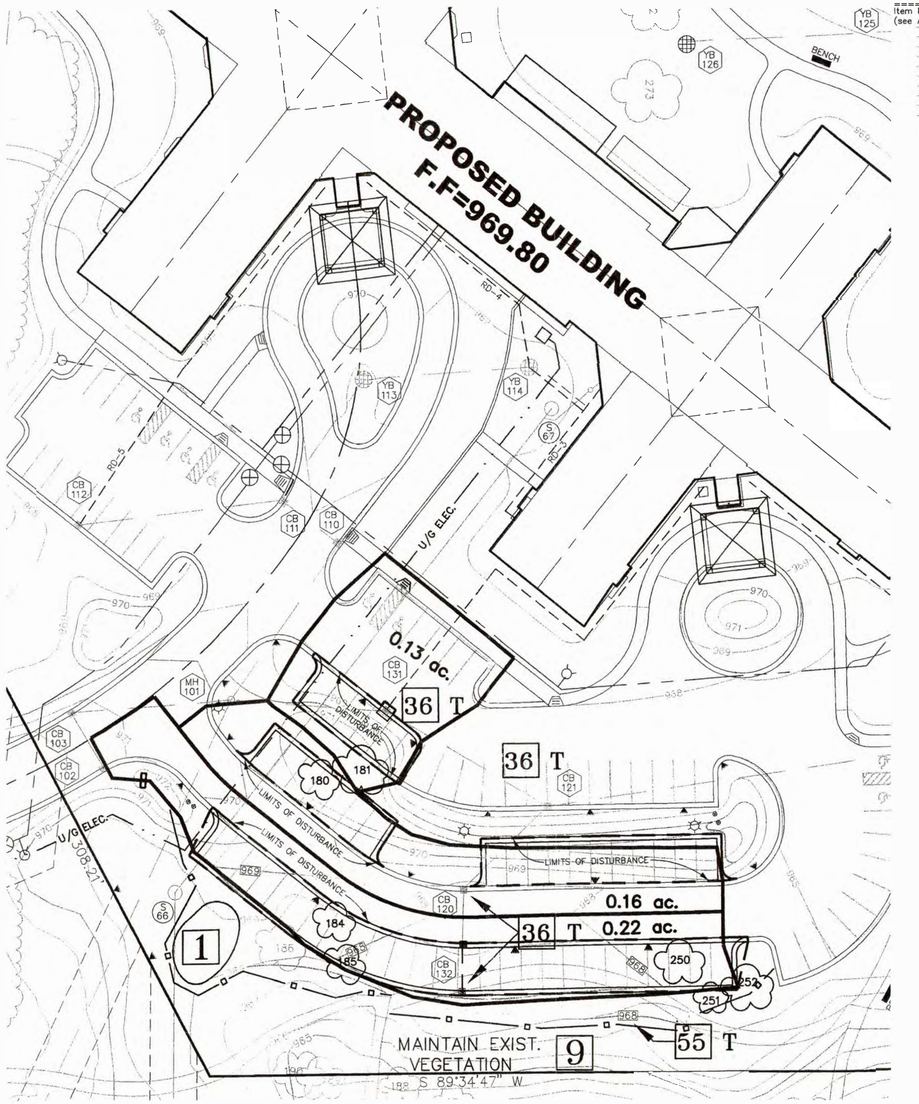
NOTE:
SOILS MAP AS PROVIDED BY THE SOIL SURVEY OF LIVINGSTON COUNTY, MICHIGAN

SOIL LEGEND

Ap	Arkport fine sandy loam
Ba	Barry sandy loam
Be	Berville loam
Br	Boyer loamy sand
Bt	Boyer–Oshtemo Loamy Sand
Bb	St. Clair Clay Loam
Br	Boyer Loamy Sand
Bu	Brady loamy sand
Bv	Breckenridge loamy sand
Bw	Broonson loamy sand
By	Brookston loam
Cc	Carlisle muck
Cr	Calwood fine sandy loam
Cv	Conover Loam
Cx	Conover–Miami loams
Fo	Fox Sandy Loam
Fr	Fox–Boyer Complex
Gd	Gilford Sandy Loam
Hd	Hillsdale loamy sand
Hl	Hillsdale sandy loam
Hm	Hillsdale–Miaml Loams
Ho	Houghton Muck
Lm	Linwood muck
Lo	Locke sandy loam
Ml	Metamora sandy loam
Mn	Metea loamy sand
Mo	Miami Loam
Mr	Miami–Conover loams
Mw	Minoa–thetford complex
Oa	Oakville fine sand
Ot	Ottokee loamy sand
Om	Owosso–Miami sandy loam
Pg	Palms Muck
Sv	Spinks–Oakville Loamy Sands
St	Blount Loam
Tm	Tawas Muck
Wc	Warners loam
Wa	Wasepi Sandy Loam
Wh	Washtenaw Silt Loam

SLOPE LEGEND

A	0 TO 2 PERCENT SLOPES
B	2 TO 6 PERCENT SLOPES
C	6 TO 12 PERCENT SLOPES
D	12 TO 18 PERCENT SLOPES
E	18 TO 25 PERCENT SLOPES
F	25 TO 40 PERCENT SLOPES



TIME LINE of Construction Sequence

Item No. (see Above)	Month in Construction Season A	B	C	D	E	F	G	H	I
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									

Explanation of Time line: The first month when work commences is designated 'A' above, the second month is 'B', etc. It is assumed that work will halt due to weather at least three months a year, which may occur in between any of the months A through I. Thus the above Sequence represents an entire year.

NOTE:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING AND MAINTAINING ADEQUATE DUST CONTROL MEASURES DURING AND AFTER CONSTRUCTION.

SOIL EROSION CONTROL AND CONSTRUCTION SEQUENCE

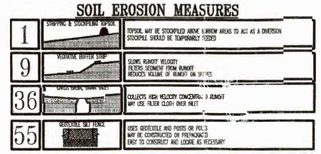
The Contractor shall perform the following work:

1) Install silt fence as shown on the Erosion and Sediment Control Plan. Install a temporary mud tracking control device at points of ingress\egress from the project.
2) Strip and stockpile topsoil. Mass grade all cut/ fill area. Install erosion control devices as work progresses.
3) The Contractor shall monitor and maintain soil erosion control measures daily.
4) Finish grade all cut/fill areas at the earliest appropriate time. Stabilize areas.
5) Install proposed utilities and storm drainage system; install soil erosion control measures at inlets and outlets.
6) Remove mud tracking control device and install road pavement.
7) Finish grade site. Perform final restoration. Establish a grass turf over all disturbed areas.
8) When sufficient vegetative ground cover has been established, remove temporary soil erosion control measures, clean all storm drainage structures, and repair all permanent erosion control devices.

SOIL EROSION CONTROL NOTES:

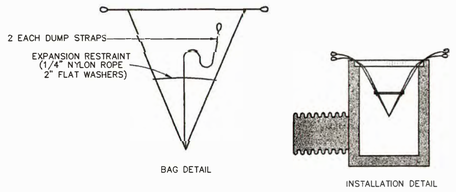
1. Construction shall comply with the County Drain Commissioner requirements and construction specifications. Prior to construction, Contractor/Owner shall pay fees and obtain the soil erosion permit, the performance bond and the inspections associated with the Work.
2. Temporary control measures shall be installed prior to massive earth disruption. Schedule work to minimize the period of time that an area is exposed and disturbed. Maintain an undisturbed VEGETATIVE BUFFER ZONE [9] around the work where noted. Contractor shall take measures as needed to observe the limits of grading shown on plans.
3. The Contractor and Owner shall agree on TREE PROTECTION MEASURES.
4. The Contractor shall MONITOR and MAINTAIN soil erosion control measures daily. Plans show minimum erosion control measures, Contractor shall provide additional measures as directed or as field conditions require.
5. All areas to be disturbed shall be stripped of topsoil, and the topsoil stored on site for use during restoration. Topsoil stockpiles shall be seeded and mulched, or matted with straw in the non-growing season, immediately after the stripping process is completed in order to prevent wind and water erosion. All material STOCKPILES shall be located as acceptable to the owner and shall be stabilized with the appropriate erosion control measures. Surround all stockpiles with a temporary diversion berm. [18]
6. Unless otherwise restored, all disturbed areas shall be RESTORED with a minimum of 3" of topsoil, seeded and mulched within 15 days of completion of the massive earth disruption. During non-growing seasons, temporary STABILIZATION [6] will be done with straw matting or other appropriate measure.
7. Contractor shall CLEAN catch basins, storm piping and roadways as required by LCDC, LCRC or other agency. The Contractor shall restore all areas disturbed by construction to an equivalent or improved condition, than existed prior to construction. Contractor shall dispose of debris in a proper manner, off-site.

SOIL EROSION MEASURES

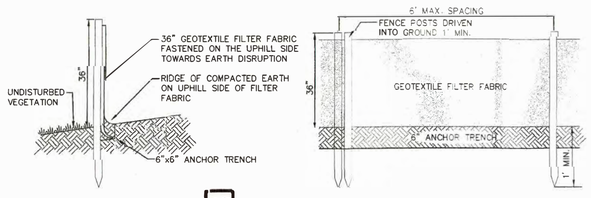


T = TEMPORARY
P = PERMANENT

TOTAL SITE AREA 7.50 AC.
DISTURBED AREA 0.23 AC.



36 INLET SEDIMENT FILTER
NOT TO SCALE



55 SILT FENCE
NOT TO SCALE

1. Repair and replace silt fence as needed, incidental
2. Field locate silt fence to follow constant contour elevations.
3. Install sed. trap & filter at drainage low points. incidental.
4. Overlap fences at joints.

SCALE: 1" = 30'

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

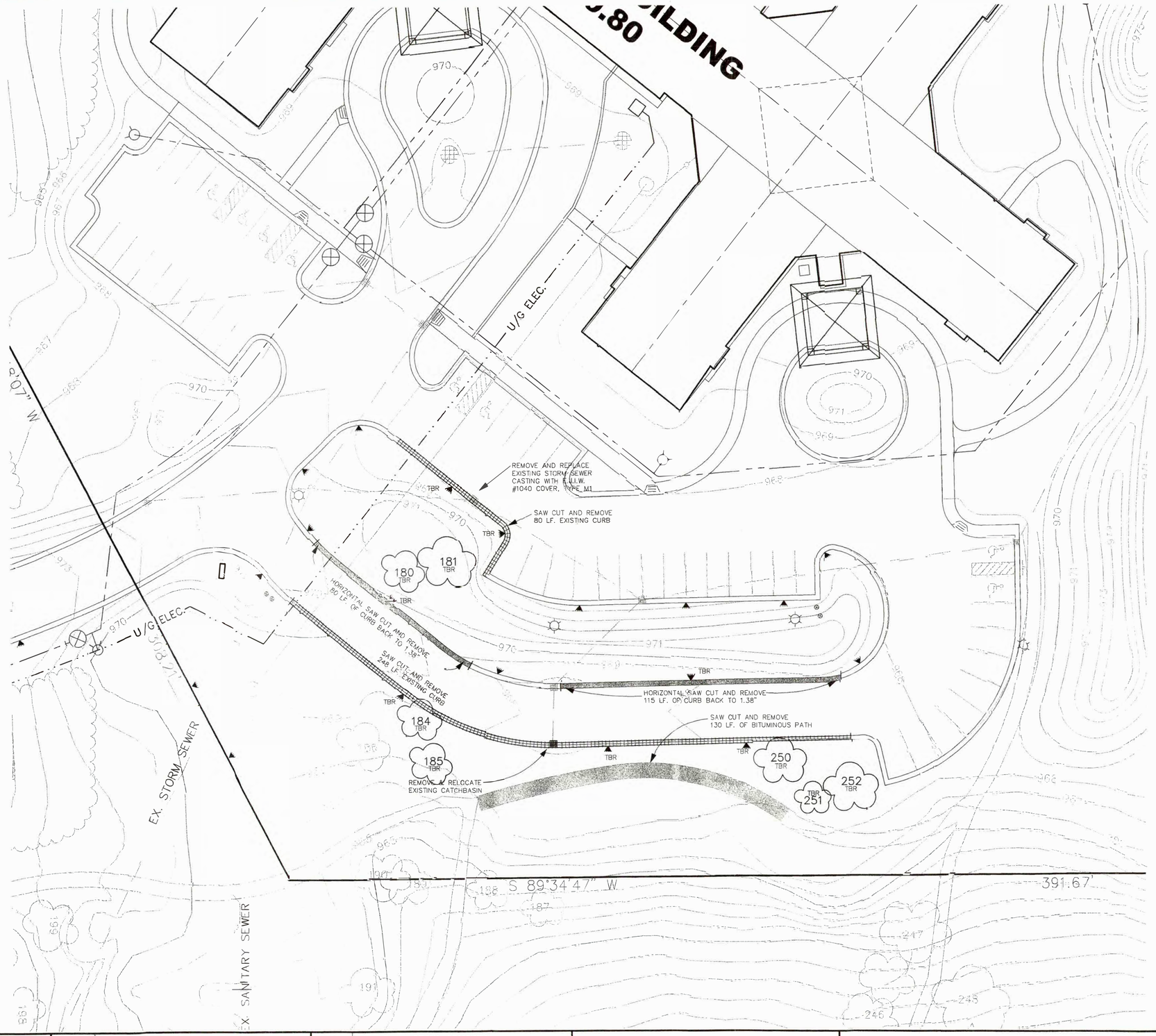
DESINE INC
(810) 227-9533
CIVIL ENGINEERS
LAND SURVEYORS
2183 PLESS DRIVE
BRIGHTON, MICHIGAN 48114

DESIGN: WMP DRAFT: JHG CHECK: WMP		DATE / REVISION-DESCRIPTION	DATE / REVISION-DESCRIPTION	The Village at Woodland	SOIL EROSION CONTROL & WATER SHED PLAN NOTES & DETAILS

CLIENT:
MERCY CONTINUING CARE
P.O. BOX 9184
FARMINGTON HILLS, MICHIGAN 48333

SCALE: AS NOTED
PROJECT No.: 61033
DWG NAME: 033-SE1
PRINT:

SE1



LEGEND

- EXISTING CONTOURS
- EXISTING ELEVATIONS
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATER MAIN
- STORM STRUCTURE
- SANITARY MANHOLE
- W.M. VALVE
- W.M. HYDRANT
- IRRIGATION HEAD

BENCHMARK

1. RAILROAD SPIKE IN EAST FACE OF UTILITY POLE LOCATED AT THE SOUTHWEST CORNER OF SUBJECT PROPERTY. 13± FT. NORTH OF THE CURB LINE OF GRAND RIVER AVE. AND 1550± FT. NORTH-WESTERLY ALONG GRAND RIVER AVE. FROM THE CENTERLINE OF BENDIX RD.
   ELEVATION = 977.33 (U.S.G.S. DATUM)

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 feet

NOTE:
REMOVE EXISTING IRRIGATION SYSTEM AS NECESSARY FOR PROPOSED CONSTRUCTION. TERMINATE AND MARK ALL EXISTING LINES FOR RECONNECTION FOLLOWING PROPOSED CONSTRUCTION.

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
800-482-7171
(TOLL FREE)

NOTE: UTILITY INFORMATION ON THIS DRAWING MAY BE FROM INFORMATION DISCLOSED TO THIS FIRM BY THE UTILITY COMPANIES, CITY/COUNTY AGENCIES AND OTHER VARIOUS SOURCES. NO GUARANTEE IS GIVEN AS TO THE COMPLETENESS OR ACCURACY THEREOF.

PRIOR TO CONSTRUCTION, ALL LOCATIONS AND DEPTHS OF EXISTING UTILITIES (IN CONFLICT WITH PROPOSED IMPROVEMENTS) SHALL BE VERIFIED IN THE FIELD.

CALL MISS DIG.

DESINE INC
(810) 227-9533
CIVIL ENGINEERS
LAND SURVEYORS
2183 PLESS DRIVE
BRIGHTON, MICHIGAN 48114

DESIGN: WMP
DRAFT: JHG
CHECK: WMP

DATE	REVISION-DESCRIPTION	DATE	REVISION-DESCRIPTION

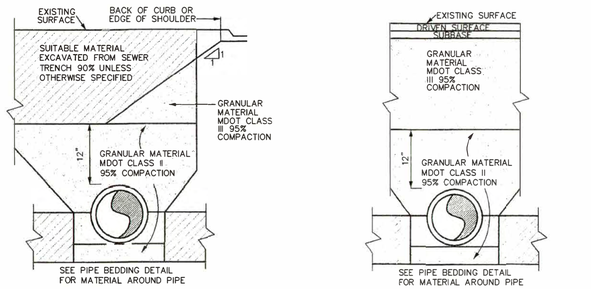
The Village at Woodland

DEMOLITION PLAN

CLIENT:
MERCY CONTINUING CARE
P.O. BOX 9184
FARMINGTON HILLS, MICHIGAN 48333

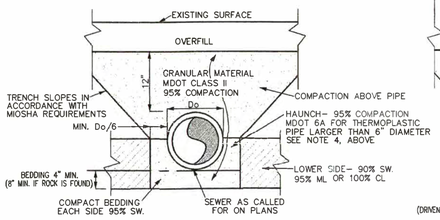
SCALE: 1in. = 20ft.
PROJECT No.: 61033
DWG NAME: 033-DEMO
PRINT: 1 of 1

DM

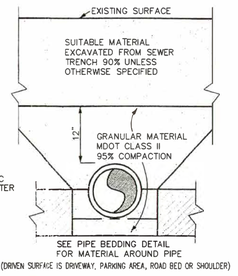


TRENCH A - PIPE UNDER OR WITHIN INFLUENCE OF DRIVEN SURFACE
NOT TO SCALE

NOTES:
1. COMPACTION PRESENTED AS STANDARD PROCTOR VALUES.
2. SOIL TYPES — AASHTO DESIG.
   - GRAVEL SANDY (SW) — A1, A3
   - SANDY SILTY (ML) — A2, A4
   - SILTY CLAY (CL) — A5, A6, A7
3. SOIL IN HAUNCH AND LOWER SIDE ZONES OUTSIDE OF Do/6 FROM SPRING LINE SHALL BE COMPACTED TO AT LEAST THE SAME COMPACTION AS THE SOIL IN THE OVERFILL ZONE.
4. MATERIALS AROUND THERMO. PLASTIC PIPE WITH DIAMETER 6 INCHES SHALL PASS 0.5 INCH SIEVE. MATERIALS AROUND OTHER PIPES SHALL PASS 1.5 INCH SIEVE.

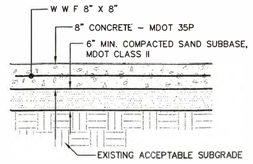


PIPE BEDDING DETAIL
NOT TO SCALE



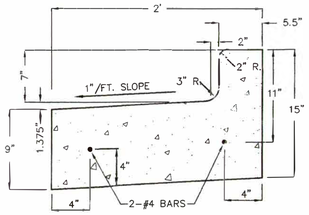
TRENCH B - PIPE NOT UNDER DRIVEN SURFACES
NOT TO SCALE

TRENCH DETAILS
NOT TO SCALE



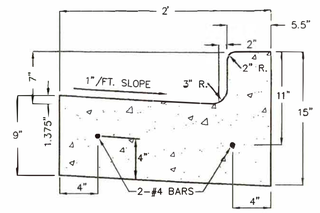
CONCRETE PAVEMENT CROSS SECTION
NOT TO SCALE

PAVEMENT NOTES:
1. UNSUITABLE SOILS, SUCH AS MUCK, PEAT, TOPSOIL, MARL, SILT OR OTHER UNSTABLE MATERIALS, SHALL BE UNDERCUT AND REPLACED WITH COMPACTED SAND SUBGRADE FILL. WHERE INCIDENTAL TO ROUGH GRADING.
2. AREAS OF SUBGRADE FILL SHALL BE CONSTRUCTED USING 12" THICK LIFTS OF COMPACTED SAND, MDOT CLASS III OR EQUIVALENT ON-SITE MATERIAL; WHEN INSIDE ROAD INFLUENCE ZONE.



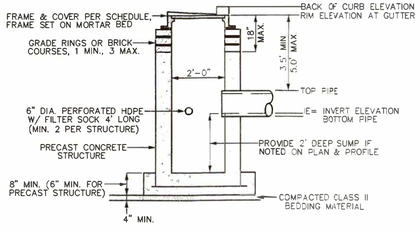
CONCRETE CURB DETAIL WITH REVERSE PITCH
NOT TO SCALE

CURB NOTES:
CONCRETE CURB SHALL BE PLACED ON A 4" THICK AGGREGATE BASE (22A)

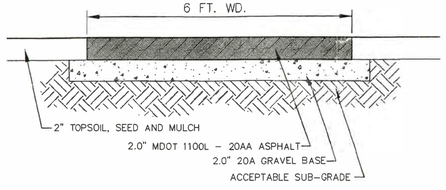


CONCRETE CURB DETAIL WITH STANDARD PITCH
NOT TO SCALE

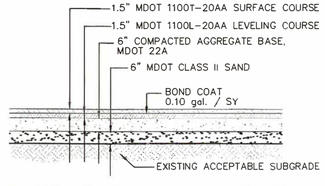
CURB NOTES:
CONCRETE CURB SHALL BE PLACED ON A 4" THICK AGGREGATE BASE (22A)



STORM STRUCTURE "C" 2' DIAMETER CATCH BASIN
NOT TO SCALE



PAVED PATHWAY DETAIL
NO SCALE



PAVEMENT CROSS-SECTION
NOT TO SCALE

PAVEMENT NOTES:
1. UNSUITABLE SOILS, SUCH AS MUCK, PEAT, TOPSOIL, MARL, SILT OR OTHER UNSTABLE MATERIALS, SHALL BE UNDERCUT AND REPLACED WITH COMPACTED SAND SUBGRADE FILL. WHERE INCIDENTAL TO ROUGH GRADING.
2. AREAS OF SUBGRADE FILL SHALL BE CONSTRUCTED USING 12" THICK LIFTS OF COMPACTED SAND, MDOT CLASS III OR EQUIVALENT ON-SITE MATERIAL; WHEN INSIDE ROAD INFLUENCE ZONE.

STORM SEWER NOTES

1. Storm sewer materials and installation shall be in accordance to the requirements of the Livingston County Drain Commission (LCDC), except when noted on the plans. Contractor shall coordinate required inspections. Refer to the General Notes for additional requirements, including soil erosion control measures.
2. All on-site storm sewer shall be High Density Polyethylene Pipe (HDPE) per AASHTO M294. HDPE pipe shall be Hancor Hi-Q SURE-LOK or equivalent, except all 30" & 36" pipe shall be HANCOR HI-Q with couplers or equivalent.
3. Backfill all storm sewers as required in Trench "A" or "B" detail, using the pipe bedding recommended by the pipe manufacturer or as required by the soil conditions to provide a stable foundation, incidental to the work.
4. When edge drains (under drains) or finger drains are shown on plans, connection to storm structure is incidental. During sewer construction, install the first 10 lineal feet each way off catch basins and cap. Finish installation after finish grade is complete, or as directed by Engineer.
5. Precast concrete manhole/catchbasins shall meet ASTM C478. Contractor may substitute brick, concrete block or cast-in-place concrete structures as acceptable to the Owner and/or Municipality; refer to M.D.O.T. Standard Plans I-1E. All temporary openings in storm structures shall be sealed water tight with cement mortar. Pipe openings shall be factory installed in precast concrete structures. Refer to M.D.O.T. Standard Plans I-2E, I-3A and I-4D for structure details when pipe size exceeds 42" diameter.
6. Install removable plugs in sewer stubs as acceptable to Engineer. Mark the end of all sewer stubs with a 2" x 2" treated wood stake from top of pipe to grade.
7. Tap existing manholes as acceptable to the municipality. Concrete coring, drilling holes 4" on center around breakout section, or other acceptable construction methods are incidental to the work. Seal all openings watertight with cement mortar and/or sealant.
8. Existing and proposed grades in the profiles are along the centerline of road, therefore pipe lengths/grades shown in profile may not be to scale.
9. Contractor shall field locate all utility crossing conflicts and shall coordinate with the appropriate utility agency the necessary labor and materials needed to complete the work.

GENERAL NOTES:

1. Contractor shall perform the work in accordance with the requirements of the appropriate Local, County and State Municipal Agencies and all other Government and Regulatory Agencies with jurisdiction over the project. Contractor shall notify the appropriate Agencies in advance of each stage of work in accordance with each Agency's requirements.
2. Contractor shall comply with all permit, insurance, licensing and inspection requirements associated with the work. Prior to construction, Contractor and Owner/Developer shall determine who is responsible for obtaining each required permit. Contractor shall verify that the each required permit has been obtained prior to commencement of the stage of work associated with the required permit(s).
3. Contractor shall furnish liability insurance and property damage insurance to save harmless the Owner, Developer, Architect, Engineer, Surveyor and Government Agencies for any accident occurring during the construction period. Refer to the appropriate Local, County and State Municipal Agencies for additional requirements. Copies of insurance certifications shall be made available to the Owner/Developer.
4. Contractor shall conduct and perform work in a safe and competent manner. Contractor shall perform all necessary measures to provide for traffic and pedestrian safety from the start of work and through substantial completion. Contractor shall determine procedures and provide safety equipment such as traffic controls, warning devices, temporary pavement markings and signs as needed. Contractor shall comply with the safety standards of the State Department of Labor, the occupational health standards of the State Department of Health and safety regulations of the appropriate Local, County, State and Federal Agencies. Refer to the safety specifications of the appropriate Regulatory Agencies. The Contractor shall designate a qualified employee with complete job site authority over the work and safety precautions; said designated employee shall be on site at all times during the work.
5. Contractor shall coordinate scheduling of all work in the proper sequence, including work by Subcontractors. Additional costs due to improper planning by Contractor or work done out of sequence as determined by standard acceptable construction practices, shall be Contractor's responsibility.
6. Contractor shall contact the MISS DIG locating system a minimum of three (3) working days prior to construction. Existing utility information on the project plans may be from information disclosed to this firm by the Utility Companies, Local, County or State Agencies, and/or various other sources. No guarantee is given as to the completeness or accuracy thereof. Prior to construction, locations and depths of all existing utilities (in possible conflict with the proposed improvements) shall be verified in the field.
7. Contractor shall coordinate scheduling a Pre-Construction Meeting with Engineer prior to commencement of work.
8. The Local, County and/or State Municipalities in which the project is located may require an Engineer's Certification of construction of the proposed site improvements. Contractor shall verify the certification requirements with Engineer prior to commencement of work. Contractor shall coordinate construction staking, testing, documentation submittal and observation with the appropriate Agency, Surveyor and/or Engineer as required for Engineer's Certification and Municipal Agency Acceptance. All materials used and work done shall meet or exceed the requirements of certification and acceptance, the contract documents and the material specifications noted on the project plans. Any materials used or work done that does not meet said requirements, contract documents and/or specifications shall be replaced and/or redone at Contractor's expense. The Owner/Developer may wait for test results, certifications and/or Agency reviews prior to accepting work.
9. Engineer may provide subsurface soil evaluation results, if available, to Contractor upon request. Subsurface soil evaluation results, soils maps and/or any other documentation does NOT guarantee existing soil conditions or that sufficient, acceptable on-site granular material is available for use as structural fill, pipe bedding, pipe backfill, road subbase or use as any other granular material specified on the project plans. On-site granular material that meets or exceeds the material specifications noted on the project plans may be used as structural fill, pipe bedding, pipe backfill and/or road subbase material. On-site granular material shall be stockpiled and tested as acceptable to the appropriate Agency and/or Engineer prior to use.
10. During the performance of their work, Contractor shall be solely responsible for determining soil conditions and appropriate construction methods based on the actual field conditions. Contractor shall furnish, install and maintain sheeting, shoring, bracing and/or other tools and equipment and/or construction techniques as needed for the safety and protection of the workers, pedestrians and vehicular traffic and for protection of adjacent structures and site improvements.
11. Contractor shall install temporary and permanent soil erosion and sedimentation control devices at the appropriate stages of construction in accordance with the appropriate regulatory Agencies. Refer to Soil Erosion and Sedimentation Control Plans and Notes on the project plans.
12. Structural fill shall be placed as specified on the project plans and within the 1 on 1 influence zone of all structures, paved areas and other areas subject to vehicular traffic. Structural fill shall be placed using the controlled density method (12" maximum lifts, compacted to 95% maximum unit weight, modified proctor). Fill material shall meet or exceed the specifications noted on the project plans or as directed by Engineer when not specified on the project plans.
13. All existing monuments, property corners, ground control and benchmarks shall be protected and preserved, and if disturbed by Contractor, shall be restored at Contractor's expense. Contractor shall notify Surveyor of any conflicts between existing monuments, property corners, ground control and/or benchmarks and the proposed site improvements.
14. Contractor shall notify Owner/Developer and Engineer immediately upon encountering any field conditions, which are inconsistent with the project plans and/or specifications.
15. When noted on the project plans for demolition and/or removal, Contractor shall remove existing structures, building and debris from the site and dispose of offsite in accordance with Local, County, State and Federal regulations.
16. Contractor shall remove excess construction materials and debris from site and perform restoration in accordance with the project plans and specifications. Disposing of excess materials and debris shall be performed in accordance with Local, County, State and Federal regulations.
17. Construction access to the site shall be located as acceptable to the Owner/Developer and to the appropriate Local, County and/or State Agency with jurisdiction over the road(s) providing access to the site. Construction access shall be maintained and cleaned in accordance with the appropriate Local, County and/or State Agencies and as directed by Owner/Developer and/or Engineer.
18. Contractor shall take necessary precautions to protect all site improvements from heavy equipment and construction procedures. Damage resulting from Contractor actions shall be repaired at Contractor's expense.

DESINE INC
(810) 227-9533
CIVIL ENGINEERS
LAND SURVEYORS
2183 PLESS DRIVE
BRIGHTON, MICHIGAN 48114

DESIGN: WMP
DRAFT: JHG
CHECK: WMP

DATE	REVISION-DESCRIPTION	DATE	REVISION-DESCRIPTION

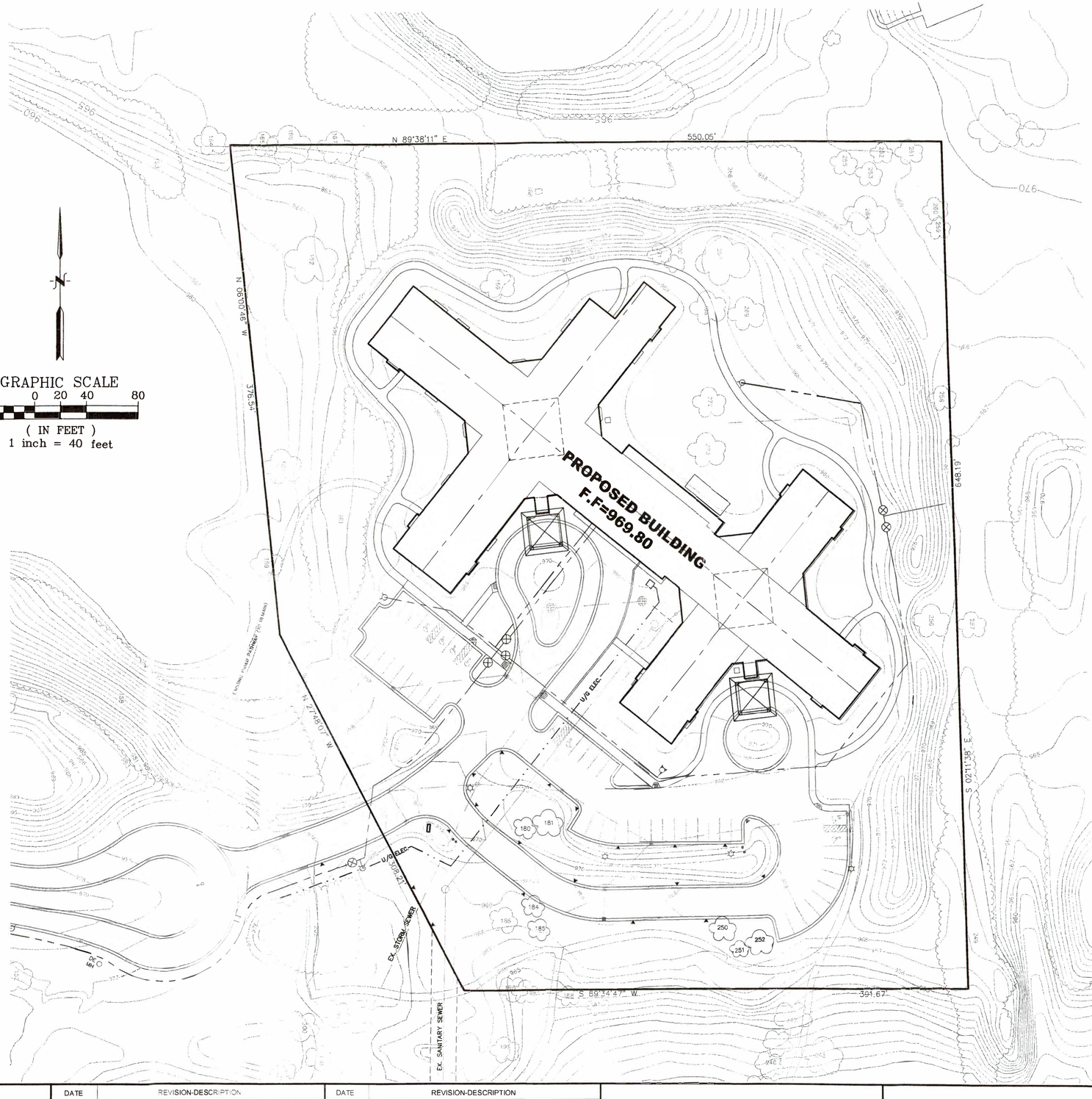
The Village at Woodland

CONSTRUCTION DETAILS & GENERAL NOTES

CLIENT:
MERCY CONTINUING CARE
P.O. BOX 9184
FARMINGTON HILLS, MICHIGAN 48333

SCALE: AS NOTED
PROJECT No.: 61033
DWG NAME: 033-DT1
PRINT: APR 1 [illegible]

DT



GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 inch = 40 feet

LEGEND

- EXISTING CONTOURS
- EXISTING ELEVATIONS
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATER MAIN
- STORM STRUCTURE
- SANITARY MANHOLE
- W.M. VALVE
- W.M. HYDRANT

BENCHMARK

1. RAILROAD SPIKE IN EAST FACE OF UTILITY POLE LOCATED AT THE SOUTHWEST CORNER OF SUBJECT PROPERTY. 13± FT. NORTH OF THE CURB LINE OF GRAND RIVER AVE. AND 1550± FT. NORTH-WESTERLY ALONG GRAND RIVER AVE. FROM THE CENTERLINE OF BENDIX RD.
   ELEVATION = 977.33 (U.S.G.S. DATUM)

3 WORKING DAYS
BEFORE YOU DIG
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CALL MISS DIG.

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CIVIL ENGINEERS
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2183 PLESS DRIVE
BRIGHTON, MICHIGAN 48114

DESIGN: WMP
DRAFT: JHG
CHECK: WMP

DATE	REVISION-DESCRIPTION	DATE	REVISION-DESCRIPTION

The Village at Woodland

EXISTING CONDITIONS PLAN

CLIENT:
MERCY CONTINUING CARE
P.O. BOX 9184
FARMINGTON HILLS, MICHIGAN 48333

SCALE: 1in. = 40ft.
PROJECT No.: 61033
DWG NAME: 033-EX
PRINT:

EX

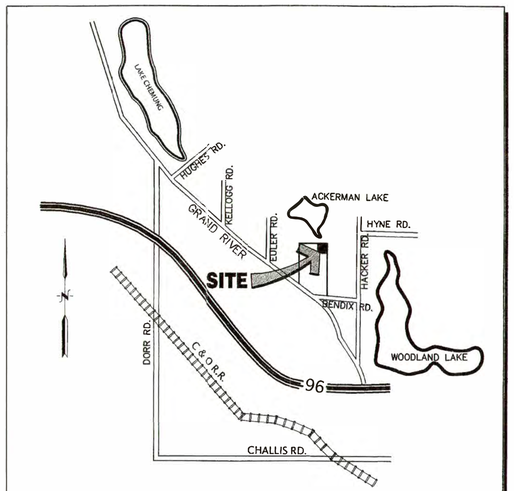
CONSTRUCTION PLANS FOR

THE VILLAGE AT WOODLAND

PARKING LOT BUILD OUT

LEGAL DESCRIPTION

Commencing at the Northeast Corner of Section 13, Town 2 North, Range 5 East, Genoa Township, Livingston County, Michigan; thence S 89°38'11" W 1355.85 feet along the North line of said Section 13 for a PLACE OF BEGINNING; thence S 02°11'38" E (recorded as S 00°10'44" W) 648.19 feet; thence S 89°34'47" W 391.67 feet; thence N 27°48'07" W 308.21 feet; thence N 06°00'46" W 376.54 feet; thence N 89°38'11" E 550.05 feet along the North line of said Section 13 to the Place of Beginning. Being a part of the Northeast 1/4 and the Southeast 1/4 of Section 13, Town 2 North, Range 5 East, Genoa Township, Livingston County, Michigan. Containing 7.5 acres of land, more or less. Subject to and together with all easements and restrictions affecting title to the above described premises.



LOCATION MAP

NOT TO SCALE

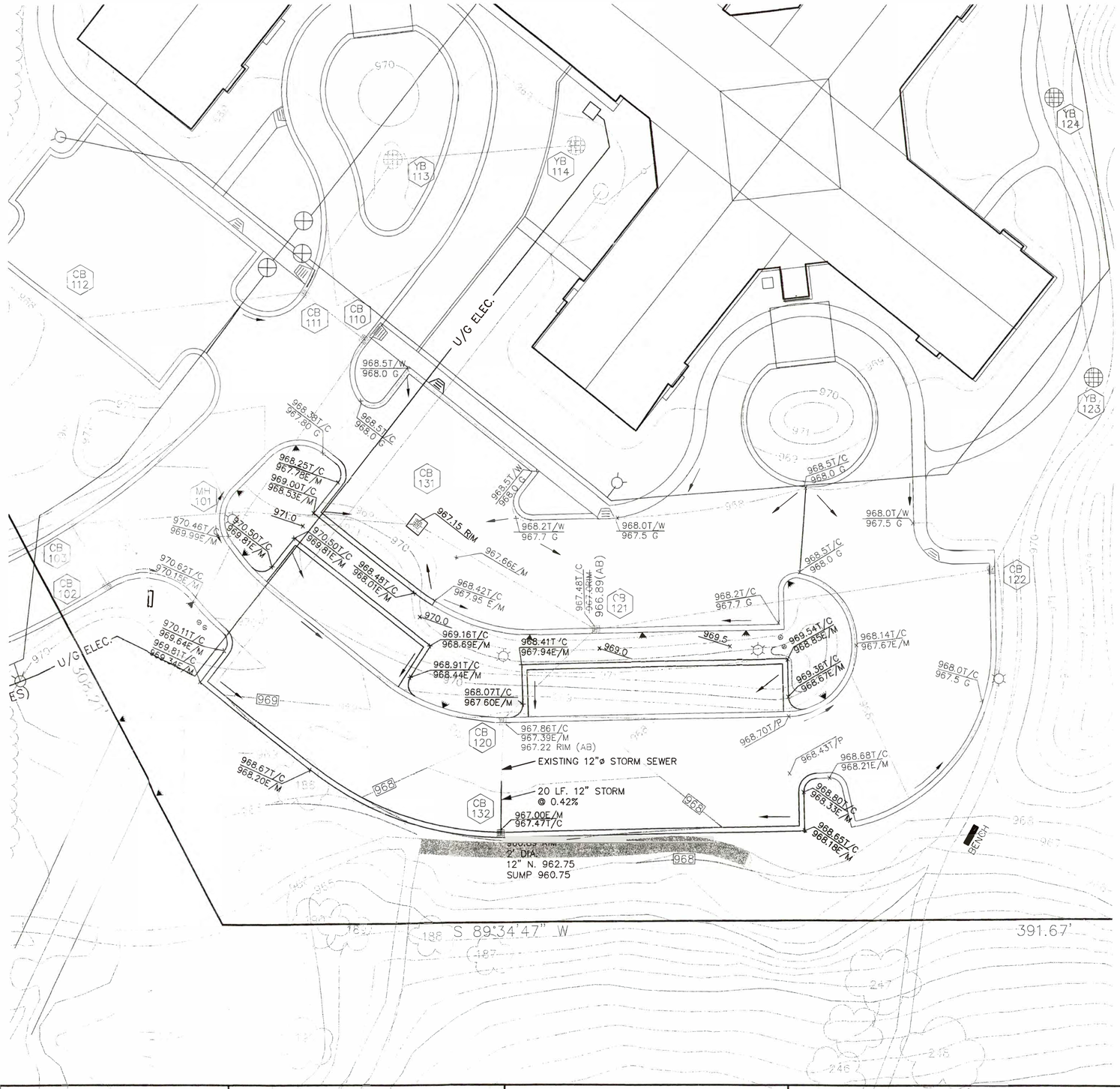
SHEET INDEX

OWNER

MERCY CONTINUING CARE
P.O. BOX 9184
FARMINGTON HILLS, MI. 48333

DESINE INC
(810) 227-9533
CIVIL ENGINEERS
LAND SURVEYORS
2183 PLESS DRIVE
BRIGHTON, MICHIGAN 48114

REVISION DATE	SCALE: AS NOTED
	PROJECT No.: 61033
	DWG NAME: 033-cov
	PRINT: APR 14 2015



LEGEND

- EXISTING CONTOURS
- x000.00 EXISTING ELEVATIONS
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATER MAIN
- 930 PROPOSED CONTOURS
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED WATER MAIN
- PROPOSED STORM STRUCTURE
- PROPOSED SANITARY MANHOLE
- PROPOSED W.M. VALVE
- PROPOSED W.M. HYDRANT
- PROPOSED CURB & GUTTER
- PROPOSED BARRIER FREE RAMPS

BENCHMARK

1. RAILROAD SPIKE IN EAST FACE OF UTILITY POLE LOCATED AT THE SOUTHWEST CORNER OF SUBJECT PROPERTY. 13± FT. NORTH OF THE CURB LINE OF GRAND RIVER AVE. AND 1550± FT. NORTH-WESTERLY ALONG GRAND RIVER AVE. FROM THE CENTERLINE OF BENDIX RD.
   ELEVATION = 977.33 (U.S.G.S. DATUM)

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 feet

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
800-482-7171
(TOLL FREE)

NOTE: UTILITY INFORMATION ON THIS DRAWING MAY BE FROM INFORMATION DISCLOSED TO THIS FIRM BY THE UTILITY COMPANIES, CITY/COUNTY AGENCIES AND OTHER VARIOUS SOURCES. NO GUARANTEE IS GIVEN AS TO THE COMPLETENESS OR ACCURACY THEREOF.

PRIOR TO CONSTRUCTION, ALL LOCATIONS AND DEPTHS OF EXISTING UTILITIES (IN CONFLICT WITH PROPOSED IMPROVEMENTS) SHALL BE VERIFIED IN THE FIELD.

CALL MISS DIG.

DESINE INC
(810) 227-9533
CIVIL ENGINEERS
LAND SURVEYORS
2183 PLESS DRIVE
BRIGHTON, MICHIGAN 48114

DESIGN: WMP
DRAFT: JHG
CHECK: WMP

DATE	REVISION-DESCRIPTION	DATE	REVISION-DESCRIPTION

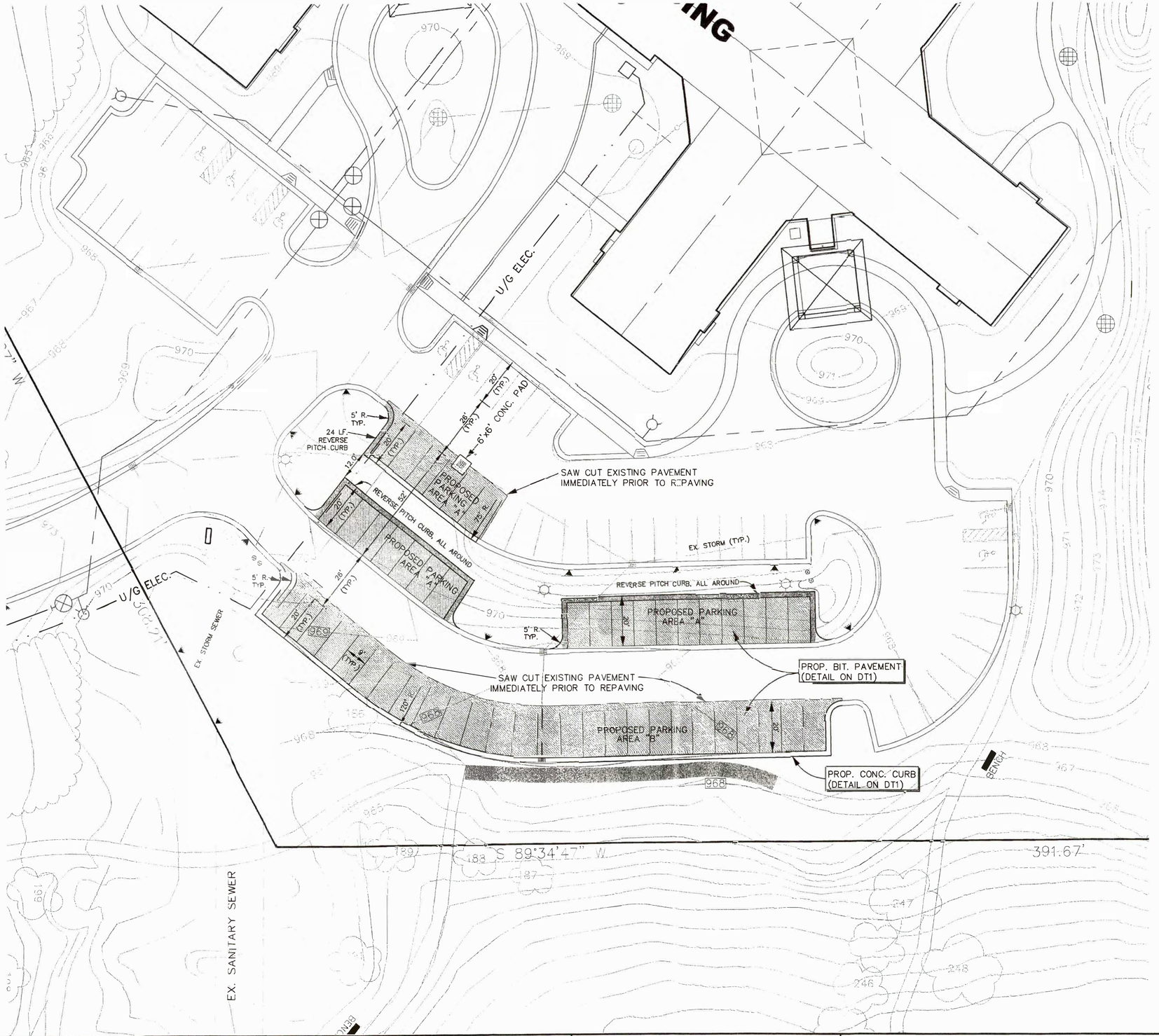
The Village at Woodland

GRADING & UTILITY PLAN

CLIENT:
MERCY CONTINUING CARE
P.O. BOX 9184
FARMINGTON HILLS, MICHIGAN 48333

SCALE: 1in. = 20ft.
PROJECT No.: 61033
DWG NAME: 033-GR1
PRINT: AUG. 7, 2020

GR



LEGEND

- EXISTING CONTOURS
- EXISTING ELEVATIONS
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING WATER MAIN
- PROPOSED CONTOURS
- PROPOSED STORM SEWER
- STORM STRUCTURE
- SANITARY MANHOLE
- W.M. VALVE
- W.M. HYDRANT
- PROPOSED CURB & GUTTER
- PROPOSED ASPHALT PAVEMENT
- IRRIGATION HEAD
- PROPOSED REVERSE PITCH CURB & GUTTER

BENCHMARK

1. RAILROAD SPIKE IN EAST FACE OF UTILITY POLE LOCATED AT THE SOUTHWEST CORNER OF SUBJECT PROPERTY. 13± FT. NORTH OF THE CURB LINE OF GRAND RIVER AVE. AND 1550± FT. NORTH-WESTERLY ALONG GRAND RIVER AVE. FROM THE CENTERLINE OF BENDIX RD.
   ELEVATION = 977.33 (U.S.G.S. DATUM)

N

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 feet

BITUMINOUS PAVEMENT AREAS:

PARKING AREA "A"	4,085 sq.ft.
PARKING AREA "B"	4,301 sq.ft.

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

NOTE: UTILITY INFORMATION ON THIS DRAWING MAY BE FROM INFORMATION DISCLOSED TO THIS FIRM BY THE UTILITY COMPANIES, CITY/COUNTY AGENCIES AND OTHER VARIOUS SOURCES. NO GUARANTEE IS GIVEN AS TO THE COMPLETENESS OR ACCURACY THEREOF.

PRIOR TO CONSTRUCTION, ALL LOCATIONS AND DEPTHS OF EXISTING UTILITIES (IN CONFLICT WITH PROPOSED IMPROVEMENTS) SHALL BE VERIFIED IN THE FIELD.

CALL MISS DIG.

DESINE, INC
(810) 227-9533
CIVIL ENGINEERS
LAND SURVEYORS
2183 PLESS DRIVE
BRIGHTON, MICHIGAN 48114

DESIGN: WMP
DRAFT: JHG
CHECK: WMP

DATE	REVISION-DESCRIPTION	DATE	REVISION-DESCRIPTION

The Village at Woodland

SITE PLAN

CLIENT:
MERCY CONTINUING CARE
P.O. BOX 9184
FARMINGTON HILLS, MICHIGAN 48333

SCALE: 1in. = 20ft.
PROJECT No.: 61033
DWG NAME: 033-SP
PRINT: 8/8/17 8:38

SP

GENOA CHARTER TOWNSHIP

Application for Site Plan Review Amendment

TO THE GENOA TOWNSHIP PLANNING COMMISSION AND TOWNSHIP BOARD:

APPLICANT NAME & ADDRESS: Panda Restaurant Group
1683 Walnut Grove Ave
Rosemead, CA 91770-3711

If applicant is not the owner, a letter of Authorization from Property Owner is needed.

OWNER'S NAME & ADDRESS: Genoa Plaza, LLC
29592 Beck Rd
Wixom, MI 48393-2821

SITE ADDRESS 1100 S. Latson Rd Howell MI, 48843 PARCEL #(s): 4711-08-200-018

APPLICANT PHONE: (616)-460-6653 OWNER PHONE: (248) 767-5337

OWNER EMAIL: kbahnam@usa2goquickstore.com

LOCATION AND BRIEF DESCRIPTION OF SITE: Site located at the NW corner of S Latson Rd and Grand Oak intersection (immediately east of Lowe's).

The site recently completed construction and the Panda Express is open and operating.

BRIEF STATEMENT OF PROPOSED USE: Casual Fast Food Restaurant with Drive-Thru

We are requesting a Site Plan Amendment for an added LED Light Strip along the building roof. The material of this red accent strip was not designated in the original site plan approval.

THE FOLLOWING BUILDINGS ARE PROPOSED: 2,600 SF Stand Alone Drive-Thru Restaurant

I HEREBY CERTIFY THAT ALL INFORMATION AND DATA ATTACHED TO AND MADE PART OF THIS APPLICATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: Alex Froehlich - NORR, LLC (Architectural Firm) - Project Staff Member

ADDRESS: NORR, LLC - 150 W. Jefferson Ave., Suite 1300, Detroit, MI 48226

Contact Information - Review Letters and Correspondence shall be forwarded to the following:

1.) Jillian Benaglio (Name) of Atwell, LLC (Business Affiliation) at jbenaglio@atwell-group.com (E-mail Address)

FEE EXCEEDANCE AGREEMENT

As stated on the site plan review fee schedule, all site plans are allocated two (2) consultant reviews and one (1) Planning Commission meeting. If additional reviews or meetings are necessary, the applicant will be required to pay the actual incurred costs for the additional reviews. If applicable, additional review fee payment will be required concurrent with submittal to the Township Board. By signing below, applicant indicates agreement and full understanding of this policy.

SIGNATURE: Hakim A. Yala DATE: 9/27/23

PRINT NAME: Hakim A. Yala PHONE: 847-477-5125

ADDRESS: PRG: 1683 Walnut Grove Ave. - Rosemead, CA 91770

November 9, 2023

Planning Commission
Genoa Township
2911 Dorr Road
Brighton, Michigan 48116

Attention:	Amy Ruthig, Planning Director
Subject:	Panda Express – Amendment to an Approved Site Plan (Review #1)
Location:	Northwest corner of Latson Road and Grand Oaks Drive
Zoning:	NRPUD Non-Residential PUD (Livingston Commons Phase II)

Dear Commissioners:

At the Township's request, we have reviewed the request from Panda Express to amend their previously approved site plan. Specifically, the applicant seeks to retain LED strip lighting around the building's roof, which was not identified on the approved site plan.

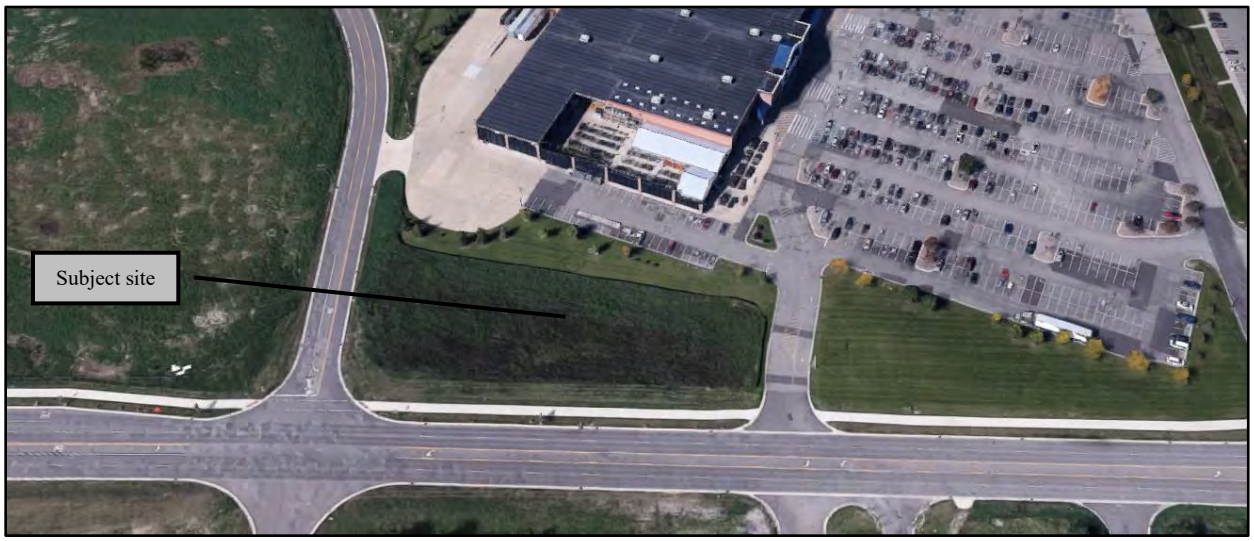
A. Summary

1. The Planning Commission may allow ornamental lighting that is part of an overall architectural theme.
2. LED strip lighting is debatable as "ornamental," in our opinion, though the Commission could consider it to be part of an architectural theme.
3. In our opinion, the request does not comply with Section 12.03.05, which requires building illumination to be placed and shielded so not to interfere with the vision of motorists.
4. In our opinion, the LED strip lighting should be removed from the building.

B. Proposal/Process

The applicant proposes to retain LED strip lighting along the building's roof, which was not part of the originally approved site plan.

Since the Planning Commission had review/approval authority over the final PUD site plan for the project, they retain review/approval authority over this proposed amendment.



Aerial view of site and surroundings prior to development (looking west)

C. Review

The revised photometric plan remains compliant with light intensities on-site and along property lines.

However, what is in question is the LED strip lighting along the building's roof, which is not shielded and was noticed by Township staff for casting glare and creating a "halo-like" effect around the building.

Section 12.03.04 allows the Planning Commission to waive the requirement for downward directed light fixtures "for ornamental lighting which is part of an overall architectural theme."

In our opinion, LED strip lighting is not inherently "ornamental" in nature, though the Commission could determine that this feature is part of an architectural theme.

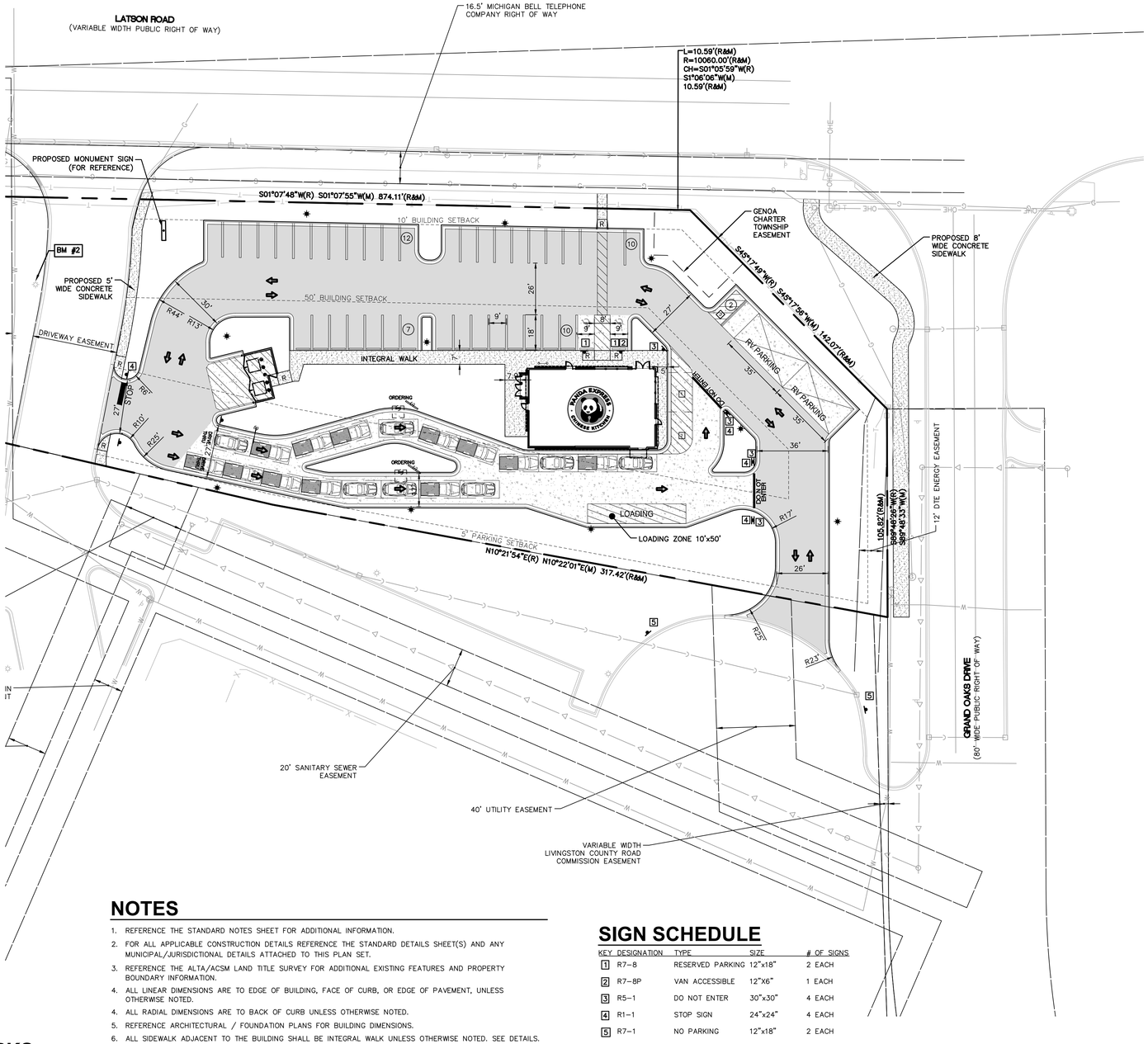
Additionally, Section 12.03.05 states that "all lighting in nonresidential districts used for external illumination of buildings to feature said buildings or to illuminate a permitted sign, shall be placed and shielded so not to interfere with the vision of persons on adjacent highways or adjacent property."

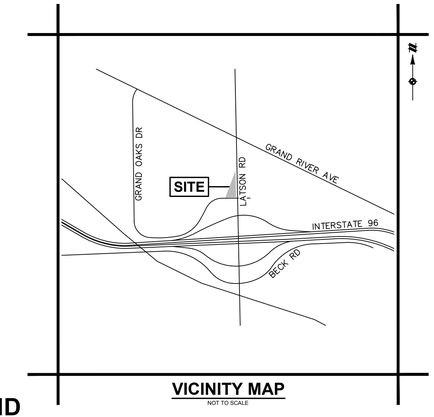
In our opinion, the proposal does not comply with this standard and said lighting should be removed from the building.

Should you have any questions concerning this matter, please do not hesitate to contact our office.

Respectfully,
SAFEBUILT

Brian V. Borden, AICP
Michigan Planning Manager





VICINITY MAP
NOT TO SCALE

LEGEND

- PROPERTY LINE
- PROPOSED CURB & GUTTER
- RIGHT-OF-WAY
- CONCRETE SIDEWALK
- CONCRETE
- PROPOSED ASPHALT PAVEMENT
- TRASH ENCLOSURE PAVEMENT
- TRAFFIC FLOW ARROWS
- PROPOSED MMUTCD SIGN
- (20) PARKING ROW COUNT
- ACCESSIBLE PARKING SPACE
- PROPOSED LIGHT POLE
- EXISTING UTILITY POLE
- [R] RAMP

SITE DATA

PARCEL SUMMARY

PARCEL ID#	PARCEL	ZONING
4711-08-200-018	±2.31 AC.	NRPUD (NON-RESIDENTIAL PLANNED UNIT DEVELOPMENT)

BUILDING DATA

HEIGHT	GROSS FLOOR AREA
23'-6"	2,600 SFT

STANDARD PARKING DATA

USER	FLOOR AREA	PROPOSED SPACES	REQUIRED SPACES	FORMULA
PANDA EXPRESS	2,600 SF	40 SPACES	38 SPACES	1 SPACE/70 SF GLA

SHORT TERM PARKING DATA

USER	PROPOSED	REQUIRED
PANDA EXPRESS	3 SPACES	3 SPACES

RV PARKING DATA

USER	PROPOSED	REQUIRED
PANDA EXPRESS	2 SPACES	2 SPACES

ACCESSIBLE PARKING DATA

	PROPOSED	REQUIRED	FORMULA
TOTAL	2 SPACES	2 SPACES	26-50 TOTAL SPACES

DRIVE-THRU STACKING DATA

USER	PROPOSED	REQUIRED
PANDA EXPRESS	19 SPACES	10 SPACES

LOADING DATA

	PROPOSED	REQUIRED
LOADING AREA	(1) 10'x50'	(1) 10'x50' OR 500 SQ FT (MIN)

IMPERVIOUS COVERAGE

SQ. FT.	PERCENTAGE	MAXIMUM	
BUILDING	2,600	2.6	50
PAVED SURFACES	39,472	39.5	--
IMPERVIOUS AREA (TOTAL)	42,072	42.1	90

NOTES

1. REFERENCE THE STANDARD NOTES SHEET FOR ADDITIONAL INFORMATION.
2. FOR ALL APPLICABLE CONSTRUCTION DETAILS REFERENCE THE STANDARD DETAILS SHEET(S) AND ANY MUNICIPAL/JURISDICTIONAL DETAILS ATTACHED TO THIS PLAN SET.
3. REFERENCE THE ALTA/ACSM LAND TITLE SURVEY FOR ADDITIONAL EXISTING FEATURES AND PROPERTY BOUNDARY INFORMATION.
4. ALL LINEAR DIMENSIONS ARE TO EDGE OF BUILDING, FACE OF CURB, OR EDGE OF PAVEMENT, UNLESS OTHERWISE NOTED.
4. ALL RADIAL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE NOTED.
5. REFERENCE ARCHITECTURAL / FOUNDATION PLANS FOR BUILDING DIMENSIONS.
6. ALL SIDEWALK ADJACENT TO THE BUILDING SHALL BE INTEGRAL WALK UNLESS OTHERWISE NOTED. SEE DETAILS.
7. LIGHT POLE LOCATIONS ARE SHOW FOR REFERENCE ONLY, SEE LIGHTING PLAN (BY OTHERS) FOR LIGHT POLE DETAILS, LOCATION, AND INTENSITIES.
8. THE BUILDING ADDRESS MUST BE VISIBLE FROM THE STREET THROUGHOUT THE PROJECT.
9. FIRE TRUCK ACCESS IS REQUIRED THROUGHOUT CONSTRUCTION.
11. GREASE INTERCEPTOR MAINTENANCE, DUMPSTER SERVICES & DELIVERIES SHALL BE COMPLETED OUTSIDE OF BUSINESS HOURS.
12. ALL NON MMUTCD SIGN LOCATIONS ARE SHOW FOR REFERENCE ONLY, SEE SIGNAGE PLAN (BY OTHERS) FOR SIGN DETAILS & LOCATIONS.
13. REFER TO SIGNAGE PACKAGE PREPARED BY PRIORITY FOR ADDITIONAL SIGNAGE INFORMATION.

SIGN SCHEDULE

KEY	DESIGNATION	TYPE	SIZE	# OF SIGNS
1	R7-8	RESERVED PARKING	12"x18"	2 EACH
2	R7-8P	VAN ACCESSIBLE	12"X6"	1 EACH
3	R5-1	DO NOT ENTER	30"x30"	4 EACH
4	R1-1	STOP SIGN	24"x24"	4 EACH
5	R7-1	NO PARKING	12"x18"	2 EACH

SITE BENCHMARKS

BM #1: SET MAG NAIL IN SOUTH SIDE OF LIGHT POLE BASE IN WESTERLY RIGHT OF WAY OF LATSON ROAD
ELEVATION: 1013.51 (NAVD88)

BM #2: SET MAG NAIL IN EAST SIDE OF LIGHT POLE BASE NORTH OF ENTRANCE DRIVE
ELEVATION: 1017.51 (NAVD88)

0 15' 30'
SCALE: 1"=30'

Know what's below. Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR; NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

PANDA RESTAURANT GROUP INC.
1683 Walnut Grove Ave.
Rosemead, California
91770
Telephone: 626.799.9898
Facsimile: 626.372.8288

REVISIONS:

ISSUE DATE:

SITE PLAN SUBMITTAL	02-16-2022
SITE PLAN RE-SUBMITTAL	04-19-2022
SITE PLAN RE-SUBMITTAL	05-26-2022
SITE PLAN RE-SUBMITTAL	07-14-2022
SITE PLAN RE-SUBMITTAL	07-21-2022

DRAWN BY: MSB/LEH

PANDA PROJECT #: JCDT20036100
PANDA STORE #: D8103
ENG PROJECT #: 20003483

NORR
ARCHITECTS ENGINEERS PLANNERS

ATWELL
866.850.4200 www.atwell-group.com
12745 23 MILE ROAD
SHELBY TOWNSHIP, MI 48315
586-786-9800

PANDA EXPRESS

TRUE WARM & WELCOME
LATSON RD. & GRAND OAKS DR.
HOWELL, MI

02

SITE LAYOUT PLAN


PANDA
EXPRESS
PANDA EXPRESS
CHINESE KITCHEN
LED Strip Canopy Light with Dimmer control


LED Strip Canopy Light with Dimmer control

Schedule

Symbol	Label	Quantity	Catalog Number	Description	Filename	Lumens Per Lamp	Lumen Multiplier	Light Loss Factor	Wattage	Efficiency
	A	4	SLM-LED-18L-SIL-FT-40--70CRI-IL	CONTACT RYAN ZINSELMEIER-314-531-2600	SLM-LED-18L-SIL-FT-40-70CRI-IL.ies	12046	1	1	148.5	100%
	D	3	SLM-LED-18L-SIL-FT-40--70CRI-IL	CONTACT RYAN ZINSELMEIER-314-531-2600	SLM-LED-18L-SIL-FT-40-70CRI-IL.ies	12046	1	1	297	100%
	L90	2	1649XX-LED	CONTACT RYAN ZINSELMEIER-314-531-2600	L90.ies	197	1	1	12.1	100%
	L85	2	WPSLS-02L-40	CONTACT RYAN ZINSELMEIER-314-531-2600	WPSLS-02L-40.ies	2271	1	1	19.87	100%
	E	3	D650-VCOB-4L40TA-MDL05	D650 Acrylic Acorn, 4 COB tower and new LEDil optic, arrays facing 270 thru 90	D650-VCOB-4L40TA-MDL05.IES	8074	1	1	73.8	100%
	F	108	701800D-R	CONTACT RYAN ZINSELMEIER-314-531-2600	ColorLINE Red - 2ft.ies	103	1	1	4.56	99%

Statistics

Description	Symbol	Avg	Max	Min	Max / Min	Avg / Min
CALC SUMMARY- PAVED SURFACE	+	2.7 fc	8.9 fc	0.3 fc	29.7:1	9.0:1
TRASH ENCLOSURE	+	3.0 fc	3.9 fc	2.3 fc	1.7:1	1.3:1
CALC SUMMARY- PROPERTY LINE	+	0.4 fc	2.4 fc	0.0 fc	N/A	N/A

Note

1. MOUNTING HEIGHT OF 22' (20'POLE)
2. CALCULATIONS TAKEN AT GROUND LEVEL
3.CONTACT VILLA LIGHTING- RYAN ZINSELMEIER- RYAN.ZINSELMEIER@VILLALIGHTING.COM- 314-531-2600

Plan View
Scale - 1" = 25ft

PANDA EXPRESS
HOWELL, MI

Designer
R. ZINSELMEIER
Date
5/24/2022
Scale
NOTED
Drawing No.

Summary


PANDA
EXPRESS
PANDA


PANDA


PANDA
EXPRESS

GENOA CHARTER TOWNSHIP
PLANNING COMMISSION
SPECIAL MEETING - PUBLIC HEARING
PARKER MIDDLE SCHOOL
400 WRIGHT ROAD
HOWELL, MI 48843
October 19, 2023

MINUTES

CALL TO ORDER: Chairman Grajek called the meeting of the Genoa Charter Township Planning Commission to order at 6:31 p.m. Present were Chris Grajek, Diana Lowe, Eric Rauch, Tim Chouinard, Glynis McBain, Marianne McCreary, and Greg Rassel. Also present were Township Manager Kelly VanMarter, Planning Director Amy Ruthig, Township Attorney Joseph Seward, Brian Borden of Safebuilt, and Shelby Byrne of Tetra Tech.

PLEDGE OF ALLEGIANCE: The pledge of allegiance was recited.

APPROVAL OF AGENDA:

Moved by Commissioner McCreary, seconded by Commissioner Rassel, to approve the agenda as presented. **The motion carried unanimously**.

DECLARATION OF CONFLICT OF INTEREST:

None

CALL TO THE PUBLIC:

The call to the public was made at 6:32 pm with no response.

OPEN PUBLIC HEARING #1… Consideration of a rezoning application, amendment to the Latson Road PUD Agreement, Environmental Impact Assessment and conceptual PUD Plan for a proposed rezoning and conceptual plan approval to expand the existing Planned Unit Development. The rezoning request is from Country Estates (CE) to Interchange Campus Planned Unit Development (CAPUD) and Interchange Commercial Planned Unit Development (ICPUD) for approximately 138 acres of undevelopment land. The request involves parcel 4711-09-300-046 which is located at the southeast intersection of Latson Road and Beck Road. The remaining parcels are located north of Crooked Lake Road and west of Latson Road consisting of the following parcel ID#s: 4711-17-200-006, 4711-17-200-002, 4711-17-400-015, 4711-17-400-013, and 4711-17-400-014. The request is petitioned by Todd Wyett.

A. Recommendation of rezoning
B. Recommendation of PUD Agreement Amendment
C. Recommendation of Environmental Impact Assessment (8-15-23)
D. Recommendation of Conceptual PUD Plan (dated 9-25-23, received 9-29-23)

Mr. Todd Wyett, the property owner, Mr. Eric Lord from Atwell Hicks, Mr. Brad Strader with MKSK Studios, and Ms. Julie Kroll from Fleiss and Vanderbrink were present.

Mr. Strader reviewed the changes that have been made to the previously approved PUD, including the buffers, landscaping and screening on Latson Road and neighboring properties; limiting the expansion of utilities to the west and sewer south to Crooked Lake road; limits were set on industrial uses; prohibited uses were added; and traffic improvements. He showed how this project is consistent with the existing Master Plan, Township standards and zoning ordinance.

Mr. Lord provided a review of the new water and sewer that have been installed south of I-96 over the past year. He showed how these utilities would be tied into the development's utilities.

Mr. Strader showed and explained the proposed expansion to the approved PUD, which would be an additional 121 acres. This area would include high tech industrial and office and mixed use residential. He showed a drawing of the revised proposed entrance sign, the location of the commercial area and the types of uses that would be allowed, the uses that would be allowed in the mixed use area, and details of the proposed residential area, including the different types of housing, landscaping, open spaces, buffer zone plantings, and the boulevard.

Ms. Kroll provided a review of the traffic study they performed. This analysis was done for the PUD plan and not a specific site plan. They used traffic data for the highest traffic generating uses allowed in the PUD. They did studies for seven intersections, including the traffic from the schools and that caused by the railroad crossing. The study provided the impact into 2043 without any road improvements.

She provided mitigation recommendations, such as traffic signal improvements, additional turn lanes, etc. With each site plan proposal, traffic studies would need to be done to determine any improvements that would be needed. Mr. Strader stated that the Livingston County Road Commission reviewed the traffic study and agreed that it was done correctly and agreed with the recommended improvements that have been made.

Mr. Borden reviewed his letter dated October 12, 2023.
1. PUD Qualifying Conditions (Section 10.02):
    a. The qualifying conditions of Section 10.02 are generally met.
2. Rezoning Criteria (Section 22.04):

a. The proposed zoning designations of CAPUD and ICPUD are consistent with the I-96/Latson Road Subarea Plan and goals of the Township Master Plan.
c. Rezoning is necessary to implement the vision and goals of the I-96/Latson Road Subarea Plan.
d. The use tables that have been provided in the revised submitted require further amendments and refinement.

3. Conceptual PUD Plan (Section 10.03.06):
   a. The dimensional deviations sought for residential components need to be incorporated into the PUD Agreement.
   b. The PUD Agreement needs to better address expansion into the future transition area per the provisions of Section 10.03.06(i).
   c. In his opinion, the threshold of progress in the original PUD prior to development in the future transition area needs further refinement to ensure that the development pattern continues in a logical north to south manner, as planned.
   d. The draft PUD Agreement does not include the exhibits that were noted.
   e. The applicant must address staff and Township Attorney comments on the draft PUD Agreement.
   g. The proposal includes changes to the previously approved gateway/development highway sign that require Township approval.
   h. The applicant must address staff comments on the Design Guidelines and Conceptual Plans.

Additionally, the applicant must address any technical comments provided by the Township Engineer and Utilities Director.

Mr. Wyett stated that many of these items have been addressed since Mr. Borden's letter was sent.

Ms. Bryne reviewed her letter dated October 11, 2023.

1. The site plan provided is very conceptual and all future developments within the PUD will need to have their own site plan review and approval.
2. The PUD Agreement has a typo in Section 17. The total available REUs should be 1,021 to be consistent with the REU numbers given in the same paragraph and in the Impact Assessment.
3. The impact assessment notes that the PUD will be serviced by water and sewer services through MHOG and GO-SWATH. Water and sanitary sewer extension to the south side of I-96 has been completed in anticipation of the proposed development. Furthermore, the expanded PUD area was already included in the assumptions made when completing the basis of design for the South Latson Road Water and Sewer improvements.
4. The Water Main Concept in the impact assessment should note a combination of 16-inch, 12-inch, and 8-inch water mains. The South Latson Road Service Area Water and Sanitary Sewer Utility Study Update completed in March 2017 recommended the local distribution infrastructure be oversized to serve the ultimate service area.

An equivalent of 16-inch water main capacity will need to be routed through the proposed development to Crooked Lake Road. Normally, oversizing costs are paid by the municipality through connection fees of future development.

5. The Water Main and Sanitary Sewer Concepts in the impact assessment should include water main and sanitary sewer extended all the way to Latson Road at the southeastern site drive as shown below. The Petitioner should ensure the conceptual gravity sewer would be deep enough to extend down Latson Road to Crooked Lake Road from the site drive.
6. The impact assessment states that a stormwater management plan will be prepared for the entire development. The master plan will have central detention facilities. The detention sizing should be determined based on the entire site to ensure that there will be proper storm management as the property develops rather than developing individual stormwater management plans for each new building. The site naturally drains to the Marion Genoa Drain that is a county maintained and operated drain. The Livingston County Drain Commissioner's (LCDC) office will need to be included in the stormwater master plan development process.
7. The general layout of the on-site roadways and intersections with Latson Road appear to be well thought out and provide for circulation through the site. The final layout may vary from this concept once end users of the sites are determined.
8. A detailed traffic impact study was completed for the proposed amended PUD. The proposed development is anticipated to cause multiple intersections in the study area to operate at level of service E or F with the increase in traffic. The traffic impact study includes a list of recommended improvements to mitigate the increase in traffic in Section11. These improvements will need to be considered by the Township as the PUD develops in the future. Any site drive or intersection recommendations should be included in future site plans for approval.
9. Improvements to Latson Road are subject to Livingston County Road Commission (LCRC) approval and should be submitted for review and comment by the Township. Since this parcel is the first major development on the south side of Latson, and as such is the gateway to Genoa Township, we recommend additional concepts be considered to promote the Township with either monument signage or landscaping details as part of the overall development plan. Any signage would need to be reviewed by the Township and their planning consultant.

Brighton Area Fire Marshal Rick Boisvert's letter dated October 12, 2023 states, "All of the previous PUD comments presented by the fire authority have been addressed in writing or acknowledged by the applicant. The fire authority has no opposition to the PUD approval and will review each portion of the project as they are submitted."

Mr. Rassel stated that letters in opposition to the proposal were received at the beginning of tonight's meeting from the following residents: Glenn and Dianne Hoskins, James Thornton, Denise Thornton, Brian and Maureen Jones, Andrew Kimball, Jane Locke, and Susan Nickels,. Also, a copy of comments from Denise Pollicella was submitted this evening.

Each of the Commissioners and staff introduced themselves and provided a summary of their professional background and experience with the township.

The call to the public was opened at 7:26 pm.

Mr. Alan Rankin of 3875 Clover Bend Court stated that he is in the middle of the blue area of the PUD. When he moved here, Genoa Township was known as “The Preserve”. They are proposing to put a berm around three sides of his property. He is disappointed and does not believe Mr. Wyett.

Mr. Eric Herbert of 4857 New Haven Drive moved here from Hartland to be in greenspace and a peaceful and quiet community. He is against this proposal. He does not want to see industry in this area. He is concerned with traffic and safety. No one here is in favor of this. Please keep Genoa Township’s greenspace.

Ms. Mallie Wilson of 3400 Beattie stated there is a prepared statement from the Coalition that she started reading and asked others to each read a portion when they speak. She read “First, the notice for this public hearing is defective in that it does not list the 10 parcels of real estate North of the proposed rezoned parcels that are also the subject of this public hearing. The stated intent of this public hearing is, in part, to amend a PUD agreement and conceptual PUD plan that governs those 10 parcels as well, and the public hearing notice is insufficient in that it does not inform the residents of Genoa Township of the full purpose of this meeting or of all of the parcels that are the subject of the meeting. Second , the PUD Agreement and conceptual PUD plan that are the subject of his public hearing and which are proposed for amendment are expired. The fact that the term in the PUD Agreement is longer than 2 years is irrelevant. The PUD Agreement and conceptual plan are two of several components of a PUD application that, according to the very plain language of the Zoning Ordinance Section 10.04.02, expire in 2 years unless a final PUD site plan is filed, or an extension is requested and granted by the Township board prior to the 2-year period. Neither of those happened, as confirmed by FOIA request in July. There is no provision in the Zoning Ordinance authorizing the magical reanimation of an expired application . An expired application cannot be amended , ratified or restated. It is simply expired. The Latson PUD application for the Northern original 173 acres expired on August 17, 2022, 14 months ago. Therefore, we object to any consideration by this body of any amendment to, or ratification of, the expired PUD application as invalid and outside the scope of this Planning Commission's authority under the Zoning Ordinance . We do not object in any way to the discussion related to the rezoning of the Southern parcels that are designated with specificity in the public hearing notice. Without waiving these objections in any way, I provide the following substantive comments.”

Mr. Bill Reiber of 3154 Stillriver Drive stated this is the third meeting he has attended and offered his comments. In all of those meetings, he has not heard anyone explain

the reason why this is needed and how it benefits the residents and taxpayers of the township. He read the meaning of a Service Level “D” from the traffic study’s result.

Ms. Veronica Goodwin of 2482 S. Latson continued reading the statement, “My objections and those of the Coalition to this development are numerous and begin with the way in which it was originally conceived and handled. The change to the Master Plan that envisioned converting a rural, residential and agricultural area that over 100 families call home into a high-tech industrial and commercial development was ill-conceived and smacks of a condescending disdain and disregard for those of us who live here. Our homes, our property, and our neighborhoods are not disposable despite your efforts to deem them so. The rezoning application asks, "do you have any evidence that a reasonable return on investment cannot be received by developing the property with one of the uses permitted under the current zoning?" to which the developer replied, "Given the construction of the Latson Road interchange, it is not reasonable to assume the area would be developed in its current designation of CE (Country Estates)." This is as insulting as it is conceited. He provides no evidence as required by the application and offers up only his divine proclamation that it is not reasonable to assume anybody would want to actually live there. I want to live there. So do the Pardiacs, and the Hoskins, and the Godwins and lots and lots of other people who moved to this specific area because we like living near the interchange in a rural, low density country estates setting. You have two people here this evening that just bought homes on Latson. So, I would submit as evidence to you this evening that a more than reasonable return on investment can be received by developing the property exactly as permitted under the current zoning, and that the applicant has not met, and cannot meet the threshold for rezoning because of it.

Ms. Sharon Staton of 1123 Allie Lane stated this development will decrease home values in Livingston County, will cause more traffic, higher taxes for infrastructure, hotels and gas stations, and will drastically change the character of the rural community.

Ms. Annette Fish of 308 W. Caledonia Street stated she moved here so she could live a quiet life. People moved here for the lifestyle.

Ms. Denise Pollicella of 4200 Sweet Road stated that she has never had a municipality prohibit delegation of time to others. She continued to read the statement, “That is not the end of the developer's proclamations. He also is kind enough to inform all of us that that there is a demand in Genoa Township for the types of uses proposed at this site. Again, he provides no evidence or support for his statement, and does not even bother to respond to the second part of the question that asks if there is anywhere else in the Township better suited to his project. So, I suppose we are all just supposed to take it as gospel that we are desperately in need of another drive through fast-food restaurant , another gas station, another low-end chain hotel and a 200,000 square foot industrial distribution warehouse that operates 24 hours a day.

But what bothers me even more than the developer's arrogant assumption that he does not have to actually take the questions on the rezoning application seriously - questions that are meant to provide a minimum basic threshold for rezoning that he has not even bothered to try to meet because you have given him no reason to think he has to it is the Township's inexplicable continued defense of this developer while at the same time treating anyone who dares question this project with a contempt and dismissiveness that is incredibly offensive. When you ask anyone at the Township about this project you get the same response: it's already a done deal, and we've been working on it for a long time. Let me be clear: nobody here cares how long you have been working on this, because it doesn't matter. The date that you or the developer started thinking about this project is irrelevant if the public had no knowledge of it, and the fact that you keep repeating how long you've been working on it is not an answer. The fact is that the very first meeting at which the public had any opportunity to know this proposed project even existed was on December 10, 2019, at a joint work session. Not July 2019 when the application was filed, and certainly not 2012. Stop telling people that this started in 2012 like that somehow justifies how horrible it is.

Ms. Michelle Herbert of 4587 New Haven continued reading the statement, “You held two total public hearings on this development, both virtual, one in June 2020 and one in August 2020, both during the pandemic lockdown when people were home terrified. Regardless of whether it was technically legal, it was immoral, it was thoughtless and, as I think you can see by the amount of anger and opposition it has engendered, it was wrong. Fortunately, you get a do-over. It is expired, and you now have the opportunity to require the developer to refile his application so that we can all discuss his proposed development for the Northern parcels in an in-person, open public forum as a community. Again, without waiving our objections, as it relates to the substantive proposals in the application , we would love to comment on the exhibits to the amended PUD agreement but there are none, so we will address the parts that were provided to the public with the expectation that there will be at least one additional public hearing after the public has had the opportunity to review the exhibits. Generally speaking, and after a careful review of the meeting packet provided, the amended PUD agreement contains Amazon warehouse-sized loopholes including, among other things, petition for buildings larger than 200,000 sf, for buildings exceeding 4 stories in height, for challenging his pro rata share of the costs of future improvements required by his development, including widening Latson Road to 5 lanes, infrastructure and the installation of a traffic light. These loopholes allow the developer to continue to escape the restrictions in the Zoning Ordinance and should be definitively closed. Specifically, and in no particular order:

- We request requiring a 100' mature green zone barrier between this development and any abutting residential property to protect their privacy, their property rights, their property values, and to reduce or mitigate the noise, odor and light pollution anticipated by this development.

Mr. Wayne Jewel of 10491 Sourwoods Court stated he is a construction code consultant and has worked with Joe Seward. He lives in Brighton Township. This development will impact his home. He has been through the PUD and there are conflictions on what are prohibited uses, allowable uses, etc. Almost half of the permitted uses will require fire suppression and there will be high rise structures. He asked if the utilities and the fire authority were equipped to handle this.

Ms. Jayne Locke of 3401 Pineview Trail reviewed the timeline for allowing electronic meetings during the COVID pandemic in 2020. The governor allowed electronic meetings; however, on October 22, the Supreme Court ruled that all the governor's actions were outside their authority and unconstitutional. Those meetings were illegal and all approvals that came out of them are illegal.

Ms. Melanie Johnson of 3990 Chilson stated the additional PUD should at a minimum be denied. She has issues with the traffic, noise ordinance violations, a boulevard, and traffic lights. She would like the township to control urban sprawl.

Ms. Deborah McCormick said the township does not comply with its own rules, has meetings during COVID when no one can attend, and ignores the residents. The Board is here to protect the residents.

Mr. Brian Jones of 2695 Chilson Road has lived in Genoa Township for 30 years. He is very concerned about the ambiguity of how this is being presented to the residents. He is concerned with safety, traffic, and noise. The Board and the developer owe transparency. There should be a real plan with real data. He is opposed to what is being proposed.

Mr. Franklin Godwin of 2482 S. Latson Road has lived in Livingston County for 50 years and he has never seen a development pushed through like this. He feels like it is a done deal and he did not know a development of this size was going on. Ms. Pollicella has a lot of information and it shouldn't be presented in pieces tonight.

Mr. Jim Post of 4923 New Haven said he has never been to a meeting where his time cannot be deferred. That was his plan this evening.

Ms. Mary Post of 4923 New Haven stated they retired and moved here to be close to their grandchildren. She is concerned that the meetings on this were held during the COVID lockdown. She is in favor of growth and development in the right locations and time. Latson is already heavily traveled and this development will allow for 24 hour truck traffic near a school. She asked the board to follow the zoning ordinance and listen to the community and constituents and not the developer.

Ms. Tracey Pardiac of 4312 Rurik has lived here for more than 45 years. The commission is working for a developer and against its residents. This PUD is expired and this board and Mr. Wyett are trying to get around this by combining the north and south parcels. There are 40 vacant buildings on Grand River. People will flee this area.

Ms. Debra Towles of 3210 Pineview Trail stated Genoa Township and PC and Zoning Board have a responsibility to listen to its residents. This is in her backyard. This PUD has expired and they should start the process again and allow the people to be involved. They feel the board is not listening to its constituents. This will increase light and noise pollution. She is concerned about the safety of children at the school, traffic, decrease in property values and preservation of this rural community.

Mr. Jim McArdle of 2581 Fishbeck Road stated he and his wife support all of the reasons for opposition stated this evening. He noted other developments in the area that will add approximately 570 vehicles and the Padre Pio site that will bring 500,000 to 1 million pilgrims to the area.

Mr. Brad Beldin of 4133 Chilson Road moved to Livingston County from Indiana because of the rural area. There are two realtors on the Commission and that could be a conflict of interest. He will remember the names at the next election.

Mr. Jerry Rans of 4160 Summerville stated that the traffic at all of the schools in the area is painful.

Mr. Matt Hurley of 4070 Brookstone Court doesn't understand why this is being pushed now. There are only conceptual plans. There should be a plan from the developer. He lives across from Meijer and there is traffic there. He wants to know if MDOT will make changes because of all of this development. If this rezoning is done, then there will be requests to rezone the east side of Latson.

Ms. Colleen Quinn of 4042 Brookstone Court is a precinct delegate. She has lived here for 27 years. She is opposed to this development. It will ruin the rural character. If the board listens to their constituents, they will not allow this. They do not want to live in urban sprawl. This development will significantly impact traffic north of Grand River. She thanked Ms. Pollicella for her investigation. There is near unanimous public opposition to this proposal.

Mr. Anthony Lougoria of 3724 Pinckney Road stated the petitioner has not demonstrated that his proposal meets the ordinance requirements and the expansion of the PUD is against the Master Plan. The rezoning will change the character of the area.

Ms. Bev Hamilton of 3769 Stillmeadow Drive stated she moved here from Canton because it was overdeveloped. She is concerned with her property values and traffic.

People will want to move. The letter from Panhandle Eastern Pipeline stated this development will not work. She would like this addressed. Everyone is against this. Mr. Tim Quinn of 4042 Brookstone Court is a precinct delegate and has lived here for over 27 years. He moved here for the open character of this community. He does not want to live in the middle of urban sprawl. He is concerned with the increase in traffic north of Grand River on Latson Road. The board needs to support the residents and not the developers.

Mr. Andrew Warner of 3453 Lakewood Shores Drive continued reading the statement, "

- We request limiting the hours of operation for the non-residential businesses located anywhere in this development to 6am - 10pm. It is nearly impossible to imagine how the Township spent a decade working on this and did not think to restrict the hours of operation for an industrial park you were dropping into the middle of a residential area. This industrial park requires restricted hours of operation, and you owe that much to the adjacent and surrounding property owners. We requested that the developer do this, but he refused because his clients need 24-hour trucking. I also find it impossible to believe that trucks coming and going 24-hours a day is what you intended to approve, especially because it is in direct contravention of the language and clear intent of the CAPUD Ordinance.

- The single-family residential proposed for the lower half of the Southern parcels are medium density and quite small and are not the two-acre lots that were, as I understand it, supposed to be here. There are also many fewer of them, and the transition area that was, according to the developer, supposed to be located North of the Marion-Genoa drain is now South of it, which significantly reduces the residential and increases the industrial. We do not agree and would want single family 2-acre homes throughout the parcel with the high-density housing further North. We also want 100-foot mature green buffer on Crooked Lake so that the development has a higher end look and feel.

- We want an environmental impact study done specific to endangered species. None has been done. The developer's report assumes because this is farmland that there are no critical habitats on the property that would fall under state or federal protection. Yet, over 80 species, including several species of bees, bats, salamanders and butterflies common in this area, were added to the Endangered Species Act in May of this year."

Mr. Ben Tasich of 3492 Lakewood Shores Drive stated the board serves us because they want the best for the community. His heart goes out of the board because of what they have to do. He moved here 25 years ago from the city. There was so little information to the public. There are huge changes being made to the lifestyle of people who live here for a commercial and industrial development when other properties remain vacant. This development will ruin people's lives. He believes in business and progress but don't do it by destroying the environment.

Ms. Stacy Wooster of 2209 S. Latson stated when she first moved here it was a dirt road. She attended many meetings and spoke to Ms. VanMarter. She was aware of the Latson Road Interchange and the Master Plan. She is in favor of the growth opportunities for Genoa Township.

Mr. Alfred Wilder of 3109 Pineview owns two homes very close to this development. He moved here 30 years ago to live in the country. There was a Zoom meeting in 2020 with no one else but the board and the developer. He will not vote for any of the board members.

Ms. Debbie Beattie of 3109 Pineview Trail has lived here for 33 years. What is being planned is death and destruction to this whole area.

Ms. Gina Gangnier of 4354 Highcrest Drive has lived here for 38 years and raised four children. It is unbelievable this passed without anyone knowing. The developer took advantage of COVID. This will increase the population, destroy the wildlife, and affect the air quality.

Chairman Grajek requested a 10 minute break at 8:42 pm.

Mr. Mark Behrendt of 4180 Timberview Drive moved here in 1987 and commuted to Southfield and Detroit. He spent 2-3 hours a day in the car, but it was worth it because he wanted his family to live in a rural community. The anger with the developer is misplaced. The residents should work with the township.

Ms. Susan Nickels of 4935 Fairways Drive stated there are over 300 signatures on an informal petition. She supports the community and continued to read the statement,

"• We would like an amendment added to the PUD Agreement and executed by every Planning Commissioner, Township employee and Township Trustee that neither they, nor any of their immediate family members, businesses or business partners have any direct or indirect ownership or options for ownership in any of the companies that own any of the real estate proposed to be developed here, or any real estate that may be added in the future, and that none of the them will or can derive any personal financial benefit from any part of this development. This is a transparency issue, plain and simple. Ownership of companies is not publicly available in Michigan. In other words, we have no idea, and neither do you, who owns any of these companies and who has options in or contracts with any of these companies."

Mr. Carl Hauss of 16880 Hauss has owned property in Genoa Township for 30 years and has seen change. The township has a lot to be proud of and a lot of work has been done on this with the township and Mr. Wyett. This is an opportunity to move forward

and this is a benefit to the county and State of Michigan. It will bring high end jobs to the township.

Mr. Leo Nicholas of 2290 S. Latson Road stated that it is embarrassing the way the public is acting this evening. People should not be booed or cut off. He is thankful that the board is putting up with this behavior this evening. He has lived here 48 years.

Ms. Suzanne Cunningham of 3413 Dewdrop Lane stated she and her husband moved from Livonia. They moved here to be near her grandchildren and she feels like she lives up north. Eighty-five percent of the buildings on Grand River are empty.

Mr. Kenneth Pardiac continued to read the statement,

"• We also want any use that is not listed in the Principal Permitted Uses in the Genoa Township CAPUD Zoning Ordinance removed from the list of permitted uses for this project. This includes, but is not limited to outdoor storage, warehousing , distribution facilities, all light industrial that is not a related or complimentary use to a Principal Permitted Use, and buildings over 40,000 square feet or 3 stories in height. This developer, like any other applicant in Genoa Township proposing a use that is not permitted in a particular Zone, should have to go through the same process that everybody else does for a variance. We have no objections to deviations as this is within your authority under the ordinance, but deviations and variances are two very different things. We have significant concerns about not only this developer, but about the potential from state or multi-national level players coming into this space due to the flexibility and autonomy afforded to this developer. As an example, look at what is happening in Big Rapids with Gotion and its EV battery plant, which bought the land in Green Township after the state approved millions in incentives for its strategic outreach fund. My point here is not to use scare tactics. It is to point out the fact that there is a massive amount of flexibility and autonomy in this project that could have incredibly destructive unforeseen consequences, and that we must put some guardrails around this project now to prevent them. We have very, very serious concerns that this Planning Commission and the developer have different ideas about what you are approving , and that the language and uses you are approving are vague enough to allow him to bring uses in here that were never intended.
- Finally, we have a major concern about the future potential use of this site. follow pending legislation and HB 4905 and 4906 just made it to the House Floor in Michigan. These bills would give tens of millions of dollars in incentives to attract hyperscale data centers in Michigan, as they recently did in Ohio."

Ms. Edna Biegas of 1950 Genoa Circle continued reading the statement, "For those of you who do not know what a hyperscale data center is, it is a massive high-security data center housing at least 5,000 servers and requires an enormous amount of power, natural resources and water to run and cool the servers. They require significant additional power sources that either do or could exist on this site. I also know that this Latson project is known as one of 4 or 5 industrial "mega sites" in Michigan that would

be at the top of any list for locating a hyperscale data center. In addition to the fact that this is not a use that is listed in the principal permitted uses for the CAPUD zone, there is no way that this use, which is fairly new, could have been contemplated or addressed when this ordinance was written several years ago. We must be proactive in addressing the potential for this use. For that reason , we request that data centers over 40,000 sf and hyperscale or colocation data centers be included on the list of prohibited uses for this project. The conditions that existed in 2019, or even 2012, that may have warranted consideration of this area for a large industrial development do not exist anymore, and due to the new remote work culture are unlikely to change. There are currently 41 vacant commercial or industrial properties for sale or lease on Grand River in Genoa Township alone. This does not include property along Latson North of 96 that is available for development."

Mr. Eugene Ivanov of 2620 S. Latson is a new resident to Michigan from California. He bought his property for its beauty and how peaceful and quiet it is. The development will affect both his front and back yard. The residents will vote the Trustees out and they will remove the Planning Commission members. He stated that Mr. Wyett is selling his property and moving to Florida.

Ms. Karen Wilbanks of 2914 Russell Drive moved to Genoa Township three years ago, which was known for rolling hills, parks and wildlife. She is concerned about over density, the runoff from industrial pollutants that could affect the well at Three Fires Middle School, the rise in child trafficking, the wetlands, environment and wildlife.

Ms. Augie Bonett of 3219 Lakewood Shore Drive moved from Detroit to Warren and then Pinckney and then to Genoa Township. This project will take away greatness from all of the residents. It makes her sad.

Ms. Andrea Sydor of 5320 Richardson Road stated she rezoned her two 10-acres parcels into a 20 acre parcel, which is the opposite of what is being requested this evening. She has lived here for a short time and plans to live here for a long time. She wants to keep the rural, country estates zoning.

Ms. Maureen Jones of 2695 Chilson Road stated her and her husband and grown children live in Genoa Township. She continued reading the statement, "In other words, there is no rationale for locating this development here, and the fact that Mr. Wyett owns the property is not sufficient justification. The prevailing law in Michigan does not, in fact, grant a property owner any vested right in his property until he has made substantial improvements to it, and this has not been done here. It would make significantly more sense to repurpose any one of numerous available properties along Grand River that are, frankly, unsightly and becoming blighted, then to allow industry to invade an already established and settled residential area. I-96 is actually the perfect dividing line between a heavy commercial and industrial area and the entrance to the residential area of Genoa Township. It is a mistake to think that you can hope to

prevent this industrial zone from expanding if you allow it to jump the expressway. There are two additional properties, one on East Latson and a large 85 acre one at the corner of Chilson and Crooked Lake that are currently being advertised on the Detroit Regional Partnership list of Verified Industrial Properties for sale in the Detroit area. The vast majority of homeowners in this area have no intention of selling their properties, but there is a provision in the proposed PUD Agreement that allows the developer, as we understand it, to automatically include nearby properties in the PUD without further review. We also know of property owners on Crooked Lake and Latson attempting to sell their properties to this or other developers. It is called Urban Sprawl for a reason, and despite your best intentions and best efforts, if you allow industrial uses South of 1-96, it will not stop, and we will lose our beautiful, rural, commuter township and everything we love about where we live. There is also no established need, demand or rationale for a large industrial warehouse distribution facility here. According to the US Census Bureau, the median household income in Genoa Township is $84,616.00, and the median home value in Genoa Township is $302,400. Those numbers are well above the US average of $70,163 and $284,000, respectively. By comparison, the average Amazon warehouse fulfillment center pay nationwide is $18.00 and has been established not to fluctuate by more than $3.50.

Mr. Clinton Rux of 4754 Stillmeadow Drive stated it is difficult to drive past Three Fires Middle School in the morning. He continued reading the statement, “Using the highest possible wage rate, the employees at a warehouse distribution facility are likely to make under $45,000 a year. Using the highest possible wage rate, the employees at a warehouse distribution facility are likely to make under $45,000 a year. In other words, the economics of an industrial warehouse facility do not make sense for Genoa Township. There have been no studies that we can find that show how this development will benefit the residents of the Township. In fact, there is every reason to believe that if a large company locates here, DTE will offer it reduced utility rates which are much lower than the utilities rates that Genoa Township residents pay, and those additional costs will again be passed on to Genoa Township and Livingston County residents as variable utility rate costs. In other words, we have every reason to believe that a large industrial development, as opposed to a smaller tech park, will be a financial burden on Genoa Township residents in every way. Please ask yourselves who this development benefits other than the developer. And if it only benefits the developer, then why on earth would we allow it? Please stop swallowing whole statements like "economic development" and "growth" like they are intrinsically good without any downside, and take a hard look at whether a large industrial development will actually improve the lives of the residents of Genoa Township. We argue strenuously that it will not. Please do not be under the illusion that you have any control going forward if you allow the expansive permitted uses listed here. These permitted uses authorize an industrial warehouse distribution site on a CSX rail stop and, yes, an opioid treatment center, and the only thing you will have a say in going forward is the paint color. The amount of development and the extreme population growth in Genoa Township and surrounding townships have exploded in recent years and we are all tired of it.”

Ms. Deanna Spivey of 2970 Beck Road continued reading the statement, “I have with me today over 300 signatures from community residents who oppose this development, and that number continues to grow. We are already suffering the adverse effects of it in the heavy traffic and uptick in crime that the vast majority of people move here from other locations in Michigan specifically to avoid. In light of the above, we hope you will agree with us that this application is deficient in a number of areas and does not currently meet the stated requirements of the Zoning Ordinance that would allow you to recommend the approval for a rezoning of the Southern Parcels at this time. In the event, however, that you do choose to take a vote this evening, we request that this Planning Commission clarify for the record what, specifically it is voting on, and specifically what parts of the development are affected or impacted by the vote. It is important for the residents and taxpayers of Genoa Township to understand the specific scope of your vote , and whether your vote on any of the agenda items tonight are intended to impact or govern the Northern Parcels in any way. It is unfortunate that we have to be here tonight when this could have easily been avoided by the Township following its own zoning ordinance. The majority of people in our Coalition, including me, are not opposed to a development here, and if it had been confined to the restrictions and intent of the CAPUD Zoning Ordinance , we would not have needed to form a Coalition of residents to oppose it. The CAPUD ordinance envisions, appropriately, a low-profile, high-end, medical or technology park that does not, and I quote, "generate offensive external impacts and operations that generate high levels of noise, heat or glare, air pollution, odors, wastewater , or truck traffic, [which] are not considered appropriate in this district." And yet the developer is shopping this out as an industrial park which will bring just that, and your original approval permitted him to do so.”

Mr. Jason Hagelthorn of 5036 Oak Bluff Court read the remainder of the statement, “We encourage you to take this opportunity to correct what we hope was an oversight, follow the ordinance and Master Plan, and approve, if you must approve anything, a development that will assimilate into the surrounding residential areas instead of literally steamrolling over them. It is entirely possible for this development to go forward in a way that benefits the developer *and* the community. It is within your authority to require it, if you will. You are our friends and neighbors, and we are yours, and we ask that you remember that tonight, and continue to do so as we go forward. Your job is not just to balance the competing interests of property owners, and it is not just to follow the Master Plan. It is also to act as our collective stewards of this community that we all live in together and call home.”

The call to the public was closed at 9:33 pm.

Mr. Rauch understands the residents and they believe that their daily lives will be changed significantly and he takes this seriously. He knows the developer has spent time and money working on this project. The Township must follow due process and

listen to and understand the subjective and objective information and comply with the laws that govern the Township. The tools the township uses when considering a rezoning request is the Master Plan. When reviewing the Master Plan, he sees significant reasons for denial and would recommend denial of the amendment to the Township Board. The majority of the property in consideration tonight is outlined and dotted in the Master Plan map as future transition area.

He stated that the Master Plan was updated last year and the township went through a multi-year process to update, create and draft the Master Plan, which included public hearings and open houses and took feedback from the community. It was based on the feedback that the Master Plan was created. The details of the transition area specifically says, in the lower right corner of Page 3.7 of the future land use map in the Master Plan, "the interchange transition area - future land use and the utility service will be reconsidered in this area concurrent with a proposal for actual campus uses (See Appendix)". Then looking at Pages 8 and 9 of the Appendix, there are two areas identified for future development of interchange campus area, which are Area A and Area B and those areas are both north of the majority of the property being considered tonight. Based on this, it would not be appropriate to recommend approval of this rezoning request so he will be making a recommendation to deny the request.

Commissioner Rassel asked Mr. Seward to explain why the PUD is not expired and why this was able to be heard this evening.

Mr. Seward stated that the current PUD has not expired and this issue will be litigated in front of Judge Geddis in December. The Michigan Zoning Enabling Act allows the PUD to vary certain terms of the ordinance and regulations. The two year requirement was changed in the agreement. He stated that the applicant has made substantial investment in the property, such as installing infrastructure, and he will present this and other arguments during the hearing in December.

Commissioner Rassel stated that the Township consulted with legal counsel to know that the agreement is not expired. He noted that all but one of the Planning Commission Members are appointed, and not elected.

Moved by Commissioner Rauch, seconded by Commissioner Rassel, to recommend to the Township Board denial of the rezoning application for Parcel ID#'s 4711-17-200-006, 4711-17-200-002, 4711-17-400-015, 4711-17-400-013, and 4711-17-400-014. **The motion carried unanimously (McCreary - yes; Chouinard - yes; Rauch - yes; McBain - yes; Rassel - yes; Grajek - no).**

Moved by Commissioner Rauch, seconded by Commissioner Lowe, to recommend to the Township Board denial of the PUD Agreement Amendment for Parcel ID#'s 4711-17-200-006, 4711-17-200-002, 4711-17-400-015, 4711-17-400-013, and 4711-17-400-

014. **The motion carried unanimously (McCreary - yes; Chouinard - yes; Rauch - yes; McBain - yes; Rassel - yes; Grajek - no).**

Moved by Commissioner Rauch, seconded by Commissioner McCreary, to recommend to the Township Board denial of the Environmental Impact Assessment dated August 15, 2023 for Parcel ID#'s 4711-17-200-006, 4711-17-200-002, 4711-17-400-015, 4711-17-400-013, and 4711-17-400-014. **The motion carried unanimously (McCreary - yes; Chouinard - yes; Rauch - yes; McBain - yes; Rassel - yes; Grajek - no).**

Moved by Commissioner Rauch, seconded by Commissioner Lowe, to recommend to the Township Board denial of the Conceptual PUD dated September 25, 2023 for Parcel ID#'s 4711-17-200-006, 4711-17-200-002, 4711-17-400-015, 4711-17-400-013, and 4711-17-400-014. **The motion carried unanimously (McCreary - yes; Chouinard - yes; Rauch - yes; McBain - yes; Rassel - yes; Grajek - no).**

ADMINISTRATIVE BUSINESS:

Staff Report

Ms. Ruthig stated there will be two items for the November Planning Commission meeting.

Approval of the October 10, 2023 Planning Commission meeting minutes

Needed changes were noted.

Moved by Commissioner McCreary, seconded by Commissioner Rassel, to approve the minutes of the October 10, 2023 Planning Commission Meeting as amended. **The motion carried unanimously.**

Member Discussion

There were no items to discuss this evening.

Adjournment

Moved by Commissioner Rassel, seconded by Commissioner Lowe, to adjourn the meeting at 9:48 pm. **The motion carried unanimously.**

Respectfully Submitted,

Patty Thomas, Recording Secretary